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MINIREVIEW

MIND UPLOADING: CURRENT APPROACHES AND PHILOSOPHICAL INCONSISTENCIES

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Abstract

Mind uploading is one of the most ambitious scientific endeavors in the history of mankind. Its main purpose is the encoding and replication of human thought through technological means, to perpetuate it alongside consciousness and to ultimately immortalize the human being. This procedure requires exponential technological growth, but it also requires a philosophical appraisal of whether it is really feasible. The current paper discusses concurrent progress and theories regarding the exploration of the brain and mind uploading. Most importantly, it addresses the foundational questions, which, even though they have been mostly overlooked, are essential to be investigated, if scientific efforts are to rely on a consistent theoretical background. These fundamental questions are investigated under the lens of critical philosophy. The opinions of the philosopher Immanuel Kant (1724-1904) regarding science are especially mentioned, as articulated in his thesis "Critique of pure reason", since Kant declared

Résumé

Téléchargement de l'esprit: approches actuelles et incohérences philosophiques

Le téléchargement de l'esprit constitue l'une des initiatives scientifiques les plus ambitieuses de l'histoire de l'humanité. Son objectif principal est l'encodage et la reproduction de la pensée humaine par des moyens technologiques, afin de perpétuer la pensée, la conscience et, ultimement, d'immortaliser l'être humain. Cette procédure exige non seulement une évolution technologique exponentielle, mais également une évaluation philosophique quant à sa réelle faisabilité. La présente étude examine les progrès actuels et les théories contemporaines concernant l'exploration du cerveau et le transfert de l'esprit. Elle aborde surtout les questions fondamentales qui, bien que souvent négligées, doivent impérativement être étudiées si les efforts scientifiques veulent s'appuyer sur un cadre théorique cohérent.

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with the most well-supported way the limits of scientific knowledge.

Keywords: mind uploading, consciousness, critical philosophy, whole brain emulation, artificial intelligence.

Ces interrogations fondamentales sont analysées à la lumière de la philosophie critique. Les positions du philosophe Immanuel Kant (1724–1804) sur la science sont particulièrement prises en considération, telles qu'elles sont formulées dans son œuvre *Critique de la raison pure*, puisque Kant a défini de manière rigoureuse les limites de la connaissance scientifique.

Mots-clés: téléchargement de l'esprit, conscience, philosophie critique, émulation du cerveau entier, intelligence artificielle.

Introduction

Nowadays, science has managed to depict neurons and dive into the world of the brain; it seems like the human being approaches the transfer of his mind and thought into the computer, the so-called *mind uploading*. This achievement constitutes an integral part of *transhumanism*, the scientific movement that aims at the human "upgrade" through technology. The newer pharmacology, genetics and medicine in general will enhance the biological organism, while mind uploading will achieve the perpetuation of thought[1]. However, this procedure, although it is a hope of many, scientists or not, poses a series of technical (and ethical) questions that are to be answered, to clarify whether the aim is actually possible. The current article analyzes some technical topics regarding mind uploading and delves deeper in the philosophical thought regarding the mind. Philosophy could not be absent from this endeavor, since the perpetuation of thought reaches the field of metaphysics. Therefore, certain, mostly overlooked, aspects are investigated and questions are raised where previously assumptions and arbitrary conclusions prevailed. The viewpoint of the German philosopher Immanuel Kant (1724-1804) is also mentioned, since he was the one who first critically addressed the limits of science in his work "Critique of pure reason".

Definitions

Thanks to the theory of whole brain emulation, the human effort to map all brain's neurons and neuronic synapses, the theory of mind uploading arose. Mind uploading is the theory that investigates the complete encoding of human thought in order to be preserved and functionally perpetuated inside a technological means[2]. This theory claims that via the complete knowledge of biochemistry, exact molecular structure and neuronal dynamics, the "capture" of human thought is possible. It would be subsequently transferred unspoiled into a technical environment where it would continue to "live" even after the biological organism has been destroyed. The foundational concept of this viewpoint is, therefore, that thought is precisely expressed by biology and is nothing other than the biochemistry, the structure and movement of particles and neuronal signals of the brain neurons.

Current achievements

The "Human Brain Project" was a large scientific project of the European Union, that took place between 2013 and 2023, to investigate and provide new knowledge regarding the brain. Its new findings aided the development of new therapeutic methods regarding brain diseases and new computing technologies that resemble the brain function to be used as experimental substrate[3]. "Neuralink's" scientific outcomes regarding brain-computer interfaces are also noteworthy. For example, researchers have successfully enabled a paralyzed patient to control a computer cursor using a microchip implanted in their brain[4]. Furthermore, technological means have been developed that allow the replication of speech via the analysis of brain function[5]. All these true scientific achievements motivate the further examination of human brain and mind uploading[6].

Basic theories

Numerous theories have been proposed concerning mind uploading. Some researchers support that the neurons' function, hence the capability of thinking, depends completely upon the natural neuronic substrate. They compare this function to photosynthesis, arguing that even if it was technically replicable, glucose would not be produced, as the substrate would differ from the natural one-the photosynthetic cell[7]. Nevertheless, consciousness is the most important topic of debate, since the encoding of thought alone does not constitute human's rescue if not including personal consciousness. Therefore,

corresponding theories like "destructive" or "non-destructive" mind uploading are discussed, which investigate what would presumably happen to consciousness after the mind was uploaded. Specifically, they focus on whether the personality would still exist or whether it would have been destroyed during the transfer. "Gradual uploading" is another view that suggests that the gradual uploading of consciousness would lead to its successful perpetuation, because it would not have been completely lost at any point[8]. Another interesting theory proposes that the gradual exchange of the physical parts of the brain with technological ones, would have subsequently developed a new artificial brain which would encompass thought and consciousness, absolutely resembling the initial natural one[9]. The scanning of the brain is always mandatory, so that the neural synapses have been mapped, as well as their duplication in computers (neural networks) with enormous computing power, to be able to conduct the brain's complex cognitive functions.

Philosophical approach

The theories suggested regarding mind uploading mainly investigate the technical aspects, even though they have not primarily examined the theoretical questions that may constitute the process unachievable. It should be first clarified that the principal point of the endeavor is not the encoding of a scattered thought, a series of words or molecules, rather than the capability to think. This underlying capability is the one that generates thought; thus, it is the one responsible for its function and reproduction and not the other way around[10]. Without it, the encoding of any neural biological signal would only constitute a separate finding, unable to reproduce the function and claim the role that humans desire. Any apparatus that does not include its way of function cannot produce the desired outcome. Therefore, one separate or many separate thoughts do not by themselves guarantee the continuation of the process of thought artificially.

A fundamental inadequacy of the effort of mind uploading is the presupposition that thought actually dwells in a specific structure and that this structure is the human brain, its neurons specifically. However, this view is a *petitio principii*, since the human being initially developed the idea of thought without possessing physical evidence that supported its existence. In other words, someone who would not have experienced what thought is, as we humans have ourselves, they would not be able to conclude its existence merely by observing the neuronic signals. They would not be able to generate the concept of thought, since it is something with different quality, different essence than pure matter[11]. This is also the case with everything intangible like emotions and fantasy. If we did not presume that thought really existed, if we had not made this hypothetical assumption, we would not be able to conclude to its existence merely by scientific facts. Hence, thought's existence logically precedes its pursuit in the brain. Its investigation inside the neural signals derives from its presupposed existence and not the contrary. This common mistake probably originates by the use of the word "existence" itself, since it sometimes refers to material entities and sometimes immaterial ones. Thus, even though many would argue that thought has a material existence, it does not exist when referring to "existence" scientifically.

Furthermore, to proceed with the examination of the substantial aims of mind uploading, the scientific desire is to immortalize consciousness, a personality that will continue to live, not merely thought. This is the ultimate objective of the project. However, it requires that personality, consciousness, exists within thought, when the reverse is probably the case. Thought, a process with coherence and continuity, should take shape around a stable point without which it would not be able to be logically articulated. This stable point should exist outside thought, because, if it was not, it would be equally varied as thought itself, therefore no experience of personal continuity would be possible. Thus, this stable point, consciousness, lies beyond thought, so any attempt to describe thought does not equal the encoding of consciousness.

To delve deeper into ontology, if we initially accept that something exists as an autonomous entity and give it a distinct place in the world, the human being hereto, it is not possible to investigate it deconstructively, as a mere summation of partial components[12]. That is because we violate our first assumption, that the entity exists distinctively from its surrounding material world. When we are likewise discussing the mind (the capability to think) it is contradictory to examine its qualitatively different existence in the shapeless mass of the material world. To characterize something as "human" or "thought" implies that it exceeds the amorphous matter, by definition differs qualitatively from it, it manifests union, it plates matter with coherence of thought. This characterization constitutes empirical presupposition, not a scientific finding. A reductive scientific study would necessarily reject the morphological function of the human mind, which generated the initial characterization. It would fragment the research object, it would therefore fragmentate the unity that it has been empirically given. The connective material that links the individual to entirety is lost, a material that, as will be shown later, mostly belongs to the observer himself.

Another approach dictates that the functional mechanism that generates thought preexists thought ontologically, it is its source of origin. Therefore, as it preexists as an entity, the mechanism itself does not contain thought, it only produces it. The mechanism that produces thought cannot contain thought itself, because it then would not be that kind of mechanism. For example, although a flashlight has the capability of producing light, it does not have light itself inside it. However, if science tried to approach the thought's producing mechanism, it would not be able to do it unless it used directly or indirectly thought. It would attempt to enter via thought somewhere, where thought a priori does not exist. Thought as subjective experience has the ability to explore its inner or outer environment, without being able to discover its ontological roots, since they belong to a qualitatively prior level.

In addition, thought is the one that forms the way we conceive reality. Therefore, it constitutes the subject that can never become an object[13]. Thought is a strictly personal experience which everyone can only confirm for themselves. For the personal thought to become an object of observation, one would have to use their own thought to approach it, therefore they would not be able to avoid the use of thought's filter. Even when studying another's thought, the observer would still have to use his. The use of one's thought to approach anything, even another's thought, always requires personal thought, so the fact of personal thought is not able to be addressed as an object.

Kant's contribution

If we were to presume what Kant's opinion would be regarding the topic of the study, he would, based on his work "Critique of pure reason", probably suggest that any attempt to fully conceive thought is impossible. Kant stands as perhaps the most significant philosopher to rigorously examine where science reaches its limits, a conversation that traces back as far as Plato's (427-347 BC) "Theaetetus". Thinking, thought itself, is an in principle immaterial entity. The theory that asserts that it is material and exists inside the brain constitutes a *petitio principii*, it is therefore arbitrary as a scientific thesis. According to Kant, whatever we conceive as a world is not but phenomena (as first proposed by George Berkeley, 1685-1753) produced by the interwove of our mental capabilities and the *thing itself* (*Ding an sich*). We approach these phenomena scientifically through the *categories*, the conditions of thought, our forms of thinking. This terminology originates from Aristotle (384-322 BC), according to whom the categories have an objective meaning, while for Kant a subjective. The categories are the a priori way we acquire experience formatting the material of our senses[14]. An important category is for example "cause and effect".

However, the categories should only be used for material entities that we can conceive via our senses, since they themselves are a product of investigation of the sensible world. Thus, thought, as immaterial, is not approached by our senses, it cannot be addressed via the categories, it cannot be scientifically addressed. However, one of the most noticeable categories is "existence" and, as every category, only adheres to material objects. Since thought is immaterial, it cannot claim the category of existence, we cannot scientifically conclude that it exists. It is evident that the basic principle of the theory of mind uploading is established upon that arbitrary view that thought exists materially. Kant would argue that thought, like any immaterial entity, like fantasy or love, cannot claim the characteristic, the category of existence, since the use of the categories is valid only when used for the world of senses[15]. The Greek philosopher Ioannis Theodorakopoulos (1900-1981) wrote that, according to Kant, "thought with its "empty" categories, with its empty logic and cognitive ways is not possible for itself to become object and content of its knowledge" [16].

Plausible future progress

After a possible mind uploading that would be characterized as successful, we would not be able to prove that thought or consciousness really exists in the artificially produced brain, as we are not able to prove it even between people. The fact that we accept that every human being possesses thought and consciousness is a matter of belief, since thought and consciousness constitute a personal reality, they cannot therefore be proved scientifically. In the future, regardless of the AI systems created, even if they seem to approach the human way of existence, they will never possess the human essence, because it is unutterable, it cannot be scientifically encoded, it lies outside of scientific reach and scientific means. Every possible way of thinking that would closely resemble the human one would not be more than a product of science, artificial algorithms and not real existence, by any means not a genuine human being.

Conclusions

Mind uploading constitutes a fascinating endeavor of human science to understand and recreate human thought. Furthermore, its main aim is not the encoding of a mere thought by itself, rather than the ability to think and the consciousness. However, none constitutes a material entity that can be localized in the brain and that is a common misunderstanding

that probably renders the whole attempt impossible. Even if an entity that closely mirrors human beings were to be created in both external appearance and internal structure –assuming such a creation does not already exist- would it truly embody anything authentically humane, or would it remain a being devoid of the essential qualities that define humanity?

Author Contributions:

M.P. conceived the original draft preparation. M.P., A.P. were responsible for conception and design of the review. M.P., I.N., A.P., and were responsible for the data acquisition. M.P., I.N., A.P., C.C.D., M.K. were responsible for the collection and assembly of the articles/published data, and their inclusion and interpretation in this review. All authors contributed to the critical revision of the manuscript for valuable intellectual content. All authors have read and agreed with the final version of the manuscript.

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