

Gu, gizakiok, oso bizkor mugitzen ari gara mundu berri baterantz non teknologiaren hazkunde esponentziala honako ideia honen mende dagoen: zerbait ondo atera badaiteke, ondo aterako da. Gainera, bide mehar batetik goaz orain, bazter batean Teodizea eta bestean Teknodizea dituen bidetik. Zer rol izango dute etorkizunean adimen artifizialak, robot adimendunek eta ziborgek?

Giltza-Hitzak: Natura eta Giza Eboluzioa. Adimen Artifiziala. Teodicea. Technodice. Robot Adimendunak. Cyborgs.

Nosotros, los humanos, nos estamos moviendo muy rápido hacia un nuevo mundo en el que el crecimiento exponencial de la tecnología está dominado por la siguiente creencia: si algo puede salir bien, saldrá bien. Además, en este momento caminamos por un angosto camino que tiene la Teodicea a un lado y Tecnodice al otro. ¿Qué papel jugarán la Inteligencia Artificial, la IA, los Robots Inteligentes y los Cyborgs en el futuro?

Palabras Clave: Naturaleza y Evolución Humana. Inteligencia Artificial. Teodicea. Technodice. Robots Inteligentes. Cyborgs.

Nous, les êtres humains, avançons très rapidement vers un nouveau monde dans lequel la croissance exponentielle de la technologie est dominée par la conviction : si quelque chose peut bien se passer, ça ira. De plus, à l'heure actuelle, nous marchons dans d'un chemin étroit qui a la Théodicée d'un côté et le Technodice de l'autre. Quel rôle l'intelligence artificielle, l'IA, les robots intelligents et les cyborgs joueront-ils à l'avenir ?

Mots-Clés : Nature et Evolution Humaine. Intelligence Artificielle. Théodicée. Technodice. Robots Intelligents. Cyborgs.

Artificial Intelligence: From Theodicy to Technodice

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Artificial Intelligence: From Theodicy to Technodice

Introduction

Artificial intelligence or AI simply means software used by computers to mimic aspects of human intelligence. For example, a program that recommends what you should read based on books you've bought or a robot vacuum that has a basic grasp of the world around it. Moreover, the so called machine learning has become extremely powerful. Rather than programmers giving machine learning AIs a definitive list of instructions on how to complete a task, the AIs have to learn how to do the task themselves.

After years of very hard work on the digitalization process in all fields of the human activities, it seems clear that Artificial intelligence, AI, poses a challenge of increasing intensity to natural intelligence. However, the rapid evolution of science and technology around AI contrasts with the slow development of habits and beliefs of both people and organizations. By not doubt the most worrying signs of this gap are clearly noticeable in the social and individual use of technologies derived from the application of AI. After years of AI applications it is remarkable that, very often their uses may be considered irresponsible and violate aspects of social and personal life as, for example, freedom and the right to privacy security. This is the reason why many people around all the world advocate to work hard for the responsible use of all artificial intelligence applications.

Let us now to come back to the title of this article. The word THEODICY was coined by Gottfried Wilhelm Leibniz (1646–1716) (1) to defend the justification of the existence of God and, in addition, sought to reconcile the existence of God with evil in the world.

That is why Leibniz considered that diseases, plagues and enormous tragedies were inevitable facts. In short, according to Leibniz, God created the best possible world because he could not create a perfect world since that would have meant "recreating" himself. From there, he concluded that there are wars, diseases and misfortunes. All this is inevitable and the fault does not belong to God but to Liberty. We may say, therefore, that it is implicit in Theodicy that man's freedom of action goes hand in hand with his total autonomy both from his natural condition and also from his creator. It can also be said that Theodicy is the defense of the goodness of God and his omnipotence given the existence of the devil. Reading carefully the Leibniz's argument for the doctrine of the solution of the problem of evil, it can be summarized as follows (2):

1. God is omnipotent, omniscient, and omnibenevolent;
2. God created the existing world;
3. God could have created a different world or none at all (i.e., there are other possible worlds);
4. Because God is omnipotent and omniscient, he knew which possible world was the best and was able to create it, and, because he is omnibenevolent, he chose to create that world;

5. Therefore, the existing world, the one that God created, is the best of all possible worlds.

At the present time, we humans still do not know how to explain the existence of God, but this lack of knowledge seems to be less painful at the present time than in the past. Now humanity worships several and very different gods and it seems that this new journey illuminated by multiple new technological and financial advances will have no end. In the words of Javier Echeverría, taken from his biography of Leibniz (3), it could be said that at the present time: "The philosophical challenge comparable to the one that Leibniz assumed in his time consists of elaborating a rational Cosmodicea, questioning the hypothesis that there is only one Cosmos and that it is necessary, in addition to encompassing all universes ". As a preliminary step to the introduction of the term Technodice, it is necessary to say that there are currently many people who sense, and have said it loud and clear, that the alliance between the States and the economic power has two consequences: The first one, is the clear atrophy of the democratic advances. The second one, it is obviously observed that there is a transfer of the authentic sovereign reserves into the hands of a fourth non-legitimized power: the one made up of the world of finance and the world of the "cloud" dominated by a few technology companies. Currently there is a clear decline in the "civic values" around the world, mostly, by no doubt, as a result of the attacks of the enemies of liberal democracy (4), but also due to the speed with which the specialization of knowledge is developing. It gives, sometimes, the impression that little by little we are forgetting the motto of the Enlightenment that knowledge liberates us: Science is the best example, and on the contrary we throw ourselves headlong into the chains of a short-term knowledge dominated by technology. We have forgotten that knowing comes before doing.

That is, we may ask ourselves how will arise the belief in Technodice in this new journey of humanity? This question is based on the idea of the existence of a god of technology and that, as in the case of Leibniz's God, it is also related to the evil that exists in the world. But if Leibniz's God created a world in which chaos ruled at the beginning, the technological god ordered, from his governing principle, to use all possible energy to bring more and more ORDER while maintaining, with total priority, the only and authentic freedoms: that of artists, scientists and technologists and that of the financial markets. Based upon this fully liberal idea were born highways, trains, ships and planes, huge cities, health care, the most varied technological devices, our modern communication technologies, the most powerful and destructive weapons and all the advances in Artificial intelligence. This is a clear and nice example of how Technodice and Artificial Intelligence will be overlapped in future times.

The followers of the Technodice recognize that there are several possible futures, but that in reality there is only one desirable, which is the one that arises "from the simulation of reality as a result of the work of AI". Some suspect, and others affirm, that the AI of the future will nullify any possibility that success and good work will be a matter of chance. In other words, the future of AI will change the world for better ...or worse (5).

Considering and rethinking most of the current events and the behavior of the actual great dominators of technology and finance, it seems clear that the staunch defenders of the Technodice are trying to justify the advances of technology with all possible means, without assessing their ethical, moral and social repercussions. This is accompanied, most of the times, with a short-term vision of all the ills that the world is suffering. It could be said that

the Technodice is a clear proof of the new and great empowerment of man and that it can be summed up by saying that: The combination of the work of the so called “digital engineers or digital bricklayers” and their “Cloud bosses” together with the financial network controlling the enormous social impact on a planetary scale, are those claiming to make the entire world a better place (does it correspond to the Cosmodicea proposed by Javier Echeverría?). Even more, they also claim that in order to defend the Technodice we, all, must try to present the evils that derive from the possible abuse of finances and technologies as a painful but necessary reality. This clearly will help, as they comment, to give meaning and full clarification to the efforts made by humanity to go a little further each time.

Although it is true that technology and AI have not yet been capable of finding, for example, new principles or physical laws on its own, we can say that we are in a time in which most of what we know has been given to us by both AI and technology and far exceeds what we have provided to technology: the overlap between science and technology is clearly asymmetrical: doing and knowing remain united, but the surplus value of technological advances seems, at times, to overshadow scientific knowledge (6).

Let us clarify this last point. History clearly shows that scientific and technological advances have always been used to improve the living conditions of humans: better health and longer life, for example. But in turn, it has always been the case that these technological advances have also contributed to knowing how to kill better and there have been recent moments in which the survival of the entire planet has even been put at risk. In other words, wars have always used scientific and technological advances for the survival of the most powerful, and technology has almost always been queen.

We have a good example of what we have just commented: the immense scientific and technological advance that led to the discovery of the atom with its electrons and nucleus until reaching the control of nuclear fission and the explosion of the first nuclear bomb. In a record short period of few years, we did move from the explanation of existence of atoms to induce a deflagration of new technological ideas and advances which allowed rapidly to generate immense amounts of energy through the fission of the nuclei of heavy atoms and, later, the fusion of light nuclei. In fact, the appearance of the greatest scientific revolution in history associated with Quantum Mechanics and the Manhattan project gather the essence of the Science-Technology binomial. So a good question might be, was the Hiroshima bombing a necessary evil? Technodiceans are clear on this point, there was no original sin of Hiroshima. On the contrary, it should rather be said that the nuclear bomb prevented a fourth world war between the two blocs that would have annihilated humanity. It has been calculated that without the use of nuclear bombs and with the sole use of the weapons of the time some 700 million people would have died. In Hiroshima only 130,000 people died.

Another example of the inherent technological character that occurs in all the great modern scientific advances may be clearly detected in the race that was established to decipher the human genome: the knowledge of the exact order of the chemical letters that constitute the human genes. This historical milestone, which is unparalleled, is due to the work of a company, which from the outset, with the corresponding patents obtained, makes it impossible for all countries to make use of the knowledge with the consequent ethical problems that derive from the commodification of said discovery. But also today we have the example of covid-19 vaccines. The discovery of these vaccines has come from the hand of

large technology companies and we have been astonished at the duel between the States and the Technological/Financial power. Once again, in the time we are living in, the supporters of the Technodice, even without taking into account the power of the masters of the CLOUD and of the applications of AI, seem no longer to have the slightest doubt of the existence of the technological god.

Discussion

Let us start this section by taking a new step forward in the reflection of the problems that affect all of us. The first point to consider could be to present technology as the synthesis of the new faith in the advancement of humanity and in the new capitalism that represents the accumulation of power economically in a few private or state-owned hands and with the power and freedom to do and undo as they please. In fact, what are all those skirmishes of a warlike nature between the great economies of the world to perpetuate themselves in its domain? Where does the power reside? Isn't the AI alliance with the Technodice behind everything even though such alliance deserves many and varied interpretations? For example, humanity has long been faced with trying to solve the energy problem and AI should help us solve this problem without attacking human singularity or attempting to violate nature beyond what is ethically and morally permissible. Another example, the staunch supporters of the AI-Technodicea alliance seem to want to lead us, sometimes, to a "relative naturalization" of what until very recently we considered a forbidden scenario by the ethical and moral values that come from both Theodicy and Illustration. For this reason, since these beginnings of change we must be attentive to the expansion of the belief that everything should only be analyzed through algorithms based on numerical information.

Consequently we should demand that AI be developed in a controlled manner both at the legal level as in the social and moral. An example, overcoming death through technique. If achieved, man himself would become God. This is where future advances in AI come into play again.

This last point is of vital importance and it is very much discussed in the scientific/technological worlds dedicated to health and new therapies. The case is that there are already techniques that are trying to overcome the death with the help of AI and if they succeed. Some will shout that man will take the place of God: "Why else was he created in the image and likeness of God? Why else was it endowed with the freedom to evolve with the only restrictions on its development than those derived from the principles and natural laws with the four forces (gravitation, electromagnetic, strong and weak) at the bow of the ship of the changes? Was it not nature itself that taught and even forced man and all animal species to consume as much energy as possible to move forward in their evolution towards complexity? And what about this new life that is coming from the combination of artificial intelligence and robotics? Isn't man doing with robots and cyborgs what the God of the creationists did with him? Are we doomed to salute the humanization of technology? What will become of our human uniqueness? It is not unreasonable to think, we will discuss it later, that AI could surpass the ability to act as its own creator and that man and machine merge in an embrace. These are the positions of transhumanism and posthumanism that clearly transcend our species and "deny" human singularity. Behind these ideas they hide behind an

optimism that is very typical of the times we live in and based on the EVERYTHING WILL BE WELL that some have already transformed into, **it has to go well!** (7,8).

Let us now go little by little into the ins and outs of the AI. To begin with, we should say that the much talked about digital revolution is at the foundation of the tremendous changes that are taking place on a planetary scale in the economic world, labor relations and public and private institutions. This digitization of "almost everything" is accompanied by great benefits and new questions regarding ethical and legal issues. In fact, the first problems have already appeared in the way changes are produced and several questions should be answered, as for example: should we forget, as some suggest, the direction of the arrow of change followed until now that marks "up/down" and learn to make decisions fully autonomous with the help of AI? To what extent can our dignity, human uniqueness and democracy itself be redefined in the future? (9,10)

So let's start by clarifying, one more time, what Artificial Intelligence is (11). If you browse the internet, you see that AI is identified with the existence of intelligent machines that are capable of performing a wide variety of jobs and functions without the need for human intervention. AI tries to operate like the human brain so it is capable of reasoning, learning and problem solving. That is why AI has fully entered our day-to-day life and so, for example, with its help: a) we make purchases online, b) it chooses the music and movies that we are most likely to like for having previously known how to prepare, with the help of algorithms, a profile of our preferences, c) it is present in numerous digital mobile phone applications that are our best assistants, d) it allows us to have conversations in different languages without having to change ours, f) our homes and cities (mobility, lighting, security...) are governed by controls that fall on their backs, g) it allows us to defend ourselves from "fake news" while at the same time contributing to creating them, h) it has fully entered all sectors of the production of goods and has become the queen in many sectors, among which health stands out, and i) it is sure that it will allow solving problems derived from climate change and the use of new energy sources. Would improve the energy mix. In short, today there is already talk of intelligent energy consumption, intelligent mobility, intelligent quality control, intelligent well-being, intelligent health surveillance and even the intelligent search for love, dying well and the intelligent transmission of genes to life at the procreation time (12).

So it is clear that AI already poses a great challenge to human intelligence. With AI, it is happening as with everything that comes from the Science/Technology duet: advances in its applications at an accelerated pace and clearly much faster than it comes from the world of beliefs and "values". Think about what is happening in our current use of AI derived technologies in our social and social worlds, freedom, the right to privacy and even the guarantee of physical security. At this time when AI still cannot solve these problems, humans must continue to establish the ethical and legal framework that regulates all our activities, including our relationships with AI.

An issue that will appear, sooner rather than later, and is of vital importance, is the temptation that refers to the homologation of humans with intelligent machines (13). If some already propose a certain homologation between the human species and the animal species, it is logical to think of the one that is upon us with intelligent machines capable of speaking and the generation of abstract thoughts that, in addition, link "good and progress" . In other words, if we are already fully involved in the situation of defending human singularity at all

costs, we should also start thinking about establishing a clear border and clear limits between human intelligence and artificial intelligence. We must make it very clear that in this evolution that AI proposes, not everything should be allowed. For this reason, if in the fruit of AI we can still recognize the human stamp, we should not give up leading and championing our future in it, no matter how much the powerful robots and intelligent machines, which are already here and will come, are capable of, for example, seeing the entire electromagnetic spectrum and hearing sounds that are non-existent for humans.

Let's continue with some AI achievements with another example. The AI that emerged from biometric recognition work is already more powerful than us when it comes to recognizing people, which is associated with its immense memory (14). This enormous advance allows people to return control of their identity. At the opposite pole we have people with Alzheimer's who are unable to recognize themselves. For these people, neither the self nor identity exists and yet, with few exceptions, no one denies them the right to be people. We could well then confront AI with Alzheimer's as the two new existing poles. Let's see, humans, in addition to memory, have intelligence and imagination and many times we do not know what is the most important thing. In the words of Einstein, "Imagination is more important than knowledge". Knowledge is limited and imagination surrounds the world. But it is clear that neither intelligence nor imagination are of much use to us if we are not capable of memorizing and remembering. In fact, the awareness of our being as thinking beings with duties and obligations is based on the ability to store data in our memory, which is derived from the establishment of neural connections. Hence, we can ask ourselves, is an intelligent machine trained to recognize and be aware of its being, closer to being of reason than an Alzheimer's patient? (15).

We have reached the key point of the answer to the question of the previous point by asking ourselves a new question. Can you really give consciousness to a machine? (16). The works on what consciousness is cover different areas of neuroscience and the neuro-psychobiological mechanisms that are in the background of consciousness. We must be clear that our brain is responsible both for conscious perceptions and for the information it produces without being conscious, and for this, scientists are trying to gain insight into the activity of the associative areas of the brain, which is a real scientific and technological challenge (17).

Consciousness understood as self-knowledge can be applied both to beings of reason and to other animal species: we must know how to be attentive, vigilant, remember and know everything that happens in our environment. In fact, the difference between human and animal consciousness lies more in quantity than in quality, since it is totally determined by the memory stored in the brain. That is why many people think that we could well make the great leap to the self-aware machine in the future (18). Possibly at the present time we still do not have images of the brain and neural connections with sufficient resolution to later apply all the knowledge generated to provide AI with consciousness. But if that day comes with enough huge technological advances, would we know for sure if our intelligent machine is self-aware? This case is curious because we would have three realities, the first is that of the man with full awareness of his ego and decision-making, that of the dog, for example, with the awareness of being the one who takes care of his master and house, which subordinates his behavior, and that of the machine with AI that would behave as if it had consciousness in its daily work but that we would not know how to test it. The man and the

dog are aware of things and also of what happens in their environment. The difference between the consciousness of both is a matter of quantity, our brain is capable of establishing billions more neural connections by having a larger brain, which allows us to think, reason and behave in different ways. This clearly shows us the path that we must follow to endow intelligent machines with consciousness: they must be able to think based on extreme knowledge and plurality of equivalent artificial neural connections that are made up of different nodes that transmit, such as neurons, signals and information between them.

Let us go now a little bit deeper in the understanding of the concept and uses of “neural network”. It is a large web of connections, inspired by the way neurons connect in the brain. The key idea is that inputs work their way through the network, guided by the strength of the connections, to find the most appropriate output. Neural networks have been used since 1950s, but only very recently have they started to have much success. This is mostly due to the huge rise in both the amount of available data we produce and the amount of computer power we have in hands. The case is that AIs require, as best, thousands to millions of examples to learn how to do something. But now millions of videos, audio clips, articles, photos and more are uploaded to the internet every minute making it much easier to get hold of suitable data sets. However, neural networks can’t do everything. For example, a neural network trained to do one thing is useless at doing something else. One of the most important aim now is to create, as soon as possible, AIs with a broader range of abilities, known as artificial general intelligence (AGI), which is expected to be so smart that may perform any task that the human brain can, even surpassing human intelligence. These superintelligences could have motivations of their own, their decisions will also be opaque and it will be very difficult to understand how networks come to conclusions: if they make a mistake it will be very difficult to find out why they made such mistake.

To complicate even more this scenario, now scientist are talking about a new type of artificial Intelligence. Very recently may people have been intensively working in one of the most fascinating and intriguing new field appearing when looking at the current research in the intersection between quantum physics and computer science: the so called Quantum Artificial Intelligence, QAI. The so called quantum memristor may be the missing link between artificial intelligence and quantum computing to create the AQI. Let us explain in two words what a memristor is. This is a device that changes its resistance depending on a memory of the past current, hence the name memory-resistor, or memristor. Immediately after its discovery, scientists realized that the peculiar behavior of memristors was surprisingly similar to that of neural synapses. The memristor has thus become a fundamental building block of neuromorphic architectures (19).

Let us now analyze the case of the so-called social robots that act autonomously and interact with humans at a social level. In fact, these robots are capable of making decisions, learning, recognizing their interlocutor and having a conversation with them and expressing their “personality” with their gestures and facial changes. If we continue with these advances in AI, the day will come when the issue to be debated will be whether the very system of values and laws that we have prohibit us from the right to instrumentalize and/or destroy social robots. If these extremes are reached, we would be facing a scenario in which the being of reason, we, would occupy the same chair as one of its products, AI. In other words, man would be equated, for the first time, to one of his achievements, which would also mean accepting, in one way or another, that subjectivity can also arise from matter itself. For the Theodicy, all

this would be equivalent to equating Leibniz's God with men, which would be totally rejectable and, on the contrary, the Technodice would see its path paved towards its total recognition with the implicit recognition that subjectivity can arise from one's own matter. The conclusion of all this is easy to state: Artificial Intelligence would acquire the surplus value of its humanization (20). Moreover, given that the development of AI will be very fast, it is to be expected that in the not too distant future, robots, in addition to operating like humans, will coexist with us and will also take care of us. In evolutionary terms we can say that the future self-driving electric cars will be like the dinosaurs of the robots that will "coexist" among us. It is very possible that in the next 200 years robots will completely replace us as a workforce.

Going even further, we may say that in the future, with the aid of AI, we will have robots with the capacity of encoding information, self-replicating and if they are well educated they will also work to have more order using, as humans are doing, the possible maximum free energy coming from, for example, solar or nuclear fusion energy. By the way, they may also avoid the death, as they may reconstruct themselves by looking at the ageing of materials. If this is a new type life, why not to say that it is also intelligent and may also have conscience? Even these AI Robots will have the capacity to discover new physical principles and considering their self-evolution, with and without the help of humans, they will be well established between us.

That is, may we say that both life and conscience are appearing from matter and that this matter is not made of the same atoms and molecules giving rise to human life after a very long and complex evolutionary process? If this were the case, we may say, therefore, that in this futuristic new scenario we will also have a new conscience life species in our world.

But, let's ask ourselves the big question again, can we talk about robotic life in the same terms as human life? Until now, man has been obsessed with the question of knowing if he is the only living being that inhabits the Universe. Hence, space missions and telescopes search hard for the existence of signal molecules of the existence of molecules associated with the biochemistry that governs our life, so extensive due to the existence of its species, and so complex, due to its intelligence as a result of evolution. . Therefore, it is necessary that we agree on what life is. In Science, the idea is that for there to be life, three requirements must be met: 1) the ability to encode information, 2) that the transmission of information occurs faster than the disintegration of the species and 3) the urgent need to have free energy to be able to create order out of disorder. Thus, if robots in the future accomplish these three requirements, robots will be considered alive.

If we just look at the most immediate present/future hybrid, that of the coming decades, it will be considered as one the most extraordinary success of the use of AI? To answer this question we can focus our attention on a case of great impact: the use of technology and AI in the field of health in the event that we must overcome the inability to communicate due to being affected by paralysis. This can already be achieved by analyzing brain waves and converting them into a written text. To achieve such a technological advance, what is known as a "neuronal prosthesis" can already be used, capable of capturing and analyzing the brain waves that are generated in the areas of the brain associated with the speech process: this will be a big step towards the cyborg and indicates the acceleration that always occurs in the technological world.

These enormous and fast technological advances may be a clear indication that it is not unreasonable to say that humans are just a short (on the geological timescale) stage of evolution from animals to intelligent robots. Robots are the next species that will dominate the universe. They will possess a greater intelligence and greater durability, making exploration of the universe easier. We may also think in a new scenario, very far from now, in which Robots assisted with AI will not co-exist with humans as we co-exist with apes. Rather humans will be evolving into cyborgs (19), with all human organs eventually replaced by technology. Once started, that evolution will accelerate very fast consuming more and more energy.

More to conclude: AI will be the dominant and most important player in the future of humans. Let us explain why: As humans travelled across the oceans in search for new places to live, it is almost inevitable that they will travel through space to other planets and establish new colonies in distant worlds. In fact this will ensure the long-term survival of the human civilization vulnerable to epidemics, volcano eruptions, collision with an asteroid, etc. Even if everything goes well, in one billion years the Earth will become unfit for life due to the sun transforming into a red giant and vaporizing oceans on Earth. Human civilization spread in the Universe would survive any unfortunate local events. Such travel, however, as well as establishing new colonies, will require enormous energy compared to our current energy needs. Nuclear fusion would be the only energy source that one can think about. In this scenario one can envision human evolution as the indivisible part of the evolution of the Universe. In one billion years all parts of visible Universe will be populated by humans and will shine due to energy used by humans the way our cities shine at night when observed from artificial satellites.

Is it possible to think in such futuristic scenario neglecting the enormous help of AI and its very fast evolution? Another crucial and important point to think about is that maybe all above mentioned it is already happening somewhere in the distant corners of the Universe due to other civilizations similar to ours.

Conclusions

In this paper I have tried to review different applications of AI and argued for its increasingly important relevance. In strategizing for the future exchange between the ideas and beliefs belonging to Theodicy and Technodice, it is important to take into account the enormous influence of AI in our daily lives and works which, however, until now have rarely involved a simple transfer of full-fledged solutions. Rather, it may be said that the AI advances have typically been useful, in a subtler way, stimulating algorithmic-level questions and solutions about facets of humans and animal learning. It is also very remarkable that AI is providing initial leads toward fully solutions of the most relevant mechanisms involved in a huge number of many different technological applications. Those people embracing transhumanisms ideas and Technodice beliefs, are fully convinced that AI will ultimately also lead to a better understanding of our own minds and thought processes. It is, therefore, very possible that the majority scientific and technological efforts in the immediate future will focus on understanding, through algorithmic constructions, the deepest mysteries of the

human mind, such as: the nature of creativity, the dreams and even, taking a step of giant, the own awareness of people.

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