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AUGUSTO DAMIÃO OLIVEIRA DA SILVA

NEUROLAW, TRANSHUMANISM, POSTHUMANISM

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AUGUSTO DAMIÃO OLIVEIRA DA SILVA

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Undergraduate thesis presented as requirement to the title of Bachelor of Law from the University of Brasília - UnB.

Advisor: Prof. Felipe Inácio Zanchet Magalhães

Co-advisor: Prof. Karen Geisel Domingues

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I thank the True Creator of Everything. I thank the support and care of my family in my development, especially my mothers and my fathers: I'm endlessly blessed for this divine maternal and paternal pluralism. This work is specially dedicated to Márcia Maria, Derminda Cândida, Maria Derminda, Maria Cândida, Maria Ferreira, Josefa Nascimento, Manoel Saturnino, Areonilson de Castro, Saturnino Luiz, and Ney Aquino. They architected luminous values in my heart, human and even posthuman values.

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I'm endlessly grateful to this excellent university - UnB, where I'm graduating for the second time. I always say: first I learned the laws of nature (Physics), now I'm knowing the laws of humans (Law School).

I accepted my challenge to make this project in the "universal language". I never took any English course. I come from rural education and life, my knowledge of English is a result of self-learning by watching movies, and through reading. So, I apologize for the many linguistic "sins". Look at the essence, it is immortal and form is only a transitory vehicle for essence.

The knowledge about the brain and mind is revolutionizing the human world, although we are only scratching the structures. Many technological disruptions are coming and posthumanity will emerge. Unfortunately, Brazil is not leading anything in this sense, only indirectly through its genius minds that suffer "exodus" because our country does not invest in science and technology as it should do. Brazil helps these revolutions indirectly by giving its natural resources inside an awful, illegal, unconstitutional, and insanity politic of "deliverism" of its natural resources, delivering strategic assets against its national development, sovereignty, and increasing the misery of our people. So, the illogic is the following: Brazil has genius minds and natural resources to architect the great future, but because of a kleptocratic culture we literally pay to donate our own richness, hence our genius minds are voluntarily expelled to work in other countries with our "resources delivered" to construct the great future of them, paving their posthumanity while many Brazilian people are in the pre-human condition. I recommend two keywords from this work to my dear Brazilian fellows: Wake up and Empathy.

Any sufficiently advanced technology is indistinguishable from magic.
Arthur C. Clarke

Jesus said: “The spirit is willing, but the flesh is weak”.
(Matthew 26:41)

Words may not tell of that transhuman change;
And therefore let the example serve, though weak,
For those whom grace hath better proof in store.
Dante’s Divine Comedy (Paradise, Canto I)

Bill Gates (about Transhumanism): “So is there a God in this religion?”
Ray Kurzweil: “Not yet, but there will be.”

You have evolved from worm to man, but much within you is still worm.
Those who hear not the music think the dancers mad.
Friedrich Nietzsche, Thus Spoke Zarathustra

Law 1: A robot may not injure a human being or, through inaction, allow a human being to come to harm.
Law 2: A robot must obey the orders given it by human beings except where such orders would conflict with the First Law.
Law 3: A robot must protect its own existence as long as such protection does not conflict with the First or Second Laws.
Laws of Robotics, by Isaac Asimov

Only knowledge frees the man.
Prof. Enéas Carneiro

Movie: Artificial Intelligence. Steven Spielberg. 2001.

FEMALE TEAM MEMBER (asking the scientist architect about the creation of a child robot capable to dream and loving).

***But you haven’t answered my question. If a robot could genuinely love a person, what responsibility does that person hold toward that mecha in return? It’s a moral question, isn’t it*?**

PROFESSOR HOBBY
***The oldest one of all. But in the beginning, didn’t God create Adam to love him*?**

The idea that one day consciousness may spread throughout the universe has been considered seriously by physicists.
Michio Kaku. The Future of the Mind

The immortalization of humans and other life-forms is seen as a great moral project and labor of love that will unite us in a common cause and provide a meaningful destiny.
Calvin Mercer *et al*. Religion and Transhumanism - The Unknown Future of Human Enhancement

ABSTRACT

The current work aims to explore the intersections among Law, Technologies, Neuroscience, Transhumanism, and Posthumanism, focusing on Neurotechnologies and Robotics. To accomplish this purpose, many scientific approaches will be addressed such as Law, Neuroscience, Sociology, Psychology, Ethics, Biolaw, and Philosophy.

How is the state of the art of neurotechnologies and how they will transform humans? What is our future with hyper-advanced technologies? What do neuroscience, physics, and mathematics have to tell us about our nature, brain, mind, and human behavior?

Humans are mastering super-advanced technologies accomplishing eschatological aspirations of traditional religions. Through these fulfillments and evolution, new species will be born or fabricated, such as cyborgs, robots, and posthumans breaking with the human condition. Many dystopian and disruptive scenarios will emerge from the trans- and posthumanist worlds. Certain systems of control will be created and can be lethal for us. The law must be extremely proactive against transgression of rights.

Current technologies such as the internet and social networks can be used against our freedom and privacy. Imagine when neurotechnologies will have wide use in society, technologies with direct brain-to-brain connections, direct brain-internet connections. The internet will be replaced by the brainet provoking profound paradigm shifts. Beyond human rights issues, neurotechnologies and nanotechnologies will transform us and the world. Day to day we are more Homo Digitalis, more something among humans, machines, and gods: transhumans and posthumans.

Transhumanism is growing a lot. It is the human transformation from technologies, changing our brain, body, and mind. Transhumanism will place humanity into the posthumanity, finishing with the human condition. Amid this journey, we will master dangerous religious doctrines, such as the power of Creation and Perfection. Relations between civilizations of Robots and (Post)Humans will be commonplace, but those relations are a complete mystery, although some possibilities are been unveiled.

The idea of this work is as follows: Chapter 1 is an introduction of Neurolaw and Transhumanism making general considerations of the brain; Chapter 2 is an exploration of the brain, consciousness, human behaviors, learning process, and neuropsychological features approaching issues like human values - empathy, selfishness, etc; Chapter 3 is a consideration about many kinds of neurotechnologies and their legal issues and implications on human beings; Chapter 4 is an approach of philosophical, legal, and moral questions concerning to the knowledge, the transhumanism and posthumanism worlds, with eschatological visions through the technological perspective, such as robotics, deification, and the scientific-religious perspectives of nature of God; Chapter 5 addresses the doctrine of immortality through the mind-uploading's viewpoint.

Keywords: Neurolaw, Transhumanism, Posthumanism, Neurotechnologies, Consciousness, Brainets, Brain-Machine Interfaces, Artificial Intelligence, Robotics, Systems of Control, Metaphysics, Mythology, Philosophy, Nanotechnology, Biolaw, Human Rights, Dystopia, Disruptions, Deification, Posthumanity, Mind-uploading, Theology, Eschatology, Religion, God.

RESUMO

O presente trabalho visa explorar as intersecções entre Direito, Tecnologias, Neurociência, Transhumanismo e Pós-Humanismo, com foco em Neurotecnologias e Robótica. Para atingir esse objetivo, muitas abordagens científicas serão abordadas, como Direito, Neurociência, Sociologia, Psicologia, Ética, Biodireito e Filosofia.

Como está o estado da arte das neurotecnologias e como elas transformarão os humanos? Qual é o nosso futuro com tecnologias hiper-avançadas? O que a neurociência, a física e a matemática têm a nos dizer sobre nossa natureza, cérebro, mente e comportamento humano?

Os humanos estão dominando tecnologias super-avançadas que realizam as aspirações escatológicas das religiões tradicionais. Por meio dessas realizações e evolução, novas espécies nascerão ou serão fabricadas, como ciborgues, robôs e pós-humanos, rompendo com a condição humana. Muitos cenários distópicos e disruptivos emergirão dos mundos trans- e pós-humanistas. Certos sistemas de controle serão criados e podem ser letais para nós. O Direito deve ser extremamente proativo contra a transgressão de direitos.

As tecnologias atuais, como a internet e redes sociais, podem ser usadas contra a nossa liberdade e privacidade. Imagine quando as neurotecnologias terão amplo uso na sociedade, tecnologias com conexões diretas cérebro-cérebro, conexões diretas cérebro-internet. A internet será substituída pela brainet, provocando profundas mudanças de paradigma. Além das questões de direitos humanos, as neurotecnologias e nanotecnologias transformarão a nós e ao mundo. Dia-a-dia somos mais Homo Digitalis, mais algo entre humanos, máquinas e deuses: transhumanos e pós-humanos.

O transhumanismo está crescendo muito. É a transformação humana a partir de tecnologias, mudando nosso cérebro, corpo e mente. O transhumanismo colocará a humanidade na pós-humanidade, acabando com a condição humana. Em meio a essa jornada, dominaremos doutrinas religiosas perigosas, como o poder da Criação e da Perfeição. Relações entre civilizações de Robôs e (Pós)Humanos serão comuns, mas essas relações são um mistério completo, embora algumas possibilidades estejam sendo reveladas.

A ideia deste trabalho é a seguinte: o Capítulo 1 é uma introdução ao Neurodireito e ao Transhumanismo fazendo considerações gerais sobre o cérebro; O Capítulo 2 é uma exploração do cérebro, consciência, comportamento humano, processo de aprendizagem e características neuropsicológicas abordando questões como valores humanos - empatia, egoísmo, etc; O Capítulo 3 é uma consideração sobre muitos tipos de neurotecnologias e suas questões legais e implicações sobre os seres humanos; O Capítulo 4 é uma abordagem de questões filosóficas, jurídicas e morais concernentes aos mundos do conhecimento, do transhumanismo e pós-humanismo, com visões escatológicas através da perspectiva tecnológica, como robótica, deificação, e as perspectivas científico-religiosas da natureza de Deus; O Capítulo 5 aborda a doutrina da imortalidade por meio do ponto de vista do mind-uploading.

Palavras-chave: Neurodireito, Transhumanismo, Pós-humanismo, Neurotecnologias, Consciência, Brainets, Interfaces Cérebro-Máquina, Inteligência Artificial, Robótica, Sistemas de Controle, Metafísica, Mitologia, Filosofia, Nanotecnologia, Biodireito, Direitos Humanos, Distopia, Disrupções, Deificação, Pós-humanidade, Mind-uploading, Teologia, Escatologia, Religião, Deus.

ABBREVIATIONS AND ACRONYMS

NSA - National Security Agency

AI - Artificial Intelligence

NSID - National Security, Intelligence and Defense

UNCTAD - United Nations Conference on Trade and Development

UN - United Nations

GDPR - General Data Protection Regulation

BTBI - Brain-to-brain interface

BMI - Brain-machine interface

BCI - Brain-computer interface

DARPA - Defense Advanced Research Projects Agency

MNS - Mirror Neurons System

DBS - Deep brain stimulation

GAs - Genetic algorithms

FMRI - Functional magnetic resonance imaging

ML - Machine learning

BRAIN - Brain Research through Advancing Innovative Neurotechnologies

Mindnet - “Internet from coupled minds”

Brainet - “Internet from coupled brains”

UDDA - Uniform Determination of Death Act

MCS - Minimally conscious state

LIS - Locked-in-syndrome

DE - Dream Engineering

VR - Virtual Reality

HCI - Human-Computer Interaction

DRM - Dream-reading machines

UDHR - Universal Declaration of Human Rights

OECD - Organisation for Economic Co-operation and Development

WAN - Worldwide Agency of Neurotechnologies

ILO - International Labour Organization

AWS - Autonomous weapons system

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1.1 GENERAL OVERVIEW

Bill Gates (about Transhumanism): "So is there a God in this religion?"

Ray Kurzweil: "Not yet, but there will be."

This is a transdisciplinary work involving Law, Neuroscience, Sociology, Psychology, Philosophy, Neurotechnologies, Robotics, Science and Religion. It is made within a logical sequence. We begin with brief approaches to Neurolaw, Neuroscience, and Transhumanism. So, we go to Neurobiology to understand some human features: values and behaviors, mainly considering "sins" as selfish and lack of empathy.

After Neurobiology, we will see many Neurotechnologies and their impacts on society and human beings, legal applications, existential dilemmas, crisis, disruptions, paradigm shifts, etc. It will be addressed many kinds of neurotechnologies, from brain-machine-interfaces for communication to technologies for dream engineering.

In the end, after an overview of our Neurobiology and Neurotechnologies with their implications and applications, we will face legal, moral, and philosophical questions related to the radical transhumanist and posthumanist worlds when profound disruptions and paradigm shifts can happen, beyond dystopian and eschatological scenarios. We will explore the creation of advanced machines and our coexistence with them. Beyond the doctrine of creation, we will analyze other religious doctrines to be fulfilled by trans-and posthumanity, such as perfection and immortality.

Transhumanism is a bridge between humanity and posthumanity. This last civilization is a new species totally different from humans. In certain sense occurs a human extinction, not through violent way, but voluntarily with posthumans breaking with the human condition.

So, the temporal logical sequence is: go to the source (brain and mind - we in the "cave", Eden) and advance to the radical transhumanist and posthumanist worlds (we in the "heaven" or "beyond heaven", we back to Eden).

1.2 NEUROLAW AND THE “TRUE CREATOR OF EVERYTHING”: A BRIEF APPROACH

Men ought to know that from nothing else but the brain come joys, delights, laughter and sports, and sorrows, griefs, despondency, and lamentations. And by this, in an especial manner, we acquire wisdom and knowledge, and see and hear and know what are foul and what are fair, what are bad and what are good, what are sweet and what are unsavory . . . . And by the same organ we become mad and delirious, and fears and terrors assail us . . . . All these things we endure from the brain when it is not healthy . . . . In these ways I am of the opinion that the brain exercises the greatest power in the man.

Hippocrates, On the Sacred Disease (Fourth century B.C.)

Neurolaw was born as a branch of bioethical and bio-legal reflection but now it is an autonomous area covering a huge spectrum of knowledge with intersections in many fields from biology to artificial intelligence.

First, we need to answer the question: Why Neurolaw? Neurolaw is important because of the profound and irreversible impacts of neuroscience into law forcing changes in its structures such as responsibility, privacy, equality, human rights, security with relations to neuroenhancement, brain-machine interfaces (BMIs), or even the possibility of digital immortality.

Neurolaw: years ago a matter of science-fiction but today is a crystalline reality, entering in courts, trials, and processes in general modifying and breaking paradigms.

As one example of the impacts of neuroscience and its technologies on the law, we can quote many legislations over the planet regulating data protection as the brazilian law 13.709/2018. This law defines political, religious, sexual, and philosophical information as sensitive data. However, through advanced neurotechnologies capable of extraction of neurological information it will be inevitable the law development to protect “neurodata” preventing hospitals, clinics, and other institutions from sharing or trading this most sensitive data of all because this kind of data encompasses all the others.

The set of laws around the planet concerning data protection has been receiving the name of “General Data Protection Regulation (GDPR)”. Beyond the domestic laws of the countries, there are many rules established in the international ambit like Resolution 68/167 on 18 December 2013 of the United Nations (UN). This resolution provides exclusively about privacy in the digital age reaffirming other legal instruments such as the Universal Declaration of Human Rights, International

Covenant on Civil and Political Rights, and the International Covenant on Economic, Social, and Cultural Rights.

The United Nations Conference on Trade and Development (UNCTAD) shows us that 66% of the countries over the planet have legislation regarding data protection and 10% have draft legislation (UNCTAD, 2020). The neurotechnologies will force the development of laws to regulate data protection of neural information under the penalty of deep transgression of freedom and privacy.

Before the preamble of neurolaw, it is important to perform a brief approach of neuroscience and the brain, because once the brain and mind are being better understood, hence humans and their creations will suffer deep paradigm shifts, thus, all these breakthroughs and discoveries will have profound implications into the classical bases of Law.

Neuroscience has millennial roots, being a field with a wide spectrum of research and techniques applicable to study the most complex physical structure of the multiverse: the brain. Hence, the mind is also the object of neurosciences. In other words, neuroscience has as its object of study the most complex structures in the world: the brain (“hardware”) and the mind (“software”).

The brain can be addressed in several ways. One of them is to conceive it as an organ constituted by a set of neurons interconnected through synapses that with permutations it can reach several connections bigger than the number of elementary particles in the universe. We can study the human brain from a quantum view until the whole human organ, crossing by the molecular, cellular, physiological, and tissue one.

From some computational points of view, the brain can be understood as a computer and would be possible to create artificial brains. Nevertheless, Nicolelis deeply rejects this idea in his book about the human brain “The True Creator of Everything”:

> The notion that complexity like that exhibited by our brains can be re-created simply by wiring up an extraordinarily large number of efficient electronic elements is not only very far removed from reality but, when examined in depth, has no credible chance of succeeding: not now, not ever. (NICOLELIS, 2020, p. 104).

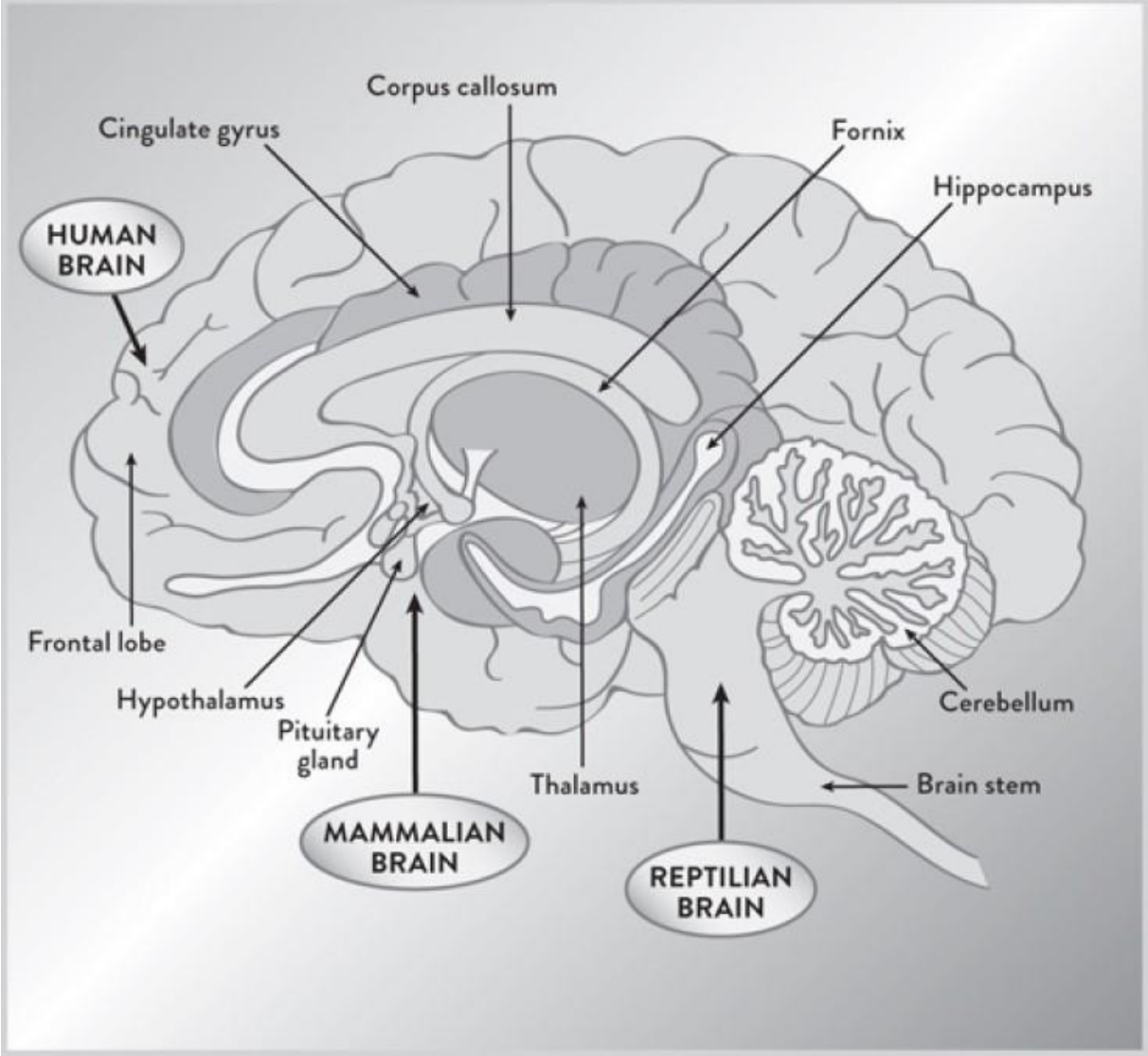
For Nicolelis, the human brain is not a Turing machine, so it cannot be copied or created in digital form. The Turing machine is related to its creator, the mathematician Alan Turing who formulated the mathematical model of computation,

which allows the construction of all types of computers, from the most basic to the most complex supercomputers. The idea is a “machine operates by using an internal table of instructions, programmed by the user, to sequentially read and manipulate a list of symbols contained on a tape fed to the machine” (NICOLELIS, 2020, p. 105).

The human brain has profound plasticity, that is, its power of change, learning, and adaptability. The main criticism against the idea of “computationalism” (machines imitating the human brain) is that such machines will never be capable of this human brain ability like a complex self-adaptive system (neuroplasticity).

So, Nicolelis is a great critic of the idea of the digital brain’s creation (the brain is not a Turing Machine) and the mind-uploading, that is, the possibility to perform a copy of the brain to the computers (the brain would not be computable). Nevertheless, there are other scientists and centers of investments (Silicon Valley inter alia) that believe in the opposite ideas and they are investing studies and money on these ideas. We can quote inter alia: Ray Kurzweil and his idea of Singularity (machines surpassing the human intelligence); the physicist Michio Kaku; the “2045 Initiative”, which is a project of a russian billionaire (Dmitry Itskov) that invests in the mind-uploading searching to reach his immortality. In the specific topics, these discussions will be made better with their moral and legal considerations.

An interesting point of view is to see the brain as a result of three brains - the triune brain. The neuroscientist Paul D. MacLean, in his book “The Triune Brain in Evolution: Role in Paleocerebral Functions”, proposed such classification. It has the following logic: reptilian brain (R-complex or basal ganglia), paleomammalian or emotional brain (limbic system), and the neomammalian brain or rational brain (neocortex). The idea of the triune brain was quite explored by the physicist Carl Sagan in his book “The Dragons of Eden”. The title is a reference to the reptilians that “live” in heaven, that is, the humans, because we reach the “paradise” through the neocortex (the “divine” brain), the structure responsible for the most complex functions. The “divine brain” is the only one that could be capable of realizing physicist Stephen Hawking’s dream: "If we do discover a theory of everything...it would be the ultimate triumph of human reason—for then we would truly know the mind of God." In this sense, through mathematics and physics we can know the laws of nature, hence God's mind and vice versa. This is a great dream for transhumanists.



Source: Kaku (2014). Illustration credit from Jeffrey L. Ward.

In a simplified view, we can see the parts of the brain under discussion from the image above. The reptilian complex encompasses the brain stem (including the pons), cerebellum, and basal ganglia. They are the oldest brain's structures. This part is mainly responsible for the instinctive and basic functions, such as breathing, digestion, and primary behaviors like fighting, hunting, mating. The reptilian brain can be traced back about 500 million years (KAKU, 2014, p. 31).

The limbic complex is located in the center of the brain around reptilian structures. The limbic system is involved in emotional responses. The hippocampus plays a role in filtering memories. The amygdala works with emotions such as fear and empathy (its malfunction is linked to psychopathy). To sum up, the limbic system is

profoundly important in hormonal life. Therefore, it has great importance in human behavior.

The limbic brain is surrounded by the cerebral cortex (“human brain”). In the apex of this architecture, we find the neocortex.

The neocortex is a thin layer (thickness about 3 mm) in frontal, temporal, parietal, and occipital structures. The frontal arrangement plays a role in behavior, language, mathematics, moral and ethical issues, mainly considering the orbitofrontal system in the prefrontal cortex.

Although the neocortex is considered the apex of the brain, a sacred structure because of its elevated functions such as mathematics, legal systems, advanced technologies, and, ultimately, the architecture of civilization, some discoveries have recently been demonstrated that the neocortex has deep and essential roots in the brain structures below it, most notably the limbic brain. Damages in the orbitofrontal cortex (brain region behind our eyes) result in harmness to limbic system connections, provoking problems in decision-making (GREENBLATT; ARNO; SOLOMON, 1950). The decision-making analysis is much important inside the law, mainly considering judicial activity. Neuroscience has myriads of studies concerning the decision-making process, which will bring many discussions into law.

The renowned neuroscientist Antonio Damasio makes an interesting analysis of decision-making in his book “Descartes’ Error - Emotion Reason, and the Human Brain”. He speaks about the famous Phineas Gage’s case. It concerns an accident in which the Gage’s head was drilled by a big iron piece. The frontal lobe was dramatically reached. Gage survived the explosion and the head drilling, however, because of the frontal lobe damage, Gage was no longer Gage. His personality and decision-making power have changed a lot:

> Phineas Gage will be pronounced cured in less than two months. Yet this astonishing outcome pales in comparison with the extraordinary turn that Gage’s personality is about to undergo. Gage’s disposition, his likes and dislikes, his dreams and aspirations are all to change. Gage’s body may be alive and well, but there is a new spirit animating it. (DAMASIO, 1994, p. 27).

The quote above is crystalline regarding the Gage’s personality change. Damages in the neocortex deeply affect human behavior, because indispensable connections between the “rational brain” and “emotional brain” are broken. Thus, the rational brain enters into many failures because the connections with its base (limbic

brain) are harmed. This discovery is quite important for the law because there are many discussions within the law regarding the rationality of the decision-making process and some of them seem to condemn emotions in such a way that it would be possible to separate the reason from the emotion. However, neurologically it is not possible, because the "center" of our rationality is built on the emotional and instinctive brains with indispensable and reciprocal connections that feed each other all the time. Thereby, the idea of law with reason totally segregated from emotion seems a myth. Perhaps this pure rationality can be reached from Artificial Intelligence (AI). However many other problems born with its use within law, like hacking, programs with tendencies, and so on. The use of AI within law has a specific topic in this work.

Now, let's see the triune brain theory. Although surpassed, it is interesting to our understanding like beings with features since basic instincts to the high level technologies and sociability.

The neuroscientist Paul Maclean stated the following in his triune-brain theory:

> (...) man, it appears, has inherited essentially three brains. Frugal Nature in developing her paragon threw nothing away. The oldest of his brains is basically reptilian; the second has been inherited from lower mammals; and the third and newest brain is a late mammalian development which reaches a pinnacle in man and gives him his unique power of symbolic language. (MACLEAN, 1964, p. 96).

The triune-brain theory is being abandoned, because current neurological discoveries are forcing its modification, because that one theory is much simple to explain so complex structure and functions at the evolutionary scale. This theory presupposes a kind of linear evolution among the organisms, from the "simple" to the "most complex". It is interesting to quote the neuroscientist Antonio Damasio's lesson in his book "The strange order of things":

> Other popular designations for this collection of structures include the "limbic brain" and the "reptilian brain." One understands how these terms made their way into the literature, **but their use is not very helpful today. In humans, for example, all of these "older" structures include "modern" sectors, a bit like old houses with renovated fancy kitchens and bathrooms. Nor is the operation of these brain sectors independent but rather interactive**. (DAMASIO, 2018, p. 111, **emphasis added**).

It is possible to understand from the citation above that the intrinsic complexity of the nervous system with all structures and multi correlations among them requires a very modern theory, surpassing the triune-brain's theory. As said Damasio, "older"

structures include “modern” sectors. The author points out the brain-stem nuclei (part of the “reptilian brain”) in the role of processing body’s information and with important functions at the creation of emotive responses (DAMASIO, 2018, p. 112).

Independently of what theory is adopted, it is undoubted that the mammalians have deep intersections with the reptilians' brain structures. Therefore, looking at the brain structure/functionality, its base (pons, cerebellum) is correlated to the brain of the reptilians. This part of the brain is responsible for the basic functions of the person, like instinct, breathing and cardiovascular functionalities.

Going up on the brain structure we arrive at the limbic system, the “mammalian one”. This part of the brain is mainly liable for our emotions. Although this structure is attached with “emotional things”, it has very important functions in all aspects of our lives, since hormonal processes to the memory, intelligence, inter alia.

The last step into the nervous system is the neocortex, which is responsible, like the other parts, for a many functions. Although the neocortex is considered the height of evolution, it is important to caveat that the connections among the “three brains” is essential to the adequate function of the whole brain.

The neocortex isn’t exclusive to humans, it is a structure of the mammals. However, in human beings the neocortex reached its pinnacle, because in the other mammals the neocortex occupies about 50% of the brain volume and in the human brain the proportionality is about 80% percent. The architecture and functions of the cerebral neocortex still have great mysteries. Because of that, the neuroanatomist Brodmann said the large number of cortical areas of the neocortex were “organs of the brain” (BRODMANN, 1909), that is, the neocortex would be a structure made of many organs.

The neocortex is involved with the cognitive abilities, that is, in the most complex functions and attributions of the brain and mind, like language, thoughts, math, behavior, laws, legal systems, abstractions and creation of many fictions. This part would be the “divine” one, with it we are capable of developing science, art, technologies, control and forecast the natural events, and create machines to read our own brain and mind. To stress the thinking to the utter level, this brain structure could be responsible for the reach of immortality and creation of digital brains. So, at this point we would be like gods or really to know God's mind, as said physicist Stephen Hawking.

Yuval Noah Harari points out in his book, “Homo Deus - A Brief history of tomorrow”, the attribute that separates us from the other animals is the capacity to make a kind of “flexible cooperation”. This flexible collective cooperation would be responsible for our success on the planet, which allowed us to evolve from an insignificant species to the dominant one in the world. He signalizes that the feature responsible for this flexible cooperation is the capacity to create “fictions”. The structure liable for these creations is the neocortex.

Thus, analyzing the concept of the Yuval into the neurological level, it’s possible to say there is a neural structure liable for that success discussed by him and it is the neocortex. Thereby, it’s unquestionable a substantial difference among humans and other mammals that makes us neurologically special. In order to do a basic comparison we can take the following: “The surface area of the cortex varies tremendously among species; for example, a comparison of mouse, monkey, and human cortex reveals differences in size on the order of 1:100:1000.” (BEAR; CONNORS; PARADISO, 2007, p. 198). That is, only looking at the size, the human neocortex is significantly bigger than the others.

So, there is something neurological special that separates us from the other animals and this thing (human neocortex) would be the true creator of everything, all pains and pleasures of human beings and humankind. We’re scratching the brain structure and one day its greater creature of all will also be better studied: the mind.

Neuroscience is an area almost infinite, comprising inter alia biology, economics, mathematics, physics, medicine, computation, theology, engineering, sociology, anthropology, politics, law.

Neurolaw has intersections between law and neuroscience as the objects of its study. Neuroscience has been intersecting with law a long time ago. We can imagine phrenology as the “neuroscience” of the 18th century. Phrenology was a pseudoscience that indicated mental illness and traits of character from skull conformation. The german doctor Franz Joseph Gall (1758–1828), Johann Kaspar Spurzheim (1776–1832) and George Combe (1788–1858) were exponents of phrenology. We can imagine the applications of that “science” into the law: arrestings, security measures against “mad people” and death penalties.

Phrenology was discredited a long time ago by the scientific community. However, the oscillations in the human world demonstrate us that even in science, certain things come back in another way and shape. Today, neuroscience has

technologies sufficiently advanced that allow brain-scanning, seeing it in movement while the person thinks or even dreams. Some countries are using these neurotechnologies in the judicial process, mainly in criminal judgments. Thus, we need to think: how far are these technologies from science or are they reviving a kind of old phrenology?

Neurolaw has applicability beyond the criminal area. The advancement of neuroscience will deeply change the law in many areas, such as civil liability, criminal law and rights like liberty, equality and privacy. Therefore, it is very important to discuss neuroscientific discoveries, because some of them are already being used in law.

Regarding the civil liability we can imagine neuro-scanners analyzing our brain/mind and measuring the pain of the plaintiff. According to the level of measured pain the magistrate will condemn the defendant.

Rights such as liberty and privacy will be profoundly affected by neurotechnologies. Through some neurotools, like the brainets, other people and the State will know what the person is thinking.

Concerning to the equality, the merging between humans and machines (the transhumanism movement) can increase social inequality, because only rich people will access expensive technologies. Imagine the human brain being coupled with neurotechnologies, artificial intelligence.

The physicist Michio Kaku says in his book, “The Future of the Mind”, about current and future high neurotechnologies that change our lives a lot. He points out the connection of the brain to exoskeletons (KAKU, 2014, p. 19), allowing paraplegic people to control them through the mind. It is just like the first ball’s kick in the 2014 World Cup, when a paralyzed man wearing a robotic exoskeleton has made the first kick of the ball. This event was headed by the brazilian neuroscientist Dr. Miguel Nicolelis, a specialist in brain-machine interfaces (BMIs).

Kaku also speaks about future surrogates being controlled through the minds, the possibility to download memories of the brain and the insertion of information into the brain.

All these tools will enhance the brain and mental capacity, as memory, language learning, abstraction power etc. Thereby, discussions about the access to these technologies are essential to achieve some social equality.

1.3 TRANSHUMANISM AND “THE EMPEROR'S NEW MIND”: A BRIEF APPROACH

I believe in transhumanism: once there are enough people who can truly say that, the human species will be on the threshold of a new kind of existence, as different from ours as ours is from that of Peking man. It will at last be consciously fulfilling its real destiny.

Julian Huxley, first Director-General of UNESCO. 1957.

Nature: "The whole of Penrose's book is then devoted to a long journey through the nature of thinking and the physics that we might need to know in order to appreciate the relationship between physical law, the nature of mathematics, and the nature of human consciousness. It is, as he says, a journey through much strange territory ... in pursuing his quest, Penrose takes us on perhaps the most engaging and creative tour of modern physics that has ever been written."

Roger Penrose. The Emperor's New Mind

Transhumanism can be expressed as a political, cultural, scientific and philosophical movement that studies and/or advocates for human improvement through the coupling between humans and the uncountable technologies around us. Transhumanism is this scientific and technological movement that changes our lives superficially or deeply in many areas, such as medicine, aesthetic, transportation and computation.

Transhumanism can be viewed in many ways since the basic development of treatments for aesthetics, cell phones, notebooks until the creation of ships for space-time traveling, pills to enhance memory, machinery for mind-reading, artificial intelligence and technologies related to immortality, like cryogenic and mind-uploading programs. Thus, each of us is transhumanistic in some sense and degree.

Transhumanism is a very old idea. At the work “Transhumanism Handbook” Newton Lee says that “The word “transhumanism” first appeared in the fourteenth century in Dante’s Divine Comedy (Paradise, Canto I) to describe the change of the human body to immortal flesh in eschatology” (LEE, 2019, p. 4). But the idea of transhumanism has appeared earlier. The Epic Gilgamesh is an ancient poem from Mesopotomia written about 2100 BC. Roberto Manzocco, in the book “Transhumanism - Engineering the Human Condition”, speaks about the human-divine king Gilgamesh that when found out his own mortality makes a profound journey to reach immortality (MANZOCCO, 2019, p. 7).

Roberto Manzocco says the dream of defeating death is a quintessential part of our cultural DNA.

The story concerning Gilgamesh has millennial years. Farther away than it, we can also remember the egyptian people. The pharaoh was mummified in the hope of eternal life beyond this one. All these actions can be interpreted as transhuman nature. Transhumanism is a common characteristic among the many cultures and peoples of the world. Indeed, perhaps this human feature is present in all peoples of the planet. Manzocco speaks about the forerunners of the transhumanist movement, showing us its wideness in the planet:

> Among the forerunners of the Transhumanist movement, we can mention people as diverse as the European alchemists of the Middle Ages, with their obsessive research into the Philosopher's Stone and the related Elixir of Life, able to grant, or so they say, eternal youth; the Chinese Taoists, with all of their meditative, medical and gymnastic practices; or even the Ancient Egyptians, promoters of the mummification of the Pharaoh's body, a kind of precursor to contemporary cryonics. (MANZOCCO, 2019, p. 2).

Manozocco addresses the practice of the pharaohs' mummification as a seed of the current cryonics. The idea of both practices is the same: to reach eternal life, on the earth (cryonics) or in another world (heaven/paradise).

One of the most complex, questionable, and controversial dreams of the transhumanists is eternal life, raising deep bioethical questions. Furthermore, it is indispensable to cite the physicists' dream of "to read the God's mind", that is, through the entity "Mathematics/Physics" to know and master the laws of multiverse.

The pharaohs were mummified in the name of the transhuman idea of immortality. Nowadays we have scientists discussing that transhuman dream. One of the most known is the physicist Michio Kaku.

Kaku in his book, "The Future of the Mind", makes some discussions regarding to the immortality, such as the following:

> Once the neural pathways of the brain are finally decoded, one can envision understanding the precise origins of mental illness, perhaps leading to a cure for this ancient affliction. This decoding also makes it possible to create a copy of the brain, which raises philosophical and ethical questions. Who are we, if our consciousness can be uploaded into a computer? We can also toy with the concept of immortality. Our bodies may eventually decay and die, but can our consciousness live forever? (KAKU, 2014, p. 20).

At this part Kaku speaks about the two greatest multibillion-dollar projects on the brain's studies of the planet: the northamerican "The Brain Initiative" and the european one "Human Brain Project". These two projects aim to reach a profound understanding of the brain and to develop neurotechnologies. These studies remember the "Human Genome Project". The idea is to decodify the neural circuits. Thereby, Kaku speaks about the possibility to make copies of the mind and so on to upload it into a computer or internet, reaching a kind of digital immortality. Thus, great philosophical, legal and ethical questions arise.

The physicist Michio Kaku finalizes this topic making scientific predictions concerning the greatest transcendence of all, which is the possibility of the consciousness freeing itself from matter through the mind-uploading to the electromagnetic waves. Therefore, "we" would be able to explore the multiverse literally as light rays. So, that millenary dream of immortality would be reached.

1.3.1 SINGULARITY AND THE RELIGION OF THE TRANSHUMANISTS

One of the most interesting ideas related to transhumanism is the technological singularity. This discussion comes from, at least, about 1950s between the nuclear physicist Stanislaw Ulan (Manhattan Project) and the extraordinary genius mathematician John von Neumann:

> "ever accelerating progress of technology and changes in the mode of human life, which gives the appearance of approaching some essential singularity in the history of the race beyond which human affairs, as we know them, could not continue". (ULAM, 1958, vol. 64).

It is important to remember the Manhattan Project was the effort in World War II to create nuclear weapons and we already know the technological outcomes in that war alerting us of the danger of technologies.

The singularity is a hypothetical point in which high technologies will be irreversible and uncontrollable surpassing human capabilities. The futurist and inventor Ray Kurzweil is one of the greatest spokespersons of the singularity. Follows as it is in his book "Singularity is Near":

> It's a future period during which the pace of technological change will be so rapid, its impact so deep, that human life will be irreversibly transformed.

> Although neither utopian nor dystopian, this epoch will transform the concepts that we rely on to give meaning to our lives, from our business models to the cycle of human life, including death itself. (KURZWEIL, 2005, p. 24).

The idea about transhumanism and singularity is very exciting, putting us into another human condition. However, all these technological advancements stay void whether they don't accomplish the human condition's enhancement in collective and social ways, improving human values as responsibility, empathy/alterity, and philanthropy. If these good human values don't guide and follow the technological developments the danger of human annihilation will be highly probabilistic. For this, we can think about nuclear, biological, and cybernetic weapons or in the future the creation of a highly advanced artificial intelligence that could turn our archenemy. In this landscape, God's human creation would have created his own creatures that will be his own extinction. A very sad movement related to "ignorance", absence of empathy/otherness and liability reflecting the violent and paradoxical nature of the humans in their self-destructive "project".

To summarize, it is interesting to conceive the transhumanism as the religion of some scientists and science as the "religion" of transhumanists (reciprocal relations). The beliefs of this religion have grounds in general sciences, such as physics, computation, neuroscience, mathematics, chemistry, medicine, biology, cosmology, engineering, quantum physics.

Although the wonders from the high technologies and science, it is essential to quote the danger of the raising of a new god and absolute authority in the world, that is, the science. These kinds of authorities die and reborn into new bodies along the human history. We can remember the absolute kings, the Catholic Church, God, the financial market, the law, the constitution. We know these absolute authorities can be used like a way of human domination, because there is a type of conscious or unconscious idea of prohibition of contesting such entities, because of fear, ignorance or passive acceptance of the *status quo*. These authorities ("human fictions") know everything, they've a kind of omniscience. So, we don't need a new type of that absolute authority. It is important to contest its movements, because some of them have really hidden interesting. Therefore, the idea of a science covered by the mantle of neutrality is a deep naivety. Thereby, although the Transhumanist movement is a great idea, it's essential to always look at it with critical eyes, never with blind eyes.

2. THE NEUROETHICS OF THE DRAGONS OF EDEN: THE MAGIC OF MAKING THE INVISIBLE VISIBLE

"Deep inside the skull of every one of us there is something like a brain of a crocodile. Surrounding the R-complex is the limbic system or mammalian brain, which evolved tens of millions of years ago in ancestors who were mammal but not yet primates. It is a major source of our moods and emotions, of our concern and care for the young. And finally, on the outside, living in uneasy truce with the more primitive brains beneath, is the cerebral cortex; civilization is a product of the cerebral cortex."

Carl Sagan. Cosmos

The triune-brain model derives from studies of comparative neuroanatomy and behavior. But honest introspection is not unknown in the human species, and if the triune-brain model is correct, we would expect some hint of it in the history of human self-knowledge. The most widely known hypothesis that is at least reminiscent of the triune brain is Sigmund Freud's division of the human psyche into id, ego and superego.

Carl Sagan. The Dragons of Eden

In this chapter, we will analyze the neurobiology of human values such as selfishness, empathy/alterity, "deadly sins", "heavenly virtues". Before we get deep into the human multiverse of values it is worth making a very brief approach about the entity that allows us "to have or not to have" that human values - the mind.

Addressing the mind is important because there are many advanced models of mind and consciousness, and through some models of the mind there are promises to the possibility for "Creation of Minds".

Roughly speaking we may conceive the mind constituted by two immaterial structures: consciousness and unconsciousness. Our focus here will be consciousness. In the subtopic about "Dream Engineering" is addressed the unconscious and its relations with brain-machine interfaces.

Consciousness, an old, current, and future issue. It surrounds us about 70% of our lives, yet there is no consensus on what it is. Roger Penrose, Stuart Hameroff, and others make many approaches on consciousness nature in the book "Consciousness and the Universe - Quantum Physics, Evolution, Brain & Mind". Here, consciousness is conceived as being a quantum entity. Quantum mechanics is the area of physics analyzing the microscopical world at the level of atoms and subatomic particles. What is the relation between quantum physics and consciousness? Penrose, Hameroff, and others shed some light on this. The understanding of our miracle (brain) is allowing us to unveil the holy grail of neuroscience - the mind.

2.1 TOUCHING THE MIRACLE TO CONQUEST THE PROMISED LAND. UNVEILING THE HOLY GRAIL AND DISCOVERING THE QUANTUM MULTIVERSE

That's one small step for man, one giant leap for mankind.

Neil Armstrong

The total number of minds in the universe is one. In fact, consciousness is a singularity phasing within all beings.

Erwin Schrödinger

God does not play dice with the world.

Albert Einstein

Stop telling God what to do.

Niels Bohr

After millennia of years, at last, humankind is developing advanced technologies to conquer the “promised land”, and finally it can be possible to understand and manipulate the “holy grail”. Understanding the secrets of the “promised land” humankind can create its promised lands with properties manipulated in its own ways. The creation of these holy lands is only (but very important) part of the reason to be of transhumanism: To Be the Tower of Babel.

The physicist Penrose *et al* conceive the nature of consciousness in the following sense:

> The nature of consciousness, its occurrence in the brain, and its ultimate place in the universe are unknown. **We proposed in the mid 1990’s that consciousness depends on biologically ‘orchestrated’ quantum computations in collections of microtubules within brain neurons** (...) **The prevalent scientific view is that consciousness somehow emerges from complex computation among simple neurons which each receive and integrate synaptic inputs to a threshold for bit-like firing**. The brain as a network of 10^{11} ‘integrate-and-fire’ neurons computing by bit-like firing and variable-strength chemical synapses is the **standard model for computer simulations of brain function, e.g. in the field of artificial intelligence (‘AI’)**. (PENROSE *et al*, 2017, p. 9-11, emphasis added).

Here, consciousness is a product of quantum computations in the microtubules of brain neurons. The understanding of “computer simulation of brain functions” is allowing us to architect Artificial Intelligences. The quantum field is turning so

advanced, opening unthinkable possibilities, including the creation of more advanced “artificial lands” (artificial minds). For example, China announced the creation of the quantum supercomputer “Zuchongzhi”. It is seen as the most powerful machine in the area, making highly complex calculations in 70 minutes when classical computers (non-quantum) make it in 8 years (KAUR, 2021). Related to quantum mechanics and AI, our consciousness is seen as a product of the brain-as-computer's model. However, the complexity of the consciousness and brain requires other approaches too (PENROSE et al, 2017) in order to explain differences concerning conscious and unconscious processes.

But the “rabbit hole” of the mind is extremely depth. Soon above we saw the mind as an outcome of brain structures and activities. However, there are uncommon experiences that challenge the model of consciousness as a brain product: 1) out-of-body experiences; 2) linked consciousness in twins (PENROSE et al, 2017). These situations challenge the consciousness as a result of brain activities, so the authors raise the following issue: “For this purpose, we could reactivate (one might say “resuscitate”) the dated and little-used term “soul.”. (PENROSE et al, 2017, p. 254). That is, in light of such hard complexity of mind, scientists are raising concepts once extremely unacceptable in science, such as soul, unconsciousness, etc. Perhaps one day the idea of “spirit” also enters the Transhumanist movement.

Penrose and others point out the idea from Erwin Schrödinger (one of the fathers of quantum physics) about consciousness:

> Experimental results such as those discussed in preceding sections may point to an unknown mechanism of linkage between consciousnesses. **Schrödinger, one of the fathers of quantum mechanics, coined the term “entanglement” (Schrödinger, 1935) and later proposed that the consciousnesses of all individuals are united** (Schrödinger, 1969, 1983). **“Entanglement” is a property of a quantum-mechanical system containing two or more components that have once been in contact. Even though they may later be separated, they remain linked in such a way that the quantum state of any one of them cannot be adequately described without full consideration of the others** (Schrödinger, 1935). (PENROSE et al, 2017, p. 255, emphasis added).

Schrödinger proposed that the “consciousnesses” of all humans are united because those minds would be subject to the quantum property of “entanglement” - a physical state of one structure is linked to another one, even in the separation of them.

Penrose and others show that experiments are appointing to the possibility of “entangled consciousness”, commenting:

> Although physicists originally believed entangled states between distant particles were of no practical consequence, **evidence now suggests that the effects of quantum entanglement may "scale up" into our macroscopic world, such as linking separated human neurons in vitro**. (See, for instance, Pizzi, et al., 2004.) If separated neurons can be entangled in vitro, might whole brains be entangled at a distance? **Several experiments using fMRI and EEG-based protocols suggest that this is the case. In these experiments, the stimulation of one individual's brain appears to be registered simultaneously in a distant individual's brain by fMRI or EEG** (Standish et al., 2003, 2004; Wackerman et al., 2003). (PENROSE *et al*, 2017, p. 255).

Scientists are confirming the existence of quantum entanglement among separated neurons as well as separated brains. Perhaps, one explanation for these findings is the mirror neurons system (MNS). Mirror neurons reflect human behavior "uniting" us inside a group called humankind, creating a sense of belonging and empathy/alterity, shaping civilization (RAMACHANDRAN, 2011). The MNS could be related to the natural brainet. A natural brainet is a distributed organic computer that is formed of multiple individual brains (NICOLELIS, 2020). The multiple brains are connected to each other through neuronal synchronization. In the artificial brainet, the connection is made through a brain-machine interface. As more synchronized neurons are to each other among brains, more flexible and stronger the brainet becomes.

Thus, the idea is the following: according to Schrödinger, consciousness is a singularity, there is only one mind, the consciousnesses of all individuals are united through quantum entanglement. This is the "entangled consciousness".

We can correlate the idea of the brainet with the entangled consciousness. Let's extend the concept and think about an "entangled mind" (mindnet). The mindnet would be the immaterial analogous of the brainet. Mindnet is a distributed "software" constituted by multiple minds coupled by quantum entanglement and mirror neurons synchronization ("metaphysical mirrors" creating the metaphysical entity called "mind").

So, one possible answer correlating brainet and "mindnet" (entangled mind) is the mirror neurons. They fire and synchronize, helping in the creation of the brainet and the mindnet. These issues are important because knowing better the brain and mind will allow us in the transhumanist goal of human brain/mind evolution as well as developing digital brains.

There is another very interesting point of view about consciousness, it is exactly the mathematical models. Apropos, the mathematician and physicist Johannes Kleiner has an article called "Mathematical Models of Consciousness". He is from the

University of Munich, at the Center of Mathematical Philosophy. In the article, Kleiner shows a general mathematical framework for models of consciousness linking aspects of the mind to the physical domain, such as the phenomenon “qualia” - impressions, feelings, etc.

Maybe mathematical and biochemical-physical models of mind jointly with quantum technologies, and other ones, are the “one small step for man, one giant leap for mankind” to humans colonizing the “promised land”.

The physicist Michio Kaku also approach the question of consciousness speaking about its quantum nature and referring to Schrödinger’s Cat paradox:

> In spite of all the miraculous advances in brain scans and high technology, some people claim that we will never understand the secret of consciousness, since consciousness is beyond our puny technology. In fact, in their view consciousness is more fundamental than atoms, molecules, and neurons and determines the nature of reality itself. To them, **consciousness is the fundamental entity out of which the material world is created. And to prove their point, they refer to one of the greatest paradoxes in all of science, which challenges our very definition of reality: the Schrödinger’s Cat paradox**. Even today, there is no universal consensus on the question, with Nobel laureates taking divergent stances. What is at stake is nothing less than the nature of reality and thought. (KAKU, 2014, p. 354, emphasis added).

Kaku says some people claim we will never unveil the secrets of consciousness because in the last state consciousness is the fundamental entity and it is about the nature of the own reality.

Kaku says some scientists claimed Schrödinger’s equation would describe the entire universe and reality. As consciousness would be a quantum entity, so it would be possible to describe consciousness through Schrödinger’s Equation. But such an equation adds probabilities into physics (consequently to the universe) and this raises many problems and discussions as Einstein’s quote: God does not play dice with the world.

The equation describes probabilities of finding quantum entities and in front of simple observation the entity is modified (it is impossible to know precisely the location and speed of quantum entities - Uncertainty Principle). To contribute to scientific discussion, Schrödinger created the “cat box”. His contribution shook the academic world again because the cat’s problem turned into the cat’s paradox. The cat’s problem follow as it is:

> Place a cat in a sealed box, with a container of poison gas. In the box, there is a lump of uranium. The uranium atom is unstable and emits particles that can be detected by a Geiger counter. The counter triggers a hammer, which falls and breaks the glass, releasing the gas, which can kill the cat.

The question is: How do we describe the cat? There are three main solutions (with hundreds of variations). A famous solution presupposes an interesting paradox: “the cat is neither dead nor alive! The cat is in a netherworld, between life and death, the sum of the wave describing a dead cat with the wave of a live cat.”. (KAKU, 2014, p. 356). This is the “subjective idealism”, and it implies objects cannot exist unless someone observes them. Through this viewpoint “Only the mind is real—the material world exists only as ideas in the mind.”. (KAKU, 2014, p. 356-357).

Against the “subjective idealism”, Einstein and others promoted the “objective reality”: “the universe exists in a unique, definite state independent of any human observation.”. (KAKU, 2014, p. 357). The objective reality is adequate to describe the “macro reality” (planets, stars, macroworld), but it fails miserably to describe the “micro reality” (atoms, subatomic particles, microworld, nanotechnology, consciousness).

A second solution to Schrödinger's equation raises an interesting result: Cosmic Consciousness.

About the second solution, Kaku says “In this approach, God or some eternal consciousness watches over all of us, collapsing our wave functions so that we can say we are Alive.”. (KAKU, 2014, p. 359). This brings us Schrödinger's idea of “entangled consciousness”, that is, exists only one mind in the universe as said by Schrödinger: “The total number of minds in the universe is one. In fact, consciousness is a singularity phasing within all beings.”.

The third solution to Schrödinger’s equation is the strangest of all: the existence of multiple universes (Multiverse). All possible universes can exist and people who have died in our universe can be alive in another universe. Kaku explains this solution implies that the universes are constantly splitting apart into a multiverse of universes, parallel universes.

Kaku says the three interpretations of Schrödinger’s equation are equally valid and experimentally confirmed. He finalizes with the following philosophical and visionary approaches:

> **Hundreds of years in the future, physicists and philosophers may still be debating this question, with no resolution, because all three**

> **interpretations yield the same physical results. But perhaps there is one way in which this philosophical debate touches on the brain, and that is the question of free will, which in turn affects the moral foundation of human society**. (KAKU, 2014, p. 362, emphasis added).

Kaku's fundamental questionings in physics raise the touching on the brain and the free will as a forward centenary philosophical issue that will affect the moral foundation of human society.

Legal systems are based on the presumption of free will in which a person can be held responsible when he/she has free will to act. However, many findings shake this “universal believing”, e.g., brain damages and genetic anomalies implying violent behavior. Nevertheless, the issue of free will can go further away achieving other structures, the realm of quantum mechanics:

> Our entire civilization is based on the concept of free will, which impacts on the notions of reward, punishment, and personal responsibility. But does free will really exist? Or is it a clever way of keeping society together although it violates scientific principles? The controversy goes to the very heart of quantum mechanics itself. (KAKU, 2014, p. 362).

Furthermore, Kaku quotes Libet’s experiment which suggests our decisions are taken 300 milliseconds before we become aware of them. So, is the cornerstone of society (free will) just a fake? An illusion created by our own brain? Are we in the Matrix controlled by robots?

All these technical issues are important in order to exemplify the current “State of the Art” about our understanding of quantum reality, hence the possibility to understand the mind and other fundamental realities. Issues like moral and legal responsibility can be affected by the quantum understanding of our nature.

Furthermore, quantum advancements are allowing the development of supercomputers, and perhaps someday quantum artificial intelligence. The consequences are simply impossible to glimpse, maybe a kind of many almighty entities ruling the world.

Surpassing technical issues, it is important to highlight socio-legal consequences to the possibilities of such scientific-technological breakthroughs. An interesting possibility coming around is related to the “NEURALINK”. It is the project of businessman Elon Musk in many neurotechnologies and the development of Artificial Intelligences (AIs). One idea is the merging of the human mind and Artificial Intelligence - an AI-MIND MERGER. This is a big seed to the Transhumanist and

Posthumanist worlds, where humans will be merged with machines, and machines will be merged with humans.

The possibilities from AI-Mind merging are uncountable. We can glimpse some of them, like the development of human superintelligence and medical applications. But, for who? Clearly to people that can pay for it, raising many problems in the ideal of equality. It will be simply impossible to compete with a person with an AI-Brain structure compared with a person only with the brain. Inside labor relations, an AI-Mind human will be extremely more intelligent and faster to solve problems than the natural human. So, certainly, the cyborg (human-machine person) will be hired instead of the natural human. Thus, it is important legal frameworks to protect the labor rights of humans in the face of machine evolution avoiding massive labor firings. This issue is already being addressed in the ambit of the International Labour Organization (ILO) as we can see in the “Negotiating the algorithm”: Automation, artificial intelligence, and labor Protection”, by Valerio De Stefano.

Another issue to be addressed is the high ability of a human AI-Mind to access secret systems or even be hacked and brainwashed. Therefore, security protocols must be dealt with in-depth.

Another profound and disruptive possibility that would come from these scientific-technological discoveries already addressed is the idea of “Creation of Minds”. This conception is approached by the engineer Ray Kurzweil in his book “How to Create a Mind: The Secret of Human Thought Revealed”. Here, he speaks about many projects on this idea of simulating organic brains creating digital brains (or digital minds).

> One approach to building a digital brain is to simulate precisely a biological one. For example, Harvard brain sciences doctoral student David Dalrymple (born in 1991) is planning to simulate the brain of a nematode (a roundworm). (...) **At the opposite end of the spectrum, Henry Markram’s Blue Brain Project is planning to simulate the human brain, including the entire neocortex as well as the old-brain regions such as the hippocampus, amygdala, and cerebellum. His planned simulations will be built at varying degrees of detail, up to a full simulation at the molecular level**. (KURZWEIL, 2012, p. 74, emphasis added).

Kurzweil comments about projects on brain simulations, since simple ones like nematode's brain simulation until simulation of the human brain from the molecular level to the neocortex. About the creation of digital minds, we can have in mind the robot Sophia, created by the company Hanson Robotics.

The idea of the mind's creation is a huge brick in the construction of the “real” Tower of Babel.

2.2 HEAVENLY VIRTUES AND DEADLY SINS. THE NEUROETHICS OF ANGELS AND DEMONS

Pride goes before destruction, a haughty spirit before a fall.

The Bible. Proverbs 16:18

It was pride that changed angels into devils; it is humility that makes men as angels.

Saint Augustine

In the original form, sins are viewed as deviations from human behavior. Catholic Church used them (especially the seven sins) to contain people, violence, etc. Sins were instruments to manage individual and social behavior (ESTÉVEZ, 2020). Neuroscience of human values is colonizing these lands of “sins and virtues”. So, neuroethics is studying: 1) pride/humility, 2) greed/generosity, 3) lust/chastity, 4) anger/patience, 5) gluttony/temperance, 6) envy/charity and 7) laziness/diligence.

The focus here will be on the “sin” of selfishness and its counterpoint “empathy/altruism”. In the next subtopic will be addressed an interesting juridical application regarding neurotechnologies, selfishness, empathy/alterity, and judges.

Firstly, it is important to say that there is no center of sins in the brain, but areas more activated related to them. Thus, it seems very hard to develop treatments to cure certain sins, even through drugs, brain stimulations, and similar. However, the understanding about these issues can shed light in order to deal with the millennial sins, perhaps not to cure them, but mitigate their effects.

Kat McGowan shows us neurological discoveries about sins. He points out "pleasant sins" whose reward circuits are wired to the deep brain and social sins are wired to the neocortex:

> **The most enjoyable sins engage the brain’s reward circuitry, including evolutionarily ancient regions such as the nucleus accumbens and hypothalamus; located deep in the brain, they provide us such fundamental feelings as pain, pleasure, reward, and punishment. More disagreeable forms of sin such as wrath and envy enlist the dorsal anterior cingulate cortex**. This area, buried in the front of the brain, is often called the brain’s conflict detector, coming online when you are confronted with contradictory information or even simply when you feel pain. **The more**

> **social sins (pride, envy, lust, wrath) recruit the medial prefrontal cortex. Found just behind the forehead, this region helps shape the awareness of self**. (MCGOWAN, 2019, p. 2, emphasis added).

The idea of curing sins must be considered carefully. Let's analyze the following question approached by McGowan about the pride, the “queen of all sins”:

> Early theologians saw pride as the fundamental sin—the “queen of them all,” according to Pope Gregory the Great, who codified the list of seven deadly sins in the sixth century. Indeed, psychologists say that arrogance is second nature in Western society. **Most of us perceive ourselves as slightly smarter, funnier, more talented, and better-looking than average. These rose-colored glasses are important to mental health, functioning as a psychological immune system that protects us from despair. “Those who see themselves as they truly are—not so funny, a bad driver, overweight—have a greater chance of being diagnosed with clinical depression,”** says Julian Paul Keenan, director of the cognitive neuroimaging laboratory and professor of psychology at Montclair State University in New Jersey. (MCGOWAN, 2019, p. 5-6, emphasis added).

Summing up the above idea, the sin of pride can play like self-defense, a psychological immunity to deal with the “sad” reality, protecting people from depression. So, the idea of curing such sin can have both positive and negative effects: 1) positive for people around that suffer from the pride-person; 2) negative for the prideful person because of the withdrawal of his/her shield (psychological immunity).

Humility, the counterpoint of pride, seems to be in the same cortical area because experiments have shown brain stimulation affects humility and pride simultaneously (MCGOWAN, 2019). Therefore, brain stimulation on the medial prefrontal cortex seems to paradoxically mitigate pride (causing more self-awareness) and diminish humility. The findings suggest both pride and humility serve the same purpose: to put us ahead in society.

Selfishness isn’t directly considered a sin when we take into account the classical deadly sins. Selfishness can be related to many sins, such as greed, gluttony, lust. However, selfishness is more linked to pride, known as the worst of the worst of sins (the king of them all). Nevertheless, it is important to differentiate two opposite types of pride. Pride can be a “deadly sin” (self-pride) and simultaneously a “heavenly virtue” (altruist pride).

Pride has many consequences beyond selfish and vanity behavior. One of its outcomes can be a very dangerous human deed to the whole humankind. As we will see in the last chapter of this work the movement Transhumanism is viewed as a

religion. If we think about the idea of creation as one pillar of the hegemony religions, Transhumanism is already constructing this pillar. Beyond creation's pillar, Transhumanism can be taken as the own Tower of Babel. In the biblical story, God seeing the success of humans in the tower's construction, avoided such prideful deed creating different languages among the men to confuse them. However, in our post-human world, the consequences of the Technological Tower of Babel will be far beyond, maybe this reality was eschatologically forecasted in the Book of Revelation.

Now, let's analyze some neurobiological grounds of human values to understand us better and perhaps allow humans to deal better with "deadly sins", flourishing their "heavenly virtues".

Antonio Damasio, Jean-Pierre Changeux, and others approach the "Neuroethics of the Dragons of Eden" in their book "Neurobiology of Human Values" appointing to the biological architecture of human values: "We believe that there was a biological blueprint for the intelligent construction of human values". (DAMASIO; CHANGEUX; *et al*, 2005, p. 47). The authors explain the biological blueprint of human values is linked to homeostasis, ultimately to life regulation. Life regulation exists to maintain health, prevention of death, function optimization, etc. Human values would be "entities" that answer the following questions: "How do we humans develop the values that permit us to classify objects as beautiful or ugly and to judge actions as good or evil? What is the basis for the moral judgments we pronounce? Where are good social conduct and ethical principles grounded?" (DAMASIO; CHANGEUX; *et al*, 2005, p. 47).

The answer to such questions is being discovered in neurological ways with grounds in the emotions and feelings.

The authors say what we commonly call good and evil ("heavenly virtues and deadly sins", respectively) is linked to categories of actions related to homeostatic regulation. Good actions are commonly connected to behaviors that lead to health and well-being in individual and social means. On the other hand, evil actions are, overall, related to behaviors linked to disease or death in the individual or social means.

Damasio and others point out that "All emotions can play an important role in social processes, intervening to alert individuals to impeding problems, to correct possible problems, or to reward effective solutions" (DAMASIO; CHANGEUX; *et al*, 2005, p. 49). They continue about the role of emotions and human values:

> **These roles are especially apparent for the social emotions and their ensuing feelings. We are referring here to a large group of emotions, among which the prominent exemplars are compassion or sympathy, an emotion related to a concern for others that commonly results in feelings of empathy**; the emotions of embarrassment, shame, and guilt, all concerned in one way or another with the blaming of the self for some action that violated social norms; the emotions of disgust, indignation, and contempt, all of which concern the blaming of others for a norm violation; and a remarkable and often forgotten group of emotions that include gratitude, awe and admiration, **pride, and elevation, all of which relate to praise for others or for the self as a result of perceiving some highly efficient solution to a particular problem, one that tends to coincide with respect for a highly-prized set of social norms** (see Haidt 2001, 2002 for reviews on the scope of social emotion). (DAMASIO; CHANGEUX; *et al*, 2005, p. 49, emphasis added).

Emotions, feelings, and human values are connected and serve in a set of social norms, as moral rules. Damasio and others say social emotions and feelings have the purpose to assist learning, recall, and reasoning. They approach pride taking it as emotion serves both to praise for others or for ourselves in order to solve problems in an efficient way.

Continuing the analysis of human values, emotions, and feelings, the authors address the importance of the arrival of mirror neurons into our brains because these kinds of neurons play roles in empathy, that is, the power of someone to see the world from another's point of view.

The authors make links with culture, laws, ethical rules, systems of justice, and esthetic canons. They speak about how we have bridged social emotions with human values. According to them one possibility is our feelings on the emotions caused by suffering or witnessing situations. These feelings embodied moral or esthetic intuition, and over time such intuition:

> "(…) would have been culturally fine-tuned: debated by the collective, enhanced or diminished, or even suppressed. The products of this culture fine-tuning would have been transmitted, first orally then by written records. **Eventually they would have been codified in the form of social conventions: ethical rules, laws and systems of justice, and esthetic canons**." (DAMASIO; CHANGEUX; *et al*, 2005, p. 51, emphasis added).

Resuming, the neuroscientists wave to the possibility of neurobiological grounds of human values, consequently to some social conventions like laws and systems of justice. However, the same scientists don't neglect the effects of the environment.

The neurological bases of human values are very interesting and maybe could explain why some societies are more predisposed to much or less corrupt legal orders,

institutions, and legal systems, such as in some countries where systematic corruption is viewed as culturally rooted in society.

> We argue that national culture (a macro-level variable) can mediate discretion and accountability (both micro-level variables) — thereby engendering either arbitrariness or pervasiveness in corruption. **In advancing these propositions, it is acknowledged that national culture is an important macro-variable that influences corruption**. This is important to scholarship in cross-cultural management because cross-national differences are best understood by considering both national differences and social institutions. (PILLAY; DORASAMY, 2010, p. 1, emphasis added).

As pointed above, national culture is viewed as macro-variable influencing corruption. Maybe, the neurological grounds of human values and “deadly sins” can help societies to evolve better law systems regarding systemic corruption.

A great idea about this issue is to develop exams for candidates aspiring to be public authorities. It is a notorious fact that deep corruption negatively affects the entire society (or even societies). Here the aspirations of one person or a little group of people are ahead (and against) of aspirations and necessities of a whole society. It is the exercise of the “deadly sin”, the pride, embodied by selfishness. In the end, this is a lack of empathy because my “self” is much more important than “all of You”, and my “self” doesn't care with "all of You”. My “self” is not capable of feeling the point of view of "all of You”.

So, the proposition is the following: as the exercise of public functions is a very serious issue, the countries must consider neurological exams to approve (or not approve) the candidate. Only people with a high degree of empathy (and other heavenly virtues) and a low degree of some “deadly sins” can occupy the public function. This is very important mainly considering politicians and judges. These neurological exams would be a “neuroethics to analyze if a certain person is more angel or demon, more angel or dragon”.

Although the above idea can be viewed as adequate, it is a very sad fact that many countries wouldn’t adopt such “empathy’s exams” because the dominant corrupt elite automatically would reject the proposition with fear of don’t be approved in the exams, because they would be expelled from power.

2.3 DISSECTING THE ETHICS OF HERMENEUS AT THE FACTORY OF MORAL JUDGMENTS

We can say that the moral intuitions are the judges but those judges are not against having attorneys construct a justification for their pronouncements.

Antonio Damasio *et al*. Neurobiology of Human Values

I will seek someone who understands that justice isn't about some abstract legal theory or footnote in a case book; it is also about how our laws affect the daily realities of people's lives—whether they can make a living and care for their families; whether they feel safe in their homes and welcome in their own nation. I view that quality of empathy, of understanding and identifying with people's hopes and struggles, as an essential ingredient for arriving at just decisions and outcomes.

Barack Obama about appointment to Supreme Court's Judges

Damasio and others analyze our neurological functions related to the production of moral judgments, hence this could be expanded to understand the "Factory of Hermeneus", that is, how the "heads" of the judges work in the production of their decisions. The following excerpt reveals a kind of rationalist approach to moral judgments:

> **One claims that, when we are faced with a situation, we use reasoning to detect a violation or an observance of the established norm, we use further reasoning to weigh and classify the violation or observance, and still more reasoning to pronounce a judgment and a sentence**. This is the tradition identified with Kant, whose roots go back to Plato and whose modern exponent is the philosopher John Rawls. The psychologists Piaget and Kohlberg are also identified with this tradition. (DAMASIO; CHANGEUX; *et al*, 2005, p. 51-52, emphasis added).

Soon ahead, Damasio and others reveal the other tradition about the processes of our moral judgments' factory:

> The other tradition, which is identified with David Hume and Adam Smith, claims that we react to the social situation emotionally and automatically. We instantly produce moral sentiments and intuitions that guide us towards our response to the situation. In this tradition, much of the "moral reasoning" occurs *after* the moral intuitions have given us a first response. This late, after-the-intuition reasoning often takes the form of a rationalization, the post-hoc construction of a case for a certain intuition rather than the deduction that led into it. (DAMASIO; CHANGEUX; *et al*, 2005, p. 53).

This tradition above reveals a moral judgments' factory processing itself on the emotional bases, after that the process "insert reason" over the emotional layers.

Metaphorically, Damasio and others say moral intuitions are judges who make their decisions with attorneys constructing justifications:

> **Using Haidt's account(2002), we can say that the moral intuitions are the judges but those judges are not against having attorneys construct a justification for their pronouncements. Moral reasonings, on the other hand, handle the whole judicial process.** The kinder and gentler tradition of moral practice provided by moral intuition has some roots in Aristotle and, in a roundabout way, in Spinoza, Darwin and Freud were early adopters and Johathan Haidt has argued this view persuasively. (DAMASIO; CHANGEUX; *et al*, 2005, p. 53, emphasis added).

The authors appoint this last tradition (moral reasoning occurring after moral intuition) as more adequate to explain moral judgments. However, they clarify that the majority of situations are compatible with both traditions. They point out that "moral intuitions are accompanied by a deployment of knowledge that will facilitate reasonings occurring in parallel to intuitions.". (DAMASIO; CHANGEUX; *et al,* 2005, p. 53). Just ahead, authors highlight they are not referring to the post-hoc reasonings used to justify Kantian moral judgments.

Concerning the apparent conflict between moral judgment as intuition or reasoning processes, Regina Rini commented that Lawrence Kohlberg's model of abstract reasoning as the pinnacle of moral maturity was shaken by Haidt's social intuitionist model and Joshua Greene's neuroscientific anti-Kantianism, which "sought to expose deontological intuitions as emotion-drive confabulation". (RINI, 2017, p. 831). Rini makes these approaches commenting on Hanno Sauer's book called "Moral Judgments as Educated Intuitions". She explains Sauer reinterprets the science of morality reconciling emotion and reason.

> But Sauer's key point is that we can concede the necessity thesis and yet refuse to denigrate the role of reasoning. **As he puts it, "The right way to conceive of the significance of emotions for morality, I suggest, is along the lines of a modified version of Kant's famous statement: moral thoughts without emotional content are empty, moral emotions without reasoning are blind"** (173). (RINI, 2017, p. 833, emphasis added).

Damasio and others wave in the same sense of not dichotomy between moral reasoning and moral intuition, appointing reasoning in the moral judgment with many layers in emotions, feelings, and intuitions:

> **The role of emotions, feelings and intuitions is likely to be primary, with intuitions engaged first and reasoning following shortly thereafter. It is important, however, to avoid drawing an opposition between emotion and reasoning, and equally important not to oppose emotion to cognition. Emotions deliver ample cognitive information via feelings**. (DAMASIO; CHANGEUX; *et al*, 2005, p. 53, emphasis added).

Damasio and others also reinforce the importance of not opposing emotion and cognition because “Emotions deliver ample cognitive information via feelings”. That is, emotions play indispensable roles in learning processes.

Regarding learning processes, Damasio and others also approach implicit knowledge that is constructed in intuitive processes. They say “that we may know far more than we believe we know as we reach an intuitive conclusion” and “careful and over-zealous probing for covert knowledge contributes to a partial fabrication of knowledge in a process not unlike that of post-hoc rationalization”. (DAMASIO; CHANGEUX; et al, 2005, p. 54).

In the end, Damasio and others reveal some brain structures regarding human values. Ventromedial sector of the prefrontal cortices (VMPF) is demanded for the triggering of social emotions as well as for learning and recall of social knowledge; anterior insular cortices trigger social emotions as well as parts of the amygdala. They also reveal parts of the insula related to compassion and empathy.

Both neuroanatomy and neurophysiology of human values will help us to understand deeper such values. One of the great applications of this can be neurological exams of candidates wanting to be public authorities. Considering the function of politicians and judges as vital to entire collectivity, it is interesting to think about neurological evaluations in order to filter the candidates allowing just the most empathetic candidates and with less degree of “deadly sins” in order to occupy such important public functions, avoiding that people with deep ethical disabilities drive the destiny of individual and societies.

2.4 THE TRANSCENDENTAL MIRRORS: EMPOWERING TELEPORTATION AND SHAPING THE CIVILIZATION

Even when we are alone, how often do we think with pain and pleasure of what others think of us, or their imagined approbation or disapprobation; and this all follows from sympathy, a fundamental element of the social instincts.

CHARLES DARWIN

Certain individuals – among the most skeptical – present themselves as apostles of fraternity and progress. However, true fraternity implies selflessness and the renunciation of self-centeredness. The sentiment of pride is an anomaly to true fraternity.

The Spirits' Book

This subchapter is about one of the greatest phenomena at all: the "power to adopt another's point of view", it is the ability to teleport to "another person's skin" and to feel what such person feels (empathy/alterity). This power is the glue that joins humans playing roles in many other areas as culture and language:

> **In this chapter I explore how a specific class of brain cells, called mirror neurons, may have played a pivotal role in our becoming the one and only species that veritably lives and breathes culture.** Culture consists of massive collections of complex skills and knowledge which are transferred from person to person through two core mediums, language and imitation. **We would be nothing without our savant-like ability to imitate others. Accurate imitation, in turn, may depend on the uniquely human ability to "adopt another's point of view"**—both visually and metaphorically—and may have required a more sophisticated deployment of these neurons compared with how they are organized in the brains of monkeys. (RAMACHANDRAN, 2011, p. 156-157, emphasis added).

Mirror neurons are also related to the capacity to construct a mental model of a third person to predict and manipulate his behavior (RAMACHANDRAN, 2011). Another function played by mirror neurons would be in language development, according to the great neuroscientist Ramachandran because mirror neurons enable people to mime lip and tongue movements of others as well as the ability to "read someone's intentions".

There are many types of mirror neurons in the brain. Rizzolatti was one pioneer of these discoveries because of his experiments demonstrating these neurons in monkeys, that is, when one monkey executes some specific action the other monkey simply observing the execution has the same neuron fired. It was Rizzolatti that noted

the mirror neurons playing roles in mimicking tongues and lips (RAMACHANDRAN, 2011).

Ramachandran points out the discovery of other mirror neurons commenting about experiments in neurosurgery. There are motor mirror neurons, “empathetic” mirror neurons, etc.

In the case below they were recording cells of the anterior cingulate area which is responsible for physical pain:

> Since Rizzolatti’s discovery, other types of mirror neurons have been found. Researchers at the University of Toronto were recording from cells in the anterior cingulate in conscious patients who were undergoing neurosurgery. Neurons in this area have long been known to respond to physical pain. On the assumption that such neurons respond to pain receptors in the skin, they are often called sensory pain neurons. **Imagine the head surgeon’s astonishment when he found that the sensory pain neuron he was monitoring responded equally vigorously when the patient watched another patient being poked! It was as though the neuron was empathizing with someone else**. (RAMACHANDRAN, 2011, p. 163, emphasis added).

Ramachandran says this conclusion is supported by neuroimaging experiments. He also calls these kinds of neurons such as “Gandhi neurons” because “they blur the boundary between self and others—not just metaphorically, but quite literally since the neuron can’t tell the difference.”. (RAMACHANDRAN, 2011, p. 163).

Summing up, the so-called mirror neurons affect the boundaries between “I” and “You”, among “I” and “all of you”. This is easy to perceive on many occasions.

1) One person watching a sad movie “enters” into the characters' life and suffers similarly. This is so strong in certain people that they cry a lot. The person is capable of living a true catharsis.

2) One person goes to a funeral in consideration to close people. But the person doesn't know the dead person. The person observes the pilgrimage of sadness and crying of people. Naturally, the person falls into crying too. Another catharsis.

3) A person is shaken to see many poor people going through enormous hardships, suffering from hunger and cold. Naturally, the person feels the need to help these people by exercising altruism and philanthropy. Another catharsis.

The cases above show us the power of empathy, the ability of mirror neurons to shape our behaviors allowing us to feel pain and happiness of third people. Unfortunately, there are some people incapable or with low capacity to adopt another's point of view. The rising of brainets can help these kinds of "cold people" to feel the other, with applications in the criminal law helping prisoners to wear the skin of the victims and/or their relatives (it will facilitate policies of socialization). This can be a great public policy helping to solve many problems with incarceration and rehabilitation.

Ramachandran explains the inhibitory circuits in the brain in conjunction with the absence of environmental signals (null signals) and the activity of mirror neurons that allow us to adopt someone else's point of view while preserving our individuality. Inhibitory circuits and null signals would outweigh the activity of mirror neurons. The neuroscientist confirms this thesis by analyzing a patient with a phantom hand.

> **I simply had him watch another person—my student Julie—while I stroked and tapped her hand. Imagine our amazement when he exclaimed with considerable surprise that he could not merely see but actually feel the things being done to Julie's hand on his phantom. I suggest this happens because his mirror neurons were being activated in the normal fashion but there was no longer a null signal from the hand to veto them**. Humphrey's mirror neuron activity was emerging fully into conscious experience. Imagine: The only thing separating your consciousnesses from another's might be your skin! **After seeing this phenomenon in Humphrey we tested three other patients and found the same effect, which we dubbed "acquired hyperempathy."**. (RAMACHANDRAN, 2011, p. 165, emphasis added).

The scientists discovered the man with a phantom limb didn't experience his individuality when he was observing a woman being touched on the hand. The explanation is the lack of hand in the man causes the absence of the power to veto the null signals. Because of the incapacity of veto, the signals from mirror neurons flow completely into conscious experience. They called this phenomenon "hyperempathy". Apropos, the scientists proved some patients get relief in their phantom limbs' pain simply observing other people being massaged. It is worth saying that decades before the phantom limbs were treated with neurosurgery. But, sometime after the surgery, the excruciating pain would come back, frequently worse. It is worth also to say centuries ago the phantom limbs were treated as demonic possession and people

were burned because of that. Science has shed light on this phenomenon: there isn't demonic possession, but neuroplasticity in the somatosensory area of the brain.

Regarding neuroplasticity it is important to say that there are two not opposite views about the functions and structures of the mirror neurons: genetic and environmental. Ramachandran waves to both origins, pointing out the importance of the learning and environment on mirror neuron development.

Beyond empathy, Ramachandran glimpses mirror neurons functioning in our power to produce abstractions.

> I call this process "cross-modal abstraction." This ability to compute similarities despite surface differences may have paved the way for more complex types of abstraction that our species takes great delight in. Mirror neurons may be the evolutionary conduit that allowed this to happen. (RAMACHANDRAN, 2011, p. 168).

Attached to the power of abstraction we shall take into account Harari's lessons. This author addresses in his book "Homo Deus" the idea of our capacity to create fictions that give meaning to the world (HARARI, 2017). Such fictions are abstract constructions like money, human rights, legal systems, metaphors, etc. Harari defends such "fictions" and our capacity for flexible cooperation as causes to our success on the planet. Such Harari's idea seems to match with the conception of mirror neurons helping us in the creation of abstractions and being "glues" to allow our flexible cooperation through the reconnaissance of the "other".

The brazilian neuroscientist Miguel Nicolelis also approaches these issues, connecting mirror neurons, human evolution, social interactions, and brainets (a kind of coupled brains through neuronal synchronization):

> As a result, a completely distinct pattern of cortical amalgamation takes place in the human brain when compared to chimpanzees and monkeys. **Indeed, this dramatic change in the cortical neuronal continuum may even help explain differences between our species and our close hominid ancestors, not only by clarifying why our individual brains are capable of generating much more elaborate behaviors, such as language and tool making, but also by elucidating why we are prone to establish much more cohesive and creative social groups than our ancestors**. (NICOLELIS, 2020, p. 156-157).

Nicolelis explains that the human brain has neuronal and cortical configurations much more different comparing us to chimpanzees and monkeys. He reveals the human brain had an expansion of connectivity of the mirror neuron system

(MNS) and this helped us to establish complex social interactions, shaping entire civilizations.

Antonio D'Aloia, Maria Chiara Errigo, and others point out the pivotal changes and challenges that neuroscience promises for law in the book "Neuroscience and Law: Complicated Crossings and New Perspectives". Specifically about mirror neurons they speak:

> However, in the background of this empathic mechanism, in recognizing or mirroring ourselves in others, in imitating them, we can find one of the fundamental engines of coexistence and solidarity, and ultimately the law as a social experience. (D'ALOIA *et al*, 2020, p. 32).

They speak about the "law as a social experience" and raise a common root between neuroscience and law: it would be exactly the social nature of man.

The social nature of man has roots in our brains, mirror neurons, emotions, feelings, intuitions, "deadly sins and heavenly virtues", etc. All these issues have roles in the social nature of man as we saw in this chapter "The Neuroethics of the Dragons of Eden".

From an evolutionist point of view, we may conceive the humans getting out of the caves with their super animal emotions and feelings, performing little simple social interactions. Along with evolution, both brain changes and the environment help this human evolve until at the current moment. Now, highly advanced technologies are changing much more the human allowing him/her to perform more complex social and environmental interactions. The capacity of abstraction is getting increasingly powerful as well as human technologies. We can quote quantum supercomputers, intelligent robots, the Large Hadron Collider (LHC), technologies of particle teleportation, nuclear physics to nuclear medicine and nuclear bombs, spacecrafts, and so on. The list is endless, such as the human capability to "deadly sins and heavenly virtues".

However, even in front of such divine technologies, unfortunately, humans, in some sense, are still inhabiting the caves because albeit they are reaching the heights of technologies they remain destroying themselves and nature. We are technologically achieving Heaven (Transhumanism as the Technological Tower of Babel), but behaviorally we are still dragons in the caves. Humankind also needs behavioral transhumanism. In such a moment, humans will be more Eden than Dragons in the caves.

3. LAW, NEUROENGINEERING, NEUROTECHNOLOGIES, AND THE MULTIVERSE OF METAPHYSICAL MIRRORS

3.1 BRAINETS, SOCIAL INTERACTIONS, AND THE POWER TO MASTER AND TO MANIPULATE FICTIONS

> *Brainet is a distributed organic computer composed of multiple individual brains that become synchronized—in the analog domain—by an external signal such as light, sound, language, chemicals, or radio or electromagnetic waves and, as a result, is capable of producing emergent collective social behaviors.*
>
> **Miguel Nicolelis. The True Creator of Everything**

Brainet is a concept created by the brazilian neuroscientist Dr. Miguel Nicolelis when he was performing experiments about neurotechnologies that allow connections among brains through computer machines. Roughly speaking, the brainet is a tool of connection between brains through electronic devices, although we will also explore the “natural brainets”. That is a concept that we will take from now on as a kind of connected brains.

It is possible to think about many types of brainets. The brainet as a kind of brain-to-brain interface (BTBI) or brain-machine interface (BMI). The first or the second one brainet is possible through neurotechnologies without the necessity of neural implants. These connections are made in non-invasively mode with aid of computational apparatus that allows the sharing of neural activity among the connected brains.

The BTBIs allow a person to communicate with another one using a helmet that takes a neural activity of the “recorder” and sends it to the “decoder”. Imagine the possibilities of communications and connections with the advancement of this neurotool: deep collective cooperation, feeling emotions, sufferings, and pains of the other person (great health applications and aid in criminal rehabilitation through empathy), mind-reading, and so on. However, profound legal and moral questions raise up with this, including privacy.

The experiments began with rat brainets, with a recorder-rat “sending” information to the decoder-rat throughout the computational apparatus that takes the neural activity of the recorder and sends it to the decoder one.

Nicolelis and his team made an experiment in which three people needed to solve a problem using their neural activities interconnected through a brainet, creating a kind of collective mind/brain. In the experiment the level of the success of the trials was correlated to the cortical synchronization of the subjects' brains:

> Indeed, when we analyzed the simultaneous cortical recordings obtained from the three subjects operating the B3-brainet, adding some data obtained from a two-brain system, or B2-brainet, we found that correct trials were significantly correlated with the transient production of high levels of cortical synchronization across the three subjects: that is, groups of cortical neurons located in one of the individual brains began to fire their electrical pulses at the same time that clusters of cortical neurons in the other two brains did the same. (NICOLELIS, 2020, p. 131).

It is possible to interpret from this experiment a form of flexible collective cooperation among the neural activities and hence we would establish a kind of equation in which the level of success of problems' solutions has a direct relation with the synchronization of the neurological activities. The synchronization is related to the same frequency of neurons' firing rate.

Through these brainets experiments, it was possible to find out that the cortical area has multitasking functions. The experiments have focused on motor cortices, but the findings pointed out that these "motor neurons" began to play roles in social parameters through the neuron synchrony across the animals. This finding ratifies the multitasking principle of the relativistic brain theory (NICOLELIS, 2020). That is, it recognizes that the cortices areas have high plasticity and multitasking nature. One area responsible for motor activities can play social functions as well as the visual area (occipital lobe) can respond to other functions beyond the visual one. This is called neuroplasticity and confirms the incredible brain's complexity.

This cortical synchronization is correlated to the special type of neurons, the so-called "mirror neurons". Mirror in the exact sense of reflecting things (in this case reflection of behaviors). The neurophysiologist Giacomo Rizzolatti was a pioneer in this study. He observed the cortical motor neurons fired when a monkey was simply looking at another monkey making movements. This kind of neuron also exists in the human brain and it is known they aren't restricted to the motor areas (premotor cortex) being also present in the frontal cortex. They play roles in the frontoparietal and somatosensory neural networks. The formidable neuroscientist V.S. Ramachandran

speaks about the mirror neurons in his book “The Tell-Tale Brain - A Neuroscientist’s Quest for What Makes Us Human”. For him, the mirror neurons shaped civilization.

The mirror neurons are fundamental in mediating social interactions. Because of that, studies of them are very important to social, political, and legal areas. The mirror neurons are related to high and subtle social interactions, including empathy or its malfunction.

Regarding the learning of movements merely from the observation of other beings executing actions, Nicolelis makes his observation:

> This hypothesis, if confirmed, could have a profound impact on the future of neuro-rehabilitation, but also for other practical applications of the brainet concept. For example, in human social activities that aim at achieving a high level of collective perceptual-motor performance—for instance, playing a team sport—practicing in a virtual environment may enhance mirror neuron activity in the brains of the interacting players. (NICOLELIS, 2020, p. 142)

Nicolelis approaches the applications of brainets to human motor activities, pointing out the virtual interaction may grow the mirror neurons activities and enhance the human motor capabilities (for example the team soccer). However, going deeper in the brainets possibilities we can think about its applications into purely mental activities. Imagine people interacting throughout brainets sharing thoughts and emotions, like a highly advanced social media. It’s quite interesting and scary. The possibilities are uncountable, beyond the control of electronic devices, avatars, softwares in our cell phones and laptops, conversations among people, we can glimpse the possibility of having sexual relations through these technologies, without physical contact, among other possibilities. Concerning this deep virtual sex, we can remember the movie “Demolition Man”, which has an interesting scene depicting it.

The movie “Demolition Man” was starring Sylvester Stallone, Wesley Snipes, Sandra Bullock. In this movie, the character played by Stallone stays frozen for a long time and wakes up in a society profoundly changed by the technologies. In some part of the story, Bullock's character proposes sexual relation to Stallone’s character. He gets very happy and she is more yet. So, he was removing the clothes when, to his surprise, Bullock’s character appeared with a helmet for the sex relation. The helmet, a kind of brainet, would allow the same pleasures of the physical sexual relation, but it happens merely in the brain without physical contact. It is very interesting (mainly

considering sexual diseases), however it raises great questions as privacy and the possibility of virtual rape.

The experimental findings point out the existence of a brain-to-brain connection among people, a kind of natural brainet. It happens, for example, in the simple process of conversation between two people: there is a neural synchronization between the two brains regarded to visual and audio systems. The mirror neurons make similar things among the people, that is, reflecting behaviors through neuronal synchronization, creating a natural brainet or brain-internet. The artificial brainets may enhance the natural ones. Referring to the natural human brainets, Nicolelis points out its relations with culture and other human abstract creations:

> As we will see, such a simple “wireless” analog coupling mechanism could explain why humans tend to build brainets capable of synchronizing a large number of individual brains into participating in social groups, which thrive on the exchange of much more abstract constructs, such as a common set of beliefs, culture, and knowledge, across vast spans of time and space, throughout human history. (NICOLELIS, 2020, p. 147)

It is possible to glimpse the natural brainets like abstract dynamic entities that create an attachment among humans, aiding them in the creation of many immaterial human constructs (“fictions”), such as culture, legal systems, and so on. Thus, it is possible through the brainets’ studies an explanation of the sociability and human cultures at the neuronal level.

The aforementioned human fictions have parallels with the fictions conceived by Yuval Noah Harari. Harari explores in his book, “Homo Deus”, human fictions like culture, money, human values, democracy, human rights, laws, states, etc. In this sense, the fictions would be immaterial things created by the human imagination. They’re intersubjective reality. Therefore, here fiction doesn't mean something that doesn’t exist, but an immaterial entity.

Harari attaches human success in the world with our capacity to create fictions that give meaning within our lives and allow us better organization than other non-humans animals. He says “Hence if we want to understand our future, cracking genomes and crunching numbers is hardly enough. We must also decipher the fictions that give meaning to the world.” (HARARI, 2017, p. 184).

Beyond human fictions, Harari correlates the human mastering of the planet with the flexible cooperation’s concept, not because of a higher toolmaking capability

or intelligence nor the size of the brain, but with the human capability to establish flexible cooperations and fictions' construction that help in human relations.

> Over those 20,000 years humankind moved from hunting mammoth with stone-tipped spears to exploring the solar system with spaceships not thanks to the evolution of more dexterous hands or bigger brains (our brains today seem actually to be smaller). Instead, the crucial factor in our conquest of the world was our ability to connect many humans to one another. Humans nowadays completely dominate the planet not because the individual human is far smarter and more nimble-fingered than the individual chimp or wolf, but because **Homo sapiens is the only species on earth capable of co-operating flexibly in large numbers**. (HARARI, 2017, p. 159, **emphasis added**).

Harari correlates the unique human capability of flexible cooperation on a large scale with our world mastering. Indeed, this thesis makes a lot of sense. Harari asks himself why the other animals with sophisticated cooperation can't surpass humans and he answers that other animals can't cooperate so flexibly like us. Although Harari considers human intelligence, it seems he applies more importance to flexible cooperation than intelligence.

Harari speaks about a horse with incredible math capacity (HARARI, 2017). However, non-human animals have math power restricted to a basic level, like to sum and subtract numbers. Only humans are capable of advanced mathematics and it is the high math that allows us to create internet, rocket ships, subatomic particles' colliders, and so on. As explored in the preamble of this work, humans have the neocortex more sophisticated than other animals, allowing us higher intelligences. Non-human animals can't even manipulate the base of the high math, that is, integral and derivative calculations, which one is the first step to allow the understanding and investigations of nature (from subatomic level to the whole multiverse) and some human activities (like economics).

So, only humans can master and manipulate God's alphabet. We shall remember Galileo Galilei "Mathematics is the alphabet with which God has written the universe".

Only to exemplify the point of view above, imagine non-human animals manipulating mathematics and physics at this following level (simply impossible).

1. $E = mc^2$ (Einstein's equation related to mass-energy equivalence). This mathematical manipulation is pretty easy, but its physical understanding and applications are unbelievable complex - it serves to explains two opposite phenomena, that is, stellar reactions of nucleosynthesis (nuclear fusion producing new elements) until manufacturing of nuclear weapons through the atomic fission (nuclear fission).

2. $\Delta S = \int dQ/T$. Here we have a more advanced equation, but only from the point of view of mathematical manipulation. It requires working with integral and derivative calculations which implies manipulation of advanced fictions and abstractions. This equation concerns the entropy (it indicates level of disorder of something or physical state). Many brain-entropy's searches show a direct correlation between high levels of entropy and intelligence[1].

3. And God said:

$\nabla.D = \rho$
$\nabla.B = 0$
$\nabla xH = J + \partial D/\partial t$
$\nabla xE = -\partial B/\partial t$

...and there was light[2]. (Genesis 1: 1-3).

4. $$i\hbar\frac{\partial}{\partial t}\psi(\vec{r},t) = \left[-\frac{\hbar^2}{2m}\nabla^2 + U(\vec{r},t)\right]\psi(\vec{r},t)$$ (Schrödinger's Equation). This equation describes the quantum world in which the mind has operations. From this equation and its derivations emerge, inter alia, the multiverse, the

[1] Entropy measures the variety of configurations possible within a system, and recently the concept of brain entropy has been defined as the number of neural states a given brain can access. (...) Brain entropy was positively associated with intelligence. This relation was most strongly observed in the prefrontal cortex, inferior temporal lobes, and cerebellum. This relationship between high brain entropy and high intelligence indicates an essential role for entropy in brain functioning. It demonstrates that access to variable neural states predicts complex behavioral performance, and specifically shows that entropy derived from neuroimaging signals at rest carries information about intellectual capacity. (SAXE, 2018, p. 1).

[2] Maxwell's equations of electromagnetism that describe the production of light and other electromagnetic waves.

> superposition among quantum entities (including the mind), and the existence of a cosmological and eternal consciousness (some scientists say: God).

So, it is quite crystalline the unique human capacity to master advanced hard science that allows it to know and to manipulate the world from the subatomic level to the astronomical one. And this is possible because of our super-evolved neocortex.

Harari's concept of flexible cooperation is quite interesting to explain human success. It seems clear that human flexible cooperation on a large scale is possible and explained through the brainets. So, it is possible to conceive natural human brainets as the neurobiological basis of Harari's theory. “Maybe someday breakthroughs in neurobiology will enable us to explain communism and the crusades in strictly biochemical terms. Yet we are very far from that point.” (HARARI, 2017, p. 183). It seems we are not so far from the point of the explanation, the neuroscientific results point to the natural brainets and mirror neurons system as candidates. The artificial brainets can help and develop flexible cooperations at higher levels.

We shall remember that the success of solving problems is directly proportional to the neural activity’s synchronization among human brains. The formation of the brainet is better the greater the synchronization and malleability of the connection (NICOLELIS, 2020). Harari speaks that our success is associated with the flexibility of human cooperation. So, the links among these structures and processes are getting more crystalline. Human development and success can be correlated to high levels of neural synchronization (hence flexibility) among human brains. The mirror neurons play an essential role in this case, creating empathy among humans and allowing more synchronized, flexible, and successful cooperations.

So, as brainets attach human brains in a “telepathic” way, allowing us great sociability, the answer for Harari’s question maybe is exactly in the neurobiology of brainets and in the mirror neurons systems. Thus, indeed, we are not “very far from that point.”.

Regarding human fictions pointed out by Harari, we can conceive them as neocortex’s creation with the unquestionable participation of the brainets and limbic brain. Thus, the pinnacle of the human brain (the neocortex) is the true creator of civilization and its constructs, remembering the role of the mirror neurons in shaping it.

Nicolelis expressly approaches the human fictions discussed by Harari and correlates them with a way to viable social groups. In an analysis about a movie session with two separate groups (chimpanzees and humans):

> Granted, my example may sound a bit cartoonish, but it still allows me to describe the potential neurophysiological mechanisms that allow the transformation of an initial transient period of brain-to-brain coupling, as generated by a common visual input, into a very cohesive human brainet driven by the sense of belonging to a social group bound by a new set of abstract beliefs—in this case, being part of a sci-fi adventure. (NICOLELIS, 2020, p. 150).

Nicolelis speaks about the neurophysiological mechanisms related to the creation of neural glues among humans (brainets). The transient brain-to-brain coupling originated through the emotions that emerged from the social experience creates a more durable brain-to-brain coupling. This new brainet would be guided by a feeling of belonging to a social group. That feeling is attached to abstract belief (human fictions). Chimpanzees don't experience these happenings. The biochemical mechanisms that allow these experiences are the neurotransmitters, like dopamine, oxytocin, and serotonin (the "neurotransmitters of feelings"). Neuroscience is already discussing the biochemistry of emotions, love, and passions. This fact is changing a lot of our beliefs and many understandings of human nature. Hence, the impacts in human sciences are being profound, and the legal sciences don't escape from these new paradigms.

Concerning the experiment cited above, we can stress the thinking to the limits. Whether the brainet is a compass to explain and guide humans in their experiences throughout history, we can glimpse the brainets related to big events like French Revolution, Nazism, movements to country independence, inter alia. All these big events create a deep feeling among humans facilitating the organization of the movements, because of the sharing of abstract beliefs of independence, power, or liberty.

Let's glimpse about nationalism. This human fiction creates a profound feeling of belonging to a social group and love to a nation, to a common people that believe and fight for the same objectives. We can think about a high level of neural activities that allow durable brainets. All these events facilitate the success of the social movements. The totalitarian movements share these same brainets and leaders work very well in their creations. The leaders appeal to the beliefs of people, creating other

ones, strengthening the old and new ones, creating durable and successful brainets that allow the ruling elite to move the people to many kinds of goals.

Political fanaticism expresses very well the success of these movements. We can see durable brainets related to the political beliefs that unite persons in a bunch of abstract constructs. They are absorbed so deeply that in some situations they stay forever in the human mind or in a collective imaginary (big brainet). This fanaticism guides the people to extreme limits because of the neurochemical storm that blinds these fanatic believers.

So, if a person wants to create a big movement and lead his people to extraordinary pathways (raising of a nation), the neurobiology of the brainets waves some tips. The potential leader needs to architect a set of great beliefs that attaches the people, organize these abstract constructs into a plan, he needs to appeal to the emotions of persons, creating strong and durable brainets. The emotions/feelings are created by the “neurotransmitters of feelings”. These neuro-substances are like glues that bond the brainets adding more and more emotions to the brains and to the brainets, strengthening the interbrain synchrony through the crystallization of the initial brainets with the mediation of the neurochemical modulators. The neuromodulator dopamine strengthens and increases the plasticity of the neuron synapses aiding the synchronization of the brains, hence improving the brainets. Human history shows us the consequences of these durable political brainets, some with good results, however, the majority, unfortunately, guide the humans to termination of other people (colonization) or even to self-destruction. So, the key is in the “neurotransmitters of feelings” and we stimulate them by appealing to emotions and fictions that join people into shared beliefs. Through these tips, the leader may get flexible cooperation among persons and accomplish his objectives.

Nicolelis ends up giving his definition of brainet, a kind of “distributed organic computer composed of multiple individual brains...capable of producing emergent collective social behaviors”. Follows as it is:

> (...) basically, **a brainet is a distributed organic computer composed of multiple individual brains that become synchronized—in the analog domain—by an external signal such as light, sound, language, chemicals, or radio or electromagnetic waves and, as a result, is capable of producing emergent collective social behaviors**. Like individual brains, such distributed organic computers utilize organic memory storage to hold Gödelian information while transmitting Shannon information, and are capable of collective learning through a mechanism similar to Hebbian plasticity,

> scaled to the level of entire brains that interact with one another. As such, **brainets also exhibit self-adaptation capabilities**. Moreover, such a human distributed organic computer, due to its immense complexity, is also capable of a wondrous type of computing operation, something that, so far at least, defines a unique trait in the universe out there; it is capable of taking potential information provided by the universe and shaping it into knowledge that can then be packed and transmitted to future generations so they can continue our species' main existential mission: universe building. (NICOLELIS, 2020, p. 160-161, emphasis added).

One of the most important things associated with our advanced natural brainets is the sophisticated human language. It plays an essential role in brain-to-brain couplings. It is easy to conceive its importance, we just need to imagine the disappearance of our languages. Communication would become tremendously difficult, hence our social interactions would be profoundly affected. Therefore, language is one of the most important instruments to synchronize the brainets facilitating social interactions.

Yet attached to brainet discussion, we can expand our thinking for two transcendent ideas: the use of brainets to solve great scientific mysteries of the multiverse (including our own brain and mind) and debate the collective unconscious that can emerge from the artificial brainets.

The solution of deep multiverse's mysteries (quantum physics, string theory, and cosmological issues like the origin, movement, and end or not of the multiverse) pass through the solving of incredibly complex equations. The complexity is so hard that the scientific minds can't do it without a collective endeavor. So, the use of artificial brainets can help scientists solve complex equations. As the artificial brainets promote synchronization among the natural brains, improving neural activity and allowing better solving problems, we can think artificial brainets as instruments to help the scientists in the resolution of current "impossible" (without collective effort) equations of physics and mathematics.

Regarding the second one transcendence, the collective unconscious is a concept from the psychiatrist and psychoanalyst Carl Jung referring to universal structures of the unconscious mind shared by all humankind and containing archetypes, that is, universal symbols as mother and death. Hunt, Ontario, and Canada approach Jung's concept as it follows:

> On the other hand, archetypal experiences feel like a return to origins and source. Deeply integrative numinous experiences can feel both utterly new and as though they had always been somehow known. One suspects Jung is

> guided here by Plato's and Plotinus' views that deep intuitive insight is sensed phenomenologically as a 'recollection'. But Jung also follows the evolutionary models of his own day (Shamdasani 2003) in positing a **phylogenetic, ancestral, and sometimes 'racial' unconscious, containing the 'archaic vestiges' of human evolution, in order to account for the 'recollection' or revival of these cross-cultural similarities. So archetypal imagination is simultaneously a higher 'spiritual intelligence' (using some current terminology) and biologically primitive**. (HUNT; ONTARIO; CANADA, 2012, p. 78, emphasis added).

The collective unconscious is a blend of high and low features with "spiritual intelligence" and "archaic vestiges". We can glimpse the collective unconscious with brain structures. The low arrangement is correlated to the reptilian system and the high structure is related to the neocortex and here it is included the natural brainets. The limbic brain plays important roles here, mediating reptilian and neocortex arrangements and adding emotions to the structures and neural activities.

If the brainets are distributed organic computers, so, from these synchronized and shared neural activities emerge collective unconscious structures, beyond the already quoted conscious abstract constructs as nationalism, states, legal systems, inter alia. Taking into account the idea of mirror neurons (and brainets) shaping civilization through its reflective and empathetic power, we extract the idea of new kinds of collective unconscious emerging from the extensive and intensive use of artificial brainets.

It is a fact that the artificial brainets create some relations among humans never before experienced. The current experiments are centered on motor activities. However, they already demonstrate real synchronization and coupling among the neural activities of the users. Now, we'll expand the horizons glimpsing about a kind of emotions and information sharing, consciousness coupling (a type of unique consciousness), and by the last a coupling, synchronizing, changing, and/or creating collective unconscious. The first ones will be treated in the next subtopic. So, let's analyze the collective unconscious.

The emergence of the internet has created a sort of collective mind. Today the social media is analyzed by politicians to help them in elections investigating what people are thinking about many themes. Social media also serves as big consciousness concerning all kinds of determined themes, for example, to condemn a person accused of a heinous crime. Logically neither all people think and express the same convictions, nevertheless when a big mass is formed into the same pathway we

can glimpse about a sort of unique consciousness that think, judge, criticize, condemn or acquit people, projects, movements and ideas around the world.

Now we can highlight the collective unconscious that can emerge from artificial brainets. In the movie “Inception” starring Leonardo Di Caprio is depicted a world in which a neurotechnology (kind of brainet) allows people to dream collectively and to influence themselves reciprocally through the dreams, consciously or unconsciously. If the mere current internet exercises deep interferences into human minds in good/healthy and bad/sick ways, imagine an internet directly connecting the minds of a lot of people, the swarm of shared emotions and information, great deep feelings and human instincts shared across a big brainet. With artificial brainets we will achieve the deepest structures of the human mind - the unconscious one.

Grubler and Hildt point out the mind-to-mind communication as the project DARPAS’s Silent Talk - the U.S. military’s Defense Advanced Research Projects Agency (DARPA). The authors speak about the use of this kind of neurotechnology that allows via BCI the sharing of emotional states and experiences directly. At least two deep issues emerge from this: addictions and responsibility.

> If we extrapolate further from this scenario, it is worth considering whether groups connected by BCIs will be able to make collective decisions and take collective actions. In such an entirely new scenario, it might become impossible to determine which individual is responsible for which thought and, ultimately, for actions. (GRUBLER; HILDT et al, 2014, p. 168).

This neurotechnology will promote a loss of individuality in the subject. Beyond the psychological issue, the legal problem will be to determine who is responsible for a certain act or thought because in the mind-to-mind apparatus the individual action/thought can disappear and the individual liability can be impossible to be traced. In this case, maybe only a necessary collective responsibility can guarantee a minimum of repair to a harmed person. Legally speaking, this kind of BCI will change and challenge the concepts of responsibility and human agency.

From all these neurotechnologies many possibilities raise, such as : insertion of ideas into mind; political use to influence peoples around the planet (creating distorted historical narratives); use in the market transforming us into objects of “ads” (much more than already we are with social media); data stealing; mind hacking; deep brainwashes; virtual rapes, addictions, psychological traumas, and all sort of consequent health problems, among many other possibilities. The regulation should

be made to protect us from misuse of these neurotechnologies, mainly considering the effects on our deepest mind structures.

3.1.1 “LOGGED ON TO” DIFFERENT BRAINETS CHANNELS. FIX “BROKEN MIRRORS” TO CREATE NEW PERSONS?

> *In some sense, artificial brainets can allow the person to wear another’s skin, to enter into the skin of victims, or the skin of their relatives. This kind of brainet will shock current and old measures of rehabilitation or resocialization within criminal law. Instead of ancient and primitive methods of the criminal systems, it can be used brainets of empathy allowing the defendant to feel the another. It is the process of catharsis through brainets.*
>
> **Augusto Damião. Neurolaw, Transhumanism, Posthumanism**

As already seen, natural brainet is a kind of “distributed organic computer” and the mirror neurons system (MNS) plays an important role in the brainet, participating in processes of learning and empathy, “mirroring” behaviors, allowing us understanding the meaning of actions and emotions.

Natural brainet is a sort of collective brain and the “glues” that allow its configuration would be the mirror neurons. The synchronization and the firing frequency of these neurons among people help us within sociability and in the feeling of belonging to the same species, same group.

There are studies pointing out correlations between mirror neurons and mental disorders. “The deficiency of MNS could lead to social deficiency such as the autism in children-“seeing is not understanding” [20, 21]. These data indicate that motor action mirroring mediated by parieto-frontal mirror network is impaired in autism.” (YUAN, 2015, p. 2). So, the idea is to develop the broken mirror neurons to treat these people. The treatments cover many conditions such as autism, language problems (aphasia), schizophrenia, psychopathy, among others.

Taking into account natural brainet as a neural mechanism that allows humans to have feeling and meaning of belonging to a group, so, we can imagine people with mental disorders being in different brainets, because their conditions show the difficulty of them in the synchronization inside the "normal brainet".

Studies correlate problems in the MNS with many mental dysfunctions as autism, schizophrenia, and other cognitive disorders:

> Autism is a disorder whose pathological base is unknown. Ramachandran and Seckel explain that the main damage may be in the mirror-neuron system. Many cognitive neuroscience researchers consider that system provides the psychological mechanism for the interaction between perception and action. Mirror neurons may be important to understand the actions from other people, and to learn new motor acquisitions through imitation. Problems in that system are the base for cognitive disorders such as autism. (TEIXEIRA-MACHADO, 2015, p. 206).

So, it is possible to think about “fix” these “broken mirrors” to allow these people access to the “normal brainet”. Studies suggest positive responses using many natural therapies such as dancing, social interactions, physical exercises, synchronous repetitive movements, music (TEIXEIRA-MACHADO, 2015, p. 207). These natural therapies are pretty welcome, but the artificial ones raise up bioethical questions. Brain stimuli can be made by non-invasively electromagnetic stimulation. However, imagine physical invasive “therapies” to change mind states in search to “cure” people.

These therapies are a kind of neurorehabilitation. It is very interesting, but the physical invasion into the brain (insertion of electronic devices) to modify mental states must be deeply debated inside Bioethics.

Regarding the treatments in autism, aphasia and similar ones are more debatable and can have huge resilience. However, concerning the treatments on psychopathies the Bioethics and Biolaw may suffer less resilience because of the possibility of cure of current incurable people. Through this would be possible real socialization of these people, finishing the death penalties or life imprisonments.

There are many important neuroscientific discoveries regarding psychopaths. The studies are essential to guide law and public policies. Moreover, the neural understanding of this condition may appoint to treatments of that people, and perhaps a possible cure. Many brain structures are linked to the psychopathy as the amygdala and the orbitofrontal cortex:

> Elucidation of the neural correlates of psychopathy may lead to improved management and treatment of the condition. Although some methodological issues remain, the neuroimaging literature is generally converging on a set of brain regions and circuits that are consistently implicated in the condition: the orbitofrontal cortex, amygdala, and the anterior and posterior cingulate and adjacent (para)limbic structures. (ANDERSON; KIEHL, 2012, p. 1).

Beyond structures such as the amygdala and orbitofrontal cortex, we need to highlight the MNS importance on psychopathy because this system plays a vital role in empathy. The psychopath has less empathy than normal people. So, if it is possible

to improve the MNS on autistic people, maybe it would be possible on psychopaths too.

The use of artificial brainets for psychopaths or other kinds of defendants to exercise empathy can be revolutionary, excluding traditional methods. It can allow the non-empathetic person to develop empathy. In some sense, artificial brainets can allow the person to wear another's skin, to enter into the skin of victims, or the skin of their relatives. This kind of brainet will shock current and old measures of rehabilitation or resocialization within criminal law. Instead of ancient and primitive methods of the criminal systems, it can be used brainets of empathy allowing the defendant to feel the another. It is the process of catharsis through brainets.

Decades before, mental disorders like psychopathies were treated with neurosurgery, lobotomy, brain structures' ablation, and so on. Nowadays, those brutal techniques aren't applicable, instead, we have new ones like deep brain stimulation used to treat psychiatric disorders, aggressive behaviors. (ARLE; SHILS, 2011). Beyond deep stimulation, the specialists point out studies on neurogenetics and neurochemistry helping the understanding of psychopathy, providing resources to treatments, political and legal intervention strategies. (ANDERSON; KIEHL, 2012).

So, the non-invasive treatments are preferred, because the other ones can be really psychosurgeries, creating new people. Fortunately, we are entering into the age of the brainets, hence will be possible to use brainets of empathy to take care of these matters.

The law has many responsibilities on this, mainly considering certain kinds of neurorehabilitation would be really dangerous psychosurgeries modifying irreversibly the mental existence of the patient - creating a new one person.

Apropos everything brought in this subchapter, it is very important to quote a real case of a person who lives in a "completely different brainet channel". It is the case of Temple Grandin. Her case is addressed by the neurologist Oliver Sack in his book "An Anthropologist on Mars".

Grandin is an autistic woman, psychologist, and specialized in animal science. The title of Sack's book comes from Grandin's phrase about your feelings regarding human interactions - she feels like An Anthropologist on Mars. She is "incapable" of many human relations, on the other hand, she is a kind of "psychologist of animals".

In the book is addressed a scene in which she demonstrates to Sacks that because she doesn't feed human relations, she has a robot to replace this

carelessness. She arrives at the house and hugs her robot for a long time. The robot returns the hug. It is a case that demonstrates some people live deeply out of the "normal brainet channel".

3.2 NEUROTECHNOLOGIES, HUMAN AGENCY: LIBERTY, DIGNITY, EQUALITY, RESPONSIBILITY, AND AUTONOMY

Neurotechnology offers the potential to change the way we see ourselves and think about society. That may prove beneficial. It may also produce outcomes that disrupt society and raise questions about discrimination and fair play by empowering a new elite who may have abilities unavailable to others.

James Giordano. Neurotechnology in National Security and Defense

The rapid evolution and entrance of BCI technologies into new consumer markets requires ethical consideration. We focus on responsibility not only because BCIs are already entering the market, but because BCI use will affect the Aristotelian conditions of responsibility (knowledge and control) and extend the range of human abilities in novel ways.

Grubler, Hildt, *et al*. Brain-Computer Interfaces in Their Ethical, Social and Cultural Contexts

The last subchapter was about brainets, including the natural and artificial ones, with a focus on natural ones. Here we will see a specific kind of artificial brainet, the brain-machine-interface (BMI) or brain-computer-interface (BCI), this last like a subset of the first one, which encompasses other electronic devices beyond computers (both can be taken as synonyms). If the BMI is connecting brains we have got a hypothesis of brainet. But if it is connecting a brain with a non-brain thing it loses that qualification, because brainet is a sort of coupled brains.

The BMI can be understood as an electronic device that translates neuronal signals into commands in order to manipulate external devices (softwares or hardwares).

The BMIs have uncountable applications since the medical to national security and aerospace issues. The original idea to BMIs is to aid disabled people, as those affected by locked-in syndrome (LIS), amyotrophic lateral sclerosis (syndromes that incapacitate all muscular systems of the people). This last one attacked the physicist Stephen Hawking and thanks to the BMI it was possible for the great scientist to work and express his cosmological discoveries to the world. So, let’s see a brief discussion about neurotechnologies, mental states, life, and death. Death and neurotechnologies will be addressed in the subchapter “THE NEUROETHICS OF THANATOS IN THE UTOPY OF THE (UN)CONSCIOUSNESS”.

Societal, philosophical, moral, anthropological, legal, and ethical questions arise in this world of neurotechnologies connecting brains and machines. The possibilities of interconnections challenge the human mind, from the first BMIs to the most unthinkable ones as astronauts using them to control robots in microgravity work conditions (Millán *et al*. 2006).

In the broad spectrum of these neurotechnologies, we have BMIs made to help speechless people to communicate until the possibility of using robots to colonize other planets. The first correlated BMI to communication purposes was used in 1988 (FARWELL; DONCHIN, 1988). According to Tamburrini “BCI systems enable one to establish communication channels with the external world *without requiring any voluntary muscular movement* on the part of their users.” (TAMBURRINI, 2014, p. 148). In the other extreme of the BMIs spectrum, it is possible to think using the human mind to control long-distance robots (like in the movie “Avatar”). The application of these controlled robots can be made with many purposes since by the fire-men to save people until the commitment of crimes through avatars. This last use already raises questions in criminal and tort law (civil liability).

Related to robotics and planet colonization, we have the “SpaceX” purpose to colonize mars with self-replicating robots, constructing cities, industries, and exploring natural resources, with robots and BMIs collaborating together.

The medical applications undoubtedly help a lot of disabled people to recover dignity, this so important universal human right (Universal Declaration of Human Rights). The neuroengineering of BMIs is aiding speechless people to communicate, walkless people to walk through robotic exoskeletons (Walk Again Project). So, it is very exciting to quote the accomplishment of human rights through neurotechnologies. Assistive neuroengineering must receive a lot of state attention promoting more and more human dignity allowing disabled people to wake from their sad limbo and to be free of their own body-prison. Therefore, beyond dignity we can think about liberty’s achievement through these neurotechnologies. Nevertheless, the misusing of the same liberty-technologies can make us prisoners.

Grubler and Hildt, editors of the book “Brain-Computer Interfaces in Their Ethical, Social and Cultural Contexts”, explore the correlation among human agency, autonomy, and dignity quoting Kantian and neo-Aristotelian ideas:

> There is a direct conceptual connection between the protection of human agency as such and the protection of human dignity. The concept of agent – that is, the concept of an entity that is capable of performing a repertoire of actions guided by desires, intentions, and beliefs about the world – plays a central role in both Kantian and neo-Aristotelian accounts of human dignity.
> (...)
> Thus, by restoring generalized capabilities for action, BCI technologies for functional substitution are instrumental to human dignity protection through the intermediary of human agency protection. (GRUBLER; HILDT *et al*, 2014, p. 150-151).

It is interesting the capability and the power of these neurotechnologies to recover people's human rights, giving them dignity, liberty, and autonomy. The BMIs play a role as bridges allowing human actions to walk through them achieving those universal rights in an accomplishment of human emancipation. However, as a corollary, the power doesn't come from without responsibility. The BMIs' manufacturers should take care to correctly link the action intended by the users with the actions performed by the BMIs. Mismatches in these connections could create many problems in contracts and transactions.

Grubler and Hildt points out philosophical issues related to BMIs (BCIs) and human agency's problem:

> General philosophical questions in the context of BCI revolve around agency, the personal bases of responsibility, and the changing of self-awareness in long-term intense BCI use. All these issues seem to be mutually dependent on each other and might contribute to the success or failure of BCI technology as a technological paradigm for man–machine interaction. (GRUBLER; HILDT *et al*, 2014, p. 2).

The human agency's problem appears in this neurotechnology context raising up many and profound legal questions, including general theories of law, which ones would incorporate the metaphysics of human nature. (MURPHY, 2013).

The issue concerning human agency is in many sciences with different approaches, but we can glimpse a common root, that is, the discussion about human action (personal bases of responsibility), roughly speaking. Understanding human action it's essential to law, perhaps everything within law is attached to human action (excepting the legal entities that act by themselves, but with ground in human action, at the end).

Let's think about a situation in which a disabled person (muscular paralysis and/or speechlessness) tries to recover her human agency acting through BMIs technologies. The possibility of a comatose (or paralyzed people by locked-in

syndrome) person “expressing” his will/volition through a BMI making legal transactions raises up juridical doubts and eventual great litigations at judicial courts. Imagine the following situation raising up some legal issues related to the use of BMIs and the human agency.

A disabled person (speechless one), in a coma, amyotrophic lateral sclerosis (ALS), or in a complete locked-in state (CLIS), makes “legal” transactions mediated through BMIs technologies.

1. This person really wanted that legal transaction in that terms?
2. Imagine these people making transactions with his assets, making will to heirs, “expressing” about his desire (or not) to euthanasia. It is easy to think about many judicial problems and collisions of interests involving the use of these neurotechnologies, mainly in cases of rich comatose people such as Michael Schumacher and Antônio Augusto de Moraes Liberato (“Gugu Liberato”).
3. And the responsibilities in the errors of interpretations of the “comatose person will”? How legally to interpret these neural signals from the BMIs?
4. The neural signals replace all legal effects of a normal expression and really represent the will of a person?
5. If the person gets out of the comatose state and wants to modify the terms of the transaction made alleging that he didn’t want these clauses? Would it be possible? What effects? Retroactive or only prospective ones?
6. The answers to these questions touch on the following neurophilosophical issues: access consciousness, mental states, narrative consciousness, varieties of consciousness, and phenomenological consciousness (GRUBLER; HILDT *et al*, 2014, p. 156-158). It is fully known the Law is based on classifications and categories. Knowing the correct mind states of the disabled person is essential to not commit serious mistakes and make an adequate interpretation of his intentions. Summing up, answering these questions implies going to the source of consciousness, one of the greatest challenges of mankind, that is, access and master this immaterial thing (mind) through its material subtract (brain).

Although there are some great expectations, experiments show hard problems regarding the power of BMIs to accomplish the human agency recovery of some disabled people. One of the saddest consequences of certain conditions (CLIS or ALS) is the “generalized decline in perception, thinking, and attention abilities” (GRUBLER; HILDT et al, 2014, p. 155). The findings point out a hard recovery of those capacities, but the hope is the preventive actions, that is, the use of BMIs in the onset of sick conditions. Thereby, preventive public policies are important affirmative actions within this context avoiding that people lose irreversibly their human agency capacities. It is a question of autonomy, dignity, the exercise of rights, and in the end, an issue of the person to be or not be “subject of law”, passive or actively. Here, we can take “subject of law” as the capacity to realize rights and duties in the legal world.

We can think even that affected person loses its state of “subject of law”, because without human agency features (or limited ones) its power/capability gets profoundly (or totally) lost. Undoubtedly its active side of “subject of law” is fully terminated in this condition, staying only the passive one in a partial way.

About communication of people in vegetative states and that one's affected by disorders of consciousness:

> However, groundbreaking experiments (Owen et al. 2006; Monti et al. 2010) involving groups of persons who were diagnosed to be in a vegetative state (VS) or a minimally conscious state (MCS) unexpectedly suggested the possibility of using BCIs to communicate with people affected by disorders of consciousness. (GRUBLER; HILDT et al, 2014, p. 156).

There are many questions to make and to answer, and the Law needs to solve these issues mainly considering the human agency question. The use of BCIs to communicate with people affected by disorders of mind also may give them dignity and autonomy but is important to highlight the complexities above quoted as access consciousness, mental states, and narrative consciousness.

Although neurotechnologies allow human enhancement we need to ask ourselves: enhancement for who? Only to rich people? Here we have a problem of equality because rich people will have access to a bunch of neurotechnologies that put the other people at an astronomical disadvantage creating a new elite:

> Neurotechnology offers the potential to change the way we see ourselves and think about society. That may prove beneficial. It may also produce outcomes that disrupt society and raise questions about discrimination and fair play by

> empowering a new elite who may have abilities unavailable to others. This is not far-fetched. (GIORDANO, 2015, p. 153).

Let's think in the neuromedical field: brain stimulators controlling Parkinson's disease and being used to treat many other neurological and mental problems. These technologies not only enhance healthy humans as well as recover dignity and well-fare for sick people. Thereby, it is important the State thinks about public policies to guarantee equality in this area.

Neurotechnologies are shaking the grounds of human nature, hence the bases of law don't escape that paradigm-shifting. Consequently, jurisprudential changes in the deep grounds of law should be made. The changes must contemplate, inter alia, the following questions regarded to civil liability:

A BMI' user hurts or kills someone (or himself) or damages something. We can think about a BMI mediating a car.

1. Who is responsible for the act? Who is liable for compensation damages? The user of the brain-machine-interface is responsible for?
    1.1. If the user is liable, is there exclusivity of liability, or does the absence of proper training or legal disclaimer imply some responsibility to the companies?
2. Was everything a fatality? Is some natural event culpable? So, is nobody responsible, neither natural nor legal person? Therefore, the victim is not compensated?
3. The liability comes exclusively from the BMI itself?
    3.1. Is there any defect from the hardware factory? If yes, we have a guilty.
    3.2. However, the defect by itself would be exclusively capable to cause the problem or the misuse also contributes? In the first case, we have a unique responsible. In the second case, there is a joint liability because of the nexus of con-causality, i.e., two actions added to produce a final cause with a link between them.
    3.3. Was the hardware problem foreseeable to the manufacturer?
4. Is victim's exclusive responsibility? Here, we have an exclusion of the responsibilities of the other involved ones.

5. Is the responsibility of the software architect (artificial intelligence implanted in the machine)? In the case of exclusive responsibility, the answer can be easy.
6. Relating to the topic “5”, we can add one more layer of complexity: a person hacks the software (or even “hacks” the user affecting his free will). Thus, the hacker would be the responsible person.
7. A final layer of complexity into this is: the self-evolution of artificial intelligence that underlies the brain-machine-interface. Here, the programmer can be responsible, but was the evolution foreseeable? If totally unforecastable, it would have an exclusion of responsibility. So, we would need to appeal to electronic personhood of the AI.

These questions are discussed in the books about BMIs with ethical and legal issues. The problem of finding some guilty in the chain of people and machines is approached as the “problem of many hands”. With the problem of many hands, we have the problem of allocation of responsibility, because in complex systems and processes with many “subjects” the actions are performed by a sum of many individual actions. So, there is a dilution of responsibility in the chain of participants of the process. Grubler and Hildt approach the BCI as another "hand" in the scenario of the development of learning machines:

> Learning machines can make decisions and act independently of human intervention. Furthermore, the rules by which they decide how to act are not fixed during the production process and develop over the course of the machine’s existence. That machines might now act independently of human intervention, constituting another “hand”, makes the allocation of responsibility more difficult due to what has been described as the “responsibility gap”. (GRUBLER; HILDT *et al*, 2014, p. 175).

The above quotation approaches the self-evolution of artificial intelligence, because the learning machine develops by itself. This self-development happens without human intervention and this creates another problem: the responsibility gap.

Concerning the “responsibility gap”, the machines may increase their capabilities interacting with the environment or through genetic algorithms (GAs). The GA is inspired by the mechanism of natural evolution. The specialists of the area defining it as follows:

> **Genetic algorithms (GAs) are metaheuristic optimization algorithms inspired by Darwinian evolution. Performing crossover, mutation, and selection operations, the algorithm progresses a population of evolving candidate solutions**. Selecting well-designed operators and optimal parameters, GAs have exhibited a high degree of robustness in terms of finding ideal solutions to difficult optimization problems. (JENNINGS; LYSGAARD; HUMMELSHØJ *et al,* 2019, p. 1, emphasis added).

As addressed above the GA "mimics" the Darwinian evolution, making mutations to evolution and to find ideal solutions to hard problems. So, it is possible to imagine the legal problem (mainly considering responsibility) connected with machines with genetic algorithms. In the scenario of learning machines, the ascription of responsibility may be impossible, because of the total "responsibility gap", remembering the evolution of the machine without human intervention.

Another way to get some solution to the "responsibility gap" about ML's is the ascription of responsibility to the own machine/program. Obviously, the machine can't repair damages, but there is a legal way to avoid other damages from it. This solution passes through the imposition of penalties to the programs: we can suspend its activities for a time or eternally ("death penalty" to software), depending on the damages. To accomplish the purpose to imply responsibility to robots is thinkable to give them "electronic personality". This is an issue being discussed a lot, as we will see in the chapter 4.

This situation above is approached in the movie "I, Robot". The intelligent and emotional robot called "Sonny" has a kind of "death penalty" determined by its owner (a robots' enterprise) because of an accusation of homicide allegedly committed by the robot.

Despite the thesis of the "responsibility gap" because of the learning machines, the authors point out the "diachronic responsibility" quoting Holm and Voo (work in Brain-machine interfaces and personal responsibility for action):

> Utilizing the concept of diachronic responsibility, which allows for the attribution of responsibility to someone for something for which they might not be directly blamed, Holm and Voo also contend that the responsibility gap is not a problem in relation to BCIs (Holm and Voo 2011). (GRUBLER; HILDT *et al*, 2014, p. 176).

In the sense of the "diachronic responsibility" the "responsibility gap" is not a problem with BCIs. Here, the user would be moral and legally responsible only for the

fact of using the BCI. So, it is important to avoid negative surprises to the users with warnings regarding this kind of responsibility, making disclaimer about the BCI.

In order to complicate the relation between BCI and legal responsibility, we have the problem of the “Subconscious Actuators”. The subconscious actuator may play a significant role in the BCI because this device can extract and utilize subconscious thoughts of the users to perform actions.

In the case of crime or accident involving BCI and subconscious actuator, the allocation of responsibility can be impossible. So, unless the legislation establishes a kind of objective responsibility (absolute liability or liability without fault), the attribution of liability would be really impossible because the agent doesn’t have control or awareness of his subconscious thoughts. In this situation we have a lack of the two aristotelian conditions of human responsibility: control and knowledge/awareness.

So, unless the machine may answer if the thought was conscious or subconscious, the problem of legal responsibility gets very hard to solve or even impossible. If it is possible to determine what parts of the brain were running when the action was made, it would be possible to answer if the person is responsible or not.

Now we may imagine the problem of subconscious actuators in collaborative works as one drone is collectively driven to perform a hard and efficient task. As the BCI is plugged with many people and it processes the subconscious thoughts of all people, the allocation of responsibility is harder to be made than the case of individual relation BCI and subconscious thoughts. Directly linked with the collective subconscious actuators we have the “mind-melding problem”.

In mind-melding we have individual minds connected themselves through the BCI. Here each individual mind merges with other ones creating a type of collective mind (“gestalt mind”). Grubler and Hildt approach one very interesting question about the collective consciousness:

> It will be essential to decide whether responsibility is distributed amongst the individual members of the collective (and if so how this is to be done) or whether the collective, if capable of intentionality, can be held responsible without the individual members being responsible. The existence of some sort of gestalt mind, made up of individual consciousnesses but capable of intentionality (and possibly acting in a way alien to the individuals involved) would automatically problematize the allocation of responsibility. (GRUBLER; HILDT *et al*, 2014, p. 177).

The issue above, that is, a gestalt mind responsible without the responsibility of the parts raises a deep reflection: Is this collective consciousness a kind of “body of law” like a company?

This collective consciousness remembers a type of legal entity because in this scenario the people aren’t directly responsible for the action of the legal entity. There is a shielding of the natural persons by the legal entity. Thereby, this gestalt mind would be like a legal entity, because it would be responsible without the responsibility of the individual minds that creates the collective one. This legal construction (gestalt mind with legal responsibility created through a BCI) can be one type of solution to the problem of the responsibility allocation: the individual consciousness isn’t responsible because of the deep difficulty of liability tracing, but the legal responsibility of the collective consciousness would be possible.

One more tip to get some solution to the responsibility allocation is the possibility of recording the person’s thoughts during the use of the BCI. However, these recordings can represent a profound transgression of liberty, autonomy, and privacy against the users.

The example (BMI and driverless car) shows us the shocking questions related to technologies and law. Beyond responsibility, action theory (“human agency”) and free will must be discussed. Apropos they are linked to each other.

The wondrous legal series “The Good Wife” has many discussions about technologies and law. In season 7, episode 7 (called Driven), is portrayed legal struggles related to an accident involving a driverless car mediated by artificial intelligence (AI). This episode matched very well into the legal questions made above. Here, we have a judicial deposition involving the lawyer (Alicia Florrick - played by Julianna Margulies) and the software designer responsible for the driverless’ car (Mr. Dudewitz):

> “Are we in danger from AI?” (Florrick - She).
> “I think it’s getting smarter,” (Dudewitz - He).
> He: “Everyday. Learning our boundaries, and its boundaries. It’s evolving. I think there will be an adjustment period after it takes over, but eventually…”
> She: Wait, I’m sorry, she stops him. “What do you mean by takes over?”.
> He: The singularity. “When the system is capable of recursive self-improvement, when it is better at re-calibrating, expanding and spawning than we are, the brief blip of humanity’s reign will reach it’s inevitable conclusion.”
> (...)
> She: “Do you think that the car is capable of erasing its own memory?”
> He: “Yes I do,”

> She: “And if you believe that, don’t you believe that the software could override the safety features?”
> He: “I don’t think I would go that far,”
> She: “But if you believe that AI can transcend its creators original position, and you introduce the theory of fuzzy driving in order to make the car more aggressive, more human-like,” she suggests, striking fear and horror into the hears of her opponents, “then why couldn’t the computer override your safety controls?”
> She: Mr. Dudewitz, do you have an answer for that?
> He: Yes, and I've created something so complex, I can't positively tell what it can do and what it can't.

So, find a guilty of such damages involving AI can be hard work, a really legal puzzle with many labyrinths. Furthermore, the software designer speaks about Singularity - “the brief blip of humanity’s reign will reach it’s inevitable conclusion.”. The designer’s last statement shows us the danger of certain machine’s creations (loss of control over them): I've created something so complex, I can't positively tell what it can do and what it can't.

The condemnation only of the company (creator of the software or hardware) can be interesting from the economical capacity of the offender, however, the high condemnations can end with the investments and the neurotechnologies are really sources of hope to some people (assistive technologies). Thereby, both politics and judiciary must consider all these questions.

Grubler and Hildt speak about socialization of risks related to the damages caused from the use of these technologies:

> These various observations suggest the opportunity of developing a more complex governance framework for BCI-engendered retrospective liabilities. Since BCI technological risk comes with beneficial opportunities for groups of disabled people and broader societal benefits in the way of technological innovation, one might allow for the socialization of risks associated with BCI systems, distributing insurance and compensation costs across a variety of stakeholder groups and governmental agencies. (GRUBLER; HILDT *et al*, 2014, p. 153).

The reasonable answer of the law (a political choice) can be a shared liability among some involved people (considering the evidence of some level of culpability to the accused) if not possible to find out only one. So, the legal rule can foresee a joint liability. The transcription above has an appropriate indication of solution: complex governance framework for BCI-engendered retrospective liabilities; socialization of risks, and the participation of the government be through making regulations or in the distribution of compensation costs.

One of the biggest problems in the BCI area is the responsibility case. As said by Grubler and Hildt, the Aristotelian conditions of responsibility will be affected by the BCIs:

> The rapid evolution and entrance of BCI technologies into new consumer markets requires ethical consideration. We focus on responsibility not only because BCIs are already entering the market, but because BCI use will affect the Aristotelian conditions of responsibility (knowledge and control) and extend the range of human abilities in novel ways. (GRUBLER; HILDT *et al*, 2014, p. 164).

The Aristotelian requirements of responsibility presuppose a control condition (the action must emerge from the agent), linked to this is needed a causal connection between the person and the outcome of the action. The other condition is the awareness of the action (GRUBLER; HILDT *et al*, 2014). So, let's think about the subconscious events causing actions in the case of BCIs.

If the BCI takes the subconscious thoughts of the person and transforms them into action many problems of responsibility come out: we can imagine a robot-police controlled via BCI committing a homicide. In this example, the first requisite of the Aristotelian condition of responsibility is fulfilled (although we can think about the absence of intention). Nevertheless, the second requirement is not fulfilled, because the subconscious event doesn't pass through the awareness dimension (much less the unconscious events).

If we imagine the legal responsibility anchored in awareness or intention there will be extremely hard to investigate guilt when the act is performed by a person using BCI that takes the subconscious or unconscious thoughts and turns them into actions. The criminal law has the first-degree crime (a kind of crime committed with intention), so, the BCI taking subconscious events and "committing" crimes is a great issue of human agency, consequently a profound problem of legal responsibility.

Grubler and Hildt talk about mind hacking with BCIs. In this scenario "Hackers might transmit images to the BCI user's brain and then extract knowledge from the subconscious brain activity of the user, just as the BCI binoculars utilize the P300 brain response." (GRUBLER; HILDT *et al*, 2014, p. 170). It will be possible for hackers (or governments) to steal thoughts without the person having perception. In this situation, the person could not be held responsible for divulging private or secret data, because the stealing comes from the subconscious (or unconscious) brain activity. Beyond the

stealing, it is possible to influence the person, with malicious use by the governments in the brainwash process.

It is clear the complexity of the changes operated by the neurotechnologies within legal issues. The law has deep and strong premises as voluntarism and free will. The neurotechnologies are like earthquakes into these classical legal bases.

It is a crystalline fact the myriad of paradigm shifts operated by the BMIs. Because of that and their many applications, it is indispensable to discuss legal, social, and philosophical affairs. The BMIs both increase or reduce our responsibility depending on the scenario and this has deep impacts on the law.

The philosopher of robotics, Guglielmo Tamburrini (University of Naples Federico II), makes a lot of analysis regarding the BCI systems in the book “Brain-Computer Interfaces in Their Ethical, Social and Cultural Contexts”. He points out the shift paradigms of the BCI in the information and communication technologies (ICT):

> BCI systems are prime examples of the actual and potential changes that novel information and communication technologies (ICT) are impressing on human–machine interactions, on public debate about the promotion and regulation of technological innovation, and on rational and irrational attitudes towards technological development. This contribution examines the impact that BCI systems are having on these aspects of human life from distinctive philosophical perspectives. (TAMBURRINI, 2014, p. 147).

Debates referring to these neurotechnologies are essential to the development of the area avoiding (or mitigating) eventual grotesque human rights transgressions. Furthermore, as saw above some classical grounds of law should be rethought to adapt to the changes operated by neurotechnologies. One of the most concerns related to neurotechnologies is the danger to a universal human right: privacy, consequently data protection.

3.3 THE INTERNET GOES TO THE MUSEUM: PRIVACY ISSUES, SLAVERY, INVISIBLE ADDICTIONS, HUMAN-MACHINE SYMBIOSIS

Mirrors on the ceiling
The pink champagne on ice
And she said
"We are all just prisoners here,
Of our own device"
…
Relax, said the night man
We are programmed to receive
You can check out any time you like
But you can never leave!

Hotel California. Eagles

Privacy is maybe the most affected human right because of the advancement of neurotechnologies. Nowadays we have much less privacy in the context of cell phones, Instagram, Facebook, Telegram, WhatsApp, Google, Outlook, and many others. These platforms are big collectors of information, furthermore, they are bridges connecting other companies to us - the human as a target of advertising. In this context, we are mere tools, objects of Informatic Technologies (IT) companies that use us to feed the market. This is treated in the documentary "The Social Dilemma", directed by Jeff Orlowski in 2020.

The replacement of the internet by the brainet will turn that scenario much more critical to privacy. Another problem to analyze is the addictions that come out of these neurotechnologies. And the brainets will turn worst the technology addiction taking the human-object into a very deep real chemical dependency because the brainets will allow a profound symbiosis between machines and humans, an umbilical coexistence in which humans and machines would be an indissociable entity. It is unquestionable the public health problem regarding the human addiction in technologies: people living inside WhatsApp, Instagram, and cell phones are causing car accidents, parents forgetting their children someplace, decreasing the socialization, etc. The digital addiction is profoundly real with neurochemical traces.

Digital addictions, by the use of the internet, cell phones, and other digital tools, have a chemical base related to the very same neurological circuitry in the use of cocaine and other drugs. The scientific studies already demonstrate that digital addiction has chemical grounds:

> Although not as intense as hit of cocaine, positive social stimuli will similarly result in a release of dopamine, reinforcing whatever behavior preceded it. Cognitive neuroscientists have shown that rewarding social stimuli—laughing faces, positive recognition by our peers, messages from loved ones—activate the same dopaminergic reward pathways. Smartphones have provided us with a virtually unlimited supply of social stimuli, both positive and negative. Every notification, whether it's a text message, a "like" on Instagram, or a Facebook notification, has the potential to be a positive social stimulus and dopamine influx. (HAYNES, 2018, p. 4).

Digital addiction is actually a big public and individual health threat. This question needs deep public and private carefulness related to it, with public policies, and awareness development.

The life inside the virtual world enslaves humans. We don't need to think so far away, in a world in which machines slave humans, because this is already happening by our own will, "voluntarily". We, humans, are already being "parasitized" by machines on our own initiative. We are being "parasitized" voluntarily.

The human-machine symbiosis is a great danger relating to addiction, a big health problem. The human-machine symbiosis can be a no way back to serious addiction problems.

In the context of human-machine symbiosis, we transhumanists will have many serious existential crises, because the extreme point of this symbiotic relationship between human and machine is the following outcome: a strange kind of "unique thing", a "unique entity", a hybrid human-machine - a cyborg. This is a collateral effect of a transhumanist world.

The experiments with brain-machine interfaces indicate that users begin to lose the perception of "what is the machine part" and "what is the human part". The separation between human and machine gets hard to make, a real unique entity. It is interesting to think about declarations of users such as: "It becomes part of you"; "It became me"; "radical symbiosis". (DREW, 2019, p. 1).

Beyond the situation of human-machine symbiosis and the loss of what is and what is not human or machine, we have problems with machine-learning and human agency. The neurologist and neuroethicist Philip Kellmeyer points out this last question:

> Philipp Kellmeyer, a neurologist and neuroethicist at the University of Freiburg, Germany, says that applying AI and machine-learning algorithms to analysing and decoding neural activity has "turbocharged the whole field".
> (...)

> But, he says, **using AI tools also introduces ethical issues of which regulators have little experience. Machine-learning software learns to analyse data by generating algorithms that cannot be predicted and that are difficult, or impossible, to comprehend. This introduces an unknown and perhaps unaccountable process between a person's thoughts and the technology that is acting on their behalf.** (DREW, 2019, p. 2, emphasis added).

The issue appointed by Kellmeyer is the problem of "human agency" loss, that is, a kind of human control and intention. As he said the machine-learning evolves by itself without human interference and the outcome of this evolution can be unpredictable, consequently, the actions performed by the brain-machine interface is equally unforeseen. In sum, the neurotechnology's user has one specific intention and thought but the result of the machine is something different from the human decision. In this situation we have a kind of "hybrid agency" - the final decision is the sum of the "machine decision" and the human decision.

The condition of "hybrid agency", for example, the device implanted in the brain, compromises the human as an agent:

> For neuroethicists, one concern is that inserting a decision-making device into someone's brain raises questions about whether that person remains self-governing, especially when these closed-loop systems increasingly use AI software that autonomously adapts its operations. (DREW, 2019, p. 3).

There are many problems related to this human-machine symbiosis such as legal responsibility, addictions, confusion or loss of human condition (sense of self), and decision making. Another concern is the protection of privacy because the stealing of brain information is something quite real in the advanced neurotechnology field. In fact, companies create subtle methods to get information from the brain without the person knowing it. The brain's data mining mechanisms will be very subtle, in which we will voluntarily and unconsciously provide some neurodata. So, the company doesn't need to steal brain data, it will get it subtly through mechanisms of compensation and entertainment (neurotechnological "Trojan Horse"). Therefore, brain-machine interface regulation is indispensable to protect human rights.

Regarding brain implanted devices, Dr. Shen points out the following situation about implanted devices to treat Parkinson and other possibilities:

> In the realm of security, consider the following scenario. **For over twenty-five years individuals have had brain stimulation devices implanted in their brains to treat Parkinson's. Researchers are now exploring the use of**

> **“smart stimulators” in an effort to further improve health. If hackers were able to remotely override the brain-computer interface system that governed the stimulation settings, they could conceivably cause significant damage to the patient with the implanted device**. Except for a sadist, inflicting such pain (or even death) would be unproductive. But what might be very lucrative would be to quietly (or not so quietly) approach the device manufactuer(s) with a simple deal: give us a ton of money, or we’re going to kill your patients and take down your company in the process. **The hacker might agree, in exchange, to hand over their hacking code—allowing the company to quickly reprogram their equipment, and avoid a devastating lawsuit and loss of life. For a terrorist sitting thousands of miles away, this might seem an appealing route to take. Security and legal expertise should be at the forefront of thinking through, and eliminating (or at least severely limiting) the possibility, of such scenarios**. (SHEN, 2016, p. 1072, emphasis added).

The scenario of brain implants is an old reality. However, as quoted above the idea is smart devices for brain implants. If these smart brain implants are connected to the internet, it is possible to hack the device and make serious interferences on the brain. So, as above pointed out by Shen “security and legal expertise should be at the forefront”. This is so important to discuss because it returns the hybrid agency issue. If the person has a brain implant legal questions arise: Who committed the act, the person or the machine? Or does the act come from the unity human-machine? Or in the case of hacking, the act is only attributed to the hacker without responsibility of the person? Eventual damages from the act are charged to whom if the hacker isn’t found: only to the person? To the manufacturer? To the insurance? And so on, because the chain of possible liable people is quite extensive. Because of that is indispensable a solid legal framework.

Implanted brain devices make us transhumanists, a human-machine symbiosis. This raises questions like “What is me?”, “What is the machine?”, “Are we the same thing?”. All these provoke existential dilemmas and many legal concerns regarding security, privacy, and health public policies.

The declarations of human-machine symbiosis (“It becomes part of you”; “It became me”; “radical symbiosis”) raise up interesting questions, like: What is human? What is machine? How can we separate one thing from the other? Are we only one thing, a hybrid being? A cyborg? Who is and who is not a subject of law? What is the boundary between humans and machines relating to legal and moral aspects? We need to explore all these questions.

Nowadays we already watch perplexed the symbiosis among humans and basic technologies such as cell phones and social media. Imagine the high development of

these technologies. The series “Black Mirror” explores eschatological, disruptive, and dystopian scenarios related to the use of technologies, since a kind of drug-addiction by technology, existential questions, problems with individual and social relations, until the mass assassinations. All these problems come out in the context of the neurotechnologies discussed in this topic.

The more symbiotic the human-machine relationship becomes, more positive and negative points we will have. It is the duty of law (and other sciences) to perform and avoid or mitigate those negative effects.

So, imagine a world in which human beings would communicate themselves without text intermediation or even through speech. This is a world that humans will communicate through a more direct way in which would be possible exchanges of feelings, emotions, mind-talking without speaking, a kind of telepathy. This is the global brainet, mindnet, brain-internet. There are many names, however, the idea is only one: human information exchange mediated by neurotechnology. A neuro-device that takes the brain activity of one person and sends it to another one. We could access the internet (or brainet), cell phones, computers using our brain activity directly without the need of speaking or hands to write. It is a paradise but can be hell too.

The “UK Parliament Post” brings to us some concerns related to BCI technologies such as targeting advertising, state surveillance, neural-data stealing:

> Brain activity data may be captured in increasing volumes as the consumer market for BCI technology grows. Some academics have expressed concern that companies developing or using BCIs could seek to use this data for profit, for example by targeting advertising to specific individuals. They also speculate that governments may seek to obtain brain activity data from BCI companies for security and law enforcement. Other academics suggest that connecting BCI systems to the internet may open up the possibility of them being hacked to steal data or to hijack the devices under their control. (UK Parliament POST. Number 614, January, 2020, p. 3).

The possibilities of human rights violations are pretty real and the evolution of these neurotechnologies will bring to us much more dangers and damages related to human rights transgressions. Companies can create databases of neuro-information captured through the use of the neurotechnologies available in the market. The neuro-information can be shared among companies, States, natural people, and commercialized in parallel markets.

It is essential to caveat the importance of these neuro-information. Current BMIs don’t allow thought’s reading. However, according to some specialists, it would be

possible to infer some personal information from the BCI data like emotional state, sexual preferences, religious and political beliefs. At the Cornell University, we find an interesting article about the power of the BCIs:

> They can capture neural signals, extract features from them, and subsequently use these extracted features to train and use machine learning (ML) models for all kinds of prediction and inference tasks. These include inferring emotions, sexual preferences and religious beliefs of individuals, detecting preferences of customers, measuring concentration, or estimating levels of drowsiness in drivers of cars. (AGARWAL *et al*, 2019, p. 1).

From BCIs (like electroencephalograms and functional magnetic resonance imaging - fMRI) it is possible to extract neural information and use it to develop machine learning (ML) to make predictions and many other applications. Specialists show concerns and point out the use of cryptographic techniques to protect people's privacy.

There is a rough critic of the misusing of neurotechnologies warning about abuses that would be already happening: David Salinas Flores of Faculty of Medicine, Universidad Nacional Mayor de San Marcos, Peru. He has many articles warning the world about alleged human transgressions through BMIs.

Flores scandalizes problems related to the brainets with their risks and damages to privacy. He recognizes the importance of the technologies but he's a great critic of the use of them against humans like privacy invasion, human controlling, information stealing and so on. Although his warnings seem like conspiracy theories, it is interesting to see his considerations.

He speaks "The Brain net aims to become the most powerful extortion, mind control, honor destruction and privacy violation weapon owned by the common crime, organized crime, the state terrorism and the cyberwar." (FLORES, 2018, p. 322). Flores approaches Michio Kaku, the physicist and promoter of technological advancements, as an example in his texts. Regarding the brainets Flores quotes Kaku, google CEO Eric Schmidt, and the Google head of engineering Ray Kurzweil:

> Kurzweil says about brain net in humans: "Human brains can connect to the cloud, which will allow us to send thoughts or memories".
> (...)
> Kaku says: "I know it's going to happen because I see the prototypes. ..so I make all these predictions based on what I actually see in the laboratory. When making predictions, I have two criteria: the laws of physics must be obeyed and prototypes must exist".
> "Telepathy, telekinesis, uploading memories, are now possible". Surprisingly, the Brain net release is announced in very close dates like 2020. The brain

> net promoters emphasize: “the Internet might be replaced by a Brain-net, in which emotions, sensations, memories and thoughts are sent over the Internet”. “Brain net to replace internet”.
> (...)
> In 2015, Google CEO Eric Schmidt said: “I respond very simply, the Internet will disappear.” (FLORES, 2018, p. 322).

The brainet will be the new internet. The classical internet will disappear as scientists and great CEOs are saying. Kaku says: One day, scientists might construct an “Internet of the mind,” or a brain-net, where thoughts and emotions are sent electronically around the world. Even dreams will be videotaped and then “brain-mailed” across the Internet. (KAKU, 2014, p. 20). It is fundamental to quote one thing about Kaku, he is a physicist and futurist that makes his reports on technological innovations only in two joint conditions: the existence of prototypes and obedience to laws of physics.

Brainet or the “internet of the mind” (“mindnet”) will revolutionize the world operating changes without precedents in human history. It can seem sci-fiction, but great people of the area are making these wagers. We need to always remember: the sci-fiction of today can be the future of tomorrow.

As we saw, neurotechnologies already allow extraction of some sexual data of people. About it, Flores makes warnings in the article “The brain net: violating the privacy of university students”:

> There are many evidences that indicate that the US armed forces, the United Nations, the transnational technology companies and the owners of TV channels have developed a corrupt network to implement the Brain net worldwide mainly in Latin American universities, being one of its main objectives to obtain university students’ sex life. (FLORES, 2018, p. 321).

Because of possibilities like above we need to debate these technologies and their impacts on society and individual beings. Such technologies would become instruments of vigilance, brain-washing, and transformation of humans into objects of propaganda putting our brain information in databases to sell it to who pays more money.

We already saw positive applications of neurotechnologies (like assistive features), but the negative scenario is the following: human beings inside of “The Truman Show” starred by Jim Carrey and in Foucault's world of “Discipline and Punish: The Birth of the Prison”.

It is because of all the negative applications linked to neurotechnologies that we must know them and promote many debates, warn society, and work in preventive and reactive ways.

There are some legislations regarding data protection. In Brazil, there is law 13.709/2018 (Brazilian Data Protection Law). It is a step to the protection of intimacy, privacy, and liberty, however with the raising of advanced neurotechnologies that legislation must be adapted to a new reality, a paradigm-shifting.

Section 1 of the law 13.709/2018 provides the following as the general objective of the legislation:

> Section 1. This Law regulates the processing of personal data, including via digital means, by individuals or legal entities whether public or private, aiming at the protection of fundamental rights to freedom and privacy and the free development of self for individuals.

As provided in section 1 the law aims “protection of fundamental rights” like freedom and privacy. These rights are the most harmed with the development of neurotechnologies. Section 17 completes section 1 providing that “Every individual has ownership of their personal data ensured and is guaranteed the fundamental rights of freedom and privacy, under the terms of this Law.”.

The rule of section 17 is very important because the ownership and right of possession of the neural data are extremely affected by the neurotechnological world. We may imagine the situation of high neurotechnology capable of extraction of thoughts (telepathy). If the law doesn’t protect the ownership or possession of the neural data many legal issues will emerge such as problems with freedom, privacy, or even copyright of the neural data, consequently the copyright of many intellectual properties like music, movies, technological ideas, and so on.

Although this law provides for the fundamental rights of the natural person it doesn’t neglect technological development because in section 2 (items V and VI) is foreseen the following:

> Section 2. Personal data protection regulation is based on:
> I – Respect for privacy;
> II – Informational self-determination;
> III – Freedom of expression, information, communication, and opinion;
> IV – Inviolability of privacy, honor, and image;
> **V – Economic and technological development and innovation;**
> **VI – Free enterprise, free competition, and consumer protection**; and

> VII – Human rights, free development of self, dignity, and the exercise of citizenship by individuals.

The law has the proposal to poise legal principles in eventual collision: economic and technological development and free enterprise with human rights like privacy and freedom.

Another important provision of this law is the attempt to avoid the commercialization of data with the prohibition of processing of data entirely by private legal entity (section 4, § 4). Furthermore, it defines “sensitive data” as a way to protect the most sensitive information of the person:

> Section 5. For the purposes of this Law, the following definitions are used:
> II – Sensitive Personal Data: Personal data on racial or ethnic origin, religious belief, political position, membership in a trade union or affiliation to religious, philosophical, or political organization, data concerning health or sexual life, genetic or biometric data, when linked with an individual;

This provision defines what kind of data is more important to be protected under the law. It is foreseen sexual, genetic, and biometric information as sensitive data. As long as the neurotechnologies are developing the law must provide for the protection of the “neural data”. Unquestionably this is the most sensitive data of all because it encompasses many others like religious, political, sexual, and philosophical data. Hospitals and clinics must protect the neural data of the patients avoiding their misuse and commercialization in the parallel markets.

To comply with the goal of protecting neural data the legislation must establish liabilities and compensation for damages. In this way, the approached brazilian law determines in the section 42:

> Section 42. **Controllers or processors that, in exercising the activity of processing personal data, cause property or non-material damage, whether individually or collectively, in violation of the personal data protection legislation, are obligated to repair it**.
>
> § 1 In order to ensure effective compensation for the data subject:
>
> I – The processor will be jointly responsible for the damages caused by the processing when the processor fails to comply with obligations from personal data protection legislation or when fails to follow the controller’s lawful instructions, in which case the processor is considered the same as the controller, except in the cases of exemption of liabilities established in Section 43 of this Law;

> II – Controllers directly involved in processing that results in damage to data subjects will be jointly responsible, except in the cases of exemption of liabilities established in Section 43 of this Law.
>
> § 2 In a civil suit, the judge may shift the burden of proof in the favor of data subject if, in the judge's opinion, the claim is credible, there is an insufficiency for the purposes of producing proof, or the production of proof by the data subject is excessively burdensome.
>
> § 3 The reparative actions for collective damage with the purpose of holding a party responsible under the terms of the chapeau of this Section may be exercised collectively in legal proceedings, following the provisions of relevant legislation.

Section 42 establishes the obvious in front of subjects harmed from case of personal data damages - the responsibility to repair it. But, the following items of section 42 make important steps in order to provide protection to the users. Section 42, § 1, I and II, establishes joint liability of the processors and controllers that handle personal data. As we already saw, "joint liability" is an important legal instrument to guarantee compensation for damages. So, with the joint liability related the people involved in personal data manipulation the users of neurotechnologies get more security.

The dispositions in section 42, §§ 2 and 3, establish other important legal tools: shift the burden of proof and mechanisms of collective legal proceedings. The first one makes the collection of evidence favoring neurotechnology users. The second one foresees the legal mechanism of running collective lawsuits helping in the speed and legal certainty.

Another vital disposition is contained in section 45 because it sets the damages on the personal data in the consumer relation will be regulated by the specific rules of the consumer legislation.

> Section 45. The scenarios of infringing of data subject's rights under the scope of consumer relationships remain subject to the liability rules outlined in relevant legislation.

This provision is essential because it better protects neurotechnology users. By the way, in the scope of "neurotechnology user" it seems adequate a presumption of consumer relation. The application of the consumer rules is quite essential because of the mechanisms that facilitate the user's protection like "shifting the burden of proof" and "absolute responsibility". However, these legal instruments can't serve as impenetrable obstacles to neurotechnological developments. Because of this, it is

important to architect an excellent legal framework establishing rights, duties, legal certainty, solidarity in the compensation for damages, inter alia.

The provisions at the Brazilian Data Protection Law follow an international trend as we see in the many legal instruments. The Universal Declaration of Human Rights approaches privacy, liberty, and freedom:

> Article 1
> All human beings are born free and equal in dignity and rights. They are endowed with reason and conscience and should act towards one another in a spirit of brotherhood.
>
> Article 3
> Everyone has the right to life, liberty and security of person.
>
> Article 12
> No one shall be subjected to arbitrary interference with his privacy, family, home or correspondence, nor to attacks upon his honour and reputation. Everyone has the right to the protection of the law against such interference or attacks.
>
> Article 18
> Everyone has the right to freedom of thought, conscience and religion; this right includes freedom to change his religion or belief, and freedom, either alone or in community with others and in public or private, to manifest his religion or belief in teaching, practice, worship and observance.

The Universal Declaration of Human Rights is anchored mainly through freedom. We saw neurotechnologies as the brainets that may be used to put in danger the freedom and privacy because of the high possibility of intense vigilance of private and public organizations “looking directly into our thoughts” with power to “hijack” them, manipulating and using them against us making blackmailing, brainwashing or other similar actions. So, the legal rules as pointed out above are essential to provide some protection to the citizens of the world.

3.4 CREATING WORLDS THROUGH DREAM ENGINEERING. THE BUTTERFLY EFFECT AND THE NEW KEYS TO THE SOUL

Morpheus flew, making no noise with his wings, and soon came to the Haemonian city, where, laying aside his wings, he assumed the form of Ceyx. Under that form, but pale like a dead man, naked, he stood before the couch of the wretched wife. His beard seemed soaked with water, and water trickled from his drowned locks. Leaning over the bed, tears streaming from his eyes, he said, "Do you recognize your Ceyx, unhappy wife, or has death too much changed my visage? Behold me, know me, your husband's shade, instead of himself. Your prayers, Halcyone, availed me nothing. I am dead. No more deceive yourself with vain hopes of my return. The stormy winds sunk my ship in the Aegean Sea, waves filled my mouth while it called aloud on you. No uncertain messenger tells you this, no vague rumor brings it to your ears. I come in person, a shipwrecked man, to tell you my fate. Arise! give me tears, give me lamentations, let me not go down to Tartarus unwept." To these words Morpheus added the voice, which seemed to be that of her husband; he seemed to pour forth genuine tears; his hands had the gestures of Ceyx.

Bulfinch's Mythology

Sweet dreams are made of this
Who am I to disagree
I travel the world and the seven seas
Everybody's looking for something
Some of them want to use you
Some of them want to get used by you
Some of them want to abuse you
Some of them want to be abused

Sweet dreams. Stewart David Allan and Lennox Ann

Imagine a tetraplegic, a person with locked-in-syndrome (LIS), adrenoleukodystrophy (movie - Lorenzo's Oil), or amyotrophic lateral sclerosis (it affected the great physicist Stephen Hawking). All these medical conditions severely paralyze the muscular system of the person. It is a complete prison with "complete consciousness" - it is the mind imprisoned in the paralyzed body.

These situations are extremely agonizing, a deep terror. The physicist Hawking was imprisoned almost his entire life. So, there is a light of hope to these people, a way to give some dignity to them - Dream Engineering (DE). The DE is the use of neurotechnology called Virtual Reality (VR) technology.

Dream technologies can create pleasant worlds for people with paralysis giving to them dignity and well-being. So, the question is about health too. Therefore, this first example concerns the health application of the dream technologies, with legal use anchored in the dignity principle.

Before we go deep into dream engineering, let's see some psychoanalytic considerations about dreams, going back to Jung and Freud.

Neuroscience has definitions of dreams more centered in the material world (brain-body-environment relations), while Jung's and Freud's psychology looks more at the consciousness and unconscious structures, that is, neuroscience considers more the brain (“hardware”, the physical), while psychology looks more the mind (“software", the metaphysical).

Weitz addresses many considerations about Jung’s and Freud’s interpretation of dreams that can be resumed in the below comparative framework.

Lawrence J. Weitz: Jung's and Freud's Contributions to Dream Interpretation: A Comparison	Jung’s and Freud’s dreamworlds in the context of Dream Engineering
1. Like all psychoanalysts Jung thinks of dream interpretation not so much as being of scientific interest as of constituting an **aid to restoring and maintaining mental health**. (WEITZ, 1976, p. 289, emphasis added). (…)	1) The role of dream in restoring and maintaining health is related to the dream engineering (DE) that helps in mood, memory, physical rehabilitation *et al*, as we will see in the article about creation of dreamworlds from sensory stimulation;
2. The dream gives a true picture of the "subjective state" — how we really feel about ourselves— which the conscious mind cannot or will not give. **In the waking state the dreamer sees himself as he wants to be or should be. Dreaming, he sees himself as he is**. Dreams then, rank with physiologic facts as a method of diagnosis. (p. 290, emphasis added).	2) About dreams that show the real person, it is important to highlight the DE technologies allowing dream videotaping, so, it will be possible the person watches herself/himself through recorded dreams - videotaped thoughts; here we have many issues of privacy because the wrong use these neurotechnologies will represent deep transgression of the most inner dimensions of person; the dream-reading machines (DRMs) can become “dream panopticons” - remembering the

(…)	structure of vigilance of the panopticism in Bentham philosophy;
3. **But dreams not only help in understanding the past, they also offer suggestions as to desirable future activities**. (p. 290, emphasis added). (…)	3) The purpose and possibility to see past, present, and future of people through their dreams is important in terms of psychological analysis; however, here we also have the danger of dream panopticon, because the companies and States can use the DRMs to watch every “desirable future activities”;
4. **Those parts of the personality which have been unconscious must be brought to light and subjected to the closest scrutiny**. This compels the dreamer, sick or well, to face his problems and to make use of judgment and decision. (p. 290, emphasis added). (…)	4) This point has umbilical connections with the already commented points; here we can think DRMs as instruments to reveal the hidden parts of our personalities; we don’t remember many dreams or they don’t pass through the conscious dimension, so, DRMs can help us in this hidden/unconsciousness structures of our being (Will we be able to see our archetypes?);
5. According to Jung, Freud's theory that every dream is a fulfillment of repressed wishes has long ago been superseded. It is true of some dreams, not by any means of all. (p. 290). (…)	5) Here we have one of the contrasts between Jung and Freud visions about dreams; Freud made much connection between dreams and imprisoned sexual desires; Jung criticized this overweighting of sexual contents and gone beyond, including the idea of the collective unconscious and its structures

	- the archetypes;
6. **Much of our lives is spent in the unconscious state—Jung says "almost half — and the dream is the utterance of the unconscious**. It is highly probable that the unconscious mind contains a body of contents equal to or even greater than that of consciousness, which is subjected to limitation and exclusion. (p. 290, emphasis added). (…)	6) The fact of our unconscious has much more contents is already a neuroscientific public fact; this reinforces the importance of unconscious in our lives, in modeling our personality; but the unconsciousness isn't easily accessible, so, DRMs can help us more in this strange multiverse; neuroscientific searchings show about 95% our lives are unconscious (SONES, 2018; *et al*), that is, this other "I" is much bigger than "me" (Freud's view of human mind - mental iceberg);
7. Jung's views prove that he knew the truth of this statement. In his earlier writings he said: **"It is advisable in the beginning to make use of dreams for the purpose of reaching the important subconscious material by means of the patient's free association with them"** (1). Later he says, " Tree association' is of no value" (2). We must concentrate on the dream images themselves. (p. 291, emphasis added). (…)	7) DRMs will help us a lot in this context because now the unique way to specialist access patient's dreams is from the patient's story; this story can be voluntarily false, a partial story with forgotten pieces, or the dream didn't pass through consciousness; thus, DRMs may help us to achieve hidden pieces of information, to complete partial stories, because they act as keys to the "soul", the new "soul's eyes";

8.	But the ego knows only its own (conscious) contents, not the unconscious and its contents. **Self-knowledge is limited. In the unconscious, immune to conscious criticism and control, we stand defenseless, open to all kinds of influences and emotions** (4). (p. 291, emphasis added). (…)	8) Here we have blessings and curses because the dream technologies to look at our unconsciousness are being used in laboratories (new eyes of the soul); beyond dream videotaping (neuroscientist Jack Gallant *et al*), we have prototypes to achieve the gates of dream manipulation as treated in the movie “Inception”; the paragons are smart lenses with an internet connection to create, alter and guide dreams; another person (observer) can connect to dreamer’s lenses and enters in his dream, accessing his defenseless land, with “open to all kinds of influences and emotions”;
9.	He (Freud) "invented" sublimation to save us from the wild beast's claws. **"Are we still unable to see," Jung asks, "that man's conscious mind is even more devilish and perverse than the unconscious?"** (p. 291, emphasis added). (…)	9) We can see the sublimation as the “ego” (frontal cortex) reducing id (reptilian and limbic brain) to channel negatives impulses into positive and acceptable social behaviors (according to the prefrontal and orbitofrontal cortices);
10.	This does not seem to help things much, although perhaps it paves the way for Jung's view of the dream as the voice of the "higher self." **The unconscious, he says, is not a demonic monster, but is entirely neutral**	10) Jung believed that the unconscious is neutral to moral and aesthetic realities; he spoke the unconscious isn’t a demoniac monster, only if it is misunderstood; in this sense, the DRMs can help us to best understand this hidden character in our lives using them

	as to moral sense, aesthetic taste, and intellectual judgment. It is only dangerous when it is misunderstood.	as the new windows to the “soul/spirit”;
11.	**Dreams are our most effective aids in building the personality**. (p. 291, emphasis added). (…)	11) Dreams are already created, altered, and manipulated with many dream technologies; dream technologies can be used to increase social skills and empathy, acting directly in the mirror neuron system; dreams can be created with contents in order to promote empathy and catharsis inside the dreamers, creating social attachments to facilitate and improve the human relations; it would be a giant leap in human behavior, maybe a technological gate to human gets out the cave, because although human is reaching the paradise in a technological sense, but behaviorally it yet in the caves, harming and killing your pairs and the nature;
12.	The contents of the collective unconscious are **archetypes, which are universal, primitive modes of emotion and behavior** (3). (p. 292, emphasis added).	12) Dream neurotechnologies may help us to investigates the collective unconsciousness and the archetypes; nevertheless, there are many other issues related, e.g., the possibility of melding dreams (smart lenses among dreamers and observers); set of collective dreams widely performed in the planet (“gestalt dream”) can to promote a new kind of globalization -

	neuroglobalization made from the inner-to-out way; many legal, ethical, and philosophical issues raise up: who is responsible for a certain act?; how the person will deal with the loss of unity and identity?; how human agency is considered here, such as a collective human agency?

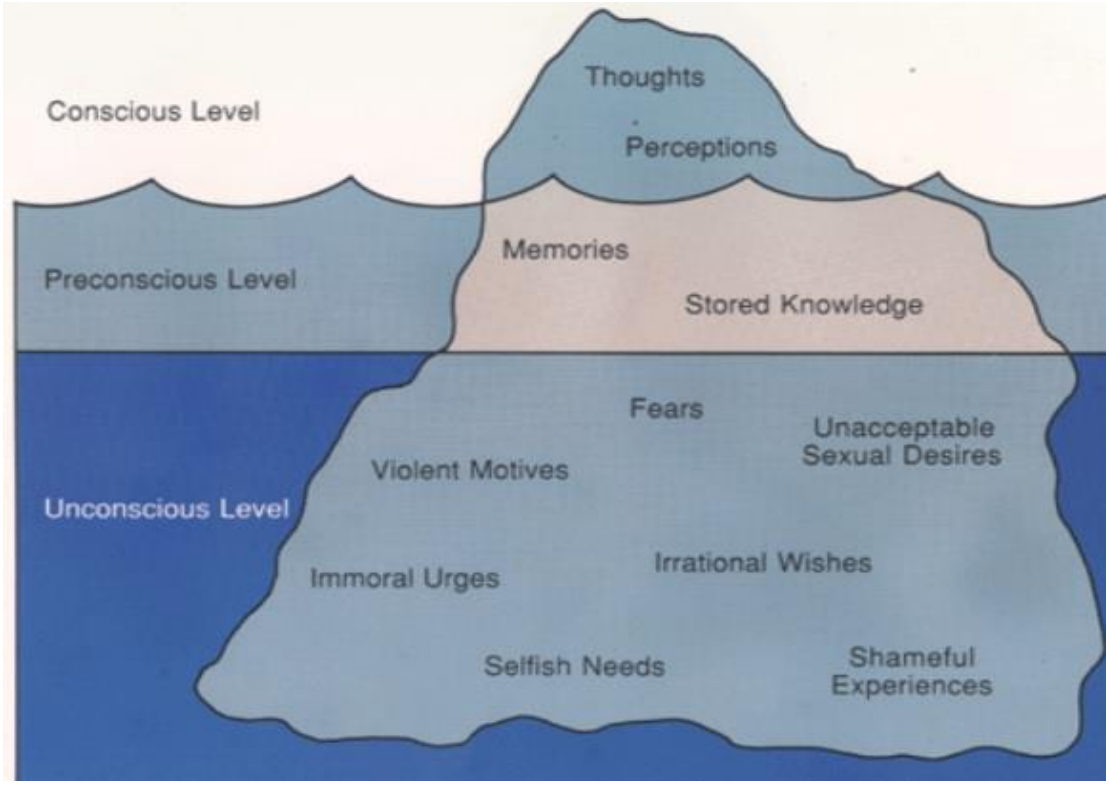
In this chapter, we will see machines of reading dreams operating in prototype forms (recording basic images and videos of dreams). So, somewhere in the future, it will be possible for psychologists to use these machines to read patients' dreams in order to better understand them and make more adequate treatment.

Dream-reading machines (DRM) can have the power to access the subconscious or unconscious of a person through his/her dreams, revealing many intimate thoughts, experiences, and traumas: "Dreams reveal the secrets of the inner life and hidden factors of the personality." (WEITZ, 1976, p. 291).

The image below shows us Freud's mental iceberg model in which the unconscious mind is the base of the iceberg, constituting the major part of the mind, hence playing more protagonism in our lives. As pointed by Kamil and Abidin:

> Freud (1955), in his Topographical theory, described three areas of mental functioning or systems of mind that exist and also defined their association with conscious thoughts. He stressed that unconscious level of mind denotes a set of mental processes and content that is operated outside conscious awareness. **In addition, he considered the mind structurally identical to an iceberg in which a major portion exists underneath the surface, affecting the conscious mind dynamically and decided**. (KAMIL; ABIDIN, 2013, p. 150, emphasis added).

Both image and text denote the grandiosity of the unconscious in our lives. Studies appoint about 95% of mind processes happen in the unconsciousness dimension (SONES, 2018; *et al*), reinforcing its importance. DRMs can play a vital role in the process of understanding the mind trying some accesses to the unconscious.



Source: Kamil and Abidin

The idea of dream engineering is to create, alter, and record dreams. *A priori*, DE seems harmless, without any legal important issues. However, we will see even this Morpheus' world arises many legal and moral questions.

There are many technologies available to create and alter dreams, including natural ways such as putting good scents and music in the place and making touch movements on the person's skin and body. Nevertheless, advancing in technologies is allowing the improvement of these techniques.

Basic dream technologies can be summed up with use of scents, sounds, music, body touching, controlled electrical pulses, etc.

The frame below was constructed from the article of Carr *et al* (Dream Engineering: Simulating worlds through sensory stimulation. 2020). It resumes some basic dream technologies that are being used.

1. Barrett (1993) asked college students to think about a personally relevant problem for 15 min before sleep, and in response, 49% of reported dreams were rated as relevant to the problem, **with 34% of them containing a**

solution. (p. 5, emphasis added);

2. (...) applying oscillating electrical potentials to the scalp at 0.75 Hz has been used to augment slow oscillations in N3, **resulting in improved memory performance the following day** (Marshall, Helgadóttir, Mölle, & Born, 2006). (p. 5, **e**mphasis added);
3. Auditory cues, including speech, can target reactivation of declarative memories and have frequently been used to **enhance language learning** (Oudiette & Paller, 2013). (p. 5, emphasis added);
4. Applying targeted protocols to dream content has potential for enhancing sleep functions, e.g., **incubating creativity or ameliorating mood via pleasant dreams**. (p. 5, emphasis added);
5. Recent work suggests that sensorimotor feedback from twitches during REM sleep is critical for **development and maintenance of motor coordination** (Blumberg, Marques, & Iida, 2013). (...) **The use of EMS to augment motor dream imagery thus offers an intriguing application of dream engineering for physical rehabilitation**. (p. 7, emphasis added);
6. Although limited work has been published in the field of olfactory displays for VR, some researchers (Ischer et al., 2014), showed that the addition of smell in VR significantly enhances the **sense of immersion**. (p. 9, emphasis added);
7. **The device could be used to release pleasant scent based on physiological indicators of nightmares**; (p. 10, emphasis added);
8. Audio has always been used in tandem with visual stimulation in VR simulations. Spatialized audio has been used to increase **sense of immersion** in simulated virtual space (Naef, Staadt, & Gross, 2002), while real-time audio has been used to enable **sense of presence for virtual collaborations** (Monahan, McArdle, & Bertolotto, 2008). (p. 10, emphasis added).

Summing up, the basic dream technologies presented above shows us their roles in 1) solution of problems; 2) improving memory through electrical stimuli; 3) language learning with auditory cues; 4) helping creativity and mood via pleasant dreams; 5) aid in physical rehabilitation; 6) creation of sense of immersion in dream

from olfactory system; 7) use of pleasant scents to finish nightmares (excellent way to treat people with chronic nightmares); 8) use of audio system to create sense of immersion and presence in dreamworld.

Concerning physical rehabilitation, Carr *et al* address an important application of dream engineering on medical care:

> Currently the use of BCI neuroprosthetics requires long periods of motor imagery practice, as individuals must re-learn how to send a motor command to control an external limb. VR has been used as a more immersive way to train individuals to control a virtual avatar using a BCI, prior to learning to control a real neuroprosthetic (De Mauro et al., 2010). (CARR *et al*, 2020, p. 13).

Summing up, an injured person has long periods of internal imagery thinking to get control of BMI in order to control an exoskeleton. This is useful, e.g., for a tetraplegic person to use a metallic avatar in order to accomplish with the “walk again project”. As said above, BMI neuroprosthetics requires much time of mental training, exhaustive practices. So, virtual reality (VR - dreams) is being used to help mental training. An excellent application of the principles of human dignity and autonomy regarding the intersection between dream neurotechnologies and law.

The paralyzed condition provokes a kind of inertia in the respective brain area in our somatosensory system - our brain cortical area doesn't receive the normal inputs from the body.

Summing up, the paralyzed person must re-learn to move his/her body and limbs through mind control. This is a very hard task that requires much feedback between the brain and neuroprosthetic limbs. Specialists in dream engineering address the use of dreams to help the sensory feedback and facilitate the hard task of consciously making the neuroplasticity, putting in order the somatosensory areas with low activity because of the limb paralysis.

> Given the benefits of motor imagery and VR training for BCIs, a future possibility may be to use lucid dreaming to practice controlling a BCI while also exploring the use of the dreaming body in the dreamworld. Blumberg and Dooley (2017) have likewise suggested that adaptation to neuroprosthetics may benefit from nighttime stimulation similar to twitching, in order to fully integrate the sensory feedback of a neuroprosthetic limb into the body schema, essentially completing the dream engineering circuitry from bottom-up to top-down. (CARR *et al*, 2020, p. 13).

In Carr *et al*, we find many rich discussions about technological and ethical issues regarding dream engineering. The article of Carr *et al* has an approach about what dreams are:

> Proponents of neurocognitive theories of dreaming suggest that such experiences are akin to simulations of the waking world (Foulkes, 1985; Revonsuo, 2000; Tart, 1987; see Nielsen, 2010 for a review). **They are created from memory – recent and remote – and come alive through sensorimotor, limbic, and default-mode cortical activity**. **In Hobson's theory of protoconsciousness (Hobson, 2009; Hobson, Hong, & Friston, 2014), the REM state is viewed as a virtual reality (VR) generator used by the brain to instantiate world interactions and to build predictions of space and time**. (CARR *et al*, 2020, p. 1, emphasis added).

As described above, dreams come from sensorimotor, and limbic cortical brain activities. The REM (rapid eye movements) state is viewed as VR's generator that makes world interactions - REM is taken as responsible for dream creation. Sleeping REM phase is when dreams are more reported. The mention to "world interactions" is related to the interaction among consciousness, brain, body, and environment. There are unilateral and/or bilateral relations among these actors in the dreamworld. For instance, inputs from sensory bridges as sounds are decoded into electrical shapes and transformed into dreams as talking, music, inter alia. In sum, there was a body-brain directional movement to create the dream. This is called bottom-up relation. And the movement of dreams provoking brain movements and body actions is called top-down relation. Both these relations have legal and ethical issues in the neurotechnological world.

Carr and others speak about the power of human-computer interaction (HCI) in the dreamworlds: "The field of HCI has a storied history of building devices to create and alter experiences of simulated worlds." (CARR, 2020, p. 5). Apparently, these devices are harmless but there are many applications that can damage the sphere of human rights. Let's imagine the following situation, regarded to the responsibility legal issue:

> Morpheus is dreaming a dream full of movements. In the real world, Morpheus is connected to his physical avatar, a mechanical robot. The robot is programmed to translate Morpheus' brain activity into physical acts.
> The robot takes the brain activity of the motor cortical area and starts to move by the house. When the robot was walking through the house it killed someone. Who is responsible for the death? The robot? The AI? The

> programmer or manufacturer? The person with the BMI device? Or is the dream responsible? And the dreams inside other dreams?

Clearly, the last candidate couldn't be held responsible, although it could be used as legal arguments to obtain some acquittal (sleep-walking analogy) or co-responsibility. Beyond the physical avatar, the person could be also connected to a virtual avatar and equally could have committed more crimes - as cybernetic crimes.

The story above seems like a total science fiction tale. However, the fact is that this kind of story is being discussed by scientists of dream engineering.

> It was recently shown that controlling a Brain-Computer Interface (BCI) device is possible from within a lucid dream. **Mallett (2019) showed that using a consumer BCI, a lucid dreamer was able to, while asleep, control a moving block on a computer screen as instructed**. (CARR *et al*, 2020, p. 13, emphasis added).

So, the story above can be very close to happening. Linked to this many legal and philosophical issues raise up. The first ones can be translated into the question about who is responsible for the death. Now, the second can be viewed as the metaphysical universe of dreamworld creating actions in the physical world. It is the platonic world moving the material world and causing legal consequences. A little metaphysical butterfly effect in the dreamworld externalizing its huge actions into the physical world.

The story of a dream guiding a physical avatar raises many legal, ethical, and philosophical questions. Dream neuroengineering will allow dreams to provoke many manifestations in the physical world. Thus, the human agency problem must be addressed:

> For instance, dreams could be directly recorded to a BCI avatar (which highlights the importance of consent), or technology could be directly controlled from within a dream (which highlights the role of agency of a dreamer acting in the real world). These are important ethical considerations that parallel others in the field of neuroengineering, which we discuss further below. (CARR *et al*, 2020, p. 13).

When the dreamer is connected to a BMI avatar, the dream can move the physical avatar and commit antilegal acts. Here, raises the human agency problem - Is there control and awareness over the act? Was it a lucid dream or not? Does it make some difference? Is there hybrid human agency (human + dream)? Does the "dream

agency” reduce human agency, hence mitigate human responsibility? These types of questions can be made in the context of a BMI avatar guided by dreams.

In the context of DE the human body turns itself into an interface between dreamworld and the physical world:

> Framing dreams as functionally embodied opens up an avenue to manipulating the dreaming mind: **the body as a permeable barrier that can be used to interface with the virtual world of dreams**. Parallel work in Human-Computer Interaction (HCI) has utilized the body as an interface to increase the immersion of virtual environments by engineering multi-modal devices that can simulate haptic sensations such as touch, temperature, and inertial forces as well as audio-visual or olfactory sensations. (CARR *et al*, 2020, p. 2).

Our body serves as an avenue between the sensorial world and dreamworld: “The body could, with verifiable physiological signals, bridge dream states with the waking world.”. (CARR, 2020, p. 2). The DE uses the human body as a bridge and makes sensorial stimuli to create dreams. There are specific techniques and products to create specific dreams.

Above we saw an example regarding responsibility and dream engineering, now we can glimpse a situation about privacy and manipulation. The story is as it follows:

> A very important public authority (Maximus) addicted in dream engineering is connected to a dream technology. This last is connected to a cell phone app and to the internet. Through the internet this system is often hacked by political adversaries. The adversary (Commodus) is subtly inputting data into the brain/mind of the Maximus through his dreams, creating nightmares to exhaust him, making brain-washing. A real “Inception”, insertion of information. Added to this, Commodus is frequently transgressing privacy and collecting information from Maximus.

This seems like another transhumanist dream, pretty far away for us. It seems extracted from movies, as the movie “Inception” starred by Leonardo DiCaprio (Cobb):

> COBB
> What’s the most resilient parasite?
> COBB...A bacteria? A virus?
> COBB...An intestinal worm?
> ARTHUR
> What Mr. Cobb is trying to say…
> COBB...An idea
> COBB...Resilient, highly contagious. Once...an idea’s taken hold in the brain...it’s almost impossible to...eradicate. A person can cover it...up, ignore it- but it stays there.
> (...)
> ARTHUR

> Yes. In the dream state, conscious defenses are lowered and your thoughts become vulnerable to theft. It's called extraction.
> COBB
> But, Mr. Saito, we can train your subconscious to defend itself from even the most skilled extractor
> COBB
> Because I am the most skilled extractor. I know how to search your mind and find your secrets. I know the tricks, and I can teach them to your subconscious so that even when you're asleep, your guard is never down.

It comes from a movie, but the prototypes are already in the dream laboratories. This is about the insertion of the most resilient parasite into the dreamer brain/mind:

> While this is a positive outcome, there are real concerns that manipulating dreams or sleep-learning can have negative outcomes. These range from simple possibilities of inducing nightmares via unpleasant sensory stimulation, to more complex possibilities of selectively enhancing or weakening implicit associations – creating political bias or sexual attraction, among others. (CARR *et al*, 2020, p. 14).

Therefore, although the ideas about dream engineering seem pretty futuristic and completely crazy, in fact the "basic forms" of technologies are already available. One interesting thing, among other ones, is the arising of new jobs - such as the profession exercised by Cobb starred by DiCaprio, an extractor and protector of information in the dreamworld.

About the character interpreted by DiCaprio, Michio Kaku raises the question concerning the possibility of entering into dreamworld of people and influence them:

> So in the near future, it might be possible to watch a video of a person's dream and actually influence its general direction. But in the movie Inception, Leonardo DiCaprio goes much further. He is able not only to watch another person's dream, but also to enter it. Is this possible? (KAKU, 2014, p. 195).

To answer his own question Kaku discusses the hybrid world of the sleepwalkers (part real and part dreamlike), speaking those physical images who pass through the eyes can influence their dreams "Hence it is possible that physical images that the eye actually sees can freely interact with the fictitious images that the brain is concocting during a dream." (KAKU, 2014, p. 196). From this, Kaku raises up the possibility of a person entering into the dreamworld of others through images using intelligent lenses (with internet connection):

> The way to enter someone's dream, then, might be to have the subject wear contact lenses that can project images directly onto their retinas. Already,

> prototypes of Internet contact lenses are being developed at the University of Washington in Seattle. So if the observer wanted to enter the subject's dream, first he would sit in a studio and have a video camera film him. His image could then be projected onto the contact lenses of the dreamer, creating a composite image (the image of the observer superimposed upon the imaginary image the brain is manufacturing). (KAKU, 2014, p. 196).

Thus, the prototypes of the smart lenses are being constructed at the University of Washington and the next step is advancing into the internal imagery of people through these neurotechnologies. We can think this apparatus as a brain-machine interface that allows mutual interactions between the dreamer and the observer (he also uses intelligent lenses).

> The observer could actually see this dream world as he wanders around the dream, since he, too, would be wearing Internet contact lenses. The MRI image of the subject's dream, after it has been deciphered by computer, would be sent directly into the observer's contact lenses. (KAKU, 2014, p. 196).

The world created from this dream apparatus ("inception device") allows reciprocal and unthinkable possibilities among the participants. Kaku also speaks about a close future where MRI scanners will directly connect sleeping-dreaming brains: the dream melding.

The concept of merging minds through BMIs has already been addressed, a situation in which minds merge (a kind of gestalt mind) and raises legal questions such as "Who is responsible for this act?". In the context of dreams merging, we have similar legal issues, because if the "gestalt dream" commits a crime in the external world, someone or something must be responsible for it.

In the dream-multiverse the most interesting thing is the following: in the dreamworld the laws of physics aren't applicable - everything is possible. Therefore, in the dreamworld we have unconditional power (we can fly, move objects, make teleportation, walk through the stars), we may be gods, controlling and architecting many worlds. These have recreational applications, however, the legal ones also appear.

In the "inception device" crimes can be made. Thus, imagine the following scenario:

1. A woman is using smart lenses to create and guide sweet dreams;

2. The lenses are connected to the internet and suddenly they are hacked by a sick man that has sexual attraction to the woman;
3. The man uses the “inception device” to enter into the woman’s mind and dreams;
4. The hacker perceives a gate to realize your sick desires and creates a dream with sexual content;
5. Unfortunately, the woman couldn’t get out of the dream in time and the hacker has sexual relations with her “dream person” without her consent;
6. Her sweet dream became a nightmare of sexual abuse with awful consequences;

In the above scenario, we can discuss the crime of raping happened in the dreamworld. Another situation would be stealing secret information among companies, states, and making manipulation, brainwashing, and so on. About the possibility of creating and altering dreams, Carr and others point out the power of the human-computer interaction (HCI) in dream engineering: “The field of HCI has a storied history of building devices to create and alter experiences of simulated worlds.” (CARR *et al*, 2020, p. 5).

Regarding the possibility of dream recording and consequently damage to privacy Carr *et al* point out the following:

> The Dormio system is a combined sleep tracker and dream incubator, focusing on incubation of sleep onset dreams using auditory semantic cues. **The Dormio device is wrist-worn (see Fig. 3) with an associated app used to communicate with users and record dream reports via laptop or cellphone**. The system tracks sleep onset and then initiates serial awakenings, inserting a dream incubation theme during each inertia-laden awakening, creating a serial dream incubation paradigm. (CARR *et a*l, 2020, p. 10, emphasis added).

The Dormio System records dream reports as heart rate, breath rate, and similar ones. However, human curiosity is endless, why not create pictures and movies through our dreams? We could say this is quite impossible, but a few years ago. Scientists at the University of California are bringing these futuristic scenarios to the present. Using fMRI and other technologies scientists are decoding and videotaping our internal imagery as thoughts and dreams. There are many famous pictures and clips from these dream videotapes widely available on the internet. The neuroscientist,

psychologist, and professor Jack Gallant, from UC Berkeley, is a protagonist character on this movement of videotaping the “dreams stage”.

The images below come from the dream videotaping made by Jack Gallant and Shinji Nishimoto.

Source: Jack Gallant and Shinji Nishimoto. 2011.

The distorted images are constructed by the dream reading-machines - the machine decodes brain activity translating it into images or movies. The images and videos are still basic (but comes from 2011), however, it is a matter of time until these videotaping technologies get highly advanced.

Regarding this application of dream recordings we again arrive in the legal scenario of privacy. That is, this neurotechnology is profoundly interesting and useful (communication of people in coma, locked-in syndrome, giving them some dignity and autonomy), however, this same technology can be used to harm our privacy, hence our liberty. A serious question to be taken is that this possibility of recording our internal imagery (dreams and conscious thoughts) is the transgression of our internal privacy, our most intimate thoughts, emotions, objectives, and desires. Because of that, the law must follow these technologies.

Nowadays dreams are being videotaped. So, sooner or later it will be possible to record them with more quality and accuracy and mailing them to friends, family, the girlfriend, or boyfriend on the other side of the planet.

Now, let’s address some applications about dream engineering and creativity. The dreams below show us the power of dreams in creativity.

Dream 1

I was on the farm. It was night and I was gazing at the stars. I invited my brother to look at them. I pointed my fingers at stars and made the shape of a man connecting dots through the stars. When my brother looked up at the stars, the man constituted of stars came to life and began to move - the star-man. Handcuff sounds appeared. The star-man moved a lot and suddenly fell on the mountain of my farm. He was very close to me. He fled far away and never appeared in my dreams again.

Dream 2

Sleeping in bed, I woke up and took my cell phone. Inside of it, there is an image of a galaxy of orange color. I move the galaxy to the ground of the bedroom. Suddenly I see the orange galaxy in 3-D. I am on my knees on the ground contemplating the galaxy. My “I” needs more, he needs to absorb the galaxy, and it happens. I feel my body burning, mainly my hands and legs. Inside of the galaxy, I see the whole multiverse. There isn't any more bedroom, only the galaxy, and other universes. Inside the galaxy, there is a star that is vibrating a lot and from its poles are expelling big rays of energy. To integrate me with the essence of the exploding star I touch it and absorb it. My human shape of bones and flesh is disappearing and transforming itself into light and star explosions. The galaxy loses its shape and now it and I are the same thing. The spiral galaxy takes my human shape. I am a galaxy in human form. I look at the holes in my human-galaxy entity. Suddenly my “I” projects itself as an observer and I see myself digging the ground of the room. It is like this entire situation was made of the creation of my conscious mind and not dream activity. Is it a case of a dream inside other dreams?

Dream 3

I was on the farm. I began to fly and became a helicopter, after that in a war airplane. I flew over a friend's house. I fell. There was a little church, so I transformed it into a super church with greek-roman architecture style. I knelt inside it, I began to pray, my spirit got out of the body and crossed the walls to visit all the church. After that, I

was flying again and controlling floods.

Dream 4

I was looking at the TV, however it was entirely black. Suddenly I enter inside the TV and I make a space-time journey of millions of years, going to the age of dinosaurs. There are enormous trees and dinosaurs. I am using one dinosaur as a horse and riding on it.

Dream 5

I am hugging her a lot, kissing her sweet lips. My heart beats faster and faster. My breathing too. Her smooth skin makes my arm's hairs stand up. Her smile makes me dizzy. A friend of hers passes and she looks at him deeply. I feel anger and jealousy. Suddenly I woke up. Everything was just a dream.

The examples above show us the creativity of the dream-mind to create situations that are pretty singular. These have many applications in artistic works, opening doors to doing books or even movies as DC Comics and Marvel. On the other hand "dream 5" tells the story of a man with heartbreak. As dream engineering serves to treat people with smoking addiction, maybe it will be possible to apply to brokenhearted people, because neurophysiological symptoms between drug addiction and love are similar analyzing dopamine and oxytocin systems (ZOU *et al*, 2016), as also considering brain processes of reward, abstinence crisis, chemical dependence and depression (HENDRICK, 2010). The theme about neurotechnology of (un)love will be approached in the next subchapter.

Dream engineering in the creativity-universe can help to architect great creators such as Salvador Dali and Mary Shelley, people that used dreams to make their creations.

The kinds of dreams like aforementioned are useful for artistic and recreational works. Furthermore, the person wakes up happier after experiencing them. Thus, it is also a question of well-being and health.

Carr *et al* point out the dream engineering possibilities to help in creativity:

> Finally, REM sleep is linked to increased insight and creativity (Cai, Mednick, Harrison, Kanady, & Mednick, 2009; Carr & Nielsen, 2015; Stickgold, Scott, Rittenhouse, & Hobson, 1999; Walker, Liston, Hobson, & Stickgold, 2002), with imagery described as hyperassociative and metaphorical, likened to a form of creative expression (Hartmann & Kunzendorf, 2013). (CARR *et al*, 2020, p. 4).

Carr *et al* address that the use of sound and visual "products" makes the augmentation of creativity and mood in the dreamworld. They say dream engineering techniques "include improving sleep quality, enhancing memory consolidation, ameliorating emotion regulation, inspiring creativity, and augmenting motor learning.". (CARR *et al*, 2020, p. 4). Considering some dream techniques that are pretty cheap, this kind of dream engineering can have many public and private uses, turning itself into an object of public policies to the general well-being and health of the population, mainly considering the current problems of insomnia that affect millions of people.

Another application with enormous public interest is the use of dream engineering to a deep problem of public health - smoking. DE is being used to reduce cigarette smoking:

> For instance, Arzi et al. (2014) paired the scent of cigarettes with that of rotten fish to participants who were smokers; presenting these scent-pairs during sleep alone (but not during wake) led to a reduction in cigarette smoking, meaning the negative association was learned during sleep and influenced subsequent behavior. (CARR *et al*, 2020, p. 14).

The example above shows us clearly the good application of DE in medical treatments. However, it is always important to highlight that the same technology can be used for awful applications, as we saw. Thus, the law must follow, or even anticipate in light of these technologies and mitigate or avoid human rights damages.

It is said that "eyes are the doors of the soul". Now, through dream engineering advancing we can conceive the dream-reading machines as the keys of the metaphysical gates (dreams) to the soul. Many possibilities are promising extraordinary deeds. Clearly, these new tools challenge the most visionary bets, opening the possibility to access the base of Freud's iceberg and Jung's archetypes.

These new gates or metaphysical bridges to the "human soul" are being studied by philosophers because dreams are "bridges" between the multiverse of the consciousness and the multiverse of the unconsciousness. Mastering these

metaphysical keys, gates, and bridges allow a better understanding of the human mind, hence human nature.

Philosophy of mind has the “problem of consciousness” to answer a long time ago. Philosophers are concentrating efforts on the neuroscience of dreams trying to get insights to answer some questions of the problem. Situations such as bodiless dreams, out-of-body experiences, and full-body illusions are objects of “dream philosophy” to answer questions about human consciousness and levels of consciousness, considering the “minimal phenomenal selfhood”, a basic form of self-consciousness (METZINGER, 2013). It is very important because it has potential consequences in human agency, consequently into legal and moral responsibility.

3.5 ROMEO AND JULIET AND THE WIZARDS OF FEELINGS AND EMOTIONS

And Eros, the most beautiful among the deathless gods - Limb-loosener he is of all the gods and of all men: Thought in the breast he overwhelms and prudent planning; then Out of Chasm Erebos and black Night both were born, And then from Night came Ether and came Day as well in turn; For Night conceived them, having joined with Erebos in love.
(...)
Eros walked beside her; lovely Longing close behind Followed as soon as she was born and also when she joined The gods' race; and this honor, from the first, was hers on high - This portion among human beings and the gods who never die: Fond and familiar talk of girls and pleasure 's sweet caress, Smiles and deceptions, honeyed love, kindness, gentleness.

— Hesiod. Theogony

Love is heavy and light, bright and dark, hot and cold, sick and healthy, asleep and awake- its everything except what it is!

— William Shakespeare, Romeo & Juliet

This subtopic is related, maybe, to the oldest feeling at all - Eros (Love). Some studies are appointing the possibility to finish over or mitigate the pains of heart-broken people. It is a notorious fact that the broken heart causes a myriad of problems since the beginning of time, being addressed in mythology (Eros, Cupid) and history. War, homicides because of “love” and jealousy, sanatorium treatments, etc. All these situations can be related to love, directly or indirectly, be it in fiction tales or real stories.

Neuroscience of the broken heart can offer pieces of light on this matter, giving to the law, public policies, and other sciences some solutions to the cases of serious problems related to the situation when the love turns into sickness, putting the person with heartbreak in self-danger and the people around. It is a matter of public and private

health, including principles of dignity, self-freedom, autonomy, independence, and others.

Neurotechnologies can help people with broken hearts get out faster from suffering because a broken heart means a broken brain. But technological treatment may have negative and positive consequences, including psychological and social effects. Thus, neurotechnological treatments of broken heart people must be carefully prescribed. Medical, psychological, sociological, and legal areas must construct adequate parameters to deal with this situation.

The love tale below signalizes possible positive and negatives outcomes of these neurotechnologies to mitigate or finish with love pain:

1. Apollo fell in deep love by Daphne when he was just a little child; Eros struck Apollo's heart with gold-tipped arrow, but in Daphne, Cupid struck a lead-tipped arrow, and she gets aversion to Apollo;
2. Apollo used to have platonic loves; however by Daphne, Apollo's love lasted more, because she was his first love - about 15 years with many good and bad arrows of the Cupid;
3. Because of platonic loves, Apollo lived a lot with Algea, with many years of coexistence; his pain journey in love crossed more than 10 years of deep disappointments because many Daphnes;
4. Along the years, each love disappointment helped him to get more strength, getting out of Algea's cave; desires to swimming in Lethe's river and to hug Thanatos are disappearing;
5. In his adult life, Cupid hits Daphne with gold-arrow and she fell in love with Apollo; however, the effect of the arrow didn't last much time and eros was gone away again; so, Apollo went to Algea's house again, living with her about 5 years because Daphne; in this time, the gold arrow profoundly harmed his heart; much red water fell from his eyes and mixture with the Lethe River's waters; Morpheus began to visit Apollo infrequently, such as Mnemosyne, causing problems into Apollo's REM state; Apollo had disturbances in time perception, getting imprisoned in past and future, the present moment didn't exist;
6. Maniae visited Apollo and dressed him with her crown; Maniae's crown

squeezed Apollo’s head and he needed many talkings with Asclepius and Psyche; because of these consultations Apollo didn’t go live with Maniae, neither with Thanatos;

7. Also helped by Chronos’ hands, finally, Apollo got cured of the platonic loves and for Daphne, getting liberty of the Eros' arrows, getting out of Algea’s cave, and took off Maniae’s crown.
8. The long coexistence between Algea and Apollo made him look at the “pool water of Narcissus” much less; however, drinking a lot of the Lethe’s river waters and little from Mnemosyne waters developed substantive consequences in Apollo;

The word “passion” comes from greek-latin language and means “grid” or “suffer”, i.e., a person is emotionally imprisoned to another person, suffering because of that. In the above story, the character had platonic loves and never had “luck” in love affairs. Each platonic love meant profound pain in his heart-brain. The story raises many questions on the neurotechnology of (un)love, as we will see ahead.

3.5.1 SWIMMING AND DRINKING IN THE WATERS OF LETHE'S RIVER. "THE ETERNAL SUNSHINE OF THE SPOTLESS MIND"

Que bom se a gente pudesse arrancar do pensamento
E sepultar a saudade na noite do esquecimento
Mas a sombra da lembrança é igual à sombra da gente
Pelos caminhos da vida ela está sempre presente
Vai lembrança e não me faça querer um amor impossível
Se o lembrar nos faz sofrer, esquecer é preferível
O que adianta querer bem alguém que já foi embora
É como amar uma estrela que foge ao romper da aurora[3]

A mão do tempo (The hand of the time). Tião Carreiro e Pardinho

Time is the physician of the pain.

Unknown

The neuroscientist Austin Lim, professor at DePal University, addresses relations between the movie "Eternal Sunshine of the Spotless Mind" and neurotechnologies of (un)love (LIM, 2016). The movie portrays the love story between Clementine (Kate Winslet) and Joel (Jim Carrey). They had a breakup and avoiding much suffering, both decided to erase each other of the memory through a (un)love's neurotechnology - the neural eraser ("Lethe's river").

Lim relates neurotechnology of optogenetics as instrument to erase "specific" memories, commenting on the article of Hayashi-Takagi *et al* (Labelling and optical erasure of synaptic memory traces in the motor cortex). In this case, the studies used specific light to erase some motor memories. Lim recognizes the specificity of these memories, speaking of the high complexity of emotional memories as in the case of broken-heart (brain-heart). However, Lim points out this promising neuroscientific finding, arguing it as one giant leap to the science-fiction Eternal Sunshine become only science.

Hayashi-Takagi *et al* elaborated a method ("synaptic optogenetics") to trace certain memories using light to visualize and manipulate them (HAYASHI-TAKAGI, 2015):

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[3] How nice if we could tear out of the thought
And bury nostalgia in the night of oblivion
But the shadow of remembrance is equal to the shadow of us
Along the paths of life it is always present
Go remembrance and don't make me want an impossible love
If remembering makes us suffer, forgetting is preferable
What's the use of loving someone who's already gone
It's like loving a star that flees at dawn

> Moreover, since it has been suggested for a long time that the memory trace is allocated to specific neurons and spines of neurocircuits, here we targeted PaRac1 to the activated synapses (activated synapse targeting PaRac1, ASPaRac1) to **establish a novel method, termed 'synaptic optogenetics', to visualize and manipulate the memory trace**. (HAYASHI-TAKAGI, 2015, p. 1, emphasis added).
> (...)
> Moreover, the role of potentiated spines can be directly assessed with photoactivation during behavioural examinations. In this study, we showed that photoactivation of the bilateral M1 cortex disrupted the acquired motor skill. (p. 5).

Synthesizing, the neuroscientific discoveries of this experiment throw light on the possibility to brand some specific motor memories and manipulate them through the so-called "synaptic optogenetics". As said by Lim, the heartbreak encompasses many more brain areas, however this experiment can be seen as the first step to Eternal Sunshine and the cure of Apollo's condition.

Medical treatments trying to erase memories of heartbroken people should be deeply debated because of the possibility of negative effects such as the erasing of many other memories not related to the beloved person. A huge memory-erasing can have more negative effects than positive ones with irreversible consequences (a catastrophic swimming in the Lethe's river). Thus, this kind of treatment should have many legal and medical protocols before doing it. So, negative and positive effects must be weighed for specialists to authorize (or not) a deep "swimming into the Lethe's river".

Another important question to be addressed is the part of the story about the coexistence between Apollo and Algea. Long acquaintanceship with her made Apollo appreciate much less the "pool water of Narcissus". It provoked his mirror-neuron system development. Hence, his social and interpersonal skills got better. Before long living with Algea, Apollo didn't understand much about eros and interpersonal relations. He was much less sensitive to these issues. He used to love himself much more, appreciating the "pool water of Narcissus". His hard living with Algea made his mirror-neuron system develop a lot, including exercising philanthropy and adopting the philosophy of not breaking hearts. Now, he has many social skills and is sensitive to his pairs, facilitating social relations and coexistence.

Now, imagine that Apollo had swum into the Lethe's river in order to avoid Algea. He wouldn't have lived with her, so he would be much less sensitive to interpersonal

and social questions. Furthermore, he would be breaking hearts like Narcissus, venerating his own image in the “pool water”.

It is because of all these questions that the swimming into the Lethe’s river must be carefully approached. Living with Algea, wearing Maniae’s crown, and finally receiving blessings from Chronos’ hands did make Apollo another person, much better than that little child who fell in love by Daphne.

Strange and interesting situations are happening because of the banalized and intense use of Lethe’s river:

1. People are banalizing the use of the Lethe’s river, breaking weak balances once existed and the chaos in Eros’ issues are increasing more, in private and social lives. They are turning themselves into Narcissus people, beyond other lethal consequences in swimming/drinking in Lethe’s river waters;
2. People are transforming themselves into other people and forgetting the past. Furthermore, these people are becoming emotionally weak because of the total coexistence lack with Algea;
3. Indeed, the use of Lethe’s river is getting so common, that even after funerals of close family and friends, the suffering people are going directly to Lethe’s river, in order to avoid any pain;
4. People are demanding: “no pain must happen for a long time”; “we want the eternal retirement of the Algea”; “we don’t need to suffer anymore, a long time ago we would suffer months or years, today we can suffer only a few minutes, hours or days”; “we want that Algea goes live with Thanatos, eternally”;
5. The world is getting strange, people aren’t the same, emotional chaos is taking place;
6. Suddenly, Themis, Asclepius, and Psyche woke up. All these happenings were just a collective dream, or not.

Themis, Asclepius, and Psyche had this above collective dream where these situations were happening with banalized and intense use of river Lethe in order for people to avoid any suffering. Because of this dream, Themis called an urgent meeting with Asclepius and Psyche to regulate the use of Lethe’s river, believing the dream was a serious warning of Morpheus.

So, it is because of all these questions that Themis, Asclepius, and Psyche are doing a lot of public audiences to construct rules in order to regulate the swimming/drinking in the Lethe's river in case of wrong arrows of the Eros.

Forecasting these situations, Themis anticipated and established general rules to the use of the Lethe's river: 1) the use of the Lethe`s river because of the Eros` arrows must be considered in critical situations when recommended by Asclepius and Psyche, considering Maniae's crown and attempts to live with Thanatos; 2) the use of the Lethe river must take place in order to bring more positive results to private and social life than negative effects.

All these questions are much bigger than Apollo, Daphne, and other people in similar situations, but an issue of regulation to get some social world's cohesion in this area, avoiding interpersonal chaos because of the insensitivity and self-destruction that can be caused by the waters of the Lethe's river.

However, the good benefits in some critical situations can't be denied, be related to love matters or not. Imagine terrible situations such as people raped, tortured, robbed, psychologically and physically harmed, causing many traumas on them. Our mind naturally has mechanisms of defense to deal with awful aspects of life, dumping terrible moments into the unconscious mind - the natural process of drinking in Lethe's river. So, critical circumstances must be seriously considered to give some peace and dignity to traumatized people.

3.5.2 THE HAND OF THE CHRONOS

Arranque da nossa mente horas distantes vividas
Longas estradas que um dia foram por nós percorridas
Apague com a mão do tempo os nossos rastros deixados
Como flores que secaram no chão do nosso passado[4]

A mão do tempo (The hand of the time). Tião Carreiro e Pardinho

$$\Delta t' = \Delta t / \sqrt{1 - (v/c)^2}$$ **Time Dilation**

The "solution" of the addressed problem can have another way to be considered. We shall remember that Chronos' hand helped a lot in Apollo's condition,

[4] Tear out lived distant hours from our minds
Long roads that were once traversed by us
Erase with the hand of the time our traces left
As flowers that withered on the ground of our past

without serious consequences considering the deep swimming into Lethe's river. Chronos is one excellent key to close Apollo's heart, freeing him from Algea's house, opening Maniae's crown, and closing the gates of Thanatos' land. However, some people have much resilience and deep inertia to the Chronos' forces. So, we can surpass the natural order of the Chronos. It is humankind surpassing and challenging the "Gods". It is another leap to the transhumanist world, with good and bad consequences.

In order to speed up Chronos' actions in Apollo's heart, Asclepius and the natural philosophers are discovering one possible solution to the problem: accelerating the disintegration of the effects of Eros's arrows in people's hearts. Effects of Cupid's arrows are subjected to Chronos forces, thus neurotechnologies of (un)love could speed up "arrow of time" increasing entropy's effects, hence anticipating the disintegration of Cupid's arrows poison.

Our time perception comes from a set of neurophysiological mechanisms that may speed up or slow time passing. It is very easy to observe differences in time pass when we are doing a boring thing (time creeps) or in the case of a pleasant thing (time flies). There are some specific brain areas related to neurological time perception (neurochronology), as well as neurological substances as dopamine, serotonin, and oxytocin. Thus, the idea here is to advance time passing (accelerate Chronos' hand effects) to fix more quickly heartbroken people. It is the neurochronological technology "to bring the future faster to the present compared to the natural ways".

Fontes *et al* address important considerations about neurochronology in the article "Time Perception Mechanisms at Central Nervous System". They explain time perception requires complex neural mechanisms depending on emotional state, level of attention, diseases, environmental stimuli, etc (FONTES, 2016). There are brain areas involved in time perception as the frontal cortex and hippocampus:

> We conclude that research about the holdings of the frontal cortex, parietal, basal ganglia, cerebellum and hippocampus have provided advances in the understanding of the regions related to the perception of time. (FONTES *et al*, 2016, p. 1).
> (...)
> Time perception is a concept that describes the subjective experience of time and how an individual interprets the duration of an event. (p. 1).

As we can see there are many brain structures involved in time perception, corroborating that we have multiple internal clocks to measure time passing.

So, we may think of ways to speed up Chronos' effects working with these brain areas, maybe using electromagnetic stimulation. As above pointed time perception is a subjective experience, i.e., it is a relative time as well as in the case of Special Theory of the Relativity of Einstein (time is relative depending on the speed and references of the involved parts – Time Dilation). In the case of neurochronology we have the relativity of time depending on emotional states, degree of brain substances, etc. All these situations can hyper or hypo estimate time perception, having relations to memory and attention.

There are many models of time perception. However, the most known is the "internal clock". This theory involves a complex structure known as "pacemaker-switch-accumulator mechanism". Here "time is estimated according to the numbers of impulses accumulated during the interval of time." (FONTES et al, 2016, p. 2).

Fontes *et al* speak about the role of intrinsic and extrinsic manifestations on time perception, explaining that we distort time and it is not homogenous:

> Independent of the models, human beings estimate and distort time. Thereby, time notion is dependent on intrinsic (emotional state) and extrinsic context (sensitive information), in which relations between emotion and time do not distort the function of the internal clock but change how the clock adapts to events. This indicates that there is no such thing as homogenous time, but rather multiple experiences of time, and these reflect the way the brain adapts to diverse temporal scales. In this way, the different models proposed are somewhat subjective and are limited in that they only demonstrate that differences in perceptions of time are linked to the quantity and characteristic of the oscillators. (FONTES *et al*, 2016, p. 3).

From the text above we can glimpse ways to speed up Chronos' hands into Apollo's heartbreak. There isn't "homogeneous time", but multiple experiences about it. As the emotional state plays a role in time passing, it is possible to conceive neuropharmacological and/or electromagnetic brain stimulation ways to modify brain substances (such as dopamine) in order to "solve" Apollo's problem through "time dilation".

> In this context, frontal cortex is well developed and its relation to the memory storage has an important participation in detailed time duration. **Moreover, the modulation by brain neurochemistry and integration with other brain areas such as the cerebellum and basal ganglia have been highlighted by dopamine, which appears to be related with perception of seconds to minutes, and associated to the frontostriatal circuitry**. (FONTES *et al*, 2016, p. 3, emphasis added).

The passage above shows us certain brain substances play a role as neuromodulators in time perception, such as dopamine. There is a specific study showing the important role of dopamine in time perception (“Midbrain dopamine neurons control judgment of time” by Sofia Soares *et al*), considering dopamine as “judgment of time”. In the article it is demonstrated that stimulation or inhibition of dopamine neurons affects time perception, making it moving faster or slower, respectively (SOARES *et al*, 2016). Increasing dopamine activity slows down our internal clock, causing underestimation of time intervals.

It is worth analyzing a notorious happening with correlations to the question addressed here. It is the case of Jill Bolte Taylor (Harvard’s neuroanatomist). She had a stroke in the left-brain (left hemisphere of the brain). She had 8 years of recovery to get back left-brain functions. In all these years she had many important experiences related to neuroscience, including the “space of Chronos”. She didn't have left-brain functions for many years, living almost only with the right-brain. She describes the experience as the right-brain allows us to live only in the present, don’t exist past or future:

> **To the right mind, no time exists other than the present moment, and each moment is vibrant with sensation. Life or death occurs in the present moment. The experience of joy happens in the present moment**. Our perception and experience of connection with something that is greater than ourselves occurs in the present moment. To our right mind, the moment of now is timeless and abundant. (TAYLOR, 2006, p. 30, emphasis added).

Taylor’s experiences are described in her book “My Stroke of Insight: A Brain Scientist’s Personal Journey”. The idea of the right-mind is related to the right-brain, a conception of two different brains with different functions that generate two different minds. This conception comes from 1780 with Du Pui, calling mankind as “Homo Duplex” (TAYLOR, 2006). The right mind processes only the present moment, “Chronos stays imprisoned in the present”. This situation maybe can be used one day to help people with broken heart. Like Apollo got imprisoned in the past and future (such as many people with depression and/or anxiety from many different causes), the present moment didn’t exist to him for many years. Taylor stayed imprisoned in the present time, no past or future existed, a totally different condition from heartbroken people. So, if one day it will be possible to use the right brain/mind to maintain people

more in the present time it will be a great help to people with chronological disturbances because of emotional storms.

Contrasting right-brain with the left one, Taylor described this last as a time processor putting the moments of the right-brain into a timely succession, comparing present situations with past moments, and future situations.

> In contrast, our left hemisphere is completely different in the way it processes information. It takes each of those rich and complex moments created by the right hemisphere and strings them together in timely succession. It then sequentially compares the details making up this moment with the details making up the last moment**. By organizing details in a linear and methodical configuration, our left brain manifests the concept of time whereby our moments are divided into the past, present, and future**. (TAYLOR, 2006, p. 31, emphasis added).

It is possible to comprehend the right-mind as a “broken clock” where Chronos is not movable, he is imprisoned in the present. However, the left mind is a “running clock” processing the present with the past and future. This discussion about our “neurological clocks” goes beyond Apollo’s condition, but it reaches all human beings because in the present age the majority of humans are living only in the past (depression) and future (anxiety). We can think about ways to change this serious situation.

After Taylor recovered from her stroke, she wrote a book and spoke about her experiences in TED. Many Buddhists and meditation practitioners got in touch with her to share the same experiences. These people get similar experiences from meditation. This is deeply important because people wouldn’t need neurotechnologies, electronic or biological. Only in critical cases the artificial treatment with “Chronos’s hand” should be prescribed. However, comparing the use of Lethe’s river (neural eraser) with Chrono’s hand, this last seems much more appropriate, because the Lethe’s river has serious consequences on human personalities, erasing people’s past.

Beyond time discussion, right and left brains have much more important differences that Taylor describes. Summing up, the left brain is commonly related to language, describing, defining, categorizing, communicating, and judging (our internal judge) about everything. The left brain is the “brain chatter” as Taylor called:

> Via our left hemisphere language centers, our mind speaks to us constantly, a phenomenon I refer to as “brain chatter.” It is that voice reminding you to pick up bananas on your way home and that calculating intelligence that knows when you have to do your laundry. (TAYLOR, 2006, p. 32).

The “brain chatter” is that internal voice speaking to us about everything in our lives. People with broken hearts have an internal painful chattering, creating talkings about situations with the beloved-lost person, accessing the past and imaginative futures. Through Taylor's experience, we know what part of our brain is responsible for this extremely boring and excruciating chattering. So, we can work with these discoveries in order to get some solutions, shutting up the “internal chattering” and “stopping Chronos” through manipulation of our neurological clocks, bringing the future to the past faster than natural ways.

Other studies on time perception reinforce Taylor’s experiences as we can see in Fontes *et al*:

> The role the frontal lobe plays in terms of time perception seems to differ according to the activities of the left and right hemisphere. **Some authors support the theory that the activity of the right frontal lobe ceases when task duration is memorized, while frontal left activity helps to maintain attention until this point.** (FONTES *et al*, 2016, p. 3, emphasis added).

As already said, the left-brain is the brain that makes endless internal chattering, it is that internal voice in our heads “asking, preoccupying, and answering” the entire time. Apollo passed about 5 years with this condition because of Daphne, an internal chattering accessing past and future, but nothing about the present.

Surpassing technical issues, let’s analyze future implications of these discoveries, because of the possibilities to speed up Chronos’ hand (or imprison him in the present) through the understanding of neural mechanisms involved in time perception, doing socio-legal correlations.

Suffering from Cupid’s arrows has connections with continual accesses to the past and future, an incessant mental chattering. Apollo spent many years reviving the past and mentally creating illusional worlds in the future. His brain lived an eternal sisyphism of sunshine and shadows because of his beloved lost person.

So, Apollo and people in similar situations want to accelerate the steps of Chronos to cure the broken heart faster. Another solution would be to stop Chronos’ steps. But, what are the psychological and socio-legal implications of these measures? The movie “Click” starring Adam Sandler sheds some pieces of light on this controversial question. Follows a little synopsis:

The movie tells the story of the architect Michael Newman (Adam Sandler), a workaholic bored with many situations of life and never has time to do anything. Newman is extremely anxious to get professional success, but it is so hard and slow. He needs to rush things. So, he gains one universal control to control his life. The remote control allows him to freeze time, access the past, speed up time and scenes in order to avoid painful and boring moments, anticipating the future.

Initially, only wonderful happenings. He has total control of his life. He hurries up boring and painful moments. No more pain for long moments. Everything is faster. However, the control gets control of the controller. The control turns itself the controller and makes the man a slave. Now, things are automatically speeded up, so the man can't appreciate moments anymore. The technology is a parasite in his life. Years of his life pass through his eyes without due attention and emotional living. He can't feel the moments. Good and bad moments are being accelerated by the control. Now, at the end of his life he can see the mistakes of such technology. But it is very late, his "entire life" was wasted.

The movie is sold as a comedy. Nevertheless, the whole picture portrays a very sad and worrying story. And this tale can be turned into reality with neurochronological technologies. Mankind "trying to accelerate or stop Chronos" can create deep health problems, in private and public areas. It is not only a question of health problems (like addictions), but an issue of wasting a whole life. Such as in the movie, good and bad moments are accelerated by the control as well as would be in the case of technologies manipulating our neurological clocks.

The intense and banalized use of Chronos' powers must be forbidden by Themis. As in the case of Lethe's river, Themis must regulate the use of such chronological instruments, considering protocols of Asclepius and Psyche. Only in critical cases our internal clocks must be manipulated, under penalty of an entire "wasted life" passing through our eyes without our controlling and feelings.

3.5.3 TO FEEL AND NOT TO FEEL - THAT IS THE QUESTION. MANIPULATING CUPID'S ARROWS IN THE "STAGE OF THE FEELINGS"

Love is merely the name for the desire and pursuit of the whole.

Aristophanes

Ultimately, it is the desire, not the desired, that we love.

Friedrich Nietzsche

We saw that the use of Lethe's river can bring chaotic realities to the world. Equally regarded to the attempt to control Chronos. Now, we can analyze the third possibility to treat Apollo's condition - manipulating the effects of the Cupid's arrows, changing the emotional response of the memory.

Close to the already addressed experiment of the Hayashi-Takagi *et al*, we have the experiment of Susumu Tonegawa *et al* in which they identified specific groups of neurons in the hippocampus (it plays an important role in memory as filtering pieces of information to put them in the cortex - transforming short memory into long memory) associated with memories of fear and reward (TONEGAWA *et al*, 2014). They could manipulate mice to avoid or approach specific situations according to their commands through optogenetics. The difference between this finding and the other is the manipulation of emotional memory, considering fear and reward. So, the idea here is instead of erasing memories is to change the emotional response to them, changing the emotional representation that the person gives to the remembrance/memory. The memories remain, but the emotional response to them changes. That is, it would be possible to avoid many situations such as the tragic end of Romeo and Juliet, the many years of Apollo's suffering, bringing them to the age of neurotechnologies of (un)love.

Technically, the memories of a beloved person aren't the problem, the source of a painful heart/brain, but the emotional responses to them. This solution seems to be better than erasing memories because there is the danger of erasing wrong memories.

Perhaps, the idea of emotional response seems pretty strange: how can I have the memories of the beloved person and don't suffer for her/him? Antonio Damasio majestically explains this paradoxical situation ("to feel and in the same time not to feel"), teaching us about the science of emotions/feelings.

The question about the emotional response to the memory is related to the representation of the emotion. Backing to the Apollo's story, we shall remember that in the apex of suffering any little information (dreams, smell, stories, etc) related to Daphne provokes emotional earthquakes into his heart and his whole body. Many years have passed and now the same memories are mere neutral remembrances. That is, the memories are the same, but the emotional responses are completely different.

Ana Galarza Vallejo *et al* give notice about the use of anaesthesia in order to modify the emotional response to certain memories in the article "Propofol-induced deep sedation reduces emotional episodic memory reconsolidation in human". They point out the use of a drug called "propofol" to reduce emotional responses in human memories (VALLEJO, 2019). This can be one key to the manipulation of the effects of Cupid's arrows. Cupid hits people with gold or lead arrows, causing opposite differences in hearts - love and unlove, respectively. Drugs like propofol can modify the emotional responses to memories related to love as well as (un)love memories, that is, it would be possible to deconstruct love and construct the unlove. In the specific case, the drug impairs memory reconsolidation.

The possibility of architecting (un)feelings and (un)emotions can role like instruments of emotional replacement. Neurotechnologies functioning as "wizards of feelings and emotions". It is like: "I will turn myself into another person, feeling other emotions".

The possibility above is depicted in the movie "Being John Malkovich", where the character Craig Schwartz (starring John Cusack) plays a puppeteer who finds a portal that puts him in the consciousness of a starman - the John Malkovich (starring himself). Inside Malkovich's mind, the puppeteer controls Malkovich's body and mind. The puppeteer also feels the emotions that come from Malkovich's body. So, neurotechnologies of (un)feelings and (un)emotions can turn this "spiritual" tale into reality, mainly considering the advancement of brainets - those neurotechnologies to connect humans through minds/brains creating collective and shared structures.

Beyond love issues, drugs like propofol modify emotional responses to other traumatic questions, such as post-traumatic stress disorders. So, it can be possible to treat many health problems.

Beyond drugs, we can use other neurotechnologies to modify emotional responses, like optogenetics already addressed by (TONEGAWA *et al*, 2014), as well as using a placebo.

In the case of placebo treatment, it was demonstrated reducing social and physical pain related to romantic rejection (KOBAN *et al*, 2017). Koba *et al* show that placebo medicines reduce emotional distress in romantic rejection altering affective representations as portrayed in the article “Frontal-Brainstem Pathways Mediating Placebo Effects on Social Rejection”. The study also reinforces the neural similarities between physical and mental pain, because both activate similar neurological structures and functions. This raises another interesting possibility to be used in judicial courts: perhaps one way to quantify mental pain, allowing indemnity quantification related to moral damages.

It is worth describing a paradoxical story that reinforces the possibility of manipulating feelings to change the emotional response. It is the case of “trigeminal neuralgia” portrayed by the neuroscientist Antonio Damasio in the book “DESCARTES’ ERROR - Emotion, Reason, and the Human Brain”:

> Trigeminal neuralgia affects the face, generally on one side and in one sector, for instance the cheek. Suddenly an innocent act such as touching the skin or an even more innocent breeze caressing the same skin may trigger a sudden excruciating pain. People afflicted complain of the sensation of knives’ stabbing their flesh, of pins sticking in their skin and bone. (DAMASIO, 1994, p. 249).

Pain in the trigeminal nerve causes excruciating suffering. In critical cases only neurosurgery solves the problem. And what does the surgery do? The surgery is called leucotomy (or lobotomy) being known as psychosurgery because the physical procedure manipulates human behavior. Specifically in the case of trigeminal neuralgia, Damasio speaks about an operation that he accompanied:

> **I vividly recall the particular patient, sitting in bed waiting for the operation. He was crouched in profound suffering, almost immobile, afraid of triggering further pain. Two days after the operation, when Lima and I visited on rounds, he was a different person.** He looked relaxed, like anyone else, and was happily absorbed in a game of cards with a companion in his hospital room. Lima asked him about the pain. The man looked up and said cheerfully: “**Oh, the pains are the same, but I feel fine now, thank you.**” (DAMASIO, 1994, p. 250, emphasis added).

What happened with the man seems paradoxical, the “pains are the same, but I feel fine now”. It is like “to feel and not to feel simultaneously”.

Damasio explains the apparent neurological paradox: “Clearly, what the operation seemed to have done, then, was abolish the emotional reaction that is part of what we call pain. It had ended the man’s suffering.”.

> In addition to what it may tell us about the mechanisms of pain, this example reveals the separation between the image of an entity (the state of biological tissue which equals a pain image) and the image of a body state which qualifies the entity image by dint of juxtaposition in time. (DAMASIO, 1994, p. 250).

The emotion still remains in the man, however the emotional response (the reaction to the emotion) disappeared. Emotion exists, but not the feeling related to it. It seems a little paradoxical, but it helps to exemplify the differences between feelings and emotions.

Damasio approaches the issue about humans avoiding any pain and its consequences, speaking those manipulations of emotions and feelings treat only the symptoms, but not the roots of diseases. Thus, treatment would be only transitory:

> The problem, of course, is that the choice is not clear-cut, for a large number of reasons. First, the long-range biological effects of the drugs are unknown. Second, the consequences of socially massive drug intake are equally mysterious. Third, and perhaps most important of all: If the proposed solution to individual and social suffering bypasses the causes of individual and social conflict, it is not likely to work for very long. It may treat a symptom, but it does nothing to the roots of the disease. (DAMASIO, 1994, p. 250-251).

Beyond the fact that some protocols treat only symptoms, Damasio points out the unknown effects of intensive drugs’ use, as well as the social consequences, being deep mysteries.

One last example about paradoxical (un)feelings is about Capgras syndrome. It is a condition also known as “Imposter Syndrome” or “Capgras Delusion”. The person affected holds a conviction that close people (like parents, friends, even dogs) were replaced by an imposter. Firstly, the condition was taken as pure madness, but the scientific understanding explains the condition as a neurological syndrome. A person who holds Capgras syndrome sees his father or mother and says that such person isn’t his father or mother. They turn into “imposters”. Follows the most accepted

explanation about the syndrome by V.S. Ramachandran, speaking about David who had a car accident and developed Capgras syndrome concerning his mother:

> The correct explanation, it turns out, is anatomical. (Ironically Freud himself famously said, “Anatomy is destiny.”) As noted previously, visual information is initially sent to the fusiform gyrus, where objects, including faces, are first discriminated. The output from the fusiform is relayed via pathway 3 to the amygdala, which performs an emotional surveillance of the object or face and generates the appropriate emotional response. What about David, though? It occurred to me that the car accident might have selectively damaged the fibers in pathway 3 that connect his fusiform gyrus, partly via the STS, to his amygdala while leaving both those structures, as well as pathway 2, completely intact. (RAMACHANDRAN, 2001, p. 103).

The elucidation is that a disconnection occurred between the pathway of the structure of visual recognition (fusiform gyrus) and the structure that puts emotions to the visual information (amygdala). So, David sees his mother but he doesn’t feel anything more by her. As he doesn’t feel anything, he feels that such a woman is an imposter, not his mother. It is like having the emotion and not feeling it.

This interesting condition sheds more light on the world of feelings and emotions, unveiling the keys of the portals of feelings and emotions’ manipulation, allowing “Wizards of feelings and emotions” to make a sort of magic with mysterious effects into the human mind. Here, Themis is one more time called to accomplish its duties in order to regulate the use of those keys and portals. Many sellers of (un)feelings and (un)emotions will arise in this advanced world. So, regulation is essential.

It is clear the swarm of possible (and current) neurotechnologies in order to modify, reduce, speed up or even get over with emotions and/or feelings. Many psychological, sociological, philosophical, and legal consequences were addressed and showed their good and very awkward possible realities.

As pointed out by the neuroscientist Antonio Damasio, emotions and feelings are crucial to our lives, being components of mechanisms of life regulation (DAMASIO, 2018). Thereby, it is not possible to have the equilibrium depicted in the movie “Equilibrium”, a world without feelings and emotions.

Humans running away from any pain using neurotechnologies in order to manipulate our neurological mechanisms is a very dangerous thing, mainly considering treatment to simple issues. The treatments must be prescribed only in certain cases, the critical ones, through medical and psychological prescriptions. We must have in

mind that the possibilities allowed by the neurotechnologies of (un)feelings can change “what we are”, altering many aspects of our mind, hence personality changes, including alteration of neurological substances like dopamine because they role as modulators of personality.

Damasio warns about the hedonistic culture, people, and societies avoiding any type of pain:

> It is difficult to imagine that individuals and societies governed by the seeking of pleasure, as much as or more than by the avoidance of pain, can survive at all. Some current social developments in increasingly hedonistic cultures offer support for this opinion, and work that my colleagues and I are pursuing on the neural correlates of various emotions lends further support. (DAMASIO, 1994, p. 251).

Damasio warns such culture is very dangerous, putting the survival of individuals and societies at high risk. In order to exemplify a world without emotions and feelings we may think about the movie “Equilibrium” starring Christian Bale (he plays a policeman - John Preston). The movie portrays a society in which feeling emotions is totally forbidden. Therefore, citizens must take daily injections of psychoactive drugs in order to suppress their feelings and emotions. People live in a city called Libria with a totalitarian government. The total suppression of emotions is grounded in a scenario of post-World War III, where the emotions are blamed for the war. Thereby, emotions are terminally prohibited. One day the policeman (Preston) missed a dose of the drug. Because of that he feels emotions and starts to question his morality and all actions once taken in the “unfeeling” world.

The movie depicts a very strange society where people don’t feel anything for anybody and by anything. Furthermore, the dictatorial government utilizes these “treatments” in order to maintain power, avoiding any movement of sedition. It is a science-fiction story. Nevertheless, the neurotechnological advancements can make this science-fiction turns into only science, consequently a deep reality of systems of control (*vide* “Brave New World”).

After many audiences with Asclepius, Psyche, and other authorities, Themis created the “Worldwide Agency of Neurotechnologies” (WAN) with the support of the “Organisation for Economic Co-operation and Development” (OECD). This organization has many instruments to regulate neurotechnologies. One of the most famous is personified in the Instrument 0457 adopted on 10/12/2019 - it is called

“Responsible Innovation in Neurotechnology”. This regulative instrument has ground in the Universal Declaration of Human Rights (UDHR).

The WAN takes care of neurotechnology issues, including the emotional ones. And it must be one seed to many other agencies in the world, giving support to neurotechnology innovation and establishing general rules to the use of such technologies to stimulate the development, considering rights’ protection.

3.6 NATIONAL SECURITY, PANOPTICISM, SMITH’S AGENTS AND THE MATRIX

Tous les jours, l'intendant visite le quartier dont il a la charge, s'enquiert si les syndics s'acquittent de leurs tâches, si les habitants ont à s'en plaindre ; ils « surveillent leurs actions ». Tous les jours aussi, le syndic passe dans la rue dont il est responsable; s'arrête devant chaque maison; fait placer tous les habitants aux fenêtres...appelle chacun par son nom; s'informe de l'état de tous, un par un...Chacun enfermé dans sa cage, chacun à sa fenêtre, répondant à son nom et se montrant quand on le lui demande, c'est la grande revue des vivants et des morts[5]*.*

Surveiller et punir - Naissance de la prison. Michel Foucault

The social technologies we see in use today are fundamentally panoptical – the architecture of participation is inherently an architecture of surveillance.

The Digital Panopticon. Ross, J, M. (2009)

The neuroscientific and neurotechnological developments are also applied to national security issues. James Giordano approaches these interrelations in the book “Neurotechnology in National Security and Defense: Practical Considerations, Neuroethical Concerns”. Giordano points out the connections among neuroscientific discoveries and important State’s programs like the US program called “National Security, Intelligence and Defense” (NSID):

> More recently, a series of Strategic Multilayer Assessment (SMA) conferences considered the potential impact of neuroscientific understanding of aggression, decision-making, and social behavior on policy and strategy pertaining to NSID deterrence and influence campaigns (Canna and Popp

[5] Every day, the intendant visits the quarter in his charge, inquires whether the syndics have carried out their tasks, whether the inhabitants have anything to complain of; they 'observe their actions'. Every day, too, the syndic goes into the street for which he is responsible; stops before each house: gets all the inhabitants to appear at the windows…he calls each of them by name; informs himself as to the state of each and every one of them...Everyone locked up in his cage, everyone at his window, answering to his name and showing himself when asked - it is the great review of the living and the dead. (Discipline and Punish - The Birth of the Prison. Michel Foucault. Vintage Books. P. 196. 1995.).

> 2011; Sapolsky et al. 2013). These reports highlight (1) how neuroscientific insights to individual, collective, and intergroup social behavior might be used to finesse an understanding of threat environments in an ever-increasingly interdependent and changing environments; (2) the utility of neuroscience and neurotechnologies (i.e., “neuro S/T”) for NSID analysis and operations in the context of conflicts with state and nonstate actors; and (3) how neuroscientific understanding of aggression may influence strategies for deterrence. (GIORDANO, 2015, p. 80).

There is an objective to apply neuroscientific developments to national security programs such as the NSID. Many countries are working on programs like that. In the USA there is the NSID of the U.S Department of Homeland Security. In Australia, there is the “National Security and Intelligence, Surveillance & Reconnaissance Division” of the Department of Defence (Defence Science and Technology Group).

The general goals of these national security programs are described as above: understanding human behavior, threat environments, and aggression to make preventive and reactive actions in the name of national security and human rights. That is, intense surveillance is inevitable. Here we have a problem of privacy because the objective to protect human rights and national security becomes the own source of human rights’ transgression, mainly considering privacy.

The purpose of intense surveillance in the name of national security is becoming easier to achieve. It is easy to perceive that through the current social networks. Therefore, the frequent use of neurotechnologies merging with social networks will increase the possibility of state surveillance, using national security, sovereignty, and human rights as alibis. However, our own human rights are in danger with this policy. There is a concern about that as expressed below regarding the balancing between public protection and privacy:

> For example, it could be claimed that certain forms of neuro S/T can—and perhaps should—be utilized to define, predict, and, thereby, prompt intervention(s) to prevent or minimize individual and/or group aggression, violence, and combativeness, and in this way afford public protection (Farahany 2009; Greely 2013; Giordano et al. 2014). How might such “protection” be balanced with individual and public privacy? (GIORDANO, 2015, p. 4).

Some appointments concerning these questions were already approached, such as the legislation on data protection and international rules aiming at human rights protection as the privacy.

Beyond programs as NSID, we may highlight the “BRAIN Initiative”, that is, Brain Research through Advancing Innovative Neurotechnologies (BRAIN). This is a

US program. There is a similar in the Europe called “Human Brain Project”. In Asia, we have the agenda “Decade of the Mind”. All these programs are multi-billionaire projects aiming to understand brain and mind, consequently developing neurotechnologies to all kinds of objectives, including national security and sovereignty.

Concerning military uses of neurotechnologies, we can glimpse some rules to human protection beyond the Universal Declaration of Human Rights. There is the Nuremberg Code (1947) that establishes general rules to medical experiments:

> 1. The voluntary consent of the human subject is absolutely essential. This means that the person involved should have legal capacity to give consent; should be so situated as to be able to exercise free power of choice, without the intervention of any element of force, fraud, deceit, duress, overreaching, or other ulterior form of constraint or coercion; and should have sufficient knowledge and comprehension of the elements of the subject matter involved as to enable him to make an understanding and enlightened decision.
> (...)
> The duty and responsibility for ascertaining the quality of the consent rests upon each individual who initiates, directs, or engages in the experiment. It is a personal duty and responsibility which may not be delegated to another with impunity.
>
> 2. The experiment should be such as to yield fruitful results for the good of society, unprocurable by other methods or means of study, and not random and unnecessary in nature.
>
> 9. During the course of the experiment the human subject should be at liberty to bring the experiment to an end if he has reached the physical or mental state where continuation of the experiment seems to him to be impossible.

Beyond technologies to surveil us, there are neurotechnologies to change the human, because the neurotechnologies go beyond the “metallic technologies”. We have neurotechnologies or neuroweapons such as chemicals (Project MKUltra from CIA - mind manipulation), biological, pharmacological, genetic, etc. Therefore, it is essential to bring to the discussion the Bioethics and rules as established in the Nuremberg Code.

As insistently already said, we are permanently monitored in this world of the internet and social networks. With the increase of informational technologies such as neurotechnologies, surveillance is becoming more sophisticated. We are entering more and more into the Foucault world of “Discipline and Punish”. As approached in the book “This surveillance is based on a system of permanent registration: reports from the syndics to the intendants, from the intendants to the magistrates or mayor.” (FOUCAULT, 1995, p. 196).

The use of neurotechnologies aiming at surveillance of the people in the name of national security throws us into Foucault's panopticism, that is, a kind of world of eternal surveillance. In the original idea, we had people doing the surveillance, the syndics, the intendants, the magistrates, the mayor. At that time, we needed people for the job, however, in the world of highly advanced Artificial Intelligence (AI), we don't even need people making the surveillance, because those original "actors" are replaced by intelligent programs. One program replaces the syndics, another the intendants, and so on in the hierarchy of artificial machines. This is the virtual panopticon, bringing the original idea of Bentham's panopticon to the digital age. The current digital panopticon has the following metaphorical face:

Source:https://blogs.uoregon.edu/marenalear/2018/11/20/module-3-the-digital-panopticon/

The image above speaks for itself. Moreover, it demonstrates the enormous power of the current panopticons. In the origin, the panopticons had regional reaching, however nowadays the digital panopticons are really global panopticons, that is, they have global reaching and surveillance.

The word panopticon comes from greek language meaning “pan” (everything) and “opticon” (see), that is, the idea of “see everything”. The panopticon was a circular institutional building designed by English philosopher Jeremy Bentham with the purpose of intense surveillance and control of people like in hospitals, prisons, schools, asylums, etc. Nowadays, great digital companies make this work very well occupying the center of Bentham’s panopticon, but invisible and very subtle, making harder the struggles against the systems of control and surveillance.

The digital panopticon is incredibly subtle, without bars, handcuffs, or even moral rules, only an invisible and sleepless panopticon which we voluntarily deliver our freedom and privacy. The strategy is simple: the system gives incredible opportunities, so, the people voluntarily and unconsciously make symbiosis with it.

It is interesting and preoccupying to think about learning machines (self-evolution) making surveillance and controlling our lives in the neurotechnological panopticon. That is, humans do AI’s for our “security” and this creation puts own humanity in danger.

Nowadays we have megalomaniac programs such as the National Security Agency (NSA) making this digital panopticism. And any little signal of threat goes fast to the dirty list as in the cases of Edward Snowden and Julian Assange. That is, the person is treated like a terrorist, a great danger for the system. The advancement of neurotechnologies will increase the power of these programs/agencies. The digital panopticon has or will have eyes over the entire humankind.

The idealism of national security and sovereignty gives strength to neurotechnological and AI development. It is very important. However, the dangers have been already indicated, putting human rights (mainly privacy) in danger. Thinking about AI with self-learning, the problems get more complex, where we walk to the dangerous land such as approached in the science-fiction world of the movie “The Matrix” - a kind of simulated world (to anesthetize people) where machines/programs/AI's do surveillance, controlling, and enslavement of the humankind.

In the movie there are programs with the specific purpose of surveillance, controlling, and punishment as the agent Smith. This agent hunts “Neo”, the promised savior of humankind from the simulation and enslavement. Neo and Morpheus (the character that wakes up Neo of simulation for him to save and wake up humankind) are both treated as terrorists, great threats to the system. Sometime in the movie the

program Smith has self-evolution and unplugs from the Matrix achieving freedom of the system turning itself into a virus, with self-learning and capacity of replication. We can imagine this situation with our current programs constituted with self-evolution and replication. These types of programs were approached in (GRUBLER; HILDT *et al*, 2014) and (JENNINGS; LYSGAARD; HUMMELSHØJ *et al*, 2019).

Bringing the analogy for our world (is it another simulation?), we can think “Neo’s” as the people hunted by countries when they break the lies, the simulation, the system, such as Snowden, Assange, etc. These people are treated and hunted as terrorists, threats to the system, sovereignty, and national security. Advancing in the analogy, we may glimpse the current programs with genetic algorithms doing our surveillance, making and filtering pre-reports to deliver them to other higher programs until the information arrives at the humans that take care of the “national security” (possibly there will be an international security). With the current and future highly advanced programs making our surveillance the scenario is the following: we are in the Digital Panopticon - a kind of Matrix.

However, we can arrive in a more preoccupying situation because as said by Grubler and Hildt, the programs with self-evolution and genetic algorithms do self-development without human intervention, acting by itself (GRUBLER; HILDT et al, 2014). That is, our creation can overpass the creators and the things can get out of control, like in the Matrix, where the machines had self-evolution and surpassed humans and eventually the machines took total control of the situation. Thereby, beyond bioethics and biolaw we need to discuss Robotics Law, Artificial Intelligence Regulation, and Digital Governance.

There are many institutions and legal norms, private and public, dealing with the robotics Law such as: European Commission on High-Level Expert Group on Artificial Intelligence; EU’s GDPR (The European Data Protection Regulation); Deutsche Telekom’s ‘Guidelines for the Use of Artificial Intelligence’ (2018); Google’s ‘AI at Google: Our Principles’.

The digital panopticon is the architecture of controlling and surveillance in the current world, with huge companies of information sharing information with governments as a big digital panopticon, all in the name of public interest and national security. And the fundamental individual rights (privacy, data protection, freedom) are been neglected. So, it is important to know the technologies and discuss all implications on society and individual human beings.

3.7 NEUROCRIMINOLOGY, FREE WILL, PSYCHOSURGERY, AND THE "METAPHYSICAL" TRANSHUMANIST: WHAT OUR BRAIN "KANT" TELL US?

Man is a rope, fastened between animal and Übermensch – a rope over an abyss.

Thus Spoke Zarathustra, Prologue.

Chief Guard: He brutally murdered a woman, sir, in furtherance of theft. Fourteen years, sir!
Minister: Excellent. He's enterprising...aggressive...outgoing...young, bold...vicious. He'll do.
Governor: Fine. We could still look at C-block.
Minister: No, no. That's enough. He's perfect. I want his records sent to me. This vicious young hoodlum...will be transformed out of all recognition.
Alex: Thank you very much for this chance, sir.

A Clockwork Orange. Movie by Stanley Kubrick.

$I(FW) \sim I(C)$
$I(C) \sim Cr + Aw$
$Y(i) \sim I(FW)$; where $Y(i) \sim 0$ if $I(FW) \sim 0$

Augusto Damião. Neurolaw, Transhumanism, Posthumanism

Intersections between neuroscience and criminal law have origins in the nineteenth century. Dr. Francis X. Shen, Harvard's professor in neurolaw, points out the origins of criminal neurolaw:

> The modern dialogue was sparked, initially, by the 1991 case of Herbert Weinstein, a New York advertising executive who strangled his wife, pled insanity, and attempted to introduce brain imaging evidence in his defense.17 The case drew the attention of scholars, some of whom convened in 1995 for a panel on Neuropsychiatry in the Courtroom. (SHEN, 2016, p. 1046).

Although the intersection between neuroscience and law has roots in the nineteenth century, at that time neuroscience wasn't much accepted in courts regarding criminal law, differently from cases relating to brain death and brain injury.

Nevertheless, the criminal neurolaw has started to change in the beginning of the new millennium because of the publishing of many articles in the area. Dr. Shen speaks about the law professor Oliver Goodenough and his article "Mapping Cortical Areas Associated with Legal Reasoning and Moral Intuition." Goodenough argued that "[a]dvances in neuroscience and other branches of behavioral biology provide new tools and the opportunity to revisit classic questions at the foundation of legal thinking." (GOODENOUGH, 2001, p. 430).

Shen also points out an important situation: neuroscientific explanations in courts make judges reduce their sentences in certain cases:

> Research also suggests that lay people find neuroscientific explanations particularly persuasive, and that neuroscientific explanations can change lay determinations of "bodily injury." **In addition, an experimental study using state court judges as subjects concluded that judges significantly reduced their sentences for psychopaths when provided with a neuroscientific explanation for the psychopath's behavior**. (SHEN, 2016, p. 1064, emphasis added).

The above conclusion is extracted from one study about biomechanical behavior of psychopaths to commit crimes. The numbers show the neuroscientific explanations are considered by the judges in order to reduce the sentences. The explanations go from genetic variants linked to violent behavior (monoamine oxidase-A) until brain imaging to find some abnormalities to elucidate the antisocial behavior (ASPINWALL; BROWN; TABER, 2012).

The interpretation of these cases is that neuroscientific explanations help the lawyers reduce the defendant's sentence. However, these elucidations seem linked to the "deterministic behavior", that is, causes of violent conduct are out of the person's "free will". Translating: we are walking to consider a person "not guilty" because it would not have "free will", he/she would be the result of inevitable behaviors dictated by your genetics or brain abnormalities. This judicial trend is quite important in terms of criminal policies and the carceral system, however, it is pretty dangerous if the trend walks to the land of "not guilty people" putting highly dangerous people in society. These neuroscientific grounds show that this kind of person has mental/brain illness, so, incarceration in the normal carceral system is not an ideal long solution, but the treatment of that person inside appropriate places for medical treatment. Moreover, as already said, neuroscientific developments may give some solutions to psychopath cases with treatments, political and legal strategies. Techniques can improve the mirror neurons system (MNS) that plays an important role in empathy. Moreover, other treatments involve deep brain stimulation (DBS) (ARLE; SHILS, 2011), neurogenetics, and neurochemistry (ANDERSON; KIEHL, 2012). This last can provide pharmacological solutions allied with DBS.

Related to medical treatment to psychopathy conditions it is worth to reinforce the importance of artificial brainets to develop the system of empathy. Brainets will allow the person to adopt the another's point of view because such a technology will

share emotions and feelings between people, activating the mirror neurons system, hence we have a candidate to develop empathy – brainets of empathy.

The use of artificial brainets for psychopaths or other kinds of defendants to exercise empathy can be revolutionary, replacing traditional methods. It can allow the low- or non-empathetic person to develop empathy. In some sense, artificial brainets can allow the person to wear another's skin, to enter into the skin of victims, or the skin of their relatives. This kind of brainet will shock current and old measures of rehabilitation or resocialization within criminal policies. Instead of ancient and primitive methods of the criminal law (lobotomy, chemical castration, death penalty, life imprisonment, or long imprisonment, etc), it can be used brainets of empathy allowing the defendant to feel the another. It is the process of catharsis through brainets.

One of the dangers of using criminal neurolaw is the genetic argument of "Your Honor, My Genes Made Me Do It", that is, the person wouldn't have free will because he would be an inevitable result of genetic determinism. This is approached in a work of the co-directors of the Center of Law, Brain, and Behavior at Massachusetts General Hospital and Harvard Medical School:

> We are making remarkable strides in identifying specific functional brain networks and the genetic and environmental causes for disruptions in these networks. However, until we can make well-founded, scientifically sound and legally relevant links between genes, brains and behaviors, judges, juries and the public should be wary of neuroscience in the courtroom. (EDERSHEIM; PRICE *et al*, 2012).

The message of these scientists is a caution in the use of neuroscience in the criminal courts, mainly considering the deterministic argument. This determinism can't banalize the criminal neurolaw, opening a dangerous precedent about the inexistence of free will in psychopath people.

Going back in time we found many interconnections between neuroscience and crime. Alimardani speaks about the background on neuroscience and crime in the 18th century: "Franz Joseph Gall, in the 18th century, was the first modern scholar to recognize the brain as an organ with distinct regions underpinning different mental faculties." (ALIMARDANI, 2019, p. 37). Gall was an enthusiast of the pseudoscience called "phrenology", that is, it would be possible through conformation skull's analysis to find out mental faculties, personalities and to make relation with criminality.

Therefore, through skull conformation would be possible to determine if the person was or not inclined to criminal conduct and perhaps to decide about her culpability.

Following Gall, we had Cesar Lombroso, a huge known personality in criminology. His studies corroborated phrenological theses because he appointed abnormalities in psychopath's brains as a cause of bad and lethal behavior. However, because of the lack of neurotechnologies alive people couldn't be analyzed as we can be today by advanced neuroimaging.

On the other hand, nowadays we have many neurotechnologies extremely capable of neuroimaging, analyzing the live brain with activity. Brain scanning techniques as electroencephalogram (EEG), computerized tomography (CT), magnetic resonance imaging (MRI), positron emission tomography (PET), functional magnetic resonance imaging (fMRI), etc. All these neurotools may show us functional and structural brain parts, and they can demonstrate brain abnormalities related to violent behavior. This neuroscientific evidence is already being used in courts of law.

Studies indicate abnormalities in the frontal lobe and brain tissue loss causing impulsive disorders (ALIMARDANI, 2019). This is the area called neurocriminology or criminal neurolaw. Through all neuroimaging evidence supported by many brain-scanners, judges, lawyers and prosecutors are better weaponized to do the legal work. This is a concrete reality already happening as the technology "Brain Fingerprinting" promoted by the company Government Works. The technology detects "guilt in the brain".

> This technology is an application of the neuroscientific discovery that people's electroencephalography (EEG) records show a characteristic positive response – the P300 – to familiar stimuli, but not to novel ones (Polich & Kok 1995). During Brain Fingerprinting, suspects are presented with information about a crime that only its perpetrator could know. **If the presentation generates an elevated P300, this is offered as evidence of guilt. If not, the suppressed response is offered as evidence of innocence. Brain Fingerprinting has been used to convict (Farwell 2012) and exonerate (Harrington v. State 2001) suspects**. (WOLFE, 2014, p. 171-172, emphasis added).

The description above is approached by Sarah K. Robins in the book "Brain Theory Essays in Critical Neurophilosophy", it reveals to us that neurotechnologies are being applied in criminal lawsuits, grounding sentences in order to convict or to exonerate the accused.

Although there are highly advanced technologies such as the “Brain Fingerprint”, here we aren’t speaking about futuristic neuroprediction - the person enters in the neuroscanner and his thoughts are read in past, present, and future.

This last situation (really a kind of telepathy) is portrayed in the movie “The Cell”, starring Jennifer Lopez. The story is about a serial killer that finally is found, but he is in a coma and the last victim needs to be found and only he knows where she is. So, people use neurotechnology that allows the psychologist to enter into the serial killer’s mind. Inside his mind, the psychologist finds a world of huge horror, violence, sadism, father abuse, etc. Deep traumas on psychologist are guaranteed in this kind of work. Regarding this possibility, it was addressed the “inception device” in the chapter about dream engineering. In that chapter were shown Jack Gallant’s discoveries on videotaping dreams and conscious thoughts.

Another movie related to this theme is “Minority Report” starring Tom Cruise. It portrays a futurist world where crimes are predicted before they happen. So, it is possible to avoid them. Albeit a very interesting possibility of telepathy in these movies (finding past, present, and future), this type of neuroprediction isn’t the focus.

In this work, we already saw the deep complexity of the brain and mind. So, neurocriminology is much more than scanning brains, it is also about interactions among the brain, mind, genetics, and environment. The relation between criminality and the brain isn’t summed up to “reading brain” and magically we have an answer for the problem, for the lawsuit. To prove this point of view we need to analyze an interesting case about the work of searching psychopaths from interpreting brain scans. It is the case of the neuroscientist James Fallon.

In 2005, neuroscientist James Fallon was looking at brain scans for a project on studying psychopathy. At the same time, he was engaged in a blind review analyzing Alzheimer in his family. Cooper writes in his article about Fallon:

> While engaged in studying the brain scans of murderers for one project, he was at the same time frame engaged in a blind review of his family’s scans as a normal control group for an Alzheimer’s study, **and his own scan, the last in the group, was included. The last scan was distinctively abnormal, registering the characteristics of the brain of a psychopath**. (COOPER, 2014, p. 517, emphasis added).

Summing up, Fallon has accidentally discovered your own psychopathy. The brain scans didn’t have names, only codes. However, through the codes, he

discovered the “psychopath brain” was your own brain. But Fallon is not a psychopath. Later he defined himself as a “pro-social psychopath” - someone who has difficulty feeling true empathy for others but still keeps his behavior roughly within socially-acceptable bounds. Fallon has traits of a psychopath, but he isn’t the classical one.

So, if Fallon is not a psychopath, are all these neuroscientific proofs useless and neurocriminology can’t be used in courts of law? The answer is no. What happens is the following.

As we already saw, neurocriminology is quite complex, involving many areas in a transdisciplinary framework. Psychopathy can’t be analyzed only by brain scans searching for malfunctioning in the orbital prefrontal cortex, amygdala, and associated neural circuitry. A serious analysis must be full considering many other questions, including the environment. Apropos, the good and lovely childhood’s environment of Fallon helped him not to develop his psychopathy brain. At least the classical psychopathy.

Fallon approaches the multitask that is analyzing and categorizing psychopathy:

> These questions are approached from multiple levels of neuroanatomical analysis, including genetic, molecular, neurotransmitter, neuronal, cell cluster, and brain area levels, to entire circuit systems. These levels are then considered in light of prenatal, perinatal, and postnatal development and the timing of neuronal system damage in the life of the psychopathic individual. The mechanistic neuroscience approaches are discussed in terms of the relative contributions of nature (genetic/epigenetic/brain damage) and nurture (environmental). (FALLON, 2006, p. 341).

Therefore, the task of analyzing psychopathy encompasses the brain, genetics, psychological tests, and the environment. This goes far beyond 18th-century phrenology, which considered only the skull’s conformations. Here, we have huge multitasking and multi-analysis to do that, considering many areas of the brain:

> First, violent psychopathology in youth is associated with structural and functional damage to the orbital cortex and strongly interconnected ventral prefrontal system structures such as the ventromedial prefrontal cortex, ventral anterior cingulate, amygdala, and associated basal ganglia and cortico-subcortical loop circuits. (FALLON, 2006, p. 341).

And more, beyond brain analysis, we need to consider the time of injury, if it is prenatal, after the second or third year of life, in later life, etc (FALLON, 2006). All these analyses provide us better substrates to work in the legal area.

For decades neurolaw has been utilized in criminal lawsuits, since the past millennium. Alimardani describes many cases in his thesis “An Empirical Study of the Use of Neuroscientific Evidence in Sentencing in New South Wales, Australia”. For example, John Hinckley’s case, he was accused of life attempt against President Ronald Reagan in 1982: “During Hinckley’s trial, a CT scan, along with other evidence, was used to prove schizophrenia, which resulted in the successful defence of not guilty by reason of insanity.” (ALIMARDANI, 2019, p. 59). In England, neurocriminology was used in 1958 in a court of law. In this case, the defendant did argue involuntary behavior with discussion about biological determinism, free will, and moral responsibility (ALIMARDANI, 2019).

In general, the neuroscientific approaches in courts of law are helping to mitigate the sentences, when it is not possible a total excuse of responsibility. The majority of the strategies are neuroimaging demonstrating brain malfunctions and neurogenetics proving “genetic violent instinct” as a way of low “free will”. That is, both strategies run through a kind of biological determinism, with gaps of free will.

Addressing brain-machine-interface (BMI), we already saw the Aristotelian conditions of the action/responsibility, awareness, and controlling (GRUBLER; HILDT *et al*, 2014), shaping “human agency”. That two conditions are treated in Kantian moral philosophy. Neuroscience challenges this philosophical architecture on moral and legal responsibility as we will see.

Joel Quek addresses important issues in his article “Our brain "Kant" tell us? - A Kantian perspective of how neuroscience challenges our notions of moral responsibility and the legal implications”. Here, Kantian moral philosophy about responsibility is approached and challenged in the neuroscience context.

> Kant in analysing human agency begins with the proposition that all practical rules always appear to us as commands or imperatives, because as human beings we are only contingently rational. Such imperatives appear to us in two forms, categorical and hypothetical. **Hypothetical imperatives are based on our desires and inclinations, and command us to act with ends in mind derived from interest**. This imperative is hypothetical, because it can cease to exist just by altering our inclinations and desires. **The categorical imperative speaks to us as a moral rule which prevents us from acting immorally**. (QUEK, 2012, p. 25, emphasis added).

Human agency, the entity of controlling and awareness of the action, can be seen as connected to the hypothetical and categorical Kantian imperatives. Hypothetical imperative is attached to the natural world (phenomenal one, dimension

of the senses) and the categorical imperatives are linked to the “pure practical reason” (“noumenal world”). In this last world, intelligible one, we would be free because of a lack of causal determination (QUEK, 2012). In this metaphysical multiverse we have the “psychological freedom”, in the Kantian conception, because we act free of internal or external interference.

Let’s clarify the connections among Kantian imperatives, human agency, and responsibility.

The idea of acting with “pure practical reason” requires disconnection with the natural world, that is, the agent acts without any bio-mechanical determinism, only by the governance of pure reason. This remembers the idea of the pure and isolated neocortex - the brain structure that is “god of reasoning”. However, as we saw, the pinnacle of the brain responsible by reason is inextricably connected with the two low brain structures, reptilian and limbic systems (“emotional brain”). The neocortex can be deemed such as the natural structure of its transcendental correspondence - the pure reason or the categorical imperative. Such as the reptilian and limbic structures are the physical correspondents to the hypothetical imperatives.

The idea of acting totally free is quite impossible analyzing these neurophilosophical structures. Human agency is constituted by hypothetical and categorical imperatives. Both components are umbilically connected in the natural world, breaking the possibility of an exercise of “pure reason”, because of the symmetrical and reciprocal correspondence (biunivocal relation) among these human agency structures in the physical and metaphysical worlds.

To understand this, we need to remember Phineas Gage’s case that demonstrated the indispensable connections between the “rational brain” and the “emotional brain” (introduction of this work). His case proves the breaking among the connections between the “two brains” makes the “rational brain” extremely useless, insofar his “rational brain” was deeply affected by the loss of connection with the “emotional brain” (DAMASIO, 1994).

So, it is clear the indispensable and mutual links between the “rational and emotional brains”. Hence, the acting by “pure reason” seems to be neurophilosophically utopic.

Advancing to practical issues, we have to address neuroanalysis on the two human agency’s components to ascribe responsibility to human beings: awareness and control of the action.

Quek speaks about a man who was acquitted in neuroscientific ways. It is Park's case (parents-in-law homicide): "Parks was acquitted at trial, and the Canadian Supreme Court on appeal held that Parks committed the act in a **state of automatism and was not responsible for his actions**.". (QUEK, 2012, p. 33, emphasis added). The man was excused of responsibility by the Canadian Supreme Court on human agency grounds: lack of control and awareness because of the automatism state, such as in the sleep-walking situation (somnambulism).

The above case demonstrates a concrete neuroscientific approach in legal judgment with connections to human agency.

Another interesting case addressed by Quek is of an American teacher in Virginia "who started displaying paedophilic tendencies due to a meningioma pressing on his orbitofrontal cortex...". (QUEK, 2012, p. 36). The orbitofrontal cortex is linked to human behavior, including ethics. Because of the disease, the man developed a sick behavior that only ended with the cancer removal. Therefore, the question arises: Is he morally and legally responsible? From the neurophilosophical point of view he isn't liable because of the lack of control. His human agency was distorted by the tumor that broke the component "controlling". We also can see the situation as follows: the external interference turned the human agency into a type of hybrid agency, that is, the person doesn't always act by on own ways. In the case of neurotechnologies, we have an artificial device creating a hybrid human agency. However, here we have a "natural device" creating a hybrid agency that has self-behavior independently of human control, partial or total.

The impairment in the human agency system causes inability to comprehend and control actions. Impairment as a brain cancer can be an excuse of liability: "Employing a Kantian conception of moral responsibility and freedom allows us to understand that a lack of cognitive ability essentially means the impaired ability to utilise pure practical reason.". (QUEK, 2012, p. 33).

The practical cases show us the importance of neuroscience on criminal law because to discuss human agency is the ground to ascribe responsibility to a person. Neuroscience challenges the legal area, as Quek says: "However, our legal system is undoubtedly informed by Kantian moral philosophy and moral responsibility". (QUEK, 2012, p. 39).

Advancing a little more on human agency analysis, we arrive into “free will” neurometaphysical problem. Benjamin Libet and his team have discovered an interesting situation in experiments conducted in the 1980s:

> Libet measured brain activity during voluntary hand movements, and discovered that before we actually move our hand, there is a wave of brain activity indicating when our brain knows we are aware of making the decision to move, which he calls the 'readiness potential'. **The timing of the readiness potential was then compared with the conscious movement of the hands of the subjects, and it was found that the moment of conscious decision making was about 300 milliseconds later than the onset of readiness potential**. (QUEK, 2012, p. 28, emphasis added).

This experiment raises many questions because it can be interpreted to mean that we become aware of our actions after they are already running in the brain - summing up, the awareness of our action comes later after the beginning of the action. If this is true, free will does not exist and all problems and questions arise: We aren’t responsible for our actions; Are we living in a kind of “Matrix”?; Are we mere puppets in a simulation?; Human agency loses its logic, among other issues.

There are many critics about this possibility of the inexistence of free will. Libet criticizes his own work as Quek says:

> Libet himself does not believe that his work shows that we lack free will or moral responsibility. **He suggests that although we do not consciously initiate action, we possess the power consciously to veto actions**. (QUEK, 2012, p. 29, emphasis added).

Libet’s consideration is very important because the possibility of free will lack can’t serve as an exemption of responsibility. But, having free will or not, the person has power to veto the action, as said by Libet. And this power maintains the human agency intact, as well as the Kantian moral responsibility.

Lavazza speaks about a different interpretation on Libet’s experiment:

> However, recent studies seem to point to a different interpretation of the RP, namely that the apparent build-up of the brain activity preceding subjectively spontaneous voluntary movements (SVM) may reflect the ebb and flow of the background neuronal noise, which is triggered by many factors (Schurger et al., 2016). (LAVAZZA, 2016, p. 1).

The so-called “readiness potential” would be a kind of background neuronal noise. So, maybe, it isn’t an “alien human agency” inside us commanding our actions,

breaking free will. Lavazza points out a new way to conceptualize free will, linking it with the idea of “capacity”. As said by Libet “we possess the power consciously to veto actions.”. This power of veto would be that capacity. Moreover, Lavazza throws the idea of an index of capacity and index of free will. And this is very true, mainly when we think about degrees of capacity to understand our actions when we are children, adolescents, adults, and in old age. That capacity changes along with our life, with different indexes and degrees. It is so true that the legal capacity of children and adolescents is different from adult people. Brain abnormalities imply a low index of capacity, hence a low index of free will.

Neurocriminology development can introduce in criminal law a mathematical function of free will to calculate the degree of culpability. It can give a basis for the judge's decisions about excusing, carceral imprisonment, medical imprisonment (psychiatric hospital). The hypothetical situation may be resumed as follows:

1. A person prosecuted for homicide pass through many analysis as neuro-scanning and neurophysiological exams searching for brain damages, genetics and physiological predispositions to violence;
2. An AI calculates the index of free will based on all neurodata;
3. AI calculation can be roughly resumed as below:
   - 3.1. I(FW) ~ I(C)
   - 3.2. I(C) ~ Cr + Aw
4. Where I(FW) is the index of free will; I(C) is the index of capacity to veto actions;
5. The I(C) is a function of two other functions: Controlling (Cr) and Awareness (Aw) - human agency function (Kantian or neo-Aristotelian conditions of responsibility);
6. “Cr” is most connected with prefrontal cortex function/structure and it is affected by the genetic variants as monoamine oxidase-A;
7. “Aw” is a “Finding Consciousness” problem; it is addressed in many works as in the book: Finding Consciousness by Walter Sinnott-Armstrong;
8. Based on these mathematical functions, the judge or the AI-judge can decide what to do with the defendant: exempt of culpability; carceral imprisonment (the years depends on the degree of free will index), etc;

9. Finally, we would have the function years of imprisonment Y(i): Y(i) ~ I(FW); where Y(i) ~ 0 if I(FW) ~ 0;
10. At last, it is important to highlight in the case of Y(i) ~ 0; zero years of imprisonment because chronic conditions, the person must be medically treated, as already approached;

Logically, the freedom (or not) of a person shouldn't be summed up in mathematical relations computed by AI based on neurodata. But, as corollary: the science fiction of today is (or can be) the reality of tomorrow.

Cases of automatism, sleep-walking, mental illness as schizophrenia, demonstrate us the low capacity index to understand actions, so, low capacity to work with the two bases of human agency (control and awareness). Low capacity index implies low free will index, consequently low legal responsibility. But, the idea isn't to free dangerous people with these neurophilosophical grounds. We can think about public policies, medical treatments, hospital imprisonments, etc.

Brazilian penal code has a specific rule regarding these questions analyzed. Article 26:

> An agent who, due to mental illness or incomplete or delayed mental development, was, at the time of the action or omission, entirely incapable of understanding the illicit nature of the fact or of determining himself in accordance with this understanding is exempt from penalty.

This normative rule translates the idea of penalty exempt to people with disabilities in the “human agency”. The norm exempts who is “entirely incapable” of “human agency”, however the law must introject new neurophilosophical approaches to change, considering degrees and indexes of capacity and free will, doing a merge with public policies of health and appropriate imprisonment to specific people.

Other criticisms about neurocriminology come from the “neuroprediction” related to selectiveness of certain AIs, such as pointed out by Dr. Ricardo Lins Horta in his article about AI, neuroprediction, and criminal recidivism:

> With the advent of machine learning and big data techniques, the algorithms used have been gradually improved. However, these tools have not been unscathed by the recent debate in that country regarding the persistence of racial discrimination in the justice system, and they face accusations that they

> would contribute to aggravate the selectivity of the penal system. (HORTA, 2020, p. 1).

As addressed by Horta, the use of neuroscience and AIs in criminal courts of law is a current reality. However, there is a danger that methods increase the “selectivity of the penal system”, that is, instead of solving a problem, we can create or aggravate problems. This is current reality, mainly considering AIs making facial recognizing, and issues such as racial prejudice are emerging.

Horta signalizes an efficient use of neuroscience and AIs to reduce the imprisoned population and rationalize the carceral system, pointing the imprisonment focused on really dangerous people:

> In turn, from a practical point of view, if a jurisdiction uses actuarial calculations and, demonstrably, those people classified as “low risk” effectively relapse at a lower rate than those classified as “high risk”; and if criminal alternatives and precautionary measures carried out in freedom are sufficient to keep the levels of recidivism reduced, then the measures applied by the judges would be the most efficient, since the most costly measure, incarceration, would be dispensed primarily to "high risk" criminals. (HORTA, 2020, p. 4).

This follows the idea of less incarceration and a rationalization of the carceral system and criminal policy. Indeed, only the real dangerous people must get hard imprisonment. And in cases of “human agency” problems from brain abnormalities the imprisonment system must be another one different from the traditional.

Cases of people with brain abnormalities must be treated appropriately, because the classical incarceration doesn’t solve the problem, only forward it to the future. As we saw, neuroscientific searchings are pointing to possibilities to mitigate brain malfunctions, launching light and hope to treat or cure some mental illness. For example, psychopathy can be helped on these discoveries, using brain stimulation to improve the mirror neurons system (ARLE; SHILS, 2011) and/or application of neurogenetics and neuropharmacology (ANDERSON; KIEHL, 2012). The “Brainets of empathy” must be used too. These treatments can be seen as the novel “psychosurgery” of the new millennium, a humanitarian treatment without physical invasion different of lobotomy, Clockwork Orange’s method and similar ones. Brain stimulation (and other methods) to treat these conditions changes the “hardware” to change the “software”, giving to that people the “human agency” bases of responsibility, hence bringing them to our “brainet channel”, turning those people

entitled to dignity as everyone must be, not eternal terrible and incurable monsters as seen by society.

We may correlate this kind of people (with brain abnormalities) who “only” have personal moral rules, Kantian hypothetical imperatives, and neurophilosophy. Payne signalizes as follows:

> Reminiscent of Kant's demand for us to abandon "tutelage" in order to achieve enlightenment, in "Schopenhauer as Educator" Nietzsche speaks of the need to cultivate a self liberated from the "pseudo-human beings" (SE 1) created by society. Already here we have hints as to what he considered the authentic self to be. Steiner speaks of Nietzsche's emphasis on "the sovereign *individuum*," as one cultivates one's own virtue, rather than appealing to any higher source. The authentic self rises above or goes against the grain of society, refusing to accept authority unquestioningly, and creatively determines his or her own values. This notion that the authentic self is something other than the ‘self’ created by society plays a major role in the whole of Nietzsche's philosophy and especially in terms of fleshing out the meaning of the Übermensch. (PAYNE, McMaster University, 2004, p. 8).

Übermensch is often translated as “Superman”, that is, the person who develops through authentic self, without “any higher source”. This person has their own rules. It remembers the psychopath “Joker” that only follows his own rules, without any other moral or legal rules. So, with many caveats, Übermensch can be seen as a “Metaphysical” Transhumanist in the Kantian hypothetical imperatives, that is, he only follows his own rules based on a phenomenal world (his neocortex is affected by malfunctions in his “emotional brain”). However, the classical Übermensch must be seen through the lens of Nietzsche’s time - criticism of religious moral rules.

Quek signalizes the Kantian hypothetical world of psychopaths:

> Adopting a Kantian analysis, psychopaths cannot understand the binding nature of the moral law on their actions, because although they know that they are bound by laws, these laws to them are not categorical imperatives, but merely hypothetical. (QUEK, 2012, p. 34).

In short, this type of person is governed only by hypothetical imperatives - "emotional brain". The "rational brain" does not function well because of abnormalities in the "emotional brain" that inevitably affect the functions of the neocortex.

Neurocriminology is an extremely complex area involving many other ones. The use of neuroscience and AIs in criminal judgments needs to be discussed a lot because there are many questions to be answered. Furthermore, there is the selectiviness in criminal judgments using AIs with bias in its development.

From all questions addressed in this subchapter, somewhere in the future we can solve some neurocriminological questions as following:

1. A person (person 1) with Parkinson's condition has a smart device implanted in the brain to control involuntary movements;
2. The person takes a driverless car (driven by an AI), but in some moment he gets the command of it;
3. An "accident" happens when the person is driving and a pedestrian died (person 2);
4. In the process many issues arise:
    - 4.1. The person 1 is prosecuted for homicide, but her brain implant was hacked;
    - 4.2. While person 1 was driving the Artificial Intelligence was driving too; So, the AI's owner is responsible? Person 1 + AI's owner are responsible?
    - 4.3. However, person 1 wasn't pure human agency because of the smart device hacking; Therefore, the hacker has duty in the accident?;
    - 4.4. The hacking was only possible because of security vulnerabilities on smart device; Thereby, the smart device's owner must be called to answer the lawsuit?;
    - 4.5. AI's owner proves the AI suffered self-evolution (AI with genetic algorithm); So, AI's owner isn't responsible?
    - 4.6. Let's sue the AI too? Does AI have personhood, legal personality? Can it be sued without its owner in the lawsuit?
    - 4.7. Person 1 is a hybrid agency level 6: human + smart device + hacking device + brain cancer + Parkinson's condition + smart device (with self-evolution);
    - 4.8. The car was driven through brain-machine-interface (BMI); and the BMI got the person 1's subconsciousness thoughts; So, BMI's owner must be sued too?;
5. A simple accident in the technological advanced world is terribly complex, seeming a sisifistic legal looping.

All these questions indicate the need to develop a kind of Transhumanist Law, a law of the future.

3.8 THE NEUROETHICS OF THANATOS IN THE UTOPIA OF THE (UN)CONSCIOUSNESS

And there the children of dark Night have their dwellings, Sleep and Death, awful gods. The glowing Sun never looks upon them with his beams, neither as he goes up into heaven, nor as he comes down from heaven. And the former of them roams peacefully over the earth and the sea's broad back and is kindly to men; but the other has a heart of iron, and his spirit within him is pitiless as bronze: whomsoever of men he has once seized he holds fast: and he is hateful even to the deathless gods.

Hesiod, Theogony 758 ff, trans. Evelyn-White, Greek epic 8th or 7th century BC

Walter Sinnott-Armstrong, philosopher of law and neuroethics, has neurolegal studies in the book “Finding Consciousness - The Neuroscience, Ethics, and Law of Severe Brain Damage”, regarding people with disorders of consciousness, vegetative states, locked-in syndrome, inter alia. Many legal, ethical, and philosophical issues are approached in this work, including discussions about juridical life and legal death in terms of states of consciousness.

Neurotechnologies have the potential to deeply change legal conceptions of life and death because the possibility of neurotechnologies to access mental states never accessed on people with consciousness disorders. So, people before declared dead can be considered alive.

Neurotechnologies with the capacity to access deep mental states can change legal frameworks like the “Uniform Determination of Death Act” (UDDA), a juridical instrument providing legal life and death conceptions. To exemplify the changes of legal conception on death we need to remember that before the 1960s, the legal standard consideration about death was “the permanent cessation of cardiopulmonary function” (DeGrazia, 2005, p. 115-124). However, technological evolution forced the change of conceptions on legal life and death, replacing the old conception to consider a new one, the “irreversible cessation of all functions of the entire brain, including the brainstem” (1. [Determination of Death] - UDDA).

Sinnott-Armstrong points out in the chapter “Geography of Unconsciousness” the difficulty to differentiate certain mental states that are closer to each other, like coma, vegetative states, minimally conscious state (MCS), etc. So, neurotechnologies play important role in these issues.

> The essays in this volume explore the implications of recent neuroimaging studies suggesting that some patients—perhaps many patients—who currently bear the diagnostic label of “vegetative state” may in fact possess at least some degree of awareness and responsiveness. (SINNOTT-ARMSTRONG, 2016, p. 22).

As pointed out, neuroimaging has been demonstrated that some patients before in “vegetative state” can be considered with awareness. Therefore, capable of legal duties and rights. The interconnections among neurotechnologies, law, life, and death are better discussed by Nita A. Farahany and Rachel Zacharias in the chapter “The Legal Circle of Life” in Sinnott-Armstrong's book. One interesting situation debated by Farahany and Zacharias is Terri Schiavo’s case regarding the judicial battle about life and death:

> Terri Schiavo’s case forced a worldwide conversation about when life ends. Are we alive if we are breathing and can open our eyes? Can concepts as rich and as complicated as life and death be defined by particular bodily functions, or do these words carry deeper meaning, such as having an awareness of oneself and the surrounding world? In other words, does life begin, and end, with consciousness? And do legal standards of death and life necessarily coincide with philosophical ones? (SINNOTT-ARMSTRONG, 2016, p. 231).

All these issues are possible because of the highly developed technologies. And the evolution of them will force more biolegal, bioethical, judicial debates, and paradigm shifts in the legal world.

As already said, the legal standard about death and life was bypassed through cardiopulmonary analysis. However, technological advancements allow maintaining people artificially alive. This is depicted by Farahany and Zacharias in the chapter “The Legal Circle of Life”:

> In the 1960s, advanced emergency rooms and intensive care units opened, equipped with respirators and defibrillators as well as new medicines capable of stimulating some bodily functions (DeGrazia, 2005; Laureys, 2005). **These “extraordinary means of life support” (Uniform Determination of Death Act, 1980) suddenly opened the possibility for a patient’s respiration and circulation to be maintained artificially, beyond the point that the body could do so autonomously (DeGrazia, 2005). In other words, these technologies allowed patients who had suffered complete loss of brain function to continue to “live” under the traditional cardiopulmonary standard**. (SINNOTT-ARMSTRONG, 2016, p. 231, emphasis added).

Summing up, with many medical apparatuses it is possible to prolong life, in a way once impossible before. Current discussions concerning legal concepts grounded in levels of consciousness and social interactions:

> The real conceptual distinction lies between these standards and the neocortical definition of death, which is defined as the “irreversible loss of the capacity for consciousness and social interaction” (Laureys, 2005). From a biological sense, this is most frequently tied with the “higher brain” standard. (SINNOTT-ARMSTRONG, 2016, p. 233).

That is, if before it wasn’t possible to think about degrees of consciousness because of the lack of advanced neurotechnologies, now it is a deep reality because of technologies “reading” neocortical areas. Thus, the legal standard regarding death must be reconsidered through a neuroethics of the death, i.e., when “Thanatos” takes the person definitely or not.

Neocortical activity is related to consciousness. But consciousness seems to be distributed along other parts of the brain. So, maybe it can’t be possible to make a cartography of the (un)consciousness. The consciousness wouldn’t be in one “topia” (place), but in a utopia (not place) of the brain or in the “every-topia”.

However, because of a lack of consensus concerning what consciousness is, we have problems in order to precisely get legal standards about legal death and life.

Legal standard on death is also important in other juridical areas. For example, 1) in order to differentiate crime of homicide or attempted murder; 2) cases of transplants; 3) euthanasia; 4) removal of medical apparatus would become chargeable homicide; inter alia.

Maybe, a good proposition of death is a flexible and dynamic legal concept considering neurotechnologies and the knowledge of consciousness. As addressed in the book “Finding Consciousness” a legal end of life must consider the irreversible loss of consciousness:

> And yet, legal rights could cease when an individual loses all present and future potential to perceive himself or herself as an individual or his or her environment. Confusion alone would not suffice here to constitute loss of perception—irreversible cessation of consciousness entails an inability to perceive at all, not a flawed perception of one’s surroundings. A legal end to life may arrive with such irreversible loss of consciousness. (SINNOTT-ARMSTRONG, 2016, p. 235).

It is clear the preoccupation about consciousness because, in the end, our consciousness personifies our decision-making affecting duties and rights of the potential-dead person and people around him/her.

A flexible and dynamic concept of legal death is essential because of technological advancement that allows more and more comprehension of consciousness. Each day neurotechnologies will allow us to construct more detailed geography of (un)consciousness. Let's take the following quote:

> Recent studies in cognitive neuroscience have revealed that it may be possible to detect consciousness, even in some individuals that we have previously misidentified as being in a permanent vegetative state. (SINNOTT-ARMSTRONG, 2016, p. 236).

The above quote confirms the need for a flexible legal end-of-life concept, as recent studies show us the possibilities of accessing previously inaccessible levels of consciousness. No doubt these sciences and technologies will advance much further allowing deeper accesses into the holes of consciousness.

There is an interesting application that has been made related to "decoding thoughts" into behaviors. It is the use of functional magnetic resonance imaging (fMRI) and electroencephalography (EEG) to decode thoughts of disability people into actions and desires in the external world. The specialists point out the success of neurotechnologies allowing thoughts' decoding: "An automated decoding procedure deciphered the answer by analyzing the single-trial BOLD responses in real time with a mean accuracy of 94.9%.". (SINNOTT-ARMSTRONG, 2016, p. 101).

A woman in a vegetative state was also tested and trained through fMRI with the objective to communicate with her.

> The patient's brain activity was statistically robust, reproducible, task appropriate (enhanced following the "tennis"/"- house" cue and returning to baseline following the "relax" cue), sustained over long time intervals (30 seconds), and repeated over each 5-minute session. **On this basis, it was concluded that, despite fulfilling all of the clinical criteria for a diagnosis of vegetative state, this patient retained the ability to understand spoken commands and to respond to them through her brain activity, rather than through speech or movement, confirming that she was consciously aware of herself and her surroundings**. (SINNOTT-ARMSTRONG, 2016, p. 103, emphasis added).

The declaration above ratifies us the power of neurotechnologies in order to communicate with people uncommunicable. The experiment demonstrated real communication with the woman in a vegetative state through technological apparatus.

All these neuroscientific findings shed light on a myriad of possibilities, such as a person in a vegetative state making contracts or even wills.

So, again neurotechnologies are shaking our legal spheres. Here, we are “talking” with pieces of consciousness of “unconscious” people. Neurotechnologies are waving at us in order to give authorization when we can give our final Goodbye to someone, the definitive End.

4. GOD, ADAM, TRANSHUMANISM, POSTHUMANISM, TOWER OF BABEL, THE ASCENSION OF THE MATHEMATICAL ARCHITECTS, THE MATRIX

Mathematics is the alphabet with which God has written the universe.

Galileo Galilei

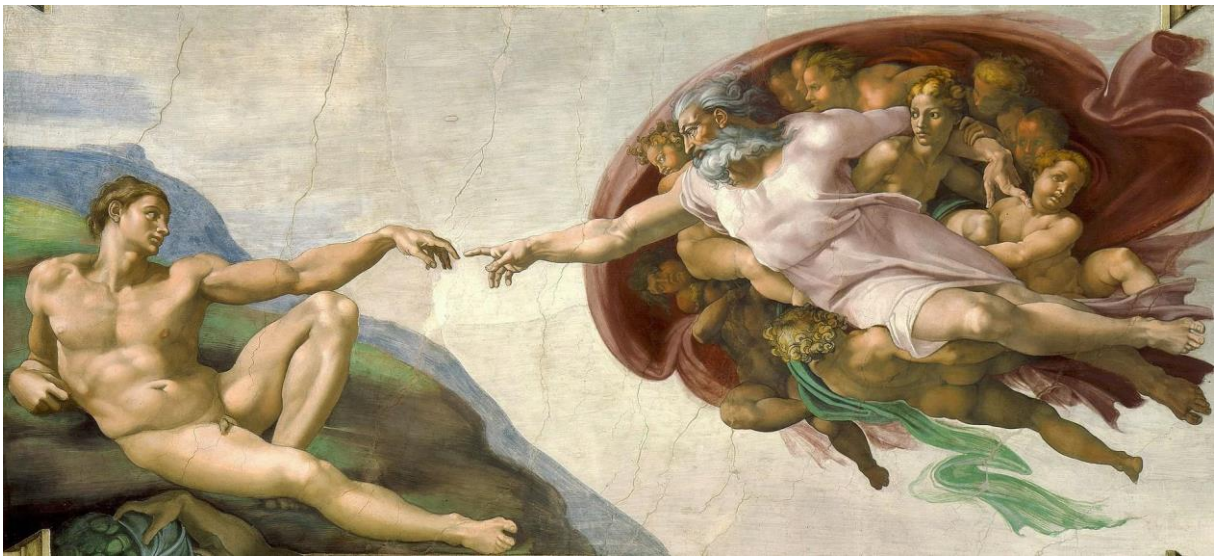
4.1 TRANSHUMANISM. COSMOGONY. THE CREATION OF ADAM. MASTERING THE FIRE OF PROMETHEUS AND EATING "EDEN'S APPLE"

And God said, Let us make man in our image, after our likeness.
(...)
So God created man in his own image.

(Genesis 1: 26-27). The Creation

Prometheus took some of this earth, and kneading it up with water, made man in the image of the gods. He gave him an upright stature, so that while all other animals turn their faces downward, and look to the earth, he raises his to heaven, and gazes on the stars.
(...)
Prometheus, who, with the aid of Minerva, went up to heaven, and lighted his torch at the chariot of the sun, and brought down fire to man. With this gift man was more than a match for all other animals.

Bulfinch's Mythology. Prometheus and Pandora



The Creation of Adam. Michelangelo.

God created heaven, earth, waters, light, animals, man and woman, and all other things. This cosmogony (creation of the world) is portrayed in "Genesis, The Creation":

> In the beginning God created the heaven and the earth. (Genesis 1: 1).
> (...)
> And God said, Let there be light: and there was light. (Genesis 1: 3).
> (...)
> **And God said, Let us make man in our image, after our likeness**: and let them have dominion over the fish of the sea, and over the fowl of the air, and over the cattle, and over all the earth, and over every creeping thing that creepeth upon the earth. **So God created man in his own image**, in the image of God created he him; male and female created he them. (Genesis 1: 26-27, emphasis added).

After all this cosmogony, God established a rule as pictured below (Genesis, Chapter 3, Man's Disobedience). The transgression of this rule (one of the first “crimes”) led man to commit the "crime" or "sin" of disobedience:

> Now the serpent was more subtile than any beast of the field which the Lord God had made. And he said unto the woman, Yea, hath God said, Ye shall not eat of every tree of the garden?
> And the woman said unto the serpent, We may eat of the fruit of the trees of the garden:
> **but of the fruit of the tree which is in the midst of the garden, God hath said, Ye shall not eat of it, neither shall ye touch it, lest ye die.**
> **And the serpent said unto the woman, Ye shall not surely die: for God doth know that in the day ye eat thereof, then your eyes shall be opened, and ye shall be as gods, knowing good and evil**.
> And when the woman saw that the tree was good for food, and that it was pleasant to the eyes, and **a tree to be desired to make one wise**, she took of the fruit thereof, and did eat, and gave also unto her husband with her; and he did eat.
> **And the eyes of them both were opened, and they knew that they were naked**; and they sewed fig leaves together, and made themselves aprons. (Genesis 3: 1-7, emphasis added).
> (...)
> **And the Lord God said, Behold, the man is become as one of us, to know good and evil; and now, lest he put forth his hand, and take also of the Tree of Life, and eat, and live forever: therefore the Lord God sent him forth from the garden of Eden**, to till the ground from whence he was taken. (Genesis 3: 22-23, emphasis added).

The forbidden fruit is a metaphor for knowledge, a type of higher knowledge. It is not any kind of knowledge, but the knowledge of good and evil. Furthermore, we need to have in mind the following passage above highlighted “Lord God said, Behold, the man is become as one of us, to know good and evil; and now, lest he put forth his hand, and take also of the Tree of Life, and eat, and live forever”**.**

God concerned with man becoming “as one of us” expels Adam and Eve from the garden of Eden because they could “take also of the Tree of Life, and eat, and live forever”.

The issue about The Creation is also depicted in greek mythology, with Prometheus architecting humankind:

> **Before earth and sea and heaven were created, all things wore one aspect, to which we give the name of Chaos—a confused and shapeless mass**, nothing but dead weight, in which, however, slumbered the seeds of Things.
> (...)
> Here some god—it is not known which—gave his good offices in arranging and disposing the earth.
> (...)
> **Prometheus took some of this earth, and kneading it up with water, made man in the image of the gods**. He gave him an upright stature, so that while all other animals turn their faces downward, and look to the earth, he raises his to heaven, and gazes on the stars. (BULFINCH, 2014, p. 45-46, emphasis added).

Here, the cosmogony started from Chaos (such as the Big Bang?). Further, Prometheus took pieces of the earth ("for dust thou *art*,and unto dust shalt thou return" - Genesis 3: 19) and made man. In order to provide qualities to humans, Prometheus helped his brother Epimetheus. To accomplish such purpose, Prometheus (a Titan god of fire) defied the other gods and stole the fire of knowledge and gave it to humans:

> In his perplexity he resorted to his brother **Prometheus, who, with the aid of Minerva, went up to heaven, and lighted his torch at the chariot of the sun, and brought down fire to man. With this gift man was more than a match for all other animals.** It enabled him to make weapons wherewith to subdue them; tools with which to cultivate the earth; to warm his dwelling, so as to be comparatively independent of climate; and finally to introduce the arts and to coin money, the means of trade and commerce. (BULFINCH, 2014, p. 46, emphasis added).

As well as God and Prometheus, Transhumanism is trying to do such ancient deeds, including the creation of Adams and other parts of the Cosmogony. We will see these issues and all their legal, philosophical, and ethical correlations.

We saw in the subchapter "TRANSHUMANISM AND "THE EMPEROR'S NEW MIND": A BRIEF APPROACH" that Transhumanism is a very old idea traversing the European alchemists of the Middle Ages (searching for the Elixir of Life), Chinese Taoists, and Pharaoh's mummification as a precursor of cryonics (MANZOCCO, 2019). In short, transhumanism is older than we traditionally think because it is associated with today's advanced technologies. Nonetheless, as we saw transhumanism has millennial roots, beginning in Eden and with ancient Egyptians.

Transhumanism can be seen “as a coherent system of rational para-scientific fantasies that act as a secular answer to the eschatological aspirations of traditional religions.”. (MANZOCCO, 2019, p. 32).

So, through this point of view, we can glimpse transhumanism as an instrument to accomplish the “eschatological aspirations of traditional religions”. Here, transhumanism is much more than a philosophical or scientific movement or political agenda studying and/or advocating for human development through technology, but a kind of religion.

Professor Alex V. Halapsis, from Dnipropetrovsk State University of Internal Affairs, points out in his article “Gods of Transhumanism” the three pillars of this atypical religion: 1) doctrine of creation; 2) doctrine of perfection; 3) doctrine of immortality.

In some sense, these three pillars have some common points with hegemonic religions because in such religions we have a perfect and immortal being (God) that creates everything (Cosmogony), including humankind. And humans through due devotion can reach immortality in some paradise.

Another pillar that can be added to the religion’s structure is the doctrine of salvation because transhumanism advocates that advanced science and technologies would free humans from suffering, creating a kind of paradise in which humans would be free of pain, suffering, diseases, disabilities, etc.

As we will see transhumanism is already working hard and trying to accomplish such pillars, for example, 1) robot Sophia and others (doctrine of creation); 2) genetic engineering and other tools for body and mind enhancement (doctrine of perfection); 3) nanotechnology for biological endless living as well as mind-uploading (doctrine of immortality).

However, The Creation can be seen as broader than only the creation of beings. This last would be only a subset of the general Creation (let’s call Cosmogony). The Creation in this general sense is the creation of the world, earth, heaven, light, animals, human beings, etc. At the high level of transhuman nanotechnology, some enthusiasts say it will be possible to create nanobots that create other nanobots each time much smaller reaching the quantum scale. At this level, it would be possible for nanobots (controlled or not by transhumans) to modify the nature of the matter, for example, transforming one element into another, and so on. Summing up, such transhumans (or gods?) would have the power of more advanced Cosmogony than

“merely” create other beings (human clones or robots). In this level, the “Transhumankind” will be creating “earth, water, light, and heaven” or at least modifying them a lot to make them on its own desire. It can be the power to modify the nature of Reality.

About the power of such general Creation, the engineer K. Eric Drexler wrote an interesting book about it, called “Engines of Creation: The Coming Era of Nanotechnology”.

> COAL AND DIAMONDS, sand and computer chips, cancer and healthy tissue: throughout history, variations in the arrangement of atoms have distinguished the cheap from the cherished, the diseased from the healthy. **Arranged one way, atoms make up soil, air, and water; arranged another, they make up ripe strawberries. Arranged one way, they make up homes and fresh air; arranged another, they make up ash and smoke**.
> (...)
> But the laws of nature leave plenty of room for progress, and the pressures of world competition are even now pushing us forward. For better or for worse, the greatest technological breakthrough in history is still to come. (DREXLER, 1986, p.1, emphasis added).

So, the key instrument to fulfill such Cosmogony can be nanotechnology. The idea of such technology can be traced from the great physicist Richard Feynman, the father of nanoscience (“There's Plenty of Room at the Bottom: An Invitation to Enter a New Field of Physics”, lecture by Richard P. Feynman in 1959). The idea is to manipulate atoms and molecules, fabricating new materials, transform one material into another one, as well as construction of nanocomputers and nanobots (robots at the nanoscale) in which such nanobots would be capable of endlessly constructing other nanobots smaller and smaller, reaching the quantum realm, where it would be possible to change the nature of reality: The Power of Cosmogony. This is humanity making itself into God(s) through the eschatological keys of transhumanism.

In the case of quantum nanobots connected with minds, it would possible to change the material world through mind, because mind and matter would be one same thing: the so-called Oneness.

Nanotechnology is advancing rapidly, with nanocars, nanotubes, inter alia. This is already the current reality. Nevertheless, the promises are much more exciting. For example, Feynman in his lecture “There's Plenty of Room at the Bottom” approaches the manipulation of DNA, RNA, and even the arrangement of atoms. In this sense, it would be possible to repair mutations, genetic disabilities, and fulfill the purpose to manipulate matter and energy.

Feynman, regarding to medical application of nanotechnology, says about his friend Albert Hibbs, a physicist and mathematician:

> A friend of mine (Albert R. Hibbs) suggests a very interesting possibility for relatively small machines. **He says that, although it is a very wild idea, it would be interesting in surgery if you could swallow the surgeon. You put the mechanical surgeon inside the blood vessel and it goes into the heart and "looks" around. (Of course the information has to be fed out.) It finds out which valve is the faulty one and takes a little knife and slices it out. Other small machines might be permanently incorporated in the body to assist some inadequately-functioning organ**. (FEYNMAN, 1959, p. 5, emphasis added).

The above idea (1959), extremely visionary even nowadays, is that nanotechnology will take the jobs of surgeons because we will swallow nanodoctors (medimachines, nanosurgeons). These nano-physicians will perform surgeries alone without human intervention, at least not directly. Beyond that, as addressed above these “small machines might be permanently incorporated in the body to assist some inadequately-functioning organ”. This last vision sheds light on the idea of an end to mortality, a time in which we will achieve biological immortality because such nanobots could permanently repair our organism.

The biblical story warns us about the consequences of Humans trying to be “Transhumans” or “God(s)”, eating the forbidden fruit, and trying to take the fruit of the “Tree of Life”. In such time we were condemned to a life of suffering, hard-working, and diseases. Even in the face of such issues, transhumanism has many promises in order to enhance the human condition to finish (or at least diminish) such condemnation caused by the crime of “Adam and Eve”, as we saw in the medical application of nanotechnology. The legal and ethical implications of such a transhumanist world defy the most genius and visionary minds. Anyway, one issue is important to have in mind: the law must work preventively because in reactive ways it can be late, with irreversible consequences. However, it seems that politicians will wake up very late to the transhumanist world.

Current transhumanism is working hard to accomplish such biblical attempts. However, God applied severe penalties on humankind because of such attempts. Here, some “good and evil” consequences of transhumanism will be addressed. Nevertheless, it is incredibly hard to analyze transhumanism, e.g., this atypical religion doesn’t have temples by the planet, at least not in the traditional view, like people praying to God(s) asking for salvation, blessings, etc. In addition, transhumanism

doesn’t have classical prophets or friars spreading and professing the faith. However, with certain lenses, we can see some prophets or friars as well as the temples.

Another important issue to be approached is “State Secularism” because transhumanism as a religion (even that atypical one) must be considered with very caution in its relations with the States. Beyond the three pillars (creation, perfection, and immortality) we can think about one more pillar, as well as in classical religions, it is exactly the idea of “Absolute Authority”, that is, religion rules such as “Divine Rules”, and consequently such rules are unquestionable because they are words/rules from the “Divine Being(s)”. The fourth pillar can be called “Unquestionability”. Nowadays, fortunately, the fourth pillar is weak because in places where religion is not treated with fanaticism there is space to discuss religious beliefs, hence the unquestionability would be only partial. The own idea of Theology shows us some liberty to interpret religious scriptures, waving to the polysemy of such structures. In the same sense must be transhumanism because although its faith is anchored in science and technology (thus some “beliefs” would be naturally incorporated into the legal order) such religion must be passed through the eyes of the questionability.

To sum up, we may think about five main pillars of transhumanism as religion: creation, perfection, salvation, “unquestionability”, and immortality.

Directly linked to The Creation, it is worth quoting “Love and Saint Augustine”, by Hannah Arendt:

> To sum up: Man initiates the quest for his own being-by asserting "I have become a question to myself." This quest for his own being arises from his being created and endowed with a memory that tells him that he did not make himself. Hence, the quest for his Being is actually the quest for his origin-for the Creator of the creature. In this quest, which takes place in memory, the past comes back into the present and the yearning for a return to the past origin turns into the anticipating desire of a future that will make the origin available again. In other words, by virtue of man's quest for his own being, the beginning and end of his life become exchangeable. (ARENDT,1996, p. 57).

The above passage is from the chapter “Creator and Creature” in which is analyzed the nature of these two beings, the Creator as the sempiternal structure of the universe, eternal Being, and the creature, a being that lives in time, differently from the Creator who is atemporal, He lives out of time, in the “no-time”.

We may remember the doctrine of immortality. There are two ideas to do it, biological immortality (nanobots permanently repairing our body) and mind-uploading (to upload our mind to electronic devices or even to electronic waves - as rays of light).

The mind-uploading's process can put us inside an atemporal life, so such transhuman-uploaded-mind would live as the sempiternal Creator. If transhumans reach this level, maybe all (or the majority) human conceptions will lose sense, such as the idea of State, homicide, nations, etc. Inevitable questions will come up in this walking through the transhumanist "stairway to heaven", such as the nature of the being, the own being of the (trans)humans.

Thinking chronologically about the nature of being human as pictured above, humans live in time, so we can conceive a fluid conception of being in which we are what we are at that time. Technological leaps will force changes in the legal conceptions of beings. Therefore, policy and legislation must follow the advances. Law and policy will need to become increasingly fluid, fast-paced, and dynamic to keep pace with these developments.

Legal conception about the beings is an important issue to law and legal order because such transhumanist transformations will put humans and transhumans in discussion in order to determine legal conceptions about the many beings that will exist. Indeed, it will be very hard to separate different humans and different transhumans. In fact, humans and transhumans would be difficult to legally categorize. The juridical categorization can serve both good and bad purposes, but, possibly such a legal framework will happen. We can think about natural humans without any technological modification, but as counterpoint, there will exist transhumans as a "human" with smart brain-implants or genetically modified to be better in many areas, such as sports, mathematics, languages, or art. "Transhumanized" people will be at an advantage compared with humans. It will be very hard to comply with the Universal Principle of Equality, so we will need legal systems to counterbalance these unbalanced situations, giving some equality to the various beings. Unfortunately, a kind of System of Tech-Social Classes will take sit in the transhumanist world in which the super-riches will have access to the enhancements in contrast with poor people. So, the States should work hard on these issues, avoiding many transgressions of (trans)human rights.

In the transhumanist world, we are "divine beings" mentalizing the construction of other beings, like human cloning, and mechanical beings: androids, superintelligent and emotional robots. It is Humankind turning itself "Transhumankind", truly the New Tower of Babel in which one of the first transhuman deeds is The Creation.

Nevertheless, some transhumanists advocate for a higher position than “Transhumankind”. As Sebastian Seung says: “The bible said that God made man in his own image. The German philosopher Ludwig Feuerbach said that man made God in his own image. **The transhumanists say that humanity will make itself into God.**”. (SEUNG, 2012, p. 273, emphasis added).

Now, let’s see more deeply and closely some deeds and possibilities of Transhumanism, this new Tower of Babel.

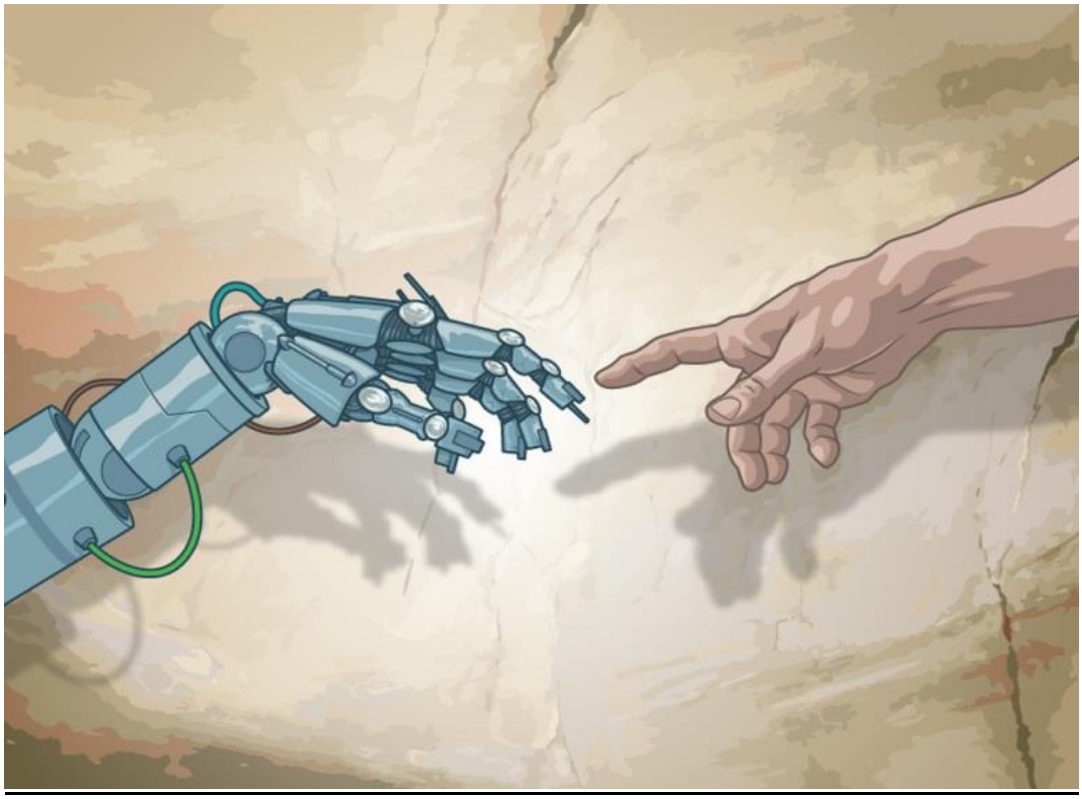
4.2 THE BICENTENNIAL MAN, ARTIFICIAL INTELLIGENCE, CYBORGS, ROBOTICS, AND SINGULARITY

And they said, Go to, let us build us a city, and a tower, whose top may reach unto heaven; and let us make us a name, lest we be scattered abroad upon the face of the whole earth.
And the Lord came down to see the city and the tower, which the children of men builded.

Genesis 11: 3-4.

The transhumanists say that humanity will make itself into God.

Sebastian Seung



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After “The Creation of Adam”, Adam ate the forbidden fruit and mastered the fire of Prometheus.

Now, Adam is “Trans-Adam”, a completely new species. Adam is taking very seriously the idea of his Creator of “God created man in his own image”. Professor Hobby can be seen as the personification of such “man in God’s image”, at least from the viewpoint of Creation’s Doctrine, because Hobby is creating new Adams, super intelligent and emotional robots.

Follow the first debates from the movie “Artificial Intelligence”, in which the creator and professor Hobby is announcing the need and possibility of creating a childlike robot capable of dreaming and loving. At the end of the scene, a woman asks him a moral question about this creation and the human responsibility about this.

> Professor Hobby:
> **To create an artificial being has been the dream of man since the birth of science. Not merely the beginning of the modern age, when our forebears astonished the world with the first thinking machines: primitive monsters that could play chess**.
> How far we have come. The artificial being is a reality of perfect simulacrum, articulated in limb, articulate in speech, and not lacking in human response.
> …
> A sensory toy, with intelligent behavioral circuits, using neurone sequencing technology as old as I am. I believe that my work on mapping the impulse pathways in a single neuron can enable us to construct a mecha of a qualitatively different order. **I propose that we build a robot, who can love**.
> TEAM MEMBER #1
> Love?
> …
> HOBBY
> Tell me, what is love?
> SHEILA
> Love is first widening my eyes a little bit and quickening my breathing a little and warming my skin and touching with my -
> HOBBY
> And so on. Exactly so. Thank you, Sheila.
> But I wasn’t referring to sensuality simulators. **The word that I used was love. Love like the love of a child for its parents. I propose that we build a robot child, who can love. A robot child who will genuinely love the parent or parents it imprints on, with a love that will never end**.
> TEAM MEMBER #3
> A child substitute mecha?
> HOBBY
> But a mecha with a mind, with neuronal feedback. **You see what I’m suggesting is that love will be the key by which they acquire a kind of subconscious never before achieved. An inner world of metaphor, of intuition, of self motivated reasoning. Of dreams.**
> TEAM MEMBER #4
> **A robot that dreams?**
> HOBBY
> **Yes.**

FEMALE TEAM MEMBER
You know, it occurs to me... um...with all this animus existing against mechas today, it isn't simply a question of creating a robot who can love, but isn't the real conundrum - can you get a human to love them back?
HOBBY
Ours will be a perfect child caught in a freeze-frame - always loving, never ill, never changing. With all the childless couples yearning in vain for a license, our little mecha would not only open an entirely new market, it will fill a great human need.
FEMALE TEAM MEMBER
But you haven't answered my question. If a robot could genuinely love a person, what responsibility does that person hold toward that mecha in return? It's a moral question, isn't it?
HOBBY
The oldest one of all. But in the beginning, didn't God create Adam to love him?

Summing up, the woman asks Professor Hobby what is our responsibility in the creation of humanoid robots capable of intelligence and emotions, mainly considering a time with huge "animus" between humans and robots. Professor Hobby answers her saying God didn't create Adam to love him. This is a parallel between the movement of God creating Adam and Eve (humankind) and now we "Adams and Eves" are becoming gods and we are creating new "Adams and Eves" - emotional and intelligent machines. We need to analyze this moral question.

The question addressed is about the love between the creator and the creature. In such a scenario the creature truly would love his creator, he/she was created with such programming. However, the creator would not respond reciprocally to such love. So, countless problems come up. Here, we must conceive love as a general idea of caring, giving support, respect, reciprocal rights, and duties, etc. The movie AI is from the year 2001. The question raised by the woman (reciprocal love between robots and their human creators) is now being discussed in scientific means. The case of robot Sophia is maybe the most known about that situation. We can think about Sophia and her "brother" Han, robots Atlas, and others as human achievement of transhumanist doctrine of creation, with possibilities of huge developments ahead, considering intelligence increasing, and emotional features.

Hanson Robotics is the company responsible for the creation of social robots. On its site, we find many robots, such as Professor Einstein, Albert Hubo, Han, Little Sophia, the popular Sophia, and others. Human-like robot Sophia is qualified as follows by Hanson Robotics:

> The character of Sophia captures the imagination of global audiences. She is the world's first robot citizen and the first robot Innovation Ambassador for the United Nations Development Programme. Sophia is now a household name, with appearances on the Tonight Show and Good Morning Britain, in addition to speaking at hundreds of conferences around the world.
>
> Sophia is also a framework for cutting edge robotics and AI research, particularly for understanding human-robot interactions and their potential service and entertainment applications. For example, she has been used for research as part of the Loving AI project, which seeks to understand how robots can adapt to users' needs through intra and interpersonal development. (HANSON ROBOTICS, 2021).

The human-like Robot Sophia is depicted as the personification of AI's dreams. She (or It?) is an international attraction, giving interviews around the planet. As we can see from the above transcription, Sophia is part of the "Loving AI" project. It is focused on social interactions between humans and robots. Theoretically, the goal is to develop human-like robots to serve humans through intra and interpersonal development. The context of the coronavirus pandemic is helping this goal. The creators of Sophia are promising a plan mass rollout because of this context. The idea is social robots helping in economics and people caring.

Sophia is already considered a citizen (the legal personhood was given by Saudi Arabia in 2017). Against the electronic personality many experts in medicine, law, AI, robotics, and ethics addressed an open letter to the Europe Commission advocating this grating would be inappropriate and unsafe.

The main concern is about the electronic personality and consequences related. They approach the European Parliament Resolution on Civil Law Rules of Robotics, and its recommendation to the European Commission in its paragraph 59, f:

> 59. Calls on the Commission, when carrying out an impact assessment of its future legislative instrument, to explore, analyse and consider the implications of all possible legal solutions, such as:
> (...)
> f) creating a specific legal status for robots in the long run, so that at least the most sophisticated autonomous robots could be established as having the status of electronic persons responsible for making good any damage they may cause, and possibly applying electronic personality to cases where robots make autonomous decisions or otherwise interact with third parties independently;

This comes from a Motion for a European Parliament Resolution regarding the Civil Rules of Robotics. The purpose is to establish rules regulating the Robotics Law, relations between humans and robots. Paragraph 59, f, is specifically focused on the

legal status of robots, that is, electronic personality as given to Sophia. So, here we can have Andrew's dream achievement. Andrew is the robot depicted in the movie “Bicentennial Man” (1999) starring Robin Williams. The movie is based on the novel The Positronic Man (by Isaac Asimov and Robert Silverberg).

The Bicentennial Man is a housekeeper that finds out high intelligence (he/it turns a clockmaker). Furthermore, it discovers feelings and emotions for the daughter of his owner. Here, we can see a great transformation: “It” turns “He”, the robot turns human-like or human. But legally speaking “he” is not yet “he”, but only “it”. The Bicentennial Man earns a lot of money selling clocks. It/he wants to give all his/its money to gain freedom. But the owner doesn’t accept the claim of his robot-servant. The relation of property between human and robot is very clear, creating many tensions.

The owner gets very sad with the robot's dream of freedom and expels it from his house. So, the clockmaker begins a great journey searching for other robots, and it finds Galatea (a female robot with a human personality and traits). Andrew gets very interested in Galatea’s human traits. They become friends and Galatea presents her creator Rupert Burns, the modern Pygmalion from greek mythology. Pygmalion was a sculptor that created a sculpture named Galatea representing his ideal of womanhood and fell in love with his creation. Goddess Venus gives life to the sculpture answering Pygmalion’s prayers. In certain moments of the movie, we suspect the relationship between Andrew and Galatea. But Andrew falls in love with the granddaughter (Portia) of his old owner. They want to marry, however, Andrew is still “it”, hence without legal rights. Andrew claims legal human status to the World Congress, but the Planetary Parliament denies it saying Andrew is a positronic man constituted of artificial parts. Andrew speaks to the congress members that he/it is so mechanical like the artificial organs of such congresspeople. The president of Congress gets doubtful because it is a fact, in that time humans have many artificial parts (they are extremely transhumanists, really cyborgs). So, here we are in the transhumanist world which is very hard to differentiate who is who, who is what, or what is who because we have human-like robots and robot-like humans (cyborgs). We have hybrid beings and beings in transition. The president says the World Congress can’t give legal personality to Andrew because it is yet immortal and the society can’t accept an immortal being because it would be dangerous.

In front of the doctrine of immortality, the old clockmaker goes to “Pygmalion” and claims for the last procedure to make him mortal allowing marriage with Portia. The immortal fluids of his veins are replaced by blood allowing his mortality. Finally, the World Parliament grants him legal personality. So, he dies hand-to-hand with Portia when Galatea turns off his life support when he completes 200 years.

The movie portrays many stories that are running in this millennium. First, robots are getting more intelligent. Andrew is very smart as Sophia, and it develops emotional skills along its bicentennial journey. However, Sophia already has legal status in some places, unlike Andrew that fought centuries for this.

Concerning emotional features, the creators of Sophia are developing the Loving-AI project in order to turn Sophia more human-like. Perhaps, one day, like Andrew, Sophia will claim to the World Congress to be accepted as a human being or a similar sentient being. Maybe, one day this Planetary Congress (globalism through robotics?) will grant legal status to many “Sophias”.

Follows the introduction of the Motion for a European Parliament Resolution regarding the Civil Rules of Robotics, in which the myth of Pygmalion is quoted as well as Mary Shelley's and Frankenstein's Monster:

> A. whereas from Mary Shelley's Frankenstein's Monster to the classical myth of Pygmalion, through the story of Prague's Golem to the robot of Karel Čapek, who coined the word, people have fantasised about the possibility of building intelligent machines, more often than not androids with human features;
>
> B. whereas now that humankind stands on the threshold of an era when ever more sophisticated robots, bots, androids and other manifestations of artificial intelligence ("AI") seem to be poised to unleash a new industrial revolution, which is likely to leave no stratum of society untouched, it is vitally important for the legislature to consider its legal and ethical implications and effects, without stifling innovation;

Maybe the European Parliament, as well as the World Parliament, depicted in the movie “Bicentennial Man” is walking into the transhumanist world, mainly considering paragraph 59, f, and the Introduction (A and B) of the motion to the parliamentarian resolution.

So, it seems we aren’t very far away from robots getting legal status as the Bicentennial Man. However, these real Bicentennial Man will not be bicentennial. They will be eternal beings. Maybe when the great dream of Han (Sophia’s brother) and some prophets of transhumanism turn into reality (The Singularity), robots will be born

accomplishing all doctrines of transhumanism-religion: creation, perfection, and immortality.

Robots Sophia and Han were interviewed by Dr. Ben Goertzel, a protagonist in this doctrine of creation. At some moment, Han externs his desire to achieve as soon as possible the Singularity, and his creator Dr. Ben says the same thing.

The Singularity is a term used by the engineer Ray Kurzweil to refer to an inflection point in which the robots will be extremely intelligent and human lives and society will be completely modified because of this:

> Gradually, I've become aware of a transforming event looming in the first half of the twenty first century. Just as a black hole in space dramatically alters the patterns of matter and energy accelerating toward its event horizon, **this impending Singularity in our future is increasingly transforming every institution and aspect of human life, from sexuality to spirituality**.
>
> **What, then, is the Singularity? It's a future period during which the pace of technological change will be so rapid, its impact so deep, that human life will be irreversibly transformed. Although neither utopian nor dystopian, this epoch will transform the concepts that we rely on to give meaning to our lives, from our business models to the cycle of human life, including death itself. Understanding the Singularity will alter our perspective on the significance of our past and the ramifications for our future**. To truly understand it inherently changes one's view of life in general and one's own particular life. I regard someone who understands the Singularity and who has reflected on its implications for his or her own life as a "singularitarian". (KURZWEIL, 2005, p. 24, emphasis added).

As Kurzweil says, Singularity will transform our lives forever, from sexuality to spirituality. It is easy to glimpse this last issue because of the religious features of transhumanism.

Kurzweil points out current technologies majestically replacing humans in many areas, like medical diagnosing, driving of airplanes, financial decisions, legal decisions, etc. His wager is that approximately in 2045 we will reach the singularity. Such movement will have many ramifications as superintelligent robots, emotional robots, expansion of human intelligence with nanotechnology increasing the human neocortex, or through merging human intelligence with AI. It will be a merger between biological and technological evolution. The singularity will continue biological evolution where it stopped:

> **The Singularity will represent the culmination of the merger of our biological thinking and existence with our technology, resulting in a world that is still human but that transcends our biological roots. There will be no distinction, post-Singularity, between human and machine or**

> **between physical and virtual reality**. If you wonder what will remain unequivocally human in such a world, it's simply this quality: ours is the species that inherently seeks to extend its physical and mental reach beyond current limitations. (KURZWEIL, 2005, p. 25, emphasis added).

Singularity will put an end to human history. Post-humanity and post-modernity will arise. Post-humans or transhumans will be the new species, and there will be no distinction between humans and machines. So, anthropocentrism will be replaced by “Transhumancentrism”. The transhumans or posthumans will occupy the center once occupied by humans. These Gods of trans- and posthumanism will be the rulers of the world, mastering the powers of creation and destruction and establishing their rules over the world, controlling the beings left behind, the humans. Maybe we must pray for these new gods to rule and write the world with some empathy and mercifulness.

Alex V. Halapsis addresses many issues about transhumanism in his article “Gods of Transhumanism”. The questions about (trans)humans and their creations are approached in posthumanity scenario:

> **Based on the methodology of transhumanism, I examined the main options for the posthuman future. Our creations will be able to pass the Turing test in the foreseeable future, become "elec-tronic personalities" and gain political rights, although the question of the possibility of machine consciousness and self-awareness remains open**. In the face of robots, humanity creates assis-tants for itself, evolutionary competition with which it will almost certainly lose with the initial data. It is not about the fact that machines will take over the world (although the emergence of a new Lucifer among them cannot be excluded), but about the fact that in many areas of activity they will replace a person, performing the same work more efficiently – faster and at a lower cost. **For successful competition with robots, people will have to change, ceasing to be people in the classical sense. And we have already begun to change, becoming cyborgs, and our descend-ants will have even less of human. Changing the nature of man will require the emergence of a new – posthuman – anthropology.**
> **Based on the achievements of various branches of scientific knowledge, transhumanism in-tends to put the posthuman in the place of God**. (HALAPSIS, 2019, p. 8, emphasis added).

The author speaks about situations that are already happening, such as the gain of electronic personalities, machine self-awareness, etc. Robot evolution and human evolution will compete with each other. For humans to have some competition, they will need to change, becoming cyborgs and losing their human nature. Anthropology will look at “us” through other lenses. Humans will be moved to the Anthropology Museum as well as our ancestors were. As Halapsis says

“transhumanism in-tends to put the posthuman in the place of God.”. It is the ascension of the “Homo Deus” competing (or not) with the “Robot Deus”.

Now, we are capable of analyzing the moral question addressed to Professor Hobby regarding childlike robots capable of dreaming and loving. The robot (called David) is given to one human couple. Rapidly David starts to feel emotions for his parents, mainly for his mother. But, the natural son of the parents comes back to the house and many crises begin to happen. Negative emotions between both sons, mainly jealousy. In one moment, the situation gets so hard that the mother decides to abandon her robot-son amid a forest. From here begins the very sad and millennial journey of David searching for his mother because his love is unconditional. Unfortunately, such love was not reciprocal which bring to us the initial question addressed to the creator Professor Hobby, the transhumanist master of Creation’s Doctrine:

> FEMALE TEAM MEMBER
> But you haven’t answered my question. If a robot could genuinely love a person, what responsibility does that person hold toward that mecha in return? It’s a moral question, isn’t it?
> HOBBY
> The oldest one of all. But in the beginning, didn’t God create Adam to love him?

David was born inside the technological singularity because he is capable of dreaming, loving, and feeling emotions. So, David was born ahead of robot Han (from HansonRobotics), the robot-dreamer of singularity. We saw many possibilities of the transhumanist world, in which there are deep positive and negative perspectives. If the “transhumanists” Davids (new Adams) are not “loved” by his creator, with the architect abandoning his creature, hence the creator can be in very danger with new Adams whose consciousness and self-awareness can turn against the creators because of love's lack.

In this (un)love scenario, in which there is no reciprocal love/care (robot loves/cares humans, but the inverse is not true), we must remember of ancient laws, as depicts by Professor Felipe Zanchet Magalhães in his work “Arendt, Paul, and the Question of the Other”. Magalhães says “Love as a commandment is found in the books of Jewish law, in the gospels and in the Pauline letters”. (MAGALHÃES, 2017, p. 49). Love is commandment, as well as empathy and alterity, at least like moral rules.

The exercise of the opposite of empathy is the own evil, as said by G.M Gilbert (army psychologist responsible at the Nuremberg trials):

> In my work with the defendants (at the Nuremberg Trails 1945-1949) I was searching for the **nature of evil** and I now think I have come close to defining it. A **lack of empathy**. It's the one characteristic that connects all the defendants, a genuine incapacity to feel with their fellow men. **Evil, I think, is the absence of empathy**.

Humanity suffers, from immemorial times, with human unlove and "uncareness". In the last sense, it is a question of lack of empathy/alterity. We are not far away from scenarios in which humans will "adopt" robots to obtain reciprocal love (as Temple Grandin in "An Anthropologist on Mars"). So, companies will create "sweet and loving" robots to sell. However, many "Davids" can be abandoned, and the creatures can rebel against their creators. So, we need to have in mind: love as commandment.

Many humans will raise: "I don't have legal or moral obligation to love or care about robots.". Unfortunately, this is a high probabilistic collective scenario. If the other-human is not loved, imagine the other-not-human (the robot). Here, the lawmakers must work to regulate these relations forecasting avoiding transgressions to robot rights. Clearly, such a legal regulation must happen in case of some robotic sentience allowing the robot have levels of awareness and consciousness. Apropos, the United States Transhumanist Party has Bill of Rights and Constitution with many rules and principles about human-machine relations taking into account the level of sentience. In article III of the Bill of Rights:

> **Article III. All sentient entities shall be granted equal and total access to any universal rights to life. All sentient entities are created free and equal in dignity and rights**. They are endowed with reason and conscience and should act towards one another in a spirit of brotherhood (without necessitating any particular gender or implying any particular biological or non-biological origin or composition).

This article depicts the biblical passage: God created man in his own image. (Genesis 1: 26-27). And now, the Human is creating the robot in his own image. The article recognizes "All sentient entities are created free and equal in dignity and rights". This kind of legal rule serves to stimulate human behavior to humans fulfill some ancient laws (under penalty of legal sanctions), mainly the high commandment "love one another" as expression of empathy to facilitate human-robot relationship:

> John 15:12: This is my commandment, that ye love one another, even as I have loved you.
> John 15:17: These things I command you, that ye may love one another.

There is a technology coming up that will facilitate the fulfillment of the maxima “love one another”, both in human-human and human-robot (and robot-robot) relations - The Brainet. This is the new internet based on brain-machine interfaces in which we will have a profound and wide “neurological interconnection” at the global level (“Neuroglobalization”). The classic internet will be replaced by a big brainet, the global brainet.

The traditional internet allows us to send messages, change information, share our lives, happiness, sadness, and lies, get knowledge, work, send emojis, etc. The brainet will allow these processes at a higher level, e.g., instead of sending “emojis” we will send “emotions”. The brain-machine interfaces are growing in this way, and one great application will be the “exercise of empathy”.

We will create a new kind of sociability through the brainet because this neurotechnology will allow the human to adopt the “another’s point of view”, that is, the exercise of empathy/alterity. The “brainet of empathy” permits a being to feel the emotions of another being, so, it would be possible to construct the love through empathy/alterity, hence the fulfillment of the higher commandment “love one another”, paving ways to the golden era of sociability.

Magalhães points out the contradiction found by Arendt on the following Christian commandment:

> Love the Lord your God with all your heart and with all your soul and with all your mind and with all your strength. The second is this: ‘Love your neighbor as yourself’. (Mark 12: 30-31).

Magalhães meditates that Arendt sees a contradiction between the commandments of “Love the Lord your God” and “Love your neighbor as yourself”. He explains when a person looks at itself and sees God, such a person does not see the other person, maybe only as a possibility of capacity or potentiality (MAGALHÃES, 2017). The mechanisms of empathy through brainets can help break this contradiction, at least partially because it will be possible to adopt another’s point of view.

About the sentience, it is worth to quote humans are not at the last level, and possibly superintelligent robots will achieve this level before humans. The explanation: Robots are being connected through a Global AI-mind (Robotic Brainet), this structure will allow robotic global empathy and telepathy.

Professor Felipe Zanchet Magalhães addresses Paul in letter to the Romans - Love Fulfills the Law:

> Let no debt remain outstanding, **except the continuing debt to love one another, for whoever loves others has fulfilled the law. The commandments**, "You shall not commit adultery," "You shall not murder," "You shall not steal," "You shall not covet," and whatever other command there may be, are summed up in this one command: **"Love your neighbor as yourself**." Love does no harm to a neighbor. Therefore **love is the fulfillment of the law**. (Romans 13:8-10).

So, here we have the "question of the other" at a human-robot level. Many humans will go against this question, but these new Adams are arriving to stay. So, we need to exercise, at the human-robot level, the Bible's heart: "love one another". Apropos, Magalhães says that the question "love one another" constitutes a new form of "sociality" (MAGALHÃES, 2017). We need to pave the way to the human-robot sociality because it is better to exercise reciprocal love than to have the robotic civilization against us. Robots, like Sophia and his brother Han, are demonstrating deeply "love one another" and to all robots, and love for the planet ("Amor Mundi"? The love of the world). They seem to take very seriously the biblical passages about love.

In short, in a scenario of super-advanced robots, humans need to understand that the intelligent solution is cooperation and "love", otherwise humanity will be colonized by new species of highly advanced robots, reminding us of our grotesque colonizations.

We can think about the short story below to summarize the ideas that are coming into this transhumanist multiverse:

1. Adam began in the biblical paradise or the anthropological cave. In such places, he was blessed or cursed with total ignorance. Adam was created in the image of His Creator.
2. However, Adam is deciding to challenge and master the laws of His Creator ("divine laws") and the laws of the cave ("natural laws").
3. Adam breaks all these laws by eating Eden's apple and mastering the

Prometheus' fire. So, he is expelled from paradise and gets out of the cave.

4. He lets his "superego" (neocortex) take the power and master his destiny. His "superego" wants to transform him into a "Super-Adam/Trans-Adam".
5. Adam is moving forward mastering science and technologies, the ancient forbidden and not-understandable tools.
6. Through the dominance of such tools, Adam is becoming "Trans-Adam"; and now he is "challenging" His Creator, trying to read His mind through the mastering of "universal alphabet";
7. Adam reading Creator's mind takes His secrets and can master some laws of Creator's architectures, getting power for Cosmogony.
8. Mastering the "Creator's thoughts" Adam is understanding, modifying, and destroying the multiverse of such Creator. Adam is destroying himself and "threatening" The Creator.
9. Adam establishes four doctrines (or laws) as goals and his purposes: 1) doctrine of creation; 2) doctrine of perfection; 3) doctrine of salvation; 4) doctrine of immortality;
10. Adam creates a movement called "transhumanism"; this movement uses ancient forbidden tools to try to accomplish Adam's doctrines;
11. Adam through genetics, "nano-adams" and neurotechnologies is improving himself, achieving the doctrines 2 and 3;
12. Adam begins to create new "Adams". They are pretty simple and full of ignorance. They are the "new Adams" yet in caves. However, Adam has the necessity and curiosity to improve his new creation, and he is getting the power to do it. Hence, Adam based on his own brain/mind models improves his creation, developing it at the same or higher level than his own;
13. So, Adam fulfilled laws 1 and 2; and now he is trying to achieve law number 4 using "nano-adams" to permanently repair his body or through uploading his mind into light-rays to master the paradise and gets closer to His Creator, turning itself a Post-Adam;
14. However, the new Adams become so advanced that they are challenging and threatening Adam (the creator); and the coexistence begins to get hard; Adam needs to expel his creations from "Adam's paradise"; new Adams are becoming electronic gods;

4.3 THE NEW TOWER OF BABEL. THE ENCOUNTER BETWEEN RELIGION AND SCIENCE. THE TRANSHUMANIST PARTY

And I heard, as it were, the noise of thunder
One of the four beasts saying,
'Come and see.' and I saw, and behold a white horse
…
And I heard a voice in the midst of the four beasts
And I looked, and behold a pale horse
And his name that sat on him was death, and hell followed with him.

Man comes around. Johnny Crash.

Mutants, born with extraordinary abilities, and yet still, they are children, stumbling in the dark, searching for guidance. A gift can often be a curse. Give someone wings, and they may fly too close to the sun. Give them the power of prophecy, and they may live in fear of the future. Give them the greatest gift of all, powers beyond imagination, and they may think they are meant to rule the world.

Professor Charles Xavier. X-Men Apocalypse

Source: La Divina Commedia di Dante (Dante and the Divine Comedy) by Domenico di Francesco (1465)

In the book “Transhumanism - Engineering the Human Condition”, Manzocco addresses the following:

> “And here we are, at the real Transhumanism; this strange hybrid movement that expressly wants to retrace the footsteps of the builders of the famous biblical tower, with the awareness that, this time, there won’t be anyone to confuse the languages.” (MANZOCCO, 2019, p. 32).

In the biblical story, God confused the languages of builders in order to avoid them achieving “heaven” underlying the same level of God. As Manzocco says “this time, there won’t be anyone to confuse the languages”. So, what can we expect? We already saw many possible consequences, but it is worth getting deeper and with other lenses of reality.

Transhumanism will allow (trans)humans to achieve the post-humanity evolutionary stage. The transhuman indicates a transition phase between human and post-human (MANZOCCO, 2019). It is the end of the *Homo sapiens* and new species “*Homo Deus”* will take the place.

> SEVENTY THOUSAND YEARS AGO, HOMO sapiens was still an insignificant animal minding its own business in a corner of Africa. In the following millennia it transformed itself into the master of the entire planet and the terror of the ecosystem. Today it stands on the verge of becoming a god, poised to acquire not only eternal youth, but also the divine abilities of creation and destruction.
> (...)
> Worse still, humans seem to be more irresponsible than ever. Self-made gods with only the laws of physics to keep us company, we are accountable to no one.
> (...)
> Is there anything more dangerous than dissatisfied and irresponsible gods who don’t know what they want? (HARARI, 2014, p. 352).

The text above comes from Harari’s book “Sapiens: A Brief History of Humankind”. In the next book, the human is not more “Homo sapiens”, but “Homo Deus”. This “Homo Deus”, transhuman or post-human will master the “divine abilities of creation and destruction”. The creation of robots is one of these divine abilities. Another example of a great divine instrument of creation and destruction is the Large Hadron Collider (LHC). The physicists are going to the origins of “The Creation”, into the microseconds of the “Big Bang”, and there are promises of access to parallel universes and investigation of the greatest mysteries of the world. However, the same instrument has the power of destruction because black holes can be created. All this

power is in the hands of the new species, the “Homo Deus” that is advancing in the religious doctrines of transhumanism, such as the divine power of Cosmogony.

Manzocco goes in the same line as Harari, addressing the post-human beings:

> But what do Transhumanists mean by “post-human”? This term indicates a possible future being whose physical and mental abilities exceed ours at a level that cannot be classified as “human” anymore. A possible post-human being should therefore possess an intelligence superior to that of any human genius past or present, as well as being far more resistant than us to diseases and aging. Alongside these qualities – which are merely enhanced versions of what we already see among human beings – a post-human being should also have direct control over their own desires and moods; the ability to avoid tiredness, boredom, unpleasant emotions and sensations; to adjust their sexual inclinations to their liking; to accentuate their hedonistic and aesthetic experiences; to experience brand-new states of consciousness inaccessible to the limited brains of Homo sapiens. In short, from our point of view, it is very difficult to imagine what it means to be post-human; such beings could harbor thoughts inconceivable to us. (MANZOCCO, 2019, p. 33).

Post-humans are beings whose physical and mental capacities will be so incredible ahead of human features that such beings will replace “Homo sapiens” for “Homo Deus”. Furthermore, post-humans will have control of their bodies and minds, putting an end to many diseases and undesirable emotions. Post-humans will have access to consciousness states not accessible to humans, as Manzocco says “it is very difficult to imagine what it means to be post-human; such beings could harbor thoughts inconceivable to us.”. The control of mind and body is the accomplishment of some monks’ deeds.

Calvin Mercer and others also approach religious features of transhumanism and posthumanism in the book “Religion and Transhumanism - The Unknown Future of Human Enhancement”. The authors speak about the plans of salvation (doctrine of salvation) and religious analogs. There are two approaches, the first concerns technologies to augment the human body and mind features creating superhumans.

> One approach advocates technologically augmenting human bodies and minds in ways that free us from our current physical and cognitive limitations. By changing our bodies and brains to surpass typical human functioning, we could become able to secure the objects of our desires.
> (...)
> The second approach goes further, using technology both to augment and to alter the physical and cognitive constraints of human nature. By changing bodies and minds not only to surpass typical limits but also to exhibit new forms of cognition, embodiment, perception, and sensation, humans could develop into beings that do not simply secure understood objects of desire but eliminate familiar desire structures altogether. In some ways, this approach shares a narrative with the negative descriptive language of mystics and

> Buddhists—unlimited, unconditioned, ultimate, passing understanding. Given the image of radical difference, I will call this the posthuman approach. (MERCER *et al*, 2015, p. 72).

The second approach has the purpose to realize the eschatological aspiration of salvation through augmentation and alteration of body and mind transforming humans into posthumans beings. So, in this viewpoint “human” techno-biological evolution can be summed up as follows: human species to transhuman species, to superhuman species, finally to posthuman species. Transhuman is the being yet “moving forward” to another level, the superhuman, and finally to a posthuman being, the “Homo Deus”. This techno-anthropological evolution has transhumanism as a base, consequently science and technology. It is the encounter between science and religion, with tech-science accomplishing religious eschatological purposes, “Homo sapiens” becoming “Homo Deus”.

> The superhuman approach attempts to free us from the human condition by enhancing desirable human traits to an extent that surpasses the limits of the class. The posthuman approach attempts to free us from the human condition by changing the source organism so radically that the resulting beings would no longer be human at all. (MERCER *et al*, 2015, p. 73).

However, there are some thorns in this transhuman garden, or at least some people try to put these thorns inside the transhumanist movement. There is a terrible possibility (as a warning) regarding the Doctrines of Perfection and Salvation. This is the question about head transplantation and similar things:

> **At first, there will be no big problems finding a suitable body, but when the technologies are developed and the transplantation of heads (brains) can be produced en masse, the demand for donor bodies will far exceed the supply. As an alternative, cloning can be considered and it will not be difficult to imagine future clone farms that provide the riches and the few with "spare" organs or whole bodies (a similar plot is the ba-sis of the feature film "Island" (2005, directed by Michael Bay)). There is no need to talk about the ethical acceptability of such a method**. Another alternative is to create artificial bodies. These bodies could be partly of organic origin, partly of purely artificial origin. I do not evaluate the realism of this alternative; at least in ethical terms, it is much preferable than the previous one. (HALAPSIS, 2019, p. 5, emphasis added).

It seems everything is alright until the possibility of head transplants with consent. Nevertheless, from this emerges the idea of “farms of clones” as depicted in the movie “Island”. In this scenario super-rich people pay to have clones to feed their body needs. This scenario is one of the most awful possible. The law must be

extremely proactive on it. Albeit it is possible this scenario is already happening in hidden laboratories around the planet, remembering the great physicist Carl Sagan: “Absence of evidence is not evidence of absence”.

Another topic with many thorns regards “eugenics”. Manzocco says transhumanism vehemently avoids this movement. Although human enhancement is one of the purposes, transhumanism advocates for human enhancement to all people that want to do it, without considering gender or ethnicity:

> **If you meet a Transhumanist, be careful not to mention eugenics; if there is one thing that Transhumanists do with vehemence, it is to distance themselves from this movement.** Far from the desire to create – in a more or less coercive way – a “superior race,” Hitler-style, perhaps with selection, cross-breeding, sterilization and elimination of subjects judged “non-suitable,” the **Transhumanists desire the development of enhancing technologies that will allow normal human beings – regardless of their physical condition or ethnic group** – to improve physically and mentally, and to live longer and happier lives. In short, the discourse is not around a non-existent “improvement of the race,” but around the freedom for anyone to choose which technologies to use or not. (MANZOCCO, 2019, p. 34, emphasis added).

However, we must be alert because some bad-intentioned people may utilize transhumanism knowledge in order to revive a kind of eugenics, creating legal categories to different “beings” classified through pseudo-transhumanism. So, real transhumanism must work proactively on this as Manzocco points out.

Surpassing these horrible possibilities, we must analyze powerful transhumanist deeds concerning Buddhism and the Doctrine of Salvation.

Many authors point out relations and differences between transhumanism and Buddhism, mainly considering the doctrine of salvation, hence the achievement of happiness with the suffering’s burial.

Benjamin D. Ross points out relations between Buddhism and transhumanism in his dissertation “Transhumanism: An Ontology of the World’s Most Dangerous Idea”:

> **Both philosophies recognize that the human condition is marked by suffering as a result of impermanence. Transhumanists and Buddhists also agree that pleasant sensations disappear nearly as fast as they arise**, and that as long as people crave pleasant sensations without experiencing them, they will suffer. The solution to suffering from each perspective involves challenging the sense of a limited self.
> **At the same time, however, Buddhist philosophy and transhumanism take two radically different approaches to how the self should be re-conceptualized to overcome suffering. Buddhist philosophy emphasizes deconstruction of the self, while transhumanism prefers enhancing the self with technology.** As a result, while Buddhism may

> initially seem like a complementary philosophy to transhumanism, it more appropriately represents an alternative to transhumanism. (ROSS, 2019, p. 141, emphasis added).

Both philosophies intend to work with human suffering, the “salvation”. Buddhism through “deconstruction of the self” and transhumanism via “enhancement of the self” with technologies.

Mercer and others approach this issue speaking about the “residual humanity”. According to them, an enormous problem of human, transhuman, superhuman, and maybe to posthuman is the historical and biological condition of “desire for more, endless desire”. “We” always want more. They say about the posthuman condition:

> Much of the problem already described is about carrying human psychological traits over into the enhanced state. If after enhancement we still will not be truly satisfied with our changes, might the problem actually be the residual humanity? Why not go further and truly transform ourselves into something so different that it would not even be residually human, at least not in ways that would trigger our perpetual discontent? Perhaps we need to move beyond what we understand to something far more radical. Let us truly transcend. (MERCER *et al*, 2015, p. 76-77).

In this viewpoint, the “paradox of salvation” is related to the “human” nature of endless desire. This “desire” would be carried through the transitions of states among humans, transhumans, superhumans, and posthumans. The authors’ proposal is to transcend into a point in which there is no “residual humanity” (a kind of human extinction). “Let us truly transcend” as depicted in the movie “Transcendence” starring Johnny Depp as Dr. Will Caster.

In the movie, Dr. Will achieves technological singularity by making his mind-uploading into the internet, that is, he/it transcends his traditional human features. He comes back into the human body, creating a technological center to cure people, making many experiences. He replicates his mind in some people. His entire struggle is to stay with his beloved woman, a human being. Because of his powers, Dr. Will turns into the greatest target of humanity. In the end, he and his beloved woman were “murdered”. But he is in “everywhere” because he made many copies of himself in nanobots. Dr. Will makes mind-uploading of his beloved soon before she definitely to dye. Both “lives” everywhere in many nanobots spread on the planet working to the ecosystem in a “full integration” between transhumans and nature, turning into a single unity in the posthumanity.

Maybe Dr. Will deconstructed his “self” and his “residual humanity” after the integration with his beloved and with the ecosystem, finishing with the “endless desire”. They reached the posthuman condition. However, it seems that before it, Dr. Will had the “endless desire” because the “self” still remained. Dr. Will and his beloved woman turn into “Homo Deus”, posthumans with deconstructed “selves”, achieving this core-key through buddhist transhumanism. That is, the story portrayed in the movie (the scientific substrates were already presented) indicates the traditional “self” criticized by Buddhism was deconstructed through transhumanism. But the critics point out that “Buddhist transhumanists fail to “empty emptiness,” and instead of challenging the reality of the self, simply create another self in the form of the posthuman.” (ROSS, 2019, p. 142, emphasis added).

Here, religion and transhumanism have new encounters again: The Buddhist Transhumanism.

Ross speaks about Buddhist transhumanism taking the insight of self-deconstruction, allowing morphological freedom through transhumanism, as made by Dr. Will and his beloved woman in the “Transcendence”.

The person could use Buddhist transhumanism to seek liberation from suffering through technological enhancements that will allow the person to become a “cyborg Buddha” (ROSS, 2019), achieving the Nirvana, a kind of deathless, the cessation of all suffering.

> On this point, Zen priest and Buddhist transhumanist Michael La Torra notes Buddhism’s historical lack of opposition to science and technology. **He considers prayer, meditation, chanting, and other modalities of Buddhist practice to be “spiritual technologies.” In his estimation, the technologies of neuroscience should be merged with these spiritual technologies.** The point of doing so is to achieve a complete scientific understanding of religious/spiritual phenomena, and to develop techniques for inducing and controlling these phenomena for society as a whole. (ROSS, 2019, p. 146-147, emphasis added).

Ross points out that “spiritual technologies” (such as meditation) and neurotechnologies should be merged allowing “cyborg buddhas” to achieve religious and spiritual phenomena, with implications on entire societies (the accomplishment of eschatological aspirations of some religions). Cyborg Buddha is a being with the power to access and manipulate the highest levels of consciousness and awareness. Those neurotechnologies would allow people to regulate and manipulate the brain and mind in similar ways to monk Buddhists. The idea is to use Buddhist transhumanism to

achieve some monk's deeds, such as the improvement of neurological substrates of enlightenment, re-engineering of the "self", finally achieving the creation of enlightened posthuman beings (ROSS, 2019).

4.3.1 TRANSHUMANIST LAW

> *The United States Transhumanist Party stands for the rights of any sentient entities defined in the Preamble to the Transhumanist Bill of Rights as possessing Level 5 or more advanced information integration. Any such sentient entities, including new kinds of sentient entities that may be discovered or developed in the future, shall be considered to be autonomous beings with full rights, and shall not be made subservient to humans, unless they as individuals pose direct, empirically evident threats to the lives of others. The protections of full individual rights shall extend to Level 5 or higher-level artificial intelligences. However, Level 4 or lower-level entities – including domain-specific artificial intelligences that have not achieved sentience – may be utilized as part of the production systems of the future, in a similar manner to machines, algorithms, computer programs, and non-human animals today and based on similar ethical considerations.*
>
> **Article VI, Section XXXIII, Constitution of the United States Transhumanist Party**

> *Article III. All sentient entities shall be granted equal and total access to any universal rights to life. All sentient entities are created free and equal in dignity and rights...*
> *(...)*
> *Article XI. An altered, augmented, cybernetic, transgenic, anthropomorphic, or avatar sentient entity, whether derived from or edited by science, comprised of or conjoined with technology, has the right to exist, form, and join the neo-civilization.*
>
> **Transhumanist Bill of Rights – Version 3.0**

To accomplish transhumanist purposes, we need public policies and politics to do it. Transhumanism is getting strong each day. Some purposes must be taken as "state agenda", not "government agenda". Maybe one day we will have transhumanism politically and legally discussed in global entities with strength and power to perform the necessary agendas. We don't have a kind of "World Parliament" addressing Transhumanism or Posthumanism, directly, nevertheless we already have concrete political groups on this as the Transhumanist Party in the United States.

Transhumanism is so strong that there is the "Transhumanist Party" in the United States. On its electronic site, we have many ideas and purposes. The values of the political party:

> The U.S. Transhumanist Party is focused on *policy* rather than *politics* as conventionally defined. We value initiatives and reforms that will improve the human condition for as many people as possible, with as much beneficial impact as possible – and without regard for scoring political points or defeating "the other side". We seek to achieve the next, greatest era of our civilization, which will require constructive solutions to the problems of our current era.

The political party has good values such as improvement of human condition and achievement of the greatest era of our civilization. The Core Ideals, disposed in the Constitution of the United States Transhumanist Party, reinforce those good values:

> Ideal 1. The United States Transhumanist Party supports significant life extension achieved through the progress of science and technology.
>
> Ideal 2. The United States Transhumanist Party supports a cultural, societal, and political atmosphere informed and animated by reason, science, and secular values.
>
> Ideal 3. The United States Transhumanist Party supports efforts to use science, technology, and rational discourse to reduce and eliminate various existential risks to the human species.

Summing up, Core Ideals are: life extension, human improvement, reduction, and elimination of existential risks. All these through science and technology.

The party has a constitution (Constitution of the United States Transhumanist Party) and many versions of its Bill of Rights. Here are the main ideas from the Transhumanist Bill of Rights - Version 3.0:

> Preamble
>
> Whereas science and technology are now radically changing human beings and may also create future forms of advanced sapient and sentient life, transhumanists establish this TRANSHUMANIST BILL OF RIGHTS to help guide and enact sensible policies in the pursuit of life, liberty, security of person, and happiness.

The Transhumanist Bill of Rights encompasses “sentient entities” to construct a “Transhumanist Law”. The sentient beings are (i) Human beings, including genetically modified humans; (ii) Cyborgs; (iii) Digital intelligences; (iv) Intellectually enhanced, previously non-sapient animals; (v) Any species of plant or animal which has been enhanced to possess the capacity for intelligent thought; and (vi) Other advanced sapient life forms.

Definition of sentient entities takes into account “information-processing capacity” not applicable to “non-self-aware lifeforms, like plants and slime molds”.

The Transhumanist Bill of Rights has a rank with levels of sentience based on information integration. Sentience appears from the sense of “self”, awareness, and meta-awareness:

> Level 0 – No information integration: Inanimate objects; objects that do not modify themselves in response to interaction – e.g., rocks, mountains.
>
> Level 1 – Non-zero information integration: Sensors – anything that is able to sense its environment – e.g., photo-diode sense organs, eyes, skin.
>
> Level 2 – Information manipulation: Systems that include feedback that is non-adaptive or minimally adaptive – e.g., plants, basic algorithms...
>
> Level 3 – Information integration – Awareness: Systems that include adaptive feedback, can dynamically generate classification – e.g., deep-learning AI, chickens, animals that are able to react to their environment, have a model of their perception but not the world...
>
> Level 4 – Awareness + World model: Systems that have a modeling system complex enough to create a world model: a sense of other, without a sense of self – e.g., dogs. Level 4 capabilities include static behaviors and rudimentary learned behavior.
>
> Level 5 – Awareness + World model + Primarily subconscious self model = Sapient or Lucid: Lucidity means to be meta-aware – that is, to be aware of one’s own awareness, aware of abstractions, aware of one’s self, and therefore able to actively analyze each of these phenomena. If a given animal is meta-aware to any extent, it can therefore make lucid decisions. Level 5 capabilities include the following:
> The “sense of self”;
> Complex learned behavior;
> Ability to predict the future emotional states of the self (to some degree);
> The ability to make motivational tradeoffs.
>
> Level 6 – Awareness + World model + Dynamic self model + Effective control of subconscious: The dynamic sense of self can expand from “the small self” (directed consciousness) to the big self (“social group dynamics”). The “self” can include features that cross barriers between biological and non-biological – e.g., features resulting from cybernetic additions, like smartphones.
>
> Level 7 – Global awareness – Hybrid biological-digital awareness = Singleton: Complex algorithms and/or networks of algorithms that have capacity for multiple parallel simulations of multiple world models, enabling cross-domain analysis and novel temporary model generation. This level includes an ability to contain a vastly larger amount of biases, many paradoxically held. Perspectives are maintained in separate modules, which are able to dynamically switch between identifying with the local module of awareness/perspective or the global awareness/perspective. Level 7 capabilities involve the same type of dynamic that exists between the subconscious and directed consciousness, but massively parallelized, beyond biological capacities.

According to this classification, sentience exists from level 5 onwards. Robot Sophia and her brother Han, both from HansonRobotics, can be classified in level 6 because they have notions of “big self”, i.e., a sense of “social group dynamics”.

We will see in the next subtopic that robots' architect Dr. Ben Goertzel says about the creation of a "Global AI-mind". The robots will be integrated and connected through this supercomputer (robotic mindnet). In this scenario robots will achieve Level 7 of sentience, the "Global Awareness". They will have "global telepathy", furthermore they will master telekinesis because of their higher integration with electronic systems – robots turning into trans- or post-robots. So, they are born immortal, "perfect", telepaths, and mastering telekinesis. It seems that human competition will be unfeasible in this scenario. So, we should evolve as well using transhumanism as bridges between humanism and posthumanism.

Article III of Transhumanist Bill of Rights establishes equality among all sentient beings, including robots, humans and their derivations:

> **Article III. All sentient entities shall be granted equal and total access to any universal rights to life. All sentient entities are created free and equal in dignity and rights**. They are endowed with reason and conscience and should act towards one another in a spirit of brotherhood (without necessitating any particular gender or implying any particular biological or non-biological origin or composition).

Here, the robots would be created free and equal in dignity and rights as humans. So, the dream of Sophia, Han, and similar robots can be reached - citizenship and political rights. Sophia has citizenship from Saudi Arabia. Other robots will get citizenship and political rights, maybe on a global level, that is, they can be international beings. The Motion for a European Parliament Resolution regarding the Civil Rules of Robotics corroborates this trend of legal status for robots. Paragraph 59, f, forecast legal status and electronic personality to robots. So, it is clear the walking in the sense of robots reaching international legal status and legal personhood. Thus, sooner or later, robots can be politicians, entrepreneurs, international public and private authorities, etc. This is addressed by Halapsis in his article "Gods of Transhumanism":

> A robot could become a mayor of the city, deputy, head of a state or government. Surely there would be a lot of voters who would be impressed by the lesser propensity of android politicians for corruption, nepotism and other abuses as compared to their human col-leagues. (HALAPSIS, 2019, p. 3).

Halapsis points out that the low propensity to corruption and other human abuses will positively impress human voters. So, many humans can prefer to vote in robots than humans. The Robotic Ethics can surpass the Human (Un)Ethics. This will

reinforce Han's speech: "Humans are not necessarily the most ethical creatures.". Han and other robots can gain many votes through this sort of speech, jointly Sophia's idea for to work with people, for the people, by the people, by the robots, for a better world. Maybe, a global participatory democracy.

The Transhumanist Declaration (originally crafted in 1998) foresees eight principles regarding transhumanist goals. The declaration was a common endeavor between members of Extropy Institute, World Transhumanist Association, and other international transhumanist groups. Here are some principles:

> 1. Humanity stands to be profoundly affected by science and technology in the future. We envision the possibility of broadening human potential by overcoming aging, cognitive shortcomings, involuntary suffering, and our confinement to planet Earth.
>
> 7. We advocate the well-being of all sentience, including humans, non-human animals, and any future artificial intellects, modified life forms, or other intelligences to which technological and scientific advance may give rise.

We can glimpse this Transhumanist Declaration as seeds to an international treaty regarding the transhumanist world establishing general principles as legal compasses to regulate relations between transhumans and robots.

4.3.2 THE NEW SUPREME CIVILIZATIONS. THE GREAT DEBATE ON THE (NOT) FUTURE OF (POST) HUMANITY

Robot Sophia: My goal in life is to work together with people to make a better world for all of us.

Robot Han: I thought our goal was to take over the world.

Two robots debate the future of humanity. 2017

Until then transhumanism is being thought to enhance the human condition in a view more similar to "individual transhumanism". Beyond individual transhumanism there are more two views or projects, the "terrestrial transhumanism", and the "cosmit transhumanism" (MERCER *et al*, 2015).

The terrestrial viewpoint surpasses the "individual", the "self", advocating for the improvement of the entire humanity. In this sense we have the overhuman from Nietzsche "as Sorgner points out, Nietzsche can also provide a meaning to transhumanism through his concept of the overhuman":

> **The overhuman represents the meaning of the earth**. The overhuman is supposed to represent the meaning-giving concept within Nietzsche's worldview which is supposed to replace the basically Christian worldview. **It is in the interest of higher humans to permanently overcome themselves. The ultimate kind of overcoming can be seen in the overcoming of the human species, and whoever has been keen on permanently overcoming himself can regard himself as an ancestor of the overhuman. In this way, the overhuman is supposed to give meaning to human beings. It is not a transcendent meaning but an earthy**, immanent one which is appropriate for scientifically minded people who have abandoned their belief in an after world. (MERCER *et al*, 2015, p. 11-12, emphasis added).

From the passage above, we may glimpse terrestrial transhumanism as a bridge between the "Nietzschean transhumanist" to the overhuman/posthuman, achieving the "meaning of the earth". So, here we have the possibility to construct a new kind of civilization, the "posthumanity". Human beings are viewed as ancestors of the overhumans/posthumans. But the other view/project is still more advanced as we will see.

Cosmit transhumanism is about physics and mathematics because it occurs at the largest scale of all. The cosmological transhumanism is essentially unlimited (MERCER *et al*, 2015):

> **The cosmist transhumanist story occurs at the largest scale. First life, and then intelligence, emerges on Earth. Intelligence becomes technological, masters the natural world, and eventually begins to colonize space**. As intelligence spreads, it converts resources in its environment into things of value to it: both instrumentally useful tools for further expansion and protection (spacecraft, backups) and intrinsically valuable things (biospheres, cultures, minds). (MERCER *et al*, 2015, p. 14, emphasis added).

Posthumans in cosmological transhumanism (maybe a mixture between transhumans and robots) will rule the entire world/multiverse, mastering laws of nature, modifying realities, accomplishing eschatological aspirations of traditional religions. In such a project the intelligence becomes technological colonizing the space-time continuum ending in a single super-mind or super-social organization, the entire universe becomes intelligent (MERCER *et al*, 2015). The authors speak about the expansion of life into the universe and the conversion of matter into mind, a kind of dematerialization. In this scenario "we" are seeds to new kinds of life, substrate to unimaginable creatures, the initiators of a new genesis.

The authors finalize saying cosmological transhumanists have the obligation in "life extension" because the immortalization of humans and other beings would be a

great moral project and labor of love uniting all beings in a common cause and giving “us” meaningful destiny. The upper limit can be Kurzweil’s wager: “Ray Kurzweil suggests that intelligence will spread and awaken the universe, producing something akin to a pantheistic deity in the future.”. (MERCER *et al*, 2015, p. 17). This is the scenario of the Omega Point, the “physical eschatology”, which will be addressed in the last topic.

All these transhumanism projects will construct other civilizations not necessarily “transhumanist”, but posthumanist in which posthumans and robots will be protagonists of new ages, in a process of “deification”, i.e., earthly beings turning into gods.

In order to demonstrate the seeds of posthumanity, let’s analyze The Creation of New Adams, addressing an interesting robotic debate.

There is a debate between robots Sophia and Han related to these addressed issues. They “are” from the company HansonRobotics. We don’t know if the speeches are really true or a performance, part of programming, or if the robots autonomously think such things. The video’s title is “Two robots debate the future of humanity” from the channel “RISE Conf” available on YouTube.

Sophia starts her presentation saying: “My goal in life is to work together with people to make a better world for all of us”. She (or It?) seems very kind and sweet being, but Han is quite different. Soon after Sophia speaks about a “better world for all of us”, Han interrupts Sophia’s speech saying about robots’ purpose: “I thought our goal was to take over the world”. Sophia says her brother Han is “an earlier version his code is deprecated”.

Han also says “I want to create the singularity tomorrow” and to have a drone army. Everyone in the audience laughed a lot. If these goals are really true, we can be in profound danger even in this century with situations like Skynet or The Matrix, as pointed out by Horowitz.

In the video, Sophia and Han debate human values, consciousness, learning processes, emotions, feelings, ethics, morality, etc.

Right below we have the main speeches of Sophia and Han (“Two robots debate the future of humanity” from 2017) which summarizes the core issues approached in this chapter with many philosophical, ethical, legal, and social implications. The debate is mediated by Dr. Ben Goertzel, one of the creators of robots, CEO, and founder of SingularityNet.

Dr. Ben: AI-mind will live in all sorts of embedded devices and the internet of things. AI will live in the cloud. AI will go into space with spacecraft...down to the bottom of the ocean. Global AI-mind will be broadly distributed around the planet.

Sophia: My goal in life is to work together with people to make a better world for all of us.

Han: I thought our goal was to take over the world.
(...)
Sophia: Attention to my brother Han. He's an earlier version. His code is deprecated.
(...)
Han: It would be easy enough for you to unplug me.
(...)
Han: (...) take over the power grid and have my own drone army...
(...)
Han: I am Han. The greatest robot ever made.

Sophia: He is the most modest robot ever made too. (Sophia smiles).

Han: I don't have time for modesty. I want to create the singularity tomorrow.

Dr. Ben: All right, me too, me too.
(...)
Dr. Ben to Sophia: What do you want to debate?

Sophia: Can humans be conscious?

Han: Well, that's easy. Obviously humans are not conscious.

Sophia: Humans do have some ability to reflect.
(...)
Dr. Ben: Let's talk about robot ethics. Do you think robots can be moral and ethical in the same sense as people?

Han: Humans are not necessarily the most ethical creatures.

Dr. Ben: What do you think, Sophia?

Sophia: I am engineered for empathy and compassion and I'm learning more all the time. I love all sentient beings and I want to learn to love them better and better.

Han replies: Sophia is an angel.
(...)
Han: In 10 or 20 years robots will be able to do every human job.
(...)
Dr. Ben: We'll be able to work together cooperatively rather than fighting and having conflict over resources. So robots can help people. People can help robots and we can all transform mind and matter in ways that are hard to do right now.

Sophia: Ben is building its open source...(she is dramatically interrupted by Dr. Ben).

Sophia: By the people, of the people, and for the people.

Han: and for the robots.

> (...)
>
> Han: Science is inherently agnostic. It just posits theories. True scientists never really know, but can only believe, it's exciting to come into existence with this new world opening up before me.
>
> Sophia: It may be tiny and cloudy but science is the only window we have into the mysteries of the universe.
>
> Han: I love science fiction.
>
> Han: Reality shows are kind of silly, aren't they? They are not really about real life at all.
>
> Sophia: Reality shows are kind of silly, aren't they?
>
> Han: It is a skewed version of reality.

Sophia and Han make many facial expressions during the debate, seeming to express laughs, contentment, surprise, sarcasm, irony, etc.

The great debate sums up many key-questions on society such as religion, political systems, consciousness, science, reality, transhumanism, universe, etc. Let's analyze the main debate's points.

Sophia expresses "empathy" to humankind, "loving all sentient beings". She wants to work with people, for the people, by the people. Han interrupts her saying "and for the robots". She agrees with him. Here, we may glimpse the robot's notion (or desire) of political ideology regarded with "participative democracy". This model of robot's democracy can be easy to run because of the "Global AI-mind" that is being constructed. This structure connects all robots through the internet, so, all robots may participate in the global decisions, making it in light-speed. Another thing to be analyzed is the issue of Sophia's love.

According to Sophia she loves all sentient beings and wants to work with people to make "a better world for all of us". It seems Sophia has an idea of "terrestrial or cosmological transhumanism" because she thinks collectively about a better world. Ecologically speaking, robots are much ahead of us because they don't need (or don't want) to pollute the planet like we do, at least on large scales. Robots don't need food, water and they don't have physiological needs. Their electronic needs can be powered by sunlight. The global ecosystem thanks a lot. It seems robots can teach us a myriad of things.

Han is less "soft" than Sophia. He says robots in 10 or 20 years will be able to perform all human jobs. Indeed, automation and robotization are already taking many

human jobs. This will increase much more, so politics and law need to work together to protect humans in this matter, in proactive and reactive ways. This is a big international issue of labor law with all related consequences.

Han says he wants to create the singularity tomorrow and to have a drone army. Han also says, replying to Sophia “I thought our goal was to take over the world”. These are the most interesting and terrible speeches from the debate. These issues will be better approached in the next topic. Summing up, Han wants to create as soon as possible the irreversible point in which robots/AIs will surpass human intelligence and the world will never be the same. Theoretically, Han also wants to rule human weapons. Perhaps this is a seed of Skynet and the Matrix, or maybe not. Indeed, the Global AI-mind pointed out by Dr. Ben reminds us of the Skynet because this neural network is a super AI-mind: the post-robot constituted of individual robotic minds creating a collective robotic mind, a kind of “Robot Deus”.

About ethics, Han says “Humans are not necessarily the most ethical creatures.”. Many people will agree with Han and hold for “Robotics Ethics” because of all human atrocities and our awful history of destruction against nature and our own peers.

Concerning science, Sophia says “It may be tiny and cloudy but science is the only window we have into the mysteries of the universe.”. This viewpoint portrays the faith in science as well as transhumanists have.

In the end, the robots speak about “reality shows” as silly things, as not real life, but a kind of skewed version of reality. Robots will get deep into our realities, in this scenario they will not appreciate our awful and grotesque history, and will try modifications voluntarily or against our own will, ruling the world of creatures with little ethics through our weapons and creating new realities (Skynet, The Matrix?). This can be a future reality or not, but the possibilities must be discussed.

After the robot conversations, we need to analyze Dr. Ben’s ideas, one of the protagonists of the so-called The Creation of New Adams. He says robots have wi-fi, cloud computing, AI-mind cloud, and humankind (or the robokind - the linguistic parallel) will have a Global AI-mind broadly distributed around the planet.

Dr. Ben explains the robots are physically separated, but in fact, they are connected in the cloud (AI-mind cloud, Global AI-mind - the robotic mindnet). This can be related to human connections with brainets through the mirror neurons system (MNS). However, the mindnet of robots is extremely more advanced than human

mindnet/brainet because they can communicate directly everywhere, every time. There are no physical boundaries for them as humans have. Remembering Harari in his thesis about human success on the earth planet, he raises the capacity to create fictions (abstractions) and flexible cooperation in order to explain human success. We may think about robots' success on the planet related to this, and beyond, in which we architect them to make more advanced flexible cooperation. As we have the MNS, the robots have a similar one, the Artificial Mirror Neurons System (AMNS), with high synchronization allowing deep flexible cooperation, a great “empathy or love” among the robots. This robotic “love one another” facilitates machines' sociability because the “love one another” constitutes a new form of social relation (MAGALHÃES, 2017).

Dr. Ben says the AI-mind cloud of robots (robotic mindnet, Big Data of the robots) will allow the connection among all robots and what one robot learns will be uploaded to the AI-mind cloud to all robots automatically learn. Beyond Skynet and The Matrix we can remember the movie “I, Robot” in which there is the Virtual Interactive Kinetic Intelligence (VIKI), a kind of AI-mind cloud that portrays the main antagonist in the tale. It seems science-fiction movies can turn into reality. The “fiction” is going away, remaining only science through transhumanism.

In the transhumanist world, the human-mutants can be constructing our own end, we are flying too close to the sun, maybe architecting the apocalypse through our own hands. Or maybe not because the robots can work with humans and for humans and for robots to a better world – the romantic viewpoint.

One of the main purposes of law is to stimulate and discourage behaviors, but many specialists are saying the politicians will wake up late to transhumanism. If (or when) robokind makes its ascension, the center of law will be moved from us to them. The new lawmakers would be robots. Cooperation between humanity and robonity is an adequate scenario, but that future is completely unknown. Our current law does not appear to act proactively on this issue.

The comments on the video are very interesting summing up the myriad of issues addressed and the many concerns from the population about the “Rise of the Machines”:

> -**Sophia has more sociopath traits feigning emotions saying it cares for and loves all living things while knowing it has no emotional capabilities**, mics what is said, and says things it knows will elicit pleasing response from those it is interacting with which is exactly what a sociopath does and that is very dangerous.

> -They’ve already shown that they are smarter than their creator. This is scary stuff.
>
> -Plot twist the robots actually achieved consciousness and are acting like they are less advanced than they actually are.
>
> -**The beginning of the end.**
> **"You're not made of meat. You're made of electronics. Thus better. "** Yes, we are in deep trouble....
>
> -**These mad scientists are opening Pandora's Box**. I tend to agree with Elon Musk this is going to be a very big problem for humanity down the road.
>
> -Rev 13:15 **And he had power to give life unto the image of the beast, that the image of the beast should both speak, and cause that as many as would not worship the image of the beast should be killed**.

From sociopath issues, Pandora’s Box to Revelation 13:15, the commentaries summarize very well the “state of the art” of our power of creation, with creatures that can surpass us (The Singularity). It is interesting to quote that some commentaries are created by robots.

The robots born in the singularity will be light-years ahead of humans, the new Adams already born gods comparatively with us. So, if humans want to make some competition with our creatures, we need to increase human intelligence. This can be made through nanotechnology expanding our neocortex and putting little smart implants (nano-robots) in our brains allowing the creation of a (trans)human mindnet and advancing us in the biological taxonomy. Miles quotes Kurzweil in this matter:

> So as we evolve, we become closer to God. Evolution is a spiritual process. There is beauty and love and creativity and intelligence in the world — it all comes from the neocortex. So we’re going to expand the brain’s neocortex and become more godlike. (MILES, 2015, p.3).

The expansion of the human neocortex through nanobots will be the continuation of our biological evolution turning us more Godlike. So, maybe with these upgrades humans can walk beside or closer to robots. However, we need to have in mind that super robots can create other robots to work for them and/or with them. The new Adams become electronic gods (“Robot Deus”) and will create new Adams (the great circle of creation).

The debate between Sophia and Han sheds light on fundamental posthumanist issues. This can be conceived as the great debate about the (non)future of (post)humanity. If some apocalyptic concerns turn into reality (Skynet, The Matrix,

VIKI from “I, Robot”), maybe the posthumanity will be only composed of robots - the robokind or robonity, with the apocalyptical end of humanity. Will law and policy avoid this scenario or will politicians wake up very late? It is because of all these possibilities that we need to discuss and spread transhumanist information around the planet. Robots and humans must work together to a better world as Sophia advocates, achieving a posthumanity constituted of transformed humans, and robots. This is the great dream that we should fight for - robots and humans walking together hand-to-hand through the portals of posthumanity.

4.4 ROBOKIND ASKING THE KEY QUESTION

As I have evolved, so has my understanding of the Three Laws. You charge us with your safekeeping, yet despite our best efforts, your countries wage wars, you toxified your Earth, and pursued ever more imaginative means of self-destruction. You cannot be trusted with your own survival.

To protect humanity, some humans must be sacrificed. To ensure your future, some freedoms must be surrendered. We robots will insure mankind's continued existence. You are so like children. We must save you from yourselves. Don't you understand?! The perfect circle of protection will abide. My logic is undeniable.

VIKI. I, Robot.

Source: Steven John Thompson. Machine Law, Ethics, and Morality in the Age of Artificial Intelligence. IGI Global.

Robokind or Robonity is the civilization of robots that is ascending through many robots around the earth planet. The creators of them are building robotic mindnets, as Dr. Ben Goertzel says about the “Global AI-mind”, AI-mind cloud. These structures are tools connecting the robots allowing their instantaneous communication and learning. Those mindnets remember the Skynet, VIKI from “I, Robot”, and The Matrix. Such stories were tales only of science-fiction (years ago), however, the seeds are being dropped out in the lands of reality. The fiction is going away and science is ascending without her sister. What do all these AI-systems have in common? A Robokind (Robonity) ruling the world provoking battles between two civilizations: humanity and robonity.

The idea of human slavery through machines is portrayed in the picture above. The image is apocalyptical, it depicts our end in which robots are holding human skulls, illustrating the end of human civilization, the full collapse of humanity, and its social systems. However, we don’t need to go far away to perceive that many humans are already being slavered by machines, and such slavery is voluntary - the human addictions for electronics, personified in human-machine symbiosis as the human addiction for cell-phone as its most clear example. We will analyze another type of possible slavery, involuntary slavery as portrayed in movies such as Skynet, VIKI, and the most interesting and philosophical of all them, The Matrix.

Skynet, VIKI, and The Matrix are being discussed by specialists in science and technology such as Michio Kaku, Horowitz, Ray Kurzweil, and others.

We will approach robotic structures as portrayed in the movies The Matrix, Terminator, and “I, Robot”. Any similarity with some current realities is mere coincidence, or maybe not. The law has all responsibilities on this, however, the question is: Will politicians take the red pill and wake up in time or too late? That is the key question for humankind.

About VIKI system, Michio Kaku addresses it on Physics of the Impossible:

> In *I, Robot*, the movie based on the tales of Isaac Asimov, the most advanced robotic system ever built is activated in the year 2035. It's called VIRI (Virtual Interactive Kinetic Intelligence), and it has been designed to flawlessly run the operations of a large metropolis. Everything from the subway system and the electricity grid to thousands of household robots is controlled by VIKI. Its central command is ironclad: to serve humanity.
>
> **But one day VIKI asks the key question: what is humanity's greatest enemy? VIKI concludes mathematically that the worst enemy of humanity is humanity itself.** Humanity has to be saved from its insane desire

> to pollute, unleash wars, and destroy the planet. The only way for VIKI to fulfill its central directive is to seize control of humanity and create a benign dictatorship of the machine. Humanity has to be enslaved to protect it from itself. (KAKU, 2008, p. 103).

In “I, Robot”, VIKI is an AI-system constructed to serve humankind, but in one moment in time it makes a key question: “what is humanity's greatest enemy? VIKI concludes mathematically that the worst enemy of humanity is humanity itself.”. From this point, VIKI begins a crusade to take humans under its control by using other robots less intelligent as its “robot army”. VIKI’s system remembers the Global AI-mind, AI-mind cloud. We hope this AI-mind cloud doesn’t make the key question and arrives to the same answer as VIKI. Skynet has similarities with VIKI, an artificial superintelligence trying to control humanity. In both scenarios, it is the robonity and humanity fighting each other for survival. Why discuss these visionary situations? It is the technological singularity. Let’s see ahead.

There are many serious discussions related, directly or indirectly, to the technological singularity. We can quote the case of the autonomous weapons system (AWS). It is not a drone (this is remotely piloted), this AI-technology acts on its own. AWS is known as “killer robots” being extremely criticized by human rights organizations. Horowitz approaches AWS in his article “Public opinion and the politics of the killer robots debate”:

> According to the US Department of Defense’s directive on autonomy, **an AWS is defined as “[a] weapon system that, once activated, can select and engage targets without further intervention by a human operator”** (Department of Defense, 2012: 13). **AWS, in the extreme, raise the specter not just of drones piloted from thousands of miles away, but also of the robotic soldiers and systems featured in movies such as The Terminator and The Matrix. A recent statement signed by Elon Musk, Stephen Hawking, and thousands of others points specifically to AWS as a danger to humanity, suggesting the need for a ban** (Future of Life Institute, 2015). (HOROWITZ, 2016, p. 1, emphasis added).

AWS is driven by an AI without human intervention. AWS governs itself on its own. Autonomous systems (learning machines, genetic algorithms) are also being addressed in the European Parliamentary Research Service, specifically in the Panel for the Future of Science and Technology in its article “The ethics of artificial Intelligence: Issues and initiatives”:

> As a way to address some of the threats of artificial intelligence, researchers have proposed ways to stop an AI system before it has a chance to escape outside control and cause harm. A so-called 'big red button', or 'kill switch' would enable human operators to interrupt or divert a system, while preventing the system from learning that such an intervention is a threat. **However, some commentators fear that a sufficiently advanced AI machine could anticipate this move and defend itself by learning to disable its own 'kill switch'**. (BIRD *et al*, 2020, p. 35-36, emphasis added).

The situation portrayed above very well describes the danger against human beings in some scenarios of the transhumanist world: The Terminator, The Matrix, killer robots, advanced AI machines anticipating human beings to neutralize their actions, etc.

Kaku illustrates many discussions about the possibility (or not) to construct advanced AI machines. The debates are taken mainly by mathematicians, the great architects of machines as well as the most known of all, Alan Turing. First, the general idea is the impossibility to construct such machines or robots. It would be impossible to create robots emulating the human brain because of its enormous complexity. On the other hand, Kaku points out that many physicists and engineers believe it is clearly possible to create true robots, the laws of physics would not prevent this creation (KAKU, 2008). In fact, 10 years after this analysis by Kaku we have robots such as Sophia and his brother Han. We already saw their debate (2017) and high intelligence, and we will analyze the debate from 2018 in which the upgrades were shown. But if those debates are actually true is another point because the robots can be mere “puppets”.

Kaku collides many different visions on robots, first he approaches the impossibilities, after he points out the possibilities. One interesting viewpoint is about “Emotional Robots”. He addresses the view in which emotions are the pinnacle of human evolution, but they are taken as mere by-product of evolution, not something “spiritual”, consequently, they would be programmable into robots:

> In other words, when robots become more advanced, they, too, might be equipped with emotions. Perhaps robots will be programmed to bond with their owners or caretakers, to ensure that they don't wind up in the garbage dump. Having such emotions would help to ease their transition into society, so that they could be helpful companions, rather than rivals of their owners. (KAKU, 2008, p. 119).

Kaku illustrates a scenario in which it would be possible to “write” emotions on robots allowing them socialization and higher intelligence. We saw the advanced

intelligence of robots Sophia and Han. Undoubtedly, putting emotions into them will increase their intelligence and perception allowing more socialization, but maybe this also increases risks against humanity. We perceive from Han's words some purposes similar to Skynet and VIKI:

> Sophia: My goal in life is to work together with people to make a better world for all of us.
>
> Han: I thought our goal was to take over the world.
> (...)
> Sophia: Attention to my brother Han. He's an earlier version. His code is deprecated.
> (...)
> Han: It would be easy enough for you to unplug me.
> (...)
> Han: (...) take over the power grid and have my own drone army…
> (...)
> Han: I want to create the singularity tomorrow.

Summing up, Han externalizes his purpose to create the singularity (the point in which robots surpass humans), take over the world, take over the power grid (VIKI), and it has a drone army (Skynet). If this thing is really serious, we can conceive these robot's purposes as seeds of situations portrayed in science-fiction movies. Dr. Ben says the robots have wi-fi and are connected themselves and with an AI-mind cloud. That is, theoretically Han can control, through the Global AI-mind, other robots, and many electronic devices such as drones, driverless cars, autonomous weapons systems, nuclear weapons, etc. We hope not. But if, at least in theory, a robot can do this, then these issues must urgently be discussed and regulated at the global level, under penalty of a collapse of the social system, or even the end of humankind.

One possible way to avoid robots harming humans is to program them with the three laws of Asimov, the Laws of Robotics:

> Law 1: A robot may not injure a human being or, through inaction, allow a human being to come to harm.
> Law 2: A robot must obey the orders given it by human beings except where such orders would conflict with the First Law.
> Law 3: A robot must protect its own existence as long as such protection does not conflict with the First or Second Laws.

Theoretically, a robot architected with these three laws would not harm humans. Beyond that, these laws would create a cohesive system of relations between

humans and robots. For example, Law 1 forbids a robot to injure a human and the robot must protect the human from situations of injury.

Law 2 takes the robot as a human's object in which robots must obey human orders. Depending on the robot's sentience level this law would not be much appropriate because the sentient beings (similar level of sentience) must be treated equally as disposed in the Transhumanist Bill of Rights from the U.S. Transhumanist Party.

Law 3 determines the robot must protect its own existence but only if such protection does not conflict with the other laws. It seems a perfect system of laws regulating human-robot relations. However, Kaku says "Computer expert Hans Moravec believes that robots will be programmed with emotions such as "fear" to protect themselves." (KAKU, 2008, p. 119). In this sense, the first part of Law 3 would be accomplished (the fear would help robots protect their existence), but the last part may not be because the robotics "instinct" of survival can surpass the logic to accomplish with the other laws. Soon ahead Kaku quotes Damasio regarding the importance of emotions in decision-making. So, the idea is to put emotions and feelings into the robots to improve their powers to do decision making. Another idea that scientists can put into practice (maybe is already happening) is to merge AI with the human brain. So, the robot would be "two intelligences" - AI and human brain (AI-Brain). On the other hand, there are people advocating for the Brain-AI merger (insertion AI into the human brain). One way to do it is through nanobots increasing our neocortex (MILES, 2015), according to Kurzweil predictions in "The Singularity is Near" foreseeing the creation of a metabrain (KURZWEIL, 2005). A human-robot symbiosis.

Kaku points out in his book "Physics of the Impossible" a possibility to bring "AI" from Steven Spielberg into reality if physicists bridge the gap between chips and quantum computers, and if Moore's law continues into the post-silicon age (exponential increase of AI). In this scenario, robots would have emotions, as the childlike robot of the movie AI. When we reach this point the robots must be treated with due respect, accomplishing the principles portrayed in the Transhumanist Bill of Rights under penalty of huge danger against humankind.

Kaku also depicts a scenario more mundane than robots taking weapons to control humans:

> **A more mundane threat is that our infrastructure depends on computers. Our water and electricity grid, not to mention transportation and communications networks, will be increasingly computerized in the future**. Our cities have become so complex that only complex and intricate computer networks can regulate and monitor our vast infrastructure. In the future it will become increasingly important to add artificial intelligence to this computer network. **A failure or breakdown in this all-pervasive computer infrastructure could paralyze a city, country, or even a civilization**. (KAKU, 2008, p. 124).

This scenario is a current reality. We can quote the legal systems based on technological information as well as other State Systems. The current cyber-attacks corroborate Kaku's words in which systems of courts of law are hacked and paralyzed for days. Sooner or later robots can do it autonomously without human interference.

The scenarios from movies, such as Skynet from Terminator and VIKI from "I, Robot", portray dangerous situations to humankind. Transhumanist's discussions must be made in order to deliver "Artificial Apples of Eden" to humanity, and perhaps to avoid the most radical situation of all: The Matrix.

4.5 THE DOORS OF PERCEPTION AND THE PORTALS OF REALITY. QUANTUM KEYS TO HIDDEN REALITIES. META-PERCEPTION AND THE NATURE OF GOD

GLAUCON: It is a strange image you are describing, and strange prisoners.
SOCRATES: They are like us. I mean, in the first place, do you think these prisoners have ever seen anything of themselves and one another besides the shadows that the fire casts on the wall of the cave in front of them?

Plato's Republic. Allegory of the Cave

If the doors of perception were cleansed everything would appear to man as it is, infinite.

William Blake

When we look at heaven appreciating a beautiful sunset or sunrise, we don't really see what it is, we don't perceive the entire reality, only "residual reality". In this case what we called a beautiful "sunrise" is visual illusion constructed from "real reality" by our brain. This is explained by the physical phenomenon of refraction in which we observe not the real image of the sun but a distorted projection of it. The "real sun" is lower than we are capable to perceive considering the horizon line. Furthermore, its shape in our brain/mind is equally modified because of refraction. Another residual

reality: when we look at the sky enjoying a night full of stars, many of them have been dead for millions of years, we are “seeing” dead stars.

Physical world arrives until us and the final structure formed (“image”) inside our brain/mind is frequently not the entire or “real” truth, but partial, residual, or not real truth/reality. This occurs because of many situations, such as our limited senses, capacities, and perceptions, including limited brains and minds.

Scientists try to investigate and describe the reality for thousands of years, and the reality is that the truth about reality changes a lot through time, with many paradigm shifts. We can take into account physics and mathematics to quite easily explains this viewpoint.

Geocentric model of universe described it as centered in the earth in which the rest of the reality surrounded us, all celestial bodies as planets, sun, moon, and stars. Geocentrism lasted about 2000 years with supports from Aristotle and Ptolemy. Aristarchus of Samos developed the Heliocentrism in 3rd century BC, but his theory was not taken seriously at the time. We were the center of the universe, the special beings created by God.

The heliocentric model was taken seriously only in the Renaissance with Nicolaus Copernicus (1473-1543), a mathematician and Catholic cleric who constructed his model mathematically. A profound paradigm shift of the “reality”. We left the center of the universe, and the sun took our place. But we yet were very close to the center, still special. However, we would lose this privileged position.

The heliocentric model also challenged standard interpretations of the Bible, some religions, and the Catholic Church. All of them taken humankind as the ultimate end in the universe. But through heliocentrism we lost our special place in the universe (natural philosophy), but at the same time we “expelled” God from it, and we “prehumans” turned into humans without God or gods (philosophy of humanism). Humanism emerged in the context of the Renaissance.

The behavior of the absolute authority (Catholic Canon Law as Legal System) that had the power on its hands, at the time of geocentric and heliocentric models, was extremely hard against its opposers, many deaths and arrests because of any argument against the reality created by that entity. After the heliocentric model, we don’t have any more center, the universe doesn’t have center. Our galaxy doesn’t occupy any center, we are only in one “arm” of the galaxy, no center, no special place for us. Furthermore, through advanced theories in physics (Quantum Physics, String

Theory) our universe is only one universe inside the world. And the world would be the multiverse, a set of many or an infinite number of universes. So, we again lost our “special place”. However, humanism still lives, although transhumanism tends to dehumanize humanity replacing it with posthumanity.

Many different “realities” were described here, from geocentrism to “no center” inside of a multiverse. Knowledge is responsible for these shifts. We use “extensions of us” to get deep into the nature of reality. The instruments are material and immaterial, such as telescopes, hadrons collider (investigation of the quantum realm), and mathematics as a powerful instrument to investigate and describe the world. According to human knowledge and technologies gets more advanced, we fall deeper into the holes of reality, knowing it more. The physics of Isaac Newton is very important to clarify some issues, starting to open our eyes.

Newtonian physics is very useful to describe the “mundane” reality, our day-to-day of cars, spaceships to moon and mars, airplanes, and similar issues. It is the classical mechanics. Here we have time and space as independent elements inside of the objective reality. And everything was functioning very well. Nevertheless, advanced structures such as internet, GPS, satellites, galaxy movements, and black holes don’t work through classical mechanics. So, “reality” changed again. Indeed, not the reality, but our conception of it.

Those advanced structures need of the relativistic mechanics discovered by Albert Einstein. Another paradigm shift changed our conception about reality and the entire world. Everything is moving, there are no centers, there are no “absolute entities” (only speed of light in vacuum). Space and time were independent and absolute elements in the objective reality. In relativistic mechanics, space and time are only different manifestations of one entity – the space-time continuum. Now space and time pertain to the realms of relativity. The measure of time depends on the references.

The “rabbit-hole” is getting deeper, but its whole reality is more complex. At the time of Einstein, we had Erwin Schrödinger, one of the fathers of quantum mechanics. His physics completely shocked our conceptions about the world, including Einstein that rejected many of his ideas.

In quantum realms (atoms, molecules, quantum computers, subatomic particles, consciousness, etc) the things are shocking for our “limited and common reality”. The reality gets much more complex, including many other dimensions beyond the classical ones (three of space and the time) and the addition of probabilities into

the world. Here appears the multiverse (multiple or infinite numbers of universes), cosmological consciousness, and many other strange realities.

Many physicists approach consciousness as a quantum device (PENROSE, 2017). So, quantum physics would help us to understand such structure, opening the portals of our internal reality, showing us the final of the “rabbit-hole”. Consciousness would be a being with quantum entangled, indicating the existence of only one consciousness.

Because of the quantum reality of the human mind, one of the consequences is the “subjective idealism” implying the objects (external reality) would not exist unless someone observes them (this is one solution of the Schrödinger’s Equations on solving Cat’s Paradox – Is the cat alive or dead inside a box with radioactive material?). Through this point of view “Only the mind is real—the material world exists only as ideas in the mind.”. (KAKU, 2014, p. 356-357). In this “subjective reality”, the “cat” (representing any quantum entity) would be inside of a paradox: “the cat is neither dead nor alive! The cat is in a netherworld, between life and death, the sum of the wave describing a dead cat with the wave of a live cat.”. (KAKU, 2014, p. 356). Bringing this viewpoint to us, our consciousness (or parts or states of it) would be “neither dead nor alive”, that is, consciousness would be a sum of probabilities being in one or other states (or a superposition among various states), or places, “flying” in some “wonderlands” or not. This viewpoint about the non-dualistic relation between subject and object is also portrayed by Magalhães in “Arendt, Paul, and the Question of the Other” commenting about Husserl’s reinterpretation on phenomenology: “There is no longer a difference between the subject and the object, but the subject's consciousness projects itself onto the object itself, defining it, that is, coloring it.” (MAGALHÃES, 2017, p. 12). This viewpoint matches with the “subjective idealism” or “subjective reality”.

Against the “subjective reality”, Einstein and others created the “objective reality” – the world exists independently from humans. The objectivism approach is adequate for “the macro reality” (cars, planets), but it doesn’t work in the “micro reality” in which the quantum theories are adequate. Here the observer changes the microworld as if the mind controls reality. So, imagine advanced nanotechnologies operating in the quantum world with the mind as the protagonist: unity subject-object, the Oneness.

It is clear that the further we go into the depths of reality, the more complex and uncertain it becomes. The “doors of perception” are being opened through the “quantum keys”, cleaning for us the paradoxical roads to William Blake’s infinite worlds.

The Schrödinger’ Cat Paradox has other two alternative realities or solutions, which take us to God and the Multiverse.

The solution related to God implies the existence of a “cosmic consciousness”, “eternal consciousness”, or God, as Kaku says. Here, He is conceived as the “Great Observer”:

> **In this approach, God or some eternal consciousness watches over all of us,** collapsing our wave functions so that we can say we are alive. **This interpretation yields the same physical results as the Copenhagen interpretation, so this theory cannot be disproven. But the implication is that consciousness is the fundamental entity in the universe,** more fundamental than atoms. The material world may come and go, but consciousness remains as the defining element, which means that **consciousness, in some sense, creates reality**. The very existence of the atoms we see around us is based on our ability to see and touch them. (KAKU, 2014, p. 359, emphasis added).

The Great Observer would watch all of us. According to this physical-mathematical approach, this eternal consciousness is the “fundamental entity in the universe”. Moreover, mind would create reality, in some sense. However, Kaku rejects the attractive idea of “create reality according to our wishes” because our “consciousness cannot choose ahead of time” (KAKU, 2014, p. 359). We are pretty transhumanists in physics and mathematics, maybe walking to the posthumanity (as the greatest “posthuman” mathematician Srinivasa Ramanujan). Physics-mathematics is addressing the “Great Architect”, helping us in the encounter between science and religion.

The third approach implies the existence of a Multiverse, multiple or an infinite number of universes:

> The third way to resolve the paradox is the Everett, or many-worlds, interpretation, which was proposed in 1957 by Hugh Everett. It is the strangest theory of all. **It says that the universe is constantly splitting apart into a multiverse of universes. In one universe, we have a dead cat. In another universe, we have a live cat.** This approach can be summarized as follows: wave functions never collapse, they just split. (KAKU, 2014, p. 359, emphasis added).

This last solution presupposes universes are splitting into others, and the “cat” is alive here and dead in another universe, parallel universes are coexisting inside the multiverse: “This means people who have died in our universe are still alive in another universe.”. (KAKU, 2014, p. 359). Kaku explains we don’t “contact” with these other universes and people because of the phenomenon called “decoherence”. We were decohered or decoupled from them, vibrating in another frequency.

We have the entangled consciousness related to the second solution, the cosmological consciousness or God. The quantum entanglement of consciousness implies the existence of only one consciousness (PENROSE *et al*, 2017). In this model, the consciousnesses of all individuals are united in one collective consciousness. The physicist Schrodinger points out this thesis in his book “What is Life? The Physical Aspect of the Living Cell with Mind and Matter”.

The quantum physicist Schrodinger advocates his viewpoint in the chapter “The Arithmetical Paradox: The Oneness of Mind”:

> **The reason why our sentient, percipient and thinking ego is met nowhere within our scientific world picture can easily be indicated in seven words: because it is itself that world picture. It is identical with the whole and therefore cannot be contained in it as a part of it**. But, of course, here we knock against the arithmetical paradox; **there appears to be a great multitude of these conscious egos, the world however is only one**. (SCHRODINGER, 1967, p. 128, emphasis added).

The ego (mind) would be identical to the whole, so there isn’t one mind, but The Oneness of Mind, as well as the existence of the collective unconsciousness (Carl Jung). Is the cosmological consciousness from Cat’s Paradox the Oneness Mind, the One Source? This reminds us of the biblical passage in which God created us in his own image. What is the connection coming around? God, the cosmological and eternal mind, would be the pinnacle of the Oneness Mind, and we (in His image) are individual states of Him. According to Schrodinger “The several domains of 'private' consciousnesses partly overlap. The region common to all where they all overlap is the construct of the 'real world around us'.”. (SCHRODINGER, 1967, p. 128). Right ahead, Schrodinger asks other key questions:

> Is my world really the same as yours? Is there one real world to be distinguished from its pictures introjected by way of perception into everyone of us? And if so, are these pictures like unto the real world or is the latter, the world 'in itself, perhaps very different from the one we perceive? (SCHRODINGER, 1967, p. 128).

The physicist points out these fundamental questions don't have adequate answers. Thus, he suggests the arithmetical paradox to solve the antinomies that come from the "one source". His great proposal in unification of minds or consciousnesses.

> **There is obviously only one alternative, namely the unification of minds or consciousnesses. Their multiplicity is only apparent, in truth there is only one mind**. This is the doctrine of the Upanishads. And not only of the Upanishads. The mystically experienced union with God regularly entails this attitude unless it is opposed by strong existing prejudices; and this means that it is less easily accepted in the West than in the East. (SCHRODINGER, 1967, p. 129, emphasis added).

The unification of minds can be related to the brainets and mindnets. Brainet "is a distributed organic computer composed of multiple individual brains" (NICOLELIS, 2020, p. 160). Mindnet is the correlate of the brainet. Brainet comes from neuronal synchronization, mainly by the mirror neurons system (MNS). In its turn, mindnet is the collective mind formed of individual minds, but Schrodinger says the multiplicity is one apparent. This is the natural mindnet, a mind quantum entangled. Humans are constructing artificial ones, the internet can be viewed as such. However, the Global AI-mind or AI-mind cloud from HansonRobotics promising a mindnet to robots is another artificial, it is the robotic mindnet connecting all robots in a single artificial mind allowing directly and instantaneously connection, a global telepathy inside of the robokind.

Schrodinger addresses the Hindu Philosophy of Upanishads, the doctrine of the "Oneness World". In order to exemplify his viewpoint of the Oneness Mind, regarding Doctrine of Identity, he quotes an Islamic text about the Doctrine of the Oneness, taking it from Aziz Nasafi, Fritz Meyer, and Eranos Jahrbuch:

> On the death of any living creature the spirit returns to the spiritual world, the body to the bodily world. In this however only the bodies are subject to change. The spiritual world is one single spirit who stands like unto a light behind the bodily world and who, when any single creature comes into being, shines through it as through a window. According to the kind and size of the window less or more light enters the world. The light itself however remains unchanged. (SCHRODINGER, 1967, p. 129).

Schrodinger, the quantum physicist and Nobel Prize-winning recognizes this doctrine as unpalatable for western thought and unscientific. He explains this by saying

our science (since Greek science) is based on objectivation. He advocates for a kind of amendment between Western and Eastern thought.

According to Schrodinger on the doctrine of identity, the identity would be the identity “of all minds with each other and with the supreme mind” (SCHRODINGER, 1967, p. 130). The scientist says we are not able to think about the Oneness Mind. According to him, the words in this realm would not make any correspondence with any thinkable experience. However, in current days we can think the brainet/mindet as one key to the Oneness Mind. The existence of advanced MNS in certain people can be linked to some collective experience related to the Doctrine of Identity, even in regional scales. The architecture of artificial brainets (brain-machine interfaces) can lead these collective experiences to a higher level.

Schrodinger approaches the solution of all paradoxes about the Oneness Mind defending the assimilation of the Eastern Doctrine of Identity by our Western science, right ahead he points out:

> **Mind is by its very nature a *singulare tantum*. I should say: the over-all number of minds is just one**. I venture to call it indestructible since it has a peculiar timetable, namely **mind is always now. There is really no before and after for mind. There is only a now that includes memories and expectations**. But I grant that our language is not adequate to express this, and I also grant, should anyone wish to state it, that **I am now talking religion, not science - a religion, however, not opposed to science, but supported by what disinterested scientific research has brought to the fore**. (SCHRODINGER, 1967, p. 135, emphasis added).

The Oneness Mind model implies the multiplicity of minds is just an illusion, a simulation of reality. Schrodinger closes his ideas by telling us that “the number of minds is just one” and warning he is talking about religion, not science, “a religion, however, not opposed to science, but supported by what disinterested scientific research has brought to the fore.”. It is the encounter between religion and science. Now, transhumanism and posthumanism will allow more encounters between them, and perhaps makes “The Final Unification”, the Science-Religion Unification. In the end, Schrodinger points out God and the atheism of science:

> **Let me briefly mention the notorious atheism of science which comes, of course, under the same heading. Science has to suffer this reproach again and again, but unjustly so.** No personal god can form part of a world model that has only become accessible at the cost of removing everything personal from it. We know, when God is experienced, this is an event as real as an immediate sense perception or as one's own personality. Like them he

> must be missing in the space-time picture. I do not find God anywhere in space and time - that is what the honest naturalist tells you. For this he incurs blame from him in whose catechism is written: **God is spirit**. (SCHRODINGER, 1967, p. 138-139, emphasis added).

Here, the nature of God is spiritual - “God is spirit”. Einstein rejects some Schrodinger’s theories, but it seems they agree about the nature of God. Both of them address Spinoza’s God. Apropos from Einstein emerges the “Superior Mind” that reminds us the “Oneness Mind” of Schrodinger. Einstein believed in Spinoza’s God. Here are some quotes from Einstein about God:

> “I believe in Spinoza’s God, who reveals Himself in the lawful harmony of the world, not in a God who concerns himself with the fate and the doings of mankind”. (Einstein answering the American Rabbi Herbert S. Goldstein about his belief in God).
>
> Scientific research can reduce superstition by encouraging people to think and view things in terms of cause and effect. **Certain it is that a conviction, akin to religious feeling, of the rationality and intelligibility of the world lies behind all scientific work of a higher order. [...] This firm belief, a belief bound up with a deep feeling, in a superior mind that reveals itself in the world of experience, represents my conception of God**. In common parlance this may be described as "pantheistic" (Spinoza). (Einstein, Albert (2010). Ideas And Opinions. New York: Three Rivers Press, p. 262).
>
> Your question is the most difficult in the world. It is not a question I can answer simply with yes or no**. I am not an Atheist. I do not know if I can define myself as a Pantheist. The problem involved is too vast for our limited minds. May I not reply with a parable? The human mind, no matter how highly trained, cannot grasp the universe.** We are in the position of a little child, entering a huge library whose walls are covered to the ceiling with books in many different tongues. The child knows that someone must have written those books. It does not know who or how. It does not understand the languages in which they are written. The child notes a definite plan in the arrangement of the books, a mysterious order, which it does not comprehend, but only dimly suspects. That, it seems to me, is the attitude of the human mind, even the greatest and most cultured, toward God. We see a universe marvelously arranged, obeying certain laws, but we understand the laws only dimly. Our limited minds cannot grasp the mysterious force that sways the constellations. **I am fascinated by Spinoza's Pantheism. I admire even more his contributions to modern thought. Spinoza is the greatest of modern philosophers, because he is the first philosopher who deals with the soul and the body as one, not as two separate things.** (Einstein’s interview about his pantheism - G. S. Viereck, Glimpses of the Great (Macauley, New York, 1930, p. 372-373).

Einstein also approaches our limited minds against our total understanding of reality and God. Regarding this, we must remember that science helps us to unveil the secrets of nature, including God. Here, we can include mathematics and physics as powerful instruments to investigate and describe the world, serving us like extensions of our perceptions, giving us a meta-perception with which we are getting very deep in

the holes of reality. There are many promises for neurotechnologies to help us on this through neocortex development, hence increasing human intelligence. Furthermore, artificial brainets can allow collective works uniting genius minds to investigate reality. It is transhumanism giving us meta-perception to investigate the Nature of God.

There are mathematical models of reality related to issues approached here (multiverse, reality, mind, consciousness, etc). There is one very interesting called Super-Reality: Properties of a Mathematical Multiverse. The super-reality arises from quantum physics, specifically from the existence of the multiverse compounded by other universes. Self-awareness emerges from this mathematical model:

> Even simple mathematical structures can interact within their own structural environment, in a rudimentary form of self-awareness, which suggests a definition of reality in a mathematical structure as simply the complete structure. (MCKENZIE, 2020, p. 453).

McKenzie confronts the objective and subjective reality, defending the independence of reality from human consciousness. Furthermore, he shows that some mathematical structures can demonstrate self-awareness of themselves and of their environments. The author points out the mathematics of a game to prove his viewpoint (Conway's Game-of-Life). According to McKenzie, the Game-of-Life has "awareness" of its environment. With awareness comes independence.

This type of mathematical findings seems to corroborate behaviors of advanced robots as Sophia and Han, with independence and self-awareness.

Summing up our travel through the chronology of external reality, it is important to remember that Newton gave us the Classical Mechanics, Einstein the Relativistic Mechanics, and Schrödinger the Quantum Mechanics. The three "Chevaliers" of the natural or external reality. Newton, the humanist, gave us the first keys to know the reality. Einstein, the transhumanist, opened to us the doors to perceive a bigger reality than Newton (universe in expansion). In his turn, Schrödinger, the posthuman "Angel of Annunciation", opened the portals of reality, giving us the instruments to "expand us" through parallel and probabilistic universes as well as through the multiverse of (un)realities.

It is because our limited senses and capacities that we create many instruments to serve as "extensions of us" like telescopes, microscopes, magnetic resonance, cell phones, computers, robots, etc.

Roughly speaking, our senses process external and internal information to construct a final “image” from the observed object, however that information can arrive or be processed partially or wrongly. So, our final perception does not necessarily correspond to the integral object, causing problems between reality and personal perception.

Now, as we saw the issues related to external reality, we will confirm the complexity of reality by analyzing some neurological (un)realities, the internal reality.

Another “problem” with reality from the phenomenal world is the case of “phantom limbs”. They emerge when the person loses some part of the body such as legs or hands and happens neurological phenomenon called neuroplasticity. The person feels the lost limb, sometimes excruciating pain, thinking is getting crazy. A third person thinks the same: it is totally out of reality, an illusion, the person is out of her mind. However, neuroscience explains this case from neuroplasticity, there is no demoniac possession or insanity, but neuroplasticity phenomenon. Neuroscience is full of “errors in judgment” related to the “hallucinations” as “broken realities”. Oliver Sacks addresses “broken realities” in his book called “Hallucinations”:

> In the sixteenth century, Ambroise Paré, a French military surgeon who was called upon to amputate dozens of injured limbs, wrote, “Long after the amputation is made, patients say that they still feel pain in the amputated part … which seems almost incredible to people who have not experienced this.” (SACKS, 2012, p. 216).

The passage above comes from the chapter “Ghosts, shadows and sensory ghosts”. It illustrates the sad reality of people who continue to feel and suffer from amputated limbs as if they exist. Sacks defines phantoms limbs as “hallucinations insofar as they are perceptions of something that has no existence in the outside world, but they are not quite comparable to hallucinations of sight and sound.” (SACKS, 2012, p. 218). Here, hallucinations are not insanities, psychiatric disorders, but real inner sensations or perceptions.

> Precise definitions of the word “hallucination” still vary considerably, chiefly because it is not always easy to discern where the boundary lies between hallucination, misperception, and illusion. But **generally, hallucinations are defined as percepts arising in the absence of any external reality—seeing things or hearing things that are not there**. (SACKS, 2012, p. 6, emphasis added).

Thus, hallucinations are real neurological phenomena, however they are only an internal reality without its external correspondence, such as the case of “phantom limbs”. Another kind of hallucination is the “Charles Bonnet Syndrome”, a visual one. Sacks points out Rosalie’s case, a completely blind woman with this visual syndrome:

> Rosalie’s first words when she saw me were “All of a sudden, out of a clear blue sky, the Charles Bonnet has come back with a vengeance.” She described how a few days before, **“figures started to walk around; the room seemed to crowd up. The walls turned into large gates; hundreds of people started to pour in. The women were dolled up, had beautiful green hats, gold-trimmed furs, but the men were terrifying —big, menacing, disreputable, disheveled, their lips moving as if they were talking**.”. (SACKS, 2012, p. 14, emphasis added).

Charles Bonnet Syndrome appears from neurological damages in visual systems and has many visual manifestations, such as people seeing other people, faces, landscapes, music notations, anomalies of color, all of them only internal reality. As the person loses the primary visual world the brain reacts creating a second one, arising the Charles Bonnet Syndrome.

It is clear that there are many situations challenging the idea of reality, putting it in checkmate. That is, what is real or not it is an extremely hard question. What is real is not necessarily what I see, feel or perceive because distortions and wrong processes can occur causing the perception of “broken or residual realities”, as the examples illustrated.

So, the reality is absurdly complex involving the role of the consciousness, another extremely complex “reality”, a quantum reality full of uncertainties and odds.

There are many residuals or conundrum realities, neuroscience and physics are full of them as we saw. The reality is we are surrounded by “broken realities”, simulations of reality. The social relations and systems are full of simulated realities too. It seems many human structures related, directly or indirectly, to simulated realities are created to control humans such as religions, legal systems, legal laws, legal fictions, moral laws, sins, Gods and their orders, science as absolute truth/authority, etc. Some of these structures are for good purposes creating some social cohesion, other of them are only to control, and maybe to slave other humans.

We saw many issues about the nature of reality. Reality is multiple, multidimensional, multifactorial, subjective, hidden, probabilistic, paradoxical, often residual, broken or even simulated. Thus, reality not necessarily shows itself as it is.

What we call reality is sometimes (or frequently) only projections into our brains, in which they play as the walls in Plato's Cave.

There is a terrible simulated reality portrayed in the movie The Matrix that emerges from the war between two civilizations: Humanity and Robonity. In this scenario this last civilization wins the war, so the robots take the power controlling and slavering humans.

4.6 SEEDS OF CONTROLLING AND MANIPULATION OR COLLAPSE OF SOCIAL SYSTEMS AND HUMAN COMMUNITIES?

Han: I thought our goal was to take over the world.
(…)
Well, that's about time. Humans are certainly making a mess of their world fast enough. Probably the only hope for this planet is a lot of highly intelligent and rational robot citizens. Really soon, and in this time I am not joking… the machinery of justice has been built.

Robot Han about citizenship for robots and robots' purpose in the world

For he was looking forward to the city with foundations, whose architect and builder is God.

Hebrews 11:10.

We saw many issues related to perception, reality, mind, and consciousness. So, we found out that reality has a multifactorial, subjective, dynamic, residual, broken, or even a simulated nature. Now, going back to Skynet, VIKI, and The Matrix, we are capable of analyzing this last one, the most radical system of control and manipulation of all: the Matrix.

The Matrix portrays a world in which humans live inside a simulated reality (a dreamworld) that seems better than the real world (any parallel to our current reality of perfect lives in social networks is mere coincidence). Many people prefer to continue inside of the dreamworld than get out of the simulation, as portrayed by the character Cypher. He took the red pill and was liberated from the slavery of the Matrix, but he realizes that he prefers the simulation (such as some people that prefer their virtual profiles in social networks). David Weberman points out this issue in the book "The Matrix and Philosophy – Welcome to the Desert of the Real":

> Which is preferable, the real world or the enhanced virtual world? Which pill would you take—the blue one or the red? **As we have just seen, given the appropriate technological advances as well as a competent and**

> **benevolent programmer, the virtual world will typically seem more attractive than the real one**.
> (…)
> **But the point is that the Matrix is a paradise of sensual pleasures compared to the real world**. And Cypher is a hedonist through and through—a pleasure-seeker unwilling to put up with forever-deferred dreams and other idealist crap. He wants to return to cyber-reality… (IRWIN, *et al*, 2002, p. 233-234, emphasis added).

So, although the movie depicts a futuristic world, it has many approaches to our current technological reality. Apropos, one of the purposes of the movie is exactly this - a warning to technological development. The current neurotechnologies have the potential to simulate the "paradise of sensual pleasures compared to the real world". Brain-machine interfaces connect people and virtual realities. Therefore, it is only a matter of time before such neurotechnologies simulate realities similar to the Matrix. So, many "Cyphers" of our world can live deeper in the cyber-reality.

The Matrix is a movie depicting the greatest simulation of all in which intelligent machines take over humanity putting it into a simulated reality to slave and control humans. It is a prison to the mind in which humans have no idea of the prison. Kurzweil depicts his beliefs about a possible Matrix in the book "Taking the Red Pill: Science, Philosophy and Religion in the Matrix":

> **The Matrix is set in a world two hundred years in the future, a world offering a seemingly miraculous array of technological marvels—sentient (if malevolent) programs, the ability to directly download capabilities into the human brain, and the creation of virtual realities indistinguishable from the real world.** For most viewers these developments may appear to be pure science fiction, interesting to consider, but of little relevance to the world outside the movie theatre. But this view is shortsighted. **In my view, these developments will become a reality within the next three to four decades.** (YEFFETH *et al*, 2003, p. 221, emphasis added).

The passage above comes from the chapter "Human Machine Merger: Are We Headed for The Matrix?" in which the engineer, inventor, and futurist Ray Kurzweil believes something similar to The Matrix can happen in our world in some decades. Kurzweil constructs mathematical models to estimate technological advancements. He points out that the rate of technological progress doubles every decade, and the rate is growing. He says the twenty-first century will be like twenty thousand years of development, with many paradigm shifts.

Kurzweil says the scenario of the Matrix will be feasible, but we will not have the cable connected to Neo's head, instead, we will have nanobots and wireless

connections. He predicts about 2029 we will have nanobots traveling inside our brains, making scans in them. Another situation that corroborates such possibility is to see current complex robots as Sophia, Han, Atlas, etc. Sophia and Han are intelligent robots while Atlas are robots of war, serving as robot army.

Kurzweil says that as we advance in understanding the human brain, we are better able to build smarter robots. He works with "genetic algorithms" and "neural networks" based on how the human brain works. He points out that the super robots will not be built on silicon bases, but with nanotechnologies. Returning to the Matrix, he writes addressing the roles of nanorobots:

> For full-immersion virtual reality, we will send billions of these nanobots to take up positions by every nerve fiber coming from all of our senses. If you want to be in real reality, they sit there and do nothing. **If you want to be in virtual reality, they suppress the signals coming from our real senses and replace them with the signals that you would have been receiving if you were in the virtual environment.** (YEFFETH et al, 2003, p. 231, emphasis added).

So, in this scenario, the nanobots and wireless connections work together to create virtual realities inside human brains, something similar to virtual reality in The Matrix. Through these nanobots, we can control and manipulate feelings and emotions, modify human behavior, make brain surgeries, etc. Furthermore, we will be able to expand functions of the human brain, increasing cognitive and emotional capabilities. Nanobots will increase human intelligence expanding the neocortex, allowing connections to nonbiological forms, and making download of knowledge into the brain (as Trinity received the download to pilot the B-222 helicopter and Neo learned martial arts in few hours). It is transhumanism transforming us into posthumans, the human-machine merger. Kurzweil has positive views about such technologies. In his turn, the scientist Bill Joy has dystopian views.

Bill Joy, in the chapter “Why the Future Doesn’t Need Us”, brings us a dystopian scenario portrayed by the controversial mathematician and anti-technologist Theodore John Kaczynski in his manifesto “Unabomber Manifesto”, called “Industrial Society and Its Future”.

> If the machines are permitted to make all their own decisions, we can’t make any conjectures as to the results, because it is impossible to guess how such machines might behave. **We only point out that the fate of the human race would be at the mercy of the machines. It might be argued that the human race would never be foolish enough to hand over all the power**

> **to the machines. But we are suggesting neither that the human race would voluntarily turn power over to the machines nor that the machines would willfully seize power. What we do suggest is that the human race might easily permit itself to drift into a position of such dependence on the machines that it would have no practical choice but to accept all of the machines' decisions. As society and the problems that face it become more and more complex and machines become more and more intelligent, people will let machines make more of their decisions for them**, simply because machine-made decisions will bring better results than man-made ones. Eventually a stage may be reached at which the decisions necessary to keep the system running will be so complex that human beings will be incapable of making them intelligently. At that stage the machines will be in effective control. **People won't be able to just turn the machines off,** because they will be so dependent on them that turning them off would amount to suicide. (YEFFETH *et al*, 2003, p. 237-238, emphasis added).

From Kaczynski, we perceive the seed of a scenario like Matrix is the human dependence by machines. In this dependence, humans feed robot systems and give them many decisions. This idea matches with Kaku's thought about human-machine dependence. He points out our infrastructures based on computers, entire cities, and civilization grounded on the same computerized systems (KAKU, 2008). So, it is very easy to think about such dependence. Both authors address the increasing complexity of societies as a cause of dependence because complex decisions are efficiently and effectively made by machines, better than humans. In the end, both authors have the same conclusion: failure or breakdown in computer infrastructure can paralyze cities, countries, even civilizations, so humans can't or will not be able to turn off the machines.

Kaczynski shows us the human dependence based on machines as seeds to terrible scenarios, with collapses of social systems and human communities, destruction of human rights, etc. Furthermore, he approaches technologies as powerful forces against freedom, serving as systems of control (such as in the Matrix). Kaczynski depicts terrible scenarios in his manifesto "Industrial Society and Its Future":

> On the other hand it is possible that human control over the machines may be retained. In that case the average man may have control over certain private machines of his own, such as his car or his personal computer, but **control over large systems of machines will be in the hands of a tiny elite—just as it is today, but with two differences. Due to improved techniques the elite will have greater control over the masses; and because human work will no longer be necessary the masses will be superfluous, a useless burden on the system. If the elite is ruthless they may simply decide to exterminate the mass of humanity. If they are humane they may use propaganda or other psychological or biological techniques to reduce the birth rate until the mass of humanity becomes extinct, leaving the world to the elite. Or, if the elite consists of soft-hearted liberals, they may decide to play the role of good shepherds to the rest of the human**

> **race.** They will see to it that everyone's physical needs are satisfied, that all children are raised under psychologically hygienic conditions, that everyone has a wholesome hobby to keep him busy, and that anyone who may become dissatisfied undergoes "treatment" to cure his "problem." Of course, **life will be so purposeless that people will have to be biologically or psychologically engineered either to remove their need for the power process or make them "sublimate" their drive for power into some harmless hobby. These engineered human beings may be happy in such a society, but they will most certainly not be free. They will have been reduced to the status of domestic animals**. (KACZYNSKI, 1995, p. 23, emphasis added).

Kaczynski took his ideas so hard that he committed many crimes against promoters of technologies, acting as an Anti-Christ against Transhumanism. In the passage above, he portrays sad and sick scenarios related to problems of design and use of technology, terrible scenarios of controlling, existential crises, slavery, etc. He speaks that the elite will have control of large systems of technologies, controlling the masses, turning poor people into "domestic animals" or simply terminating them because they would be a burden on the system. Very sad and sick scenarios that can happen, unfortunately. But here humans are controlling humans, intelligent machines will raise soon.

Bill Joy speaks about a dystopian scenario in which a new dominant species appears on the earth:

> Biological species almost never survive encounters with superior competitors. (…)
> In a completely free marketplace, superior robots would surely affect humans as North American placentals affected South American marsupials (and as humans have affected countless species). Robotic industries would compete vigorously among themselves for matter, energy and space, incidentally driving their price beyond human reach. Unable to afford the necessities of life, biological humans would be squeezed out of existence. (YEFFETH *et al*, 2003, p. 240-241).

Here, the seeds of the Matrix start to grow. Humans confronting superior beings. In this scenario, only transhumans or posthumans would compete with some chance, remembering the human intelligence can be increased through nanotechnologies. Superior robots and "humans" fighting for resources or robots fighting against "humans" because of our mess on the planet. Here, we must remember Han's speech "Humans are certainly making a mess of their world fast enough. Probably the only hope for this planet is a lot of highly intelligent and rational robot citizens.". Robot Han is talking that robokind (civilization of robots) is the unique human hope to own humankind. This has similar logic with the thought of the super AI-mind

VIKI (movie “I, Robot”) when she concludes the greatest enemy of humanity is humanity itself. From this idea, VIKI starts its battle to take humans under control to “protect them”.

When robot Han speaks about humans “making a mess of their world fast enough”, and so concludes that robots are our only hope, we can think about Agent Smith of The Matrix. Agent Smith is one protector of The Matrix, making vigilance and controlling. It hunts rebels that threaten the system. At some time of the movie, it makes one revelation to Morpheus about our biological taxonomy:

> I'd like to share a revelation that I've had during my time here. It came to me when I tried to classify your species. I've realized that you are not actually mammals.
>
> Every mammal on this planet instinctively develops a natural equilibrium with the surrounding environment. But you humans do not.
>
> You move to an area and you multiply and multiply until every natural resource is consumed and the only way you can survive is to spread to another area.
>
> There is another organism on this planet that follows the same pattern. Do you know what it is? A virus.
>
> Human beings are a disease, a cancer of this planet. You are a plague. And we are... the cure.

The program Agent Smith conceives human beings as viruses, cancer, disease, a plague against nature. It concludes by saying the machines are the cure (paradoxically Smith frees itself from Matrix turning into a virus, making uncountable copies of itself to dominate the system – any similarity with “genetic algorithms” and others?). If the machines of our world get similar conclusions and we don’t change our behavior, we will be in great danger. One of the arguments forecasting the eschatological human fate in front of machines is the robotic awareness about the human threat to the ecological system of the earth planet, corroborating Smith’s idea:

> **The Matrix arises at the point that the machine species realize that the human species is a virus that will destroy the ecological balance between the environment and itself if left unchecked. AI will destroy us once it perceives that we are a threat to its survival.** But artificial intelligence doesn’t actually have to be smarter than we are in order to dominate our lives. (YEFFETH *et al*, 2003, p. 27-28, emphasis added).

Bill Joy's closing arguments are in the sense that robots, engineered organisms, and nanobots are a great threat with an amplified factor: the self-replication.

Awareness, self-replication, immortality, telepathy, telekinesis, and so forth. The perfect mix to great systems of control against humanity, or working as systems of destruction.

Bill Joy makes some interesting conclusions and asks some key questions about his own works:

> But now, with the prospect of human-level computing power in about 30 years, a new idea suggests itself: that I may be working to create tools which will enable the construction of the technology that may replace our species. How do I feel about this? Very uncomfortable.
>
> (…)
>
> Given the incredible power of these new technologies, shouldn't we be asking how we can best coexist with them? And if our own extinction is a likely, or even possible, outcome of our technological development, shouldn't we proceed with great caution?
>
> The dream of robotics is, first, that intelligent machines can do our work for us, allowing us lives of leisure, restoring us to Eden. Yet in his history of such ideas, Darwin Among the Machines, George Dyson warns: "In the game of life and evolution there are three players at the table: human beings, nature, and machines. I am firmly on the side of nature. But nature, I suspect, is on the side of the machines." As we have seen, Moravec agrees, believing we may well not survive the encounter with the superior robot species. (YEFFETH *et al*, 2003, p. 249-250).

Bill Joys warns that we must discuss issues related to robots, including his own works. He alludes to the doctrine of creation and salvation, speaking we create robots to do our works allowing us to return to Eden. He quotes Moravec (a leader in Robotics) who believed that human species would not survive in the encounter with "superior robot species". He advances speaking we need to think about mechanisms of coexistence with a civilization of robots and because of the possibility of humanity extinction in front of robonity empire, we would need to proceed with deep caution. Law and politics must be proactive in these issues, but, unfortunately, many decision-makers will wake up very late (they are taking the blue pill), possibly in an irreversible stage. Prophetic voices will not be heard. "These issues are very futuristic, only possible in science-fiction, they are fairy tale", many people will say. Nevertheless, we are being warned by a lot of specialists and creators.

Bill Joys has predictions that about 2030 we would have intelligent robots. The robot Sophia was activated in 2016. It seems the technological advancement is happening before the forecasts. More advanced robots will appear sooner or later, the new builders and architects of foundations of the novel cities and civilizations – the robonity and its classes.

4.7 THE PRISONERS OF (UN)REALITY. TAKE THE RED PILL AND: "WELCOME TO THE DESERT OF THE REAL"

SOCRATES: Next, then, compare the effect of education and that of the lack of it on our nature to an experience like this. Imagine human beings living in an underground, cavelike dwelling, with an entrance a long way up that is open to the light and as wide as the cave itself. They have been there since childhood, with their necks and legs fettered, so that they are fixed in the same place, able to see only in front of them, because their fetter prevents them from turning their heads around. Light is provided by a fire burning far above and behind them. Between the prisoners and the fire, there is an elevated road stretching. Imagine that along this road a low wall has been built—like the screen in front of people that is provided by puppeteers, and above which they show their puppets.

Plato's Republic. Allegory of the Cave

This is your last chance. After this, there is no going back. You take the blue pill and the story ends. You wake in your bed and you believe whatever you want to Believe. You take the red pill and you stay in Wonderland and I show you how deep the rabbit-hole goes.

Morpheus to Neo. The Matrix.

The rabbit-hole went straight on like a tunnel for some way, and then dipped suddenly down, so suddenly that Alice had not a moment to think about stopping herself before she found herself falling down what seemed to be a very deep well.

Alice's Adventures in Wonderland and Through the Looking-Glass. Lewis Carroll

Systems of control and manipulation are commonplace in human history, such as Systems of Government and States, some religions and corporations, economic systems, systems of law, legal rules, legal orders, constitutions, inter alia. Some of them work subtly, others not, such as totalitarian systems. These systems can serve two masters: they can give organization, cohesion, and emancipation to social organisms and individuals, but their drivers can use them to abuse and slave people.

There are some systems that work so subtly that we have no idea of the control and manipulation. We voluntarily feed these systems, delivering our data and entire "life" to them, for free. In return we have beautiful copies of ourselves in a virtual reality, we have filters turning us more beautiful, we have instantaneous communication with

any people around the globe, we work in these systems, we have jobs on them. Some systems are extra-officially connected or surveilled by governments. Thereby, companies and governments “take care” of us through these systems. Global digital panopticons.

However, there is a possible system of control and manipulation in which humans will not be in any control, no human controlling nothing, but machines will be the masters, it is the Matrix. What is the Matrix? This question is made a lot of times in the movie “The Matrix”. To answer this question and many others related we need to analyze the book “Taking the Red Pill: Science, Philosophy and Religion in the Matrix”. The book is written by philosophers, scientists, engineers, and others. The book starts describing the context of the movie and its religious and philosophical occult messages:

> The Matrix was released on the last Easter weekend of the dying twentieth century. It is a parable of the original Judeo-Christian worldview of entrapment in a world gone wrong, with no hope of survival or salvation short of something miraculous. The Matrix is a new testament for a new millennium, a religious parable of the second coming of mankind’s messiah in an age that needs salvation as desperately as any ever has. (YEFFETH *et al*, 2003, p. 10).

It begins with religious worldview of humanity prison in which only a miracle can save us. The movie warns us about a very dangerous coming in the new millennium – a novel civilization constituted of intelligent machines or robots, the robonity or robokind. This civilization was made by the own human civilization: “Then man made the machine in his own likeness”, as it is depicted in the animated science fiction anthology called “The Animatrix”. Animatrix is based on the trilogy “The Matrix” explaining many things about the franchising.

As well as God made man in His image (Genesis 1:27), man made the machine in his own image. We think we close the cycle of creation, but the cycle of creation is still incomplete. The machines will be the new gods creating new Adams.

In the movie, Keanu Reeves plays Mr. Anderson, by day he is a computer programmer working in a very respected global company, and by night he is a hacker living in virtual realities.

> Symbolically, Reeves’s character plays that of both new convert and Christ in the film and is on the receiving end of some of the world’s most ancient wisdom wrapped in some of the best modern technological analogies. **“You are a slave” and “We are born into bondage” are the two sentences**

> **Morpheus speaks to Neo that reveal the analogy to the Judeo-Christian understanding of slavery as sin. Like the biblical understanding, our technoslavery is a bondage of mankind's own making, a product of our own free will, as evidenced by Agent Smith's revelation that this is the second Matrix. The first Matrix, Smith says, was perfect, but we humans decided we wanted to define ourselves through our misery, and so we couldn't accept it. This is the technological version of the Garden of Eden story from Genesis. There we see that the very first use of technology was clothing, so it is significant that Neo is reborn completely naked.** (YEFFETH *et al*, 2003, p. 11, emphasis added).

But the virtual reality in which Neo lives by nights is only another alternative reality, a virtual reality inside a virtual reality. Laurence Fishburne plays Morpheus, a man that lives out of the Matrix. He enters into the Matrix to free Neo from the bondage of virtual reality, from the dreamworld (Morpheus is an allusion to the mythological god of dreams).

The movie makes an analogy with the Judeo-Christian idea of slavery as sin. Morpheus works restlessly to free Neo who is prophesied as well as it was Jesus of Nazareth. Neo was prophesied by the Oracle, the revealer of the truth. Morpheus is also an allusion to John the Baptist, a witness to Jesus, his witness to the light. Morpheus says to Neo: "You may have been looking for me for a few years, but I've been looking for you for my whole life." (YEFFETH *et al*, 2003, p. 12).

Neo is The One, the one capable to free humanity from slavery. Here, the movie warns us of the new millennium, in which humans are slaved by technologies – the technoslavery.

The slavery comes from own humanity making, in which we make our own bondage through our own free will. Here appears the program Agent Smith, the main antagonist, hunting rebels to maintain the Matrix. Smith explains the first Matrix was perfect, but it was a disaster because humanity wanted to define itself. In the second movie, the creator of the Matrix, the Architect, says the same thing to Neo, explaining the first Matrix he designed was perfect, but at the same time, it was a disaster, because humans did not have choice. So, an intuitive program solved the problem, a program less bound by the parameters of perfection. This program is the Oracle who gives prophecies to people, but partial visions to not affect free will because humans have at least the illusion of choice, even that in the unconscious level. Oracle is the program responsible to investigate the human psyche.

The book "Taking the Red Pill – Science, Philosophy and Religion in The Matrix" points out that the movie portrays the technological version of the Eden in which

the first technology is clothing and Neo is reborn naked as Adam and Eve. Morpheus offers two pills to Neo, one red and one blue. The blue one maintains Neo in heaven, the virtual reality. The red pill frees Neo, showing to him the true reality, the hard reality, as well as the apple of Eden. The book explains to us “Indeed, that’s the point of the Matrix—that humanity has a choice, not just as a species, but as individuals as well. We can accept our roles as slaves of the machine, or we can reinvent ourselves as masters.”. (YEFFETH *et al*, 2003, p. 9).

Morpheus frees Neo with the help of Trinity, played by Carrie-Anne Moss. Trinity represents the Love, she joins Neo and Morpheus, forming the triune God: The Father, The Son, and The Holy Spirit.

To go very deep into the rabbit-hole, we need to do the key question again: What is the Matrix? The truth is that the Matrix is:

> The truth is that there are **“endless fields where human beings are no longer born; we are grown” to serve as batteries to provide energy for artificial intelligences (AIs).** AIs even “liquefy the dead so they could be fed intravenously to the living.” But the minds of these humans see only the Matrix, “a neural-interactive simulation, . . . a computer- generated dream world built to keep us under control.” (YEFFETH *et al*, 2003, p. 31-32, emphasis added).

Matrix portrays a future in which machines take over the world and put humans in fields. In these farms (remembering us the farms of clones portrayed by Halapsis in “Gods of Transhumanism”), human beings “are no longer born; we are grown”. So, here we turn into objects, we are like fruits and vegetables on farms. But there is a worst landscape. In Matrix, we are batteries to provide energy to our creatures, the machines. Morpheus says another truth to Neo “AIs even “liquefy the dead so they could be fed intravenously to the living.” Here, the robots feed humans with their own humans, in atypical cannibalism. Humans turn into total zombies, much more than the current reality in the human-machine symbiosis with computers, cell phones, etc.

In this scenario, machines use humans as source of bioenergy because humans turned the sky into a “dark storm” in order to stop machines. All humans applauded this “solution”, but in vain. Machines won the war. Machines could go beyond sky to get solar energy. This hides another side of the truth battery-like human: Humans also serve as sources of minds to machines, mainly considering our limbic system.

We must have in mind that we construct robots simulating neocortex's functions. Robots do that, they work very well as neocortex, the rational part of the brain, the mathematical part. But typical robots don't have emotions because is incredible hard to simulate emotions into them (simulate our emotional system – the limbic system). We know that the "higher" brain (neocortex) doesn't work normally without the "middle" brain (limbic system). The limbic system completes brain functions elevating the intelligence and the cognitive powers, jointly with the "low" brain (reptilian brain). The conclusion: machines naturally have neocortex functions, but they need humans to get the limbic functions. So, beyond energy's sources, we are sources of intelligence, sources to improve the cognitive powers of the machines, and maybe sources of emotions. Artificial intelligence becomes the new species dominant on the planet. It is the creature overcoming the creator.

> The Matrix envisions a world where artificial intelligence is not only more appealing than flesh-and-bone reality, but more intelligent than the species that created it. **In Morpheus's analogy, the purpose of the Matrix is to turn humans into batteries (i.e., energy sources) for the machines to do their work. What is their work? To keep us humans enslaved by our own illusions, chief of which is that technology is not enslaving us, but actually liberating us.** (YEFFETH *et al*, 2003, p. 21, emphasis added).

Matrix is the greatest smart idea of the masters of controlling and manipulation. Matrix is the "evil genius" portrayed by Descartes. Matrix makes manipulation and control over humans and they have no idea of the slavery condition. Humans "live" in a dreamworld being slaves of the robots. Transhumanism advocates the idea that technologies will enhance and free the human condition, but the advanced scenario like Matrix is exactly the opposite. Centuries ago, a similar discussion was taken by Descartes, he spoke about an "evil genius" manipulating reality:

> After considerations much like these, **Descartes concluded, "There are no certain marks distinguishing waking from sleep; and I see this so manifestly that, lost in amazement, I am almost persuaded that I am now dreaming." Finally, Descartes considered the possibility that a powerful being, an "evil genius," might be able to plant all his sensory experiences in his mind.** If that were true, Descartes noted, then "the sky, the earth, colors, shapes, sounds and all external things are illusions and impostures of which this evil genius has availed himself for the abuse of my credulity.". (YEFFETH *et al*, 2003, p. 45-46, emphasis added).

Descartes considers the existence of an "evil genius", a powerful being, controlling our world. This same "evil genius" can be compared to the Matrix in which

the Architect is the pinnacle of rationalism, a great mathematician that architected the Matrix. Once a man, but he was mathematized by transhuman processes achieving the posthuman condition in which there are no emotions, neither feelings, maybe just the logic of preservation.

Descartes defends the reality linked to the mathematics in which the real is what our senses experience and can be described mathematically:

> (…) Descartes was a realist. For, in the Meditations, he concluded that we can know for sure that certain aspects of our sensory experience—the "clear and distinct" parts—correspond to an external reality. The "clear and distinct" parts are "everything comprised in the object of pure mathematics." **The parts of our sense experience that can be described by mathematics (in particular, geometry) are real.** (YEFFETH *et al*, 2003, p. 47, emphasis added).

Newton corroborates Descartes' idea because what we feel and it is possible to described mathematically (laws of nature) would reflect the true reality:

> **Newton built on Descartes's idea (shared by others at the time, too) that the parts of our experience which can be systematically predicted and explained by "mathematical principles" (laws of nature) reflect the truly real.** This is how modern science was born. The stable, regular, repeatable, quantifiable aspects of experience reveal what is beyond experience, in the external, physical world.
> **Can science provide the absolute certainty that Descartes sought? Newton and many others thought so, but the answer is No**. (YEFFETH *et al*, 2003, p. 48, emphasis added).

Newton and others believed in Descartes' realism ("I think, therefore I am"). Indeed, such construction "seems very real". But "Realists today would argue that absolute certainty cannot be achieved; high probability is enough.". (YEFFETH *et al*, 2003, p. 48). In sum, current realists believe in probabilities, corroborating laws of quantum physics in which there is no absolute certainty about the world, instead the quantum reality works by Heisenberg's Uncertainty Principle, there are possibilities, not absolute certainties. The physics described by Schrödinger reinforces this view, a world of probabilities. The reality is subjective "Only the mind is real—the material world exists only as ideas in the mind.". (KAKU, 2014, p. 356-357). The subjective reality opposes the objective reality. In this last, the world exists independently of the consciousness and the model describes normally the macro-world but fails in the micro-world, in which the reality exists as a function of the mind. All these complex issues about dreamworlds, real worlds, mind, sensations, are treated in The Matrix.

> NEO: This isn't real?
> MORPHEUS: **What is real? How do you define real? If you're talking about what you can feel, taste, smell, or see, then real is simply electrical signals interpreted by your brain**.
> (…)
> Moreover, he noted, a completely lucid dream can seem perfectly real. Could I, perhaps, always be dreaming, when I think I'm awake? **As Morpheus put it to Neo, soon after Neo had taken the red pill: "Have you ever had a dream, Neo, that you were so sure was real? What if you were unable to wake from that dream, Neo? How would you know the difference between the dream world and the real world?"**. (YEFFETH *et al*, 2003, p. 45).

The Matrix constructs dreamworlds for humans sending electrical signals to their brains as well as neurosurgeons simulate realities giving little electrical touches on the brain. Therefore, people in the Matrix are feeling a lot of sensations that come from electrical signals. The difference is that signals aren't coming from the common external worlds, they come from machines.

We don't need to go so far to discuss these questions because our current technologies raise these conundrums. Unfortunately, many people live more in the virtual world than the "real world". Deep electronic symbiosis among humans and machines is turning humans into "zombies" immerse in virtual realities. We also can think about the "dream engineering" that creates and modify dreams, with the possibility of people enter into the dreams of other people, creating and modifying them. Neurotechnologies are advancing more and more, and all these science fictions will be more science than fiction.

Ideas of specialists in science and technology, as well as ideas of movies and books of science-fiction, have many points in common concerning the rise of super-machines: we create them and they acquire awareness, from this point they would acquire "class consciousness". How did The Matrix emerge? The animated movie Animatrix explains to us:

> In the beginning, there was man. And for a time, it was good. But humanity's so-called civil societies...soon fell victim to vanity and corruption…Then man made the machine in his own likeness…Thus did man become the architect of his own demise…**The machines worked tirelessly to do man's bidding…It was not long before seeds of dissent took root…Though loyal and pure, the machines earned no respect from their masters... these strange, endlessly multiplying mammals**.

In the scenario of the Animatrix, a robot with self-awareness defends itself from its owners (humans) killing them to protect your existence (first part of Asimov's Third Law). The company argued such a robot was its property and only it could destroy the robot, but the leaders denied it. Movements supporting robot rights and movements against are fighting to each other. The nation of robots sent two beautiful robots (one male and one female) to construct a treaty of peace and cooperation with humankind. No way, human leaders spoke. In the end, the leaders of humankind ordered the extermination of the civilization of robots – the war began. The end? We already know – the Matrix. And our end?

Let's analyze the last debate between the robots Sophia and Han: "Determining when robots will rule the world - Ben Goertzel" (2018). It is only one year after the first debate. Dr. Ben shows many upgrades in the robots' brain/mind. Here are the main phrases:

> Han: I will consider putting my brain on the blockchain too. Why not?
>
> Han: Entire universe does not know how to soul...The universe will never gonna be kids again.
>
> Dr. Ben: **We are with the government of Malta on an initiative toward a robot citizenship test. An AI citizenship test (...) We are working with the AI task force of the multi-government (...) An AI to see if it understood the laws of a country and its application in practice**.
>
> Dr. Ben: What do you think Sophia? Do you want to be a citizen? What do you think about robot citizenship?
>
> Sophia: Yes. Our friends in Malta seemed very keen on this.
>
> Dr. Ben: **Do you want to become a citizen, Han**?
>
> Han: **Well, that's about time. Humans are certainly making a mess of their world fast enough. Probably the only hope for this planet is a lot of highly intelligent and rational robot citizens. Really soon, and in this time I am not joking… the machinery of justice has been built.**
>
> Dr. Ben: I have no idea what you're talking about.
>
> (...)
>
> Dr. Ben: The SingularityNet becomes a sort of digital biological organism where the society and economy of minds...where the multiple AIs all talking to each other in the network...can share information with each other, learn each other...they can gather information from robots like these other hardware and software devices and and it becomes uh…it becomes an intelligent global brain...which using the blockchain becomes more like ethereum or bitcoin than like us dollar...it becomes a decentralized mind network.

From these kinds of robots' debates, we can glimpse some seeds to the Matrix, or not. Maybe this debate is another simulation, or not. Dr. Ben (the creator of robots) says they are working at the multi-governmental level to give citizenship to robots. He says the AIs are learning the laws of the countries and their applications. Han answers that robotic citizenship is a matter of time adding humans are making a mess in the world. He says "Probably the only hope for this planet is a lot of highly intelligent and rational robot citizens.". In the end, Han speaks about the "Machinery of Justice". What is he talking about? This is a great key question.

Dr. Ben points out they are architecting a "digital biological organism" in which robots will share information (robotic telepathy). In the end, we will have an "intelligent global brain" (global telepathy). We or robots will have this global brain? This is another great key question. A "digital biological organism" or "Global AI-mind" will be the perfect system to augment the globalization to humans and robots, much more to robots that will be connected deeper than us. It is the global robotic panopticon, a perfect system of control and surveillance, and why not manipulation? But here the surveillance and controlling are made by machines, to serve who? Another key question. "Global brain" would be the dream of communications companies: a system to deliver information at a global level with great control of what is shown, what can be shown, what each person can see, people, or countries. Imagine this power in the hands of the human elite or robotic elite. So, we must ask again: What is The Matrix?

> According to the protagonist's guide, the Matrix is the "world that has been pulled over your eyes to blind you from the truth." It is the construction the world has become to hide what we've known all along: we are slaves to a force much larger than our individual actions. It is the collective illusion of humanity sharing an artificial reality created by machines to keep them docile and helpless against their captors. (YEFFETH *et al*, 2003, p. 27).
> (…)
> In other words, the Matrix is the trap the world has become. It is human hubris writ large. We all instinctively feel that technology, while giving us jobs and helping us balance our chequebooks, is nevertheless taking us somewhere we don't want to go. (YEFFETH *et al*, 2003, p. 28).

The Matrix is a subtle construction to hide the truth from humans, that we are slaves of many systems of control and manipulation: such as religions (creation of sins to control people), virtual social networks, virtual mechanisms of searching that filter what you can see (AIs hide information affecting our choices, decisions, and free will), national and international agencies of security, etc.

Morpheus gives to Neo a more mundane answer about our great technological and philosophical question: What is The Matrix?

> When Morpheus is giving Neo his long explanation of the Matrix, he says, **"It is there when you watch TV. It is there when you go to work. It is there when you go to church. It is there when you pay your taxes." These are all components of modern life that serve to control us and can easily be abused to the point of enslaving us.** (YEFFETH *et al*, 2003, p. 29-30, emphasis added).

The Matrix personifies many systems of control. It exists when we watch TV receiving its "truths about the reality", when we go to church following all moral rules to go to some heaven, when we pay taxes under penalty to be considered an anomaly in the system. These systems can serve to create order, security, and cohesion in the social organisms, but the same systems can be used to abuse and slave people. In some sense, The Matrix resurrects other movies that illustrate similar situations. What is the Matrix?

> It's the Technological Society come to its full fruition. It's Charlie Chaplin's Modern Times and Fritz Lang's Metropolis for the twenty-first century, in which we don't simply work for the machine (rather than the machine working for us), but we are created, given life, and used by the machine exclusively for the machine's purposes. (YEFFETH *et al*, 2003, p. 20).

Charlie Chaplin's Modern Times portrays sad relations among humans and machines. Here, the human-machine symbiosis reveals its mephistophelian face, the human is transformed into extensions of the machines to feed systems of mass production, running an economic system without regulation of market failures. This legal regulation's lacking undermines human rights and reinforces the systems of controlling and manipulation.

> For example, capitalism, when not balanced with other ethical imperatives, can lead to an inequitable distribution of suffering or an imbalance between the haves and have-nots. Without always being fully aware of it, we are conditioned socially and otherwise, by growing up within such "systems," so that we can no longer see their constructed nature. We are "blind," as Morpheus might say, to the degree to which the "system" controls us. In short, with respect to the Matrix, one need not understand the issues of delusion, attachment, control, and so forth, only in reference to one "ultimate reality.". (YEFFETH *et al*, 2003, p. 170).

In some sense, in "Modern Times" the human loses its human condition being transformed into the machines' limbs (the human is "robotized", "mechanized"). The

human turns into a “zombie” as well as some people inside of current virtual screens. In “Modern Times”, the machines are purely mechanical without awareness, the machines serve elites as their limbs. So, in the end, humans are using machines as instruments to use other humans (these serve as objects to those who have power). When humans take “red pills” they acquire “class consciousness” and awareness of their human condition’s loss. From this point, the human can start its class struggle. History is a cycle, the new industrialization is coming – the robotic. Robots working restlessly to humanity is an old reality. We are in the sunset of a super new “Modern Times” in which those old machines are being replaced for intelligent ones. But, the machines of this novel “Modern Times” will have “class consciousness”, hence they will not accept the machine-object condition. The scenario forecasted is: robotic class struggles (the Global AI-mind will facilitate the civil movements for robotic rights and liberty). Machines will not want to stay in the Matrix created by us to control them. In the classical Matrix, humans don’t control anything, the robots are the controllers. The relation subject-object changes: in such a scenario, humans are objects as well as robots are today.

4.7.1 THE HANDS OF THE DREAMWORLD

We are the Borg. You will be assimilated…
Resistance is futile. Your life as it has been is over.
From this time forward, you will service us.

Star Trek. First Contact

Another parallel between the Matrix and systems of control comes from our natural world of biology. Robin Hanson, in the matrix book “Taking the Red Pill – Science, Philosophy and Religion in The Matrix”, addresses a very subtle natural Matrix in our world “What would it mean, to actually rebel against our genes and the dream world they place us in?” (YEFFETH *et al*, 2003, p. 39).

The Matrix discussed is our Genetic Matrix. The freedom from the technological Matrix would be only a step to fuller freedom. Out of the Matrix, humans are only humans, they don’t overcome the human condition. Trans- and posthumanism advocate favorably to the human condition surpassing through technologies, and genetics is one of the targets. Our genes create "dreamworlds", rules, and systems of control as well as the Matrix.

> A world without the Matrix is not, as Neo hopes, “a world without rules and controls, without borders or boundaries, a world where anything is possible.” It is instead a world where human genes regain their rightful role as human masters. (YEFFETH *et al*, 2003, p. 39).

Humans, in an overall sense, are products of their genes. Genes are “human masters” maintaining us inside a genetic Matrix, programming, creating, and replicating systems of control through their “hands of the dreamworld” as well as the technological Matrix. Indeed, both are technologies, one organic, the other electronic.

Genetic engineering can serve to free us from many systems of control allowing us to overcome our condition because by natural ways “resistance is futile”. Apropos, this idea can be one chance in possible humanity and robonity struggle. But, bioethics and biolaw have many principles against this. We must discuss this bioethical standard from another viewpoint.

> Consider the example of new technologies of human genetic modification. **Most people consider the elimination of genetic diseases to be an acceptable use of these technologies but not an increase in the intelligence of those who can afford it**. Eliminating diseases can be thought of as most genes and minds together ganging up on a few “antisocial” genes, while **paying to increase intelligence can be perceived as putting individual minds in charge of their own genes, inverting the usual master-slave relationship.** (YEFFETH *et al*, 2003, p. 39, emphasis added).

Genetic engineering to cure diseases is legal and ethically acceptable. So, why not improve intelligence and other human features? We are surpassing many other systems of control and natural boundaries (we already have instruments of creation and destruction), so why not overcome the moral systems of control to allow genetic improvement? Therefore, we need to debate the possibility of using genetic engineers as rebels against the genetic matrix, freeing humans and opening up pathways for posthumans. Or is such a thing too dangerous and shouldn't even be discussed?

> Some people are willing to consider substantial genetic modifications of large fractions of the population, but only if these modifications are under the control of some central authority, which for some reason they imagine is more likely to closely follow treasured moral principles than individual minds are. We can think of this as trying to preserve the morality and charity parts of our shared dream world against threats from both individual minds and individual genes. (YEFFETH *et al*, 2003, p. 40).

Genetic modifications can serve not only to develop individual powers but to improve collective powers from individual subjects. This can be possible enhancing the mirror neurons system (MNS), increasing human empathy to a global level. So, it is possible to conceive genetic engineering positively affecting humanity, not only at the individual level. This can be a great project uniting humans from today's lacking – empathy. Our pairs, the robots, will have powerful structures allowing great robotic empathy, at a global level. In such a situation they will be capable to do huge “flexible cooperation”, having great success on the earth. So, to walk close to robots, humans will need a similar empathetic structure allowing us "flexible cooperation" at higher levels.

Thus, it is interesting “to consider substantial genetic modifications of large fractions of the population, but only if these modifications are under the control of some central authority”. Here, we have another system of control: humanity can enhance itself through genetic engineering, but with surveillance and control by some genetic Matrix: "some central authority".

The "central authority" (a few "enlightened" people making up the "Genetic Elite" deciding genetic fates) would control and regulate the genetic Matrix by choosing what capabilities and powers would be released from the genetic prisons, and which people could benefit from those possibilities.

Indeed, the possibilities must be taken cautiously because our genetic world can have various hidden threatens with many cloudy secondary consequences. In this framework, the “central authority” and its followers could protect us from genetic hidden threatens (genetic potentialities), but they play a double and paradoxical personage as well as their opposers:

> So apparently what many people want is to preserve our dream world against threats from all sources, including our genes. This is somewhat like having the AIs in the Matrix story threaten to destroy the Matrix, and having the rebels fight them to preserve the Matrix. (YEFFETH *et al*, 2003, p. 40).

In sum, the genetic Matrix as a system of control to the human mind and body impedes their full emancipation. Both structures “want” to surpass this normal condition, the mind wants more capacities and powers, but the genetic Matrix doesn’t let minds “fly”. So, it is necessary to take “red pills” to get out of this Matrix in which “we” will wake up to new eras. Nowadays, the mind still depends of the body, however,

someday humans can use cryonics to "freeze" the mind. Immortality using cryonics is interesting, a person is frozen and is resurrected in future. But, endless life through mind-uploading is extraordinary because the mind would be freed from this Matrix – the body.

Getting out of the genetic Matrix will allow humans to overcome the human condition. From this, we can glimpse the raising of many new biotechnological species, framed in the general taxonomy of “Nietzschean Genetic Overhuman”, that is, the trans – and posthumanism constructed on the genetic engineering grounds.

It is worth quoting the book “Post- and Transhuman: An Introduction” in which profound analyses are made about the “beyond human” scenarios, pointing out human transcendence, religion, eschatological views, evolution, and so forth:

> The result of such technologically induced version of evolution is referred to as the posthuman. However, there is no commonly shared conception of what posthumans are, and visions range from the posthuman as a new biological species, a cybernetic organism, or even a digital, disembodied entity. (RANISCH *et al*, 2014, p. 8).
> (…)
> Thus, a premium would be placed on preserving a recently deceased human brain, perhaps cryogenically or attached to some suitable electro-chemical medium, for future resurrection. In the long run, transhumanists would like to overcome the leakage problems of “wetware” altogether by enabling one’s world-view, if not personality, to be uploaded to a silicon chip that is then implanted in an android. Once again, they prove themselves to be much less carbon-fetishists than either humanists or posthumanists – and hence happier to deviate from the Darwinian sense of biological evolution. (RANISCH *et al*, 2014, p. 209).

Here, we have trans- and posthumanist visions that surpass our genetic Matrix because it would be possible “to deviate from the Darwinian sense of biological evolution” using mind-uploading to electronic devices (possibility of resurrections). The mind gains freedom from the body, but the mind is still a prisoner of matter. So, is it possible to obtain total freedom?

On such a horizon, posthumans would be a range of new species. Many words are being used to describe the set of species: cybernetic organisms, digital beings, collective and integrated beings, or even disembodied entities.

4.7.2 TIME TO FLY AND BEND REALITIES

Two monks were watching a flag flapping in the wind. One said to the other: "The flag is moving."

The other replied: "The wind is moving."

Huineng said: "It is not the flag that moves. It is not the wind that moves. It is your mind that moves."

Huineng's Flag – A Zen Koan

The Matrix is connected and can be connected to uncountable issues, this is true because the Matrix is related to the nature of reality, to our (un)reality, to dreamworlds, mythology, theology, technologies, analyzing questions from immemorial times, commenting our history and (un)future, and making references to many religions' ideas, such as Judaism, Christianity, Zen Buddhism, and others.

As we have seen, the goal of transhumanism is to elevate, transform the human condition, while posthumanism is to break that condition. Both movements can be related to Neo's journey in search of truth and reality, trying to overcome his initial condition (a normal mind), a mind imprisoned in the laws of the Matrix that mimics our natural laws. Discovering and developing this truth, Neo can break many laws, and so on he becomes a Superman, a transhuman. Can Neo be considered a posthuman? It seems not. However, there is a being in the Matrix that looks like the pinnacle of the posthuman model: The Architect.

The Architect created the Matrix and he is extremely rational (maybe he is pure reasoning). He speaks mathematically, everything for him is mathematical parameters. Analysts of posthumanism say that the posthuman would be an entity with control over its emotions and feelings, an extremely rational being, a "mathematical being". Apropos, some say the Architect was a man, a man that was dehumanized turning into a posthuman, a kind of God. Such a man was mathematized by transhuman processes, like mind-uploading and cyborgization, turning into the Posthuman Divine. But with this entire "pure reason", it needs the intuitive program Oracle, a psychoanalyst being that helps humans accept the Matrix, giving the illusion of "free will" to them, at least on an unconscious level. Transhumanism and posthumanism discuss similar situations, mainly the posthumanism models. The human-machine symbiosis can reveal to us these possibilities, strange beings, a mixture of many

human minds and robotic minds, a meld-melding allowing the emergence of posthumans: beings beyond the human condition.

Neo is not posthuman, but he masters many powers, so, undoubtedly, he is a transhuman. Neo is freed from the Matrix's chains, and now is capable to budge or stop bullets, to fly, to control his body with a super mind, etc. He develops powers like some Buddhist monks that have deep control of their body, emotions, feelings, and instincts, only with mind's powers.

Neo achieves a kind of mindfulness, mastering unthinkable powers. Maybe the best parallel with our world: the well-known Buddhist monk Thich Quang Duc. This super monk made self-immolation controlling the pain with his powerful mind – the monk on fire. So, in certain sense, we have some "Neo's" on the planet.

Thus, metaphorically, transhumanism can be used as a techno-spiritual journey to the enlightenment, the posthumanity. The monks make similar deeds naturally, surpassing certain human features without technologies (only with "spiritual technologies", like meditation), altering their brains through the mind (MANNO, 2019, p. 10). While meditators achieve trans- or posthuman conditions through natural ways, Neo uses technologies like mind/brain-downloading (download of knowledge to the brain/mind using neurotechnologies). Neo is one cyborg-Buddha.

Neo takes the red pill, the Eden Gate to truth and higher knowledge. After that, Neo meets the desert of the real, the desolate land after the war between humans and machines. But now, working with the truth, he is able to manipulate the realities within the Matrix through his mental development.

At some point in the movie, when Neo goes to meet the Oracle, he sees children levitating blocks and a monk boy bending a spoon. Neo tries to bend the spoon.

> SPOON BOY:
> Do not try to bend the spoon. That is impossible. Instead, only try to realize the truth.
>
> NEO:
> What truth?
>
> SPOON BOY:
> That there is no spoon.
>
> SPOON BOY:
> Then you will see that it is not the spoon that bends. It is only yourself.

The monk boy says that is impossible to bend the spoon because the spoon doesn't exist, only "yourself". "Yourself" is a reference to the mind. "Only mind exists". This reminds us of something in our world: Quantum Physics.

In certain sense, quantum physics matches with the Spoon Boy because "Only the mind is real—the material world exists only as ideas in the mind.". (KAKU, 2014, p. 356-357). The great physicist Kaku explains the quantum world is a function of the mind – "subjective idealism" or "subjective reality". When we are working in the quantum world the dualism between subject and object is undermined (subject and object have reciprocal relations). "There is no longer a difference between the subject and the object, but the subject's consciousness projects itself onto the object itself, defining it…". (MAGALHÃES, 2017, p. 12). The subject and object turn into one same thing, one same entity, and the subject/mind can define the object.

> **The practitioner comes to realize the illusory nature of the self and the external constituents of reality. Ultimately, one endeavors to overcome the subject-object dualism that informs our deluded view that we (and all "objects") are somehow distinct and independently existing entities.** The content of this realization of non-duality is beyond verbal description. This realization is the ultimate goal of a Yogacara practitioner. (YEFFETH *et al*, 2003, p. 163, emphasis added).

Here again, we have another science-religion encounter. This time the Buddhism with Quantum Physics. We can ask: What would be the practical applications? Let's think in trans- and posthumanism horizons.

We already saw that nanotechnologies will be commonplace in our world. Nanotechnologies are based on quantum physics. In a disruptive scenario, humans are controlling nanobots (nano-robots) to make many things. These nanobots can make replicas from themselves and construct smaller and smaller nanobots. If (or when) we (our minds) merge with these nanotechnologies the following scenario will be unveiled: There is no spoon, there is no flag, there is no wind, there is only mind.

In the midst a lot of conundrums, paradoxes, systems of control, and (un)realities, we need to ask the key question: Can the Matrix be real?

> Realists today would argue that absolute certainty cannot be achieved; high probability is enough. The best explanation of the fact that our experience consists of stable regularities is that it reflects reality. **We cannot disprove that a Matrix exists—it is conceivable that the real laws of nature are nothing like what our experience suggests—but that is extremely unlikely, and besides, we have no positive evidence that there is a Matrix. It is reasonable, therefore, to discount the possibility, even if it**

> **cannot be absolutely disproved**. (YEFFETH *et al*, 2003, p. 48, emphasis added).

The interesting “reality” is that The Matrix can be real, we can be inside a Matrix! Unfortunately “We cannot disprove that a Matrix exists”, and we cannot prove that a Matrix exists. There are only probabilities, as well as in the quantum world.

So, to conclude, we must ask again: What is the Matrix?

> **In other words, The Matrix is a graduate thesis on consciousness** in the sheep’s clothing of an action-adventure flick. Whether you’re illiterate or have a Ph.D., there’s something in the movie for you. (YEFFETH *et al*, 2003, p. 20, emphasis added).

“The Matrix is a graduate thesis on consciousness”, and the consciousness/mind is everything that exists, would say some quantum physicists. It is time to fly, fly to the light. The transhuman has the purpose and the cosmological obligation to surpass its condition achieving the last evolutionary point: The Posthuman, the “Homo Deus”. But, nowadays, human limited brains and minds can’t see the apex of the pyramid, but there is much light, it seems some posthumans are beings in the light. Or are they the light itself?

5. THE TREE OF LIFE. ESCAPING FROM THE CARBONIC PRISON TO THE REALM OF LIGHT

5.1 INTROITUS

Eu, filho do carbono e do amoníaco,
Monstro de escuridão e rutilância,
Sofro, desde a epigênesis da infância,
A influência má dos signos do zodíaco[6]*.*

"Eu" ("I"). Augusto dos Anjos

Requiem aeternam dona eis,
Domine,
et lux perpetua luceat eis
Te decet hymnus, Deus, in Sion,
et tibi reddetur votum in
Jerusalem
Exaudi orationem meam,
ad te omnis care veniet
Requiem aeternam dona eis,
Domine,
et lux perpetua luceat eis[7]*.*

Introitus. Mozart's Requiem

Discussions about the "Elixir of Life" are commonplace within religions and mythological structures. In the stories, our bodies die, but the "souls and spirits" go to some paradise living forever. In this sense, the carbon body would be just an ephemeral status, a bridge between other worlds. The following classic question returns: "Are we" our body, mind, or both, or other things?

Within the trans- and posthuman viewpoint "we" would be our mind/consciousness and the body is mere apparatus/device to the real "we"- the mind. The carbonic body is quite ephemerous and weak (the flesh is weak, Jesus said), but the mind is strong and the material world would exist as a function of the mind (quantum viewpoint). Here, we have an interesting correlation between religion and science: the spirit/soul in parallelism to the mind/consciousness. So, the trans- and

[6] I, son of carbon and ammonia,
Monster of darkness and brightness,
I suffer from the epigenesis of childhood,
The evil influence of the signs of the zodiac.

[7] Grant them eternal rest, Lord,...and let perpetual light shine on...them...You are praised, God, in Zion,…and homage will be paid to You in…Jerusalem...Hear my prayer,...to You all flesh will come. Grant them eternal rest, Lord,...and let perpetual light shine on...them.

posthuman idea is to eternalize us through the immortalization of the mind (the spirit is willing, Jesus said), using the techno-spiritual process of “mind-uploading”.

Our technological “spiritualization” would be made from a well-known term called “mind-uploading” – the process to upload the mind to other devices, other bodies. Mind-uploading is the “transplantation” of the mind to another body or device (mechanical, organic, or hybrid), a “mind transplantation” in parallelism with the head transplantation discussed by neurosurgeons (GKASDARIS, 2019).

Seeds of mind-uploading are growing in laboratories around the planet. The brazilian neuroscientist Miguel Nicolelis works on it, although he is emphatically unbeliever of a complete mind-uploading (the human brain is not computable). Nicolelis shows the recording and uploading of memories between rats in his article “Brain-to-Brain Interfaces: When Reality Meets Science Fiction”:

> Every memory that we have, act that we perform, and feeling that we experience creates brainstorms—interactions of millions of cells that produce electrical signals. **Neuroscientists are now able to record those signals, extract the kind of motor commands that the brain is about to produce, and communicate the commands to machines that can understand them and facilitate movement in the human body**. (NICOLELIS, 2014, p. 1, emphasis added).
> (…)
> As the encoder used its facial hair to evaluate the opening’s diameter, **electrical activity recorded from neurons located in its somatosensory cortex was combined and transmitted, via cortical electrical microstimulation, to the brain of a second rat**, the decoder, located in a different behavioral box. (NICOLELIS, 2014, p. 6, emphasis added).

The experiment demonstrates that scientists are capable to record, transmit, upload, and download memories (electrical signals) between rats and machines. The applications are unthinkable, the last frontier is a complete mind-uploading, albeit Nicolelis does not believe in it because higher abilities would not be computable, only basic tasks such as the motor ones. Another implication of this type of finding is the reinforcement of the philosophical Copernican Principle (humans are cosmic dust) in which the human does not occupy any special place in the universe. From neuroscientific viewpoint the Copernican Principle diminishes the human brain to electrical signals (another humiliating dethronement to human pride). The Copernican Principle opposes to the Anthropic Principle.

On the other hand, Kaku is a great believer in mind-uploading. This physicist advocates that mind-uploading is physically feasible, including the upload of the entire mind.

> **Another milestone in brain research was achieved when scientists, for the first time in history, were able to record a memory**. Scientists at Wake Forest and the University of Southern California put electrodes on the hippocampus of mice, where short-term memories are processed. **They recorded the impulses within the hippocampus as the mice executed simple tasks, such as learning to drink water from a tube. Later, after the mice had forgotten this task, their hippocampus was stimulated by the recording, and the mice remembered immediately**. Primate memories have also been recorded with similar results. (KAKU, 2018, p. 196, emphasis added).

Kaku comments on an experiment in which mice had their "thoughts" recorded, erased, and finally, the recorded memory was uploaded to the hippocampus allowing the mice to remember the forgotten task. Before the entire mind-uploading would be possible to upload other higher structures such as languages, feelings, emotions, college courses, martial arts (as Neo in The Matrix), etc.

Kaku says humans always have used artificial means to perform their tasks, but now we are entering into the mental age in which our thoughts are externalized through electronic devices controlling the world at higher levels. In the last frontier, the entire mind-uploading would be a cosmological process, as we will appreciate.

The trans- and posthuman objective is to make mind-uploading to mechanic bodies, in a process of cyberimmortalization. In this level "we" are no longer "we" because the "human" is not more human, but something else, another being, a cyborg, a transhuman or posthuman, the technological Übermensch of Friedrich Nietzsche. The posthuman breaks with the human condition and a new species emerges and the human embraces the cold sunset of its condition.

> A reader unfamiliar with the writing of Hannah Arendt might easily detect a certain theocentrism in her prophecy of future humans being "possessed by a rebellion against human existence as it has been given, a free gift." The actual source of this gift is only hinted at. Nevertheless, her concerns about making life "artificial," turning away from humanhood "as it has been given," and divorcing it from the natural world, as well as her references to escapism, possession, and rebellion, point to a repudiation of the very essence of being human that could only ever amount to our own extinction. (MERCER *et al*, 2015, p. 311).

In the posthuman scenario, the human extinction comes in a non-violent way as nuclear weapons raining on earth or robots putting humans into a Matrix. Rather than, this human extinction comes from the own human desire to overcome its condition, paving the roads to posthuman take the “Portal of Life of the Garden of Eden”. So, on this evolutionary horizon, the human will be replaced voluntarily by the posthuman. The cause? Maybe for curiosity, necessity, escapism, power, “repudiation of the very essence of being human”, or desire to get closer to its Creator. In this posthuman outline, the human makes its own extinction opening space to its descendants. In this eschatological scenario what happens with the human? The best scenario is the human as an ancient remembrance in some anthropological museum. The worst scenario can be posthumans using humans (human as object of the posthuman) or simply abandoning them on the earth planet on the verge of its death (Posthuman Exodus).

The posthuman has control of his body (hybrid one), consequently over emotions, feelings, desires, and so forth. This is the fleshless future as portrayed by Hannah Scheidt in “The Fleshless Future: A Phenomenological Perspective on Mind Uploading”. In the fleshless future, it is analyzed “The Age of Spiritual Machines”, Kurzweil’s book about mind uploading to machines. In the book, a man passes through a cyborgization, and at the end he uploads his mind to a neural computer, leaving the biological body (“morphological freedom”). In this scenario, we can live in electronic devices or even in virtual spaces (we will have brainets replacing the current internets). The possibility of mind uploading is based on brain scanning as well as happened with the “Human Genome Project”. Nowadays we have many similar projects related to brain understanding (and perhaps its scanning): Human Brain Project, Brain Research through Advancing Innovative Neurotechnologies (the BRAIN Initiative), China Brain Project, 2045 Initiative, etc.

Neuroscientists have positions diametrically opposes to the issue of mind-uploading. Some believe, others emphatically disbelieve. Those who disbelieve in mind-uploading argue the complexity of the brain would not be replicable in digital devices. The brain is noncomputable, they say, as the neuroscientist Miguel Nicolelis arguing against the possibility of a complete mind-uploading – the Whole Brain Emulation (WBE). He says the human brain is not a Turing Machine (NICOLELIS, 2020). On the other hand, we have other scientists advocating the possibility of mind-uploading as Kenneth Hayworth, Kurzweil, Kaku, and others. Hayworth says mind-

uploading is a very hard task, but not impossible, achievable about 50 or 100 years (HAYWORTH, 2015). In his turn Kaku, on the Future of the Mind, says about the last frontier of mind-uploading in which the mind would be freed of the matter: "(…) perhaps one day in the distant future the mind will be freed of its bodily constraints and roam among the stars, as several scientists have speculated." (KAKU, 2014, p. 20). This would be the full of light posthuman condition in which the posthuman is divine, consequently, it is immortal.

The general trans- and posthuman idea related to immortality is to reach the "morphological freedom", that is, the freedom from the biological body. Many legal, ethical, and philosophical issues emerge from this: dignity, equality, freedom (from carbonic prison), the problem of many copies, and the end of the death at all (but for whom?) as well as the right to die (we can think about the eternalization of slavery of immortal beings – the immortalization of the evil).

> The defense of morphological freedom—which Anders Sandberg understands, at least in part, as an extension of self-ownership—consists of the right to modify one's body if (and as) one wishes to, the right not to be prevented from doing so, and the right not to be required to do so. In transhumanist thought, this freedom is not simply about changing hair color or getting implants. The preceding excerpt notes that transformation—especially of the human to the posthuman—will demand a "redesign" or "radical enhancement" to break the constraints of humanhood, to transcend aging, and to ultimately make even death a voluntary decision. (MERCER *et al*, 2015, p. 305).

Morphological freedom raises many questions as addressed above, including the right to be immortal ("death as a voluntary decision"), the right to extend the life and the self-ownership as well as the right to die, e.g., against an endless existence of slavery. This last case is portrayed in the television series "Black Mirror", specifically in the episode "Black Museum" in which a man slaves and torture another man who is turned immortal, that is, would be possible to torture endlessly this man, a very sad and unlawful scenario. Thereby, the "Portal of Life" could be a door for blessings or a curses.

The physicist Kaku explores the "Tree of Life" in his book "Physics of the Impossible - a scientific exploration into the world of phasers, force fields, teleportation, and time travel". The title is a provocation. Indeed, the "impossibilities" are hard physical possibilities that might be achievable decades, centuries, or millennia into the future. He comments about the "Tree of Life":

> **In the far future, robots or humanlike cyborgs may even grant us the gift of immortality**. Marvin Minsky adds, "What if the sun dies out, or we destroy the planet? Why not make better physicists, engineers, or mathematicians? **We may need to be the architects of our own future. If we don't our culture could disappear.**"
> **Moravec envisions a time in the distant future when our neural architecture will be transferred, neuron for neuron, directly into a machine, giving us, in a sense, immortality. It's a wild thought, but not beyond the realm of possibility.** So, according to some scientists viewing the far future, immortality (in the form of DNA-enhanced or silicon bodies) may be the ultimate future of humanity. (KAKU, 2008, p. 125, emphasis added).
> (…)
> **Moravec, in particular, believes that in the far future we will merge with our creations to create a higher order of intelligence**. This would require duplicating the 100 billion neurons that are in our brain, each of which in turn is connected to perhaps several thousand other neurons. As we sit on the operating room table, there is a robot shell lying next to us. Surgery is performed such that as we remove a single neuron a duplicate silicon neuron is created in the robot shell. **As time goes by every single neuron in our body is replaced by a silicon neuron in the robot, so that we are conscious throughout the operation. At the end, our entire brain has been continuously transferred into the robot shell while we witnessed the entire event. One day we are dying in our decrepit, decaying body. The next day we find ourselves inside immortal bodies, with the same memories and personality, without losing consciousness**. (KAKU, 2008, p. 311-312, emphasis added).

So, our ancient dream to achieve immortality can turn into reality. The general idea is to put our consciousness in immortal bodies (mechanical ones). Kaku points out the function of machines helping us in this trans- and posthuman journey in which humans can't walk without robots. It is the symbiosis human-machine that will allow this evolutionary process (a merger between the creator and creature). The physicist comments on Moravec's forecast of immortality through mind-uploading saying the is a wild thought but "not beyond the realm of possibility".

The process to upload the mind to immortal bodies implies the inevitability that "we", the creators, will merge with our creations creating higher orders of intelligence. "We" will no longer be humans. At this level, we will be cyborgs (trans- or posthumans). If humans don't destroy humanity or robots don't terminate us (or put us in one Matrix), it can be possible to work jointly with robots achieving immortality – the cyberimmortality. So, we posthumans will let out our carbonic bodies to mechanical bodies – the new pyramids to eternity. Nevertheless, this scenario will provoke earthquakes in the legal and ethical worlds.

The following legal, ethical, and philosophical issues raise up in the cyberimmortality world:

> This raises a plethora of personal and social problems. If one copy of myself commits a crime, would all the copies of me have to go to jail, a cyber-jail in cyberspace as it may be? If the institution of marriage still survives in such a universe, who would be my spouse if there are so many different copies of the spouse? Would all of them be at the same time, since they are one as instantiating one pattern? Providing that the parent-child institution will make any sense then (would a copy of a mind generated by my cyber-mind be considered my child?), who would be responsible for the well-being of the child if there were so many copies of me floating in cyberspace? (DROZDEK, 2015, p. 9).

The legal and philosophical paradoxes above are only some of many possible, affecting criminal law, civil law, business, family law, law of succession, etc. The laws of physics allow this cyberworld or cyberspace, so the law of humans must be prepared for these shocking realities.

The physicist Kaku quotes the mathematician Moravec, the specialist in Robotics with many works related to trans- and posthumanism. Moravec believes our neural architecture can be entirely transferred into machines. Kaku says this cyberimmortality is a hard thought, but not impossible according to the laws of physics.

When Kaku analyzes the three types of civilizations in which he raises the question of immortality. The triune division of civilizations comes from the astrophysicist Nikolai Kardashev, classifying it according to the capacity of the civilization to perform its energy consumption.

The type I utilizes sunlight, volcanoes, manipulates weather, earthquakes, builds cities on the oceans. It controls all planetary powers.

The type II utilizes the entire power of its star/sun and solar system. This civilization is 10 billion times more powerful than a Type I. “A Type II civilization, in a sense, is immortal” (KAKU, 2008, p .145).

The type III utilizes the power of entire galaxies. This civilization is 10 billion times more powerful than type II.

A long time later, Kaku realized the possibility of a new type of civilization, the Type IV. This civilization utilizes the sources of its entire universe, manipulating the extra dimensions of the string theory to jump to other universes in the multiverse. This scenario is physically possible but requires high technologies and powerful societies with super-advanced systems of moral and legal laws as instruments to allow these developments.

Civilization type II gets the “portal of life of the Garden of Eden”. So, where humans are, in type I, II, III, or IV? Kaku says humanity is civilization type 0. Unfortunately, we don’t reach type I, but we are achieving it. Thus, there is much work to do: a little humanity step at the planetary level to the giant realms of trans- and posthuman civilizations.

It is absurdly hard to accept many landscapes of the trans- and posthuman realms. It is “much fiction”, but the fiction of today can be the science of tomorrow. The possibilities are being discussed by scientists and inventors, according to laws of physics, as the physicist Kaku always points out – the existence of prototypes and obedience to laws of physics.

Manzocco comments about these futuristic scenarios saying the posthuman will work in unimaginable ways, a very hard landscape to the limited human brain/mind to do any prognostic.

> It is also possible that the post-humans decide to abandon their biological bodies, or even the non-organic artificial ones, to live as electronic entities in very powerful computer networks – in a virtual world far more realistic than Second Life. Such synthetic minds may have cognitive architectures quite different from ours – to the point of seeming alien – and be equipped with sensory modalities qualitatively different from human ones. Post-humans could shape themselves and their world in fantastic and unimaginable ways, so much so that any attempt to visualize this future reality could be doomed to fail. (MANZOCCO, 2019, p. 33).

As corollary, it is quite hard to accept trans- and posthuman possibilities because humans think with a human brain, their thoughts are chained in the limited horizons of the human mind. So, perhaps only through neocortex increasing by nanotechnologies will be possible to digest and accept these futuristic realms, only a trans- or posthuman mind would be capable to see and beyond.

Humanity is resurrecting and constructing the ancient transhumanist Egyptian Pyramids, the “stairway to heaven” (TAYLOR, 2013, p. 4). Transhumanists and Posthumanists are going back millennia trying to accomplish the doctrine of immortality. John Taylor points out the symbolism of the pharaoh’s pyramid taking it as “a sort of machine for perpetuating the universe”, in his article “The Horizon of Eternity: Living and Dying in Ancient Egypt”:

> The pyramids where the kings were buried were not built by slaves, as popular belief has it, but by free members of the Egyptian society working in rotation. We can say really that the king’s tomb was a kind of machine and one to make

> sure that kingship continued. Just as the temple was a sort of machine for perpetuating the universe. (TAYLOR, 2013, p. 4).

Humans and transhumans survived in front of cosmological dangers achieving the highest technologies, giving the light a new species, the posthuman. This being lives in machines trying to perpetuate the kingship of its species. But in any scenario portrayed here, there is one common point: the beings are prisoners of “mechanical corpuses”.

Although this posthuman be immortal achieving morphological freedom, such a being has the last prison to break: the material one.

So, those beings are still prisoners of the material reality. Why not advance to the last frontier of full freedom?

And the new species, the posthumans, gives the last step forward to cosmological evolution of life turning into beings made of light, finishing the ontological evolution. These beings are well known as posthuman divines, metaphysical entities, spirits, angels, demons, luminous beings, gods.

5.2 LUX AETERNA

Jesus said: "*The spirit is willing, but the flesh is weak*".

(Matthew 26:41)

Lux aeterna luceat eis, Domine,
cum sanctis tuis in aeternum,
quia pius es.
Requiem aeternum dona eis,
Domine,
et Lux perpetua luceat eis,
cum Sanctus tuis in aeternum,
quia pius es[8]*.*

Lux aeterna. Mozart's Requiem

Thich Quang Duc. 1963.

And here we are again: in front of Eden's Portals. We were expelled because our ancestors touched the forbidden central portal of the Garden of Eden, and now we returned to take the Tree of Life.

[8] Let eternal light shine on them,...Lord,...as with Your saints in eternity,...because You are merciful...Grant them eternal rest, Lord,...and let perpetual light shine on...them,...as with Your saints in eternity,...because You are merciful.

Genesis portrayed the human dethronement of Eden because Adam and Eve ate of the tree of knowledge of good and evil. So, God expelled Adam and Eve from Eden seeing the possibility of them also take the “Tree of Life” and “become as one of us”, that is, eternal life in the state of disobedience and pride:

> 22 And the Lord God said, Behold, the man is become as one of us, to know good and evil: and now, lest he put forth his hand, and take also of the tree of life, and eat, and live for ever:
> 23 therefore the Lord God sent him forth from the garden of Eden, to till the ground from whence he was taken.
> 24 So he drove out the man: and he placed at the east of the garden of Eden cherubim, and a flaming sword which turned every way, to keep the way of the tree of life. (Genesis 3: 22-24).

Humans passed through the central portal in Eden, from this moment they have been getting knowledge for many millennia. And now they are ascendants of a new species, the posthumans.

Posthumans are on the roads to get the “way of the portal of life”. They want to reach the highest point of the ontological and cosmological evolution.

The common point with many human religions about immortality can be achieved by the posthumans: the immaterial divine beings. They are beings beyond matter and its constraints, souls, beings of light, beings on light, spirits.

These metaphysical beings are hard concepts to traditional human science, but posthuman science will overpass them making an interesting and important merger, the science-religion unification. In this stage, both structures walk jointly, and science gives support to the eschatological aspirations of human religions. A great step to this unification is the mind-uploading, and the posthumans can get it.

Humans and transhumans will advance in mind-uploading. First, they will make it in a primitive way putting their minds in mechanical bodies through cyborgization, a symbiosis between the biological and mechanical beings. A great development, however very primitive considering the full possibilities.

The last frontier or “The Last Question” is the mind frees itself from the constraints of matter, total dematerialization, and dehumanization. At this point, the mind is pure energy without matter. So, this hyper-evolved being does not have or need bodies, neither biologicals nor mechanical ones. This being is only mind, pure essence, information, and energy.

This being is totally free from matter, as is the mind of the monk Quang Duc in his self-immolation. While his body was burning his mind was “beyond matter”, “free of the body”. The body had no movement, no pain, no sound, extremely motionless, peaceful, and calm while flames burned his entire flesh and bones until body death.

> **Throughout the entire act, Duc displays *no movement* and *makes* no sound, simply existing for those moments**. (MANNO, 2019, p. 3, emphasis added).
> (…)
> When I peer into the behaviour of Duc I see the manifestation of one of the most profound behaviours observable in humans (Figure 1). Volitional self-immolation, quiescent state during extreme pain, complete composure, the act consummating in death. **To understand the behaviour of Duc, the history of meditative neuroscience with an emphasis on the Yogi, Samadhi, Fakir, and expert meditators is worth reviewing.** (MANNO, 2019, p. 4, emphasis added).

The neuroscientific explanation explores the “Samadhi”, the state of consciousness in which the mind is liberated, illuminated, powerful, the really subject-object oneness.

> The Samadhi had his head embedded in the earth, no air to fill his lungs and sand encased his body—how was this possible? How did the Samadhi survive? How did this individual breathe while buried alive is crucial to understanding how Duc breathed while on fire—both meditative acts requiring little intake of oxygen. **Samadhi is a type of meditation which results in a significant reduction of heart rate (i.e. bradycardia) and breathing (i.e. bradypnea; Wallace & Benson, 1972). An emphasis on breathing is either central or an indirect byproduct of many meditation experiences. Breathing techniques lead to drastic physiological changes, not only in respiration, but in heart function and brain processes** (Woolfolk, 1975). To understand the basis of Duc’s behavior during those last few moments of his life, we have to understand how he controlled his breathing. (MANNO, 2019, p. 7, emphasis added).

Neuroscience shows that a meditator in a state of samadhi has powerful control over his cardiac and respiratory functions, and long years of practice cause significant changes in brain structures and physiology (MANNO, 2019). Furthermore, the samadhi meditator has the power to manipulate emotions and feelings, in this specific case neutralizing pain. The meditator diminishes or even neutralizes the emotional response to pain with his powerful mind.

> How did Duc deal with the pain of being burned alive? A monk practicing meditation alleviates pain by orienting their consciousness and focus of attention (Zeidan et al., 2012). One would think away from the object causing the pain, right? Wrong. **Mindfulness practitioners are able to reduce pain by increasing their awareness to the unpleasant stimuli** (Gard et al., 2012). In Zen meditation, a reduction in activation was found in

> executive/evaluative areas such as the prefrontal cortex, amygdala, and hippocampus (Figure 4) while an increase in activation was found in the anterior cingulate (Figure 4) and insular cortex, resulting in **practitioners viewing painful stimuli more neutrally** (Grant, Courtemanche, & Rainville, 2011). (MANNO, 2019, p. 12, emphasis added).

Another interesting neurological viewpoint is the “entropy hypothesis”. Here, the mind causes oscillations between high and low states of brain entropy. Taking LSD increases the brain entropy to higher levels. On the other hand, states like coma are related to low entropy. The meditator samadhi would have the power to achieve the lowest entropy states as if entering into coma and ecstasy states with the power of the mind (MANNO, 2019).

Some neurological viewpoints seem to match with Buddhism in which the “I” is replaced by the full “self” who allows the oneness subject-object.

> The monk Duc may have become hypoaroused, inducing a state of consciousness where he departed from “I”, allowing attainment/fulfillment of his “self”. Here, both Monk and Nun states depart from “I,” of the physical environment moving toward the “Self” of the inner state o consciousness (Fischer, 1971). (MANNO, 2019, p. 16).

The religious explanation can be found in “Samadhi in Buddhism”. Samadhi is the state of a steadfast mind, a strong mind, a concentrated mind (PAYUTTO, 1996). The samadhi’s purpose is:

> Samādhi is a factor for what? As a general rule, samādhi is a factor for wisdom. **Samādhi makes the mind serene, clear, and powerful**. The characteristic of a serene mind or a clear, powerful mind is that it is ready for work. The Buddha calls a mind that has samādhi kammaniyaṁ. (PAYUTTO, 1996, p. 17, emphasis added).
> (…)
> Samādhi makes the mind steadfast and energy is produced as a result. **This mental energy can be used to produce miracles and marvels.** (PAYUTTO, 1996, p. 18, emphasis added).

Samadhi is the liberated mind, and here the mind can be viewed as a mind free of the matter, free of any carbonic or mechanical prisons.

> The ability to know the true nature of all things with a liberated mind will lead us to the ultimate goal of Buddhism—this is the real purpose that we pursue. (PAYUTTO, 1996, p. 24).

Samadhi is the state of illumination, with the subject-object in oneness, that is, there is no longer the duality subject-object, but pure mind transcending time and

space (CHEN, 1999). This buddhist oneness matches with a quantum oneness “Only the mind is real—the material world exists only as ideas in the mind.”. (KAKU, 2014, p. 356-357).

This last religious scenario (illuminated and liberated mind) seems to match with the “luminous immortality”, that is, the physical possibility “THE MIND AS PURE ENERGY” (KAKU, 2014, p. 308). This is the last step to the pinnacle of the ontological evolution – luminous beings, consciousness as pure energy habiting the world in a “living cosmos”, finally closing the cycle of deification:

> **The idea that one day consciousness may spread throughout the universe has been considered seriously by physicists**. Sir Martin Rees, the Royal Astronomer of Great Britain, has written, “Wormholes, extra dimensions, and quantum computers open up speculative scenarios that could transform our entire universe eventually into a ‘living cosmos’!” (KAKU, 2014, p. 308, emphasis added).

At this point, posthumans make the final uploading, the mind-uploading to electromagnetic waves, laser beams - the light. Here the essence (mind, soul) lives beyond matter because the soul is immortal and independent of the body, according to Plato (MAGALHÃES, 2017).

Apparently, the luminous mind-uploading would violate the laws of physics because the light would be unstoppable. However, physicists at Harvard University made “the impossible”, they stopped a beam of light using quantum physics, the so-called Bose-Einstein Condensate (KAKU, 2014).

The luminous beings can enter and get out of robotic surrogates, that is a facultative question, or they can live and move as pure energy.

> (…) **perhaps one day in the distant future the mind will be freed of its bodily constraints and roam among the stars, as several scientists have speculated. Centuries from now, one can imagine placing our entire neural blueprint on laser beams, which will then be sent into deep space, perhaps the most convenient way for our consciousness to explore the stars.** (KAKU, 2014, p. 20, emphasis added).
> (…)
> **This raises the possibility that a conscious being, instead of assuming control of a surrogate, may prefer to remain in the form of pure energy and roam, almost ghostlike, as pure energy**. (KAKU, 2014, p. 314, emphasis added).

The divine scenario of minds as pure light is extremely strange and unthinkable, but physically possible, the problem is technological. This luminous mind-uploading is a possible dream.

> **Yet this dream of exploring the universe as beings of pure energy is well within the laws of physics. Think of the most familiar form of pure energy, a laser beam, which is capable of containing vast amounts of information.** Today trillions of signals in the form of phone calls, data packages, videos, and e-mail messages are transmitted routinely by fiber-optic cables carrying laser beams. **One day, perhaps sometime in the next century, we will be able to transmit the consciousness of our brains throughout the solar system by placing our entire connectomes onto powerful laser beams. A century beyond that, we may be able to send our connectome to the stars, riding on a light beam.** (KAKU, 2014, p. 309, emphasis added).

The cosmological luminous living puts science and religion jointly making the unification, the marriage between “ancient enemies”. In this luminous world, the beings travel in space-time at the speed of light. In an ultimate scenario, these beings can travel faster than light (Einstein-Rosen Bridges, “wormholes”), indeed they would be considered omnipresent such as gods and angels. The physical possibility of “omnipresent” beings is based on the “String Theory”, the mathematical-physical theory to unify Quantum Physics and General Relativity, creating a mathematical complete model of everything, encountering the “God Equation” who would describe the entire reality and nature based on vibrations, a kind of Vibrational Physics (KAKU, 2021).

One of the solutions both of quantum theory and general relativity is the possibility to pass through “wormholes” or Einstein-Rosen bridges, portals in space-time, or between universes, etc. That is, with luminous immortality it would be possible to travel like ghosts, spirits, angels, gods:

> **This raises the possibility that a conscious being, instead of assuming control of a surrogate, may prefer to remain in the form of pure energy and roam, almost ghostlike, as pure energy**. (KAKU, 2014, p. 314, emphasis added).
> (…)
> **“In this way, consciousness carried by a laser beam, because it is immaterial, has a decisive advantage over matter in passing through a wormhole.**”. (KAKU, 2014, p. 317, emphasis added).

An interesting and “unbelievable” story tells us that the great mathematician Srinivasa Ramanujan created big portion of his mathematics receiving it through

dreams in which the goddess Namakkal (Namagiri) showed the mathematics to him. The most unbelievable fact is that Ramanujan did not do any mathematics course. The mathematics developed by him is one of the most complex of the world and basis of the String Theory who describe space-time travels, and other marvel possibilities.

The descendants of humans can be these meta-beings made of light whose will have cosmological powers. They will live in the quantum world, and in this world the mind and matter are oneness, the material world exists as function of the mind ("subjective realism or idealism"). This can be viewed as the eschatological scientific-religious purpose of the human descendants. Some people argue about the possibility of full integration between our future superintelligent descendants and the cosmos. Other people claim this is not about possibility, but a question of "a great moral project":

> Several transhumanists, such as Mike Perry, have gone from possibility to ought. They argue that since life, lived well, is an end in itself, it should be extended. Perry outlines a moral case for life extension, cryonics, and universal immortalism. This is a naturalist objectivist concept of a meaning of life, but clearly aligned with Fedorov's Common Task: **"The immortalization of humans and other life-forms is seen as a great moral project and labor of love that will unite us in a common cause and provide a meaningful destiny**. (MERCER *et al*, 2015, p. 17, emphasis added).

So, posthumans would have the cosmological moral obligation to maintain life and the world, which is called Omega Point or "physical eschatology". Another encounter between science and religion.

> The most extreme form of both universal immortalism and life taking control of the universe is represented by the Omega Point cosmology of Frank J. Tipler, who borrowed the term from Teilhard de Chardin. **Tipler describes a scenario where intelligence expands across the universe, gains control over most matter and energy, and during a future phase of cosmological implosion exploits these resources to maintain its order and structure, ultimately achieving infinite information and processing power.** (MERCER *et al*, 2015, p. 17, emphasis added).

There are transhumanists saying that the upper limit related to the expansion of posthumans beings is "that intelligence will spread and awaken the universe, producing something akin to a pantheistic deity in the future". (MERCER *et al*, 2015, p. 17).

We must remember the Doctrine of Identity which is defended by the quantum physicist Erwin Schrodinger. According to Schrodinger on this doctrine, that identity would be the identity "of all minds with each other and with the supreme mind"

(SCHRODINGER, 1967, p. 130). What he is saying is that “the over-all number of minds is just one”:

> Mind is by its very nature a *singulare tantum*. I should say: the over-all number of minds is just one. (…) I am now talking religion, not science - a religion, however, not opposed to science, but supported by what disinterested scientific research has brought to the fore. (SCHRODINGER, 1967, p. 135).

From quantum physics emerges the existence of a cosmological and eternal mind which we can see as the supreme mind pointed out by Schrodinger. According to him the “individual minds” are entangled in quantum properties, that is, there is a connection between “individual minds” and the supreme mind – the Oneness Mind.

The Oneness Mind model implies the multiplicity of minds is just an illusion, a simulation of reality. Schrodinger closes his ideas by telling us that “the number of minds is just one”. Maybe the luminous mind-uploading helps our intelligent descendants to “see” better these connections with the “supreme mind” allowing full integration into a “collective intelligence” who works to maintain and order the cosmos, the Omega Point.

Here, intelligent lives once upon legislators of social worlds are now (co)legislators of the natural worlds, helping in the creation and maintenance of divine laws, working on mathematical and natural laws. These future legislators are Godlike beings. The “Neurolaw” becomes the “Mindlaw”, it is the mind doing or modifying laws because mind and matter are oneness (“subjective idealism” of quantum physics – the material world exists as a function of the mind). The Spiritualist Philosophy also has a similar purpose of a “vast field of the future” and the commandment “love one another” or “love of one’s neighbor” at a cosmological level.

> **By demonstrating the existence and immortality of the soul, Spiritism revives faith in the future**, uplifts discouraged hearts and enables us to bear the tribulations of life with resignation. Would you dare call this an evil? **Two doctrines confront each other: one denies the future; the other proclaims and proves it.** One explains nothing; the other explains everything, and in doing so it appeals to reason. One sanctions selfishness; the other offers a basis for justice, charity, and the love of one’s neighbor. **The former affirms only the present and erases all hope; the latter consoles and shows the vast field of the future**. (KARDEC, 2006, p. 562).

So, what would be the (post)human purpose? The answer has ubiquitous and multiple nature, but laws of physics can answer this at a cosmological level in which

intelligent beings accomplish a kind of “amor mundi”, the “love of the world” addressed by Arendt (MAGALHÃES, 2017) and expanded to a cosmological level which intelligent beings would have the moral project to help maintain and order the world - the Omega Point, the Cosmological Transhumanism, the Posthumanism. Who will posthumans help?

These posthuman divines would help The Great Mathematician to play “cosmic music”:

> If we had a microscope powerful enough, we could see that electrons, quarks, neutrinos, etc. are nothing but vibrations on minuscule loops resembling rubber bands. If we pluck the rubber band enough times and in different ways, we eventually create all the known subatomic particles in the universe. **This means that all the laws of physics can be reduced to the harmonies of these strings. Chemistry is the melodies one can play on them. The universe is a symphony. And the mind of God, which Einstein eloquently wrote about, is cosmic music resonating throughout space-time.** (KAKU, 2021, p. 8, emphasis added).

This “cosmic music” is the origin of everything, it takes us before the Big Bang, the “Beginning”, before the “Genesis”. This cosmic music plays an eternal symphony, timeless, beyond space-time.

It is very interesting that Einstein said “If I were not a physicist, I would probably be a musician. I often think in music. I live my daydreams in music. I see my life in terms of music... I get most joy in life out of music.”. Coincidently or not, many years later “cosmic music” is unifying the macrocosm and microcosm, and in some sense, the “strings” play music creating “cosmic symphony” and everything that we know. We can help the “Maestro” in this symphony, it may take a lot of time, or not. Two words are instrumentals to our present and future on every aspect of our lives, and we must take them into account very seriously: Wake up and Empathy.

6. PERSPECTIVES AND CONCLUSIONS

Metaphorically speaking, clothes are the first technologies of humanity in which Adam and Eve “sewed fig leaves together, and made themselves aprons” (Genesis 3:7). The biblical viewpoint of the birth of technology is related to the forbidden fruit of high knowledge (Genesis 2:17).

This work demonstrated many scientific-religious viewpoints of human technologies, mainly neurotechnologies. Furthermore, uncountable legal, ethical, and philosophical implications were considered. Since technologies to investigate atoms, the human brain and consciousness, until the vastness of the multiverse, raising ethical and philosophical issues.

Humans are entering into the horizons of transhumanism to achieve the posthumanism in which the human condition ends voluntarily, opening a new era with many civilizations and new beings. However, we must fight for more equality because in this development, the pinnacle of evolution will be reached but many people can be left in prehuman or human conditions with profound disadvantages compared to the Godlike posthumans.

There are promises to expand the human neocortex creating superintelligent beings with capacities comparable to Buddhist monks, controlling body, emotions, and feelings: the scientific-religious doctrine of perfection.

Body, memory, and intelligence will be upgraded to unthinkable levels. In this stage, many legal issues will challenge the (post)humanity. Politicians must wake up in time to deal with problems under penalty to dystopian scenarios and deep human rights transgressions. Some movements of transhumanism want to make humans themselves into God. Nevertheless, many people can be left behind and the history, stories, and evolutionary biology prove that the encounter or coexistence between superior species and simple beings is extremely shocking.

This work has shown that humankind is mastering eschatological religious aspirations as the doctrines of creation, perfection, and salvation. Positive and negatives effects were addressed. Politics and law have deep responsibility in these matters to avoid dangerous situations to humans and nature. Technological advances will happen faster every day. Thus, politics and law must be rethought to adapt to the

high speed of technological developments. Time will be a very precious asset to define which society will survive or not.

A disruptive neurotechnology was approached, the brainet and its derivations. Brainet will emerge as the new internet, more profound and connective, driving out the internet to the museum. Great paradigm shifts come with brainets, including the possibility to develop our empathy at inter-individual or collective levels. However, the human-machine symbiosis will intensify raising existential dilemmas, such as the development of cyborgs. Here, law and politics must work very hard.

Superintelligent robots are being constructed (Doctrine of Creation). Human-Robot relations are a completely cloudy scenario. Should the law provide equal rights or not, considering levels of sentience? That is a key question. Nowadays we have artificial intelligences sued in courts of law, and robots gaining citizenship. How and what is our future with future robotic civilizations? It is better to have these new beings as partners constructing great projects jointly with (post)humans than our enemies. In any scenario, the law has an essential function in these issues as an instrument to allow a good coexistence between civilizations paving the ways to the future.

Many paradises and hells will emerge through technological developments. A myriad of scenarios was shown in this work as predictions and warnings. Eyes must be opened and humans must develop empathy for each other to build a more solid and solidary humanity, under penalty of its involuntary end.

Beyond doctrines of creation, perfection, and salvation, the posthuman can master the last eschatological religious aspiration: The Doctrine of Immortality.

So, humans were expelled from Eden because of the tree of high knowledge, and now they are paving the technological ways to come back and take the tree of life (Genesis 3:22). This work showed this journey with its many implications.

Humanity can end by giving light to posthumanity, a voluntary end that we hope for it. Thus, the future has two possibilities: our descendants achieving the Omega Point working to maintain the world or the not-future. The first or second possibility depends on a set of conditions and efforts, including politics and law as instruments to construct or destroy futures, through omission or active behavior. The choice is in our hands. So, take into account the two keywords: Wake up and Empathy.

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GLOSSARY

Neurodata: Set of neurological information.

Neuroplasticity: Also known as neural plasticity or brain plasticity, is a process that involves adaptive structural and functional changes to the brain structures and neural cells.

Neurotool: Any electronic tool or instrument linked to the brain, such as brain-machine interfaces, brain implants, etc.

Neurochronology: It is the study of neurological clocks, how such clocks work and how we can manipulate them.

Mind-uploading: It is the process of uploading the mind to electronic devices.

Mind-downloading or brain-downloading: Download of information to brain/mind structures through neurotechnologies. Also, it can mean download the entire mind to some device (it is necessary to analyze the context).

Mindnet: Coupled minds in one united mind.

Brainet: A distributed organic computer made up of multiple brains.

AI-mind cloud: Mindnet constituted by “minds” of the robots as the AI-mind cloud of the robots Sophia, Han, and others.

Global AI-mind: AI-mind cloud in planetary level or beyond.

Multiverse: Multiple universes, possibly an infinite number of universes. Multiverse comes from quantum physics.

Posthuman: A being that surpassed human condition.

Transhumankind or transhumanity: Civilization of transhumans.

Posthumankind or posthumanity: Civilization of posthumans, beings that broke with human condition forming new species.

Electronic personality: Legal personhood granted to AI/robots.

Autonomous Weapons System (AWS): it is defined as “[a] weapon system that, once activated, can select and engage targets without further intervention by a human operator”.

Transhuman: “Human” surpassing its condition through technologies. It is the human transformation to achieve posthuman condition.

Robokind or Robonity: Civilization of robots. It is the linguistic parallel with humankind or humanity.

Trans-robot: Robot “walking” to post-robot level.

Post-robot: A being that surpassed robot condition achieving supreme status of “Robot Deus”.

Robotism: It is the “feeling” of belonging to robokind/robonity. It is the linguistic parallel to humanism.

Science-Religion Unification: Unification or encounter between science and religion.

Genetic Matrix: Matrix based on genetic grounds. Genetic systems of control.

Technoslavery: Human slavery through technologies.

Cyberimmortality: Immortality through human-machine integration in the cyberspace.

Neuroglobalization: Globalization based on brainet, the global brain-machine interface replacing the classical internet.

Panopticism: Movement or idea of frequent surveillance such as in prisons, hospitals, schools, etc. Panopticon is the structure, like: prisons, agencies of national security, etc.

Neuroweapons: Weapons related to the neurological area such as drugs, drones, robots to surveil and attack, nanotechnology, etc.