# The coherent emergentist concept of machines; or why the popular concept of artificial intelligence is a materialist anthropomorphism

The concept of artificial intelligence is very popular in both science and culture today. Similarly, the concept of emergence has become quite popular during the last decades in the sciences. For example, it is commonplace in the case of machines to speak of an overall blueprint and several different material components; thus, we can regard the blueprint as a kind of comprehensive emergent additive. However, is it true then that the machine, due to this plus component, is not material? Practically nobody wants to acknowledge that. Still, in practice, there are no machines without added blueprints. In my paper, based on Samuel Alexander's original concept of emergence, I will investigate these problems and contradictions, which stem from the materialist interpretation of the concept, and I will present a coherent emergentist concept of machines, according to which machines are clearly a unique kind between simple material things and living beings.

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## 1. Preface: Machines and emergence

The concept of artificial intelligence, referring to a unique feature of computers, is very popular in both science and culture today, especially thanks to the rapid rise and fame of ChatGPT. The hopes and fears associated with it are beyond all imagination.

The concept of emergence is not so famous, but in the scientific world, because of its practical usefulness, it has also become quite popular during the last decades. Countless papers and authors speak about some kind of emergence and try to deal with the problems that arise from it. Similarly, the notion of emergence can be found in almost every field of science, from informatics via biology to physics, to describe some strange, complex features of nature—or machines.

But what is a so-called emergent feature, because of which we sometimes use this concept to grasp the point of certain entities? For example, it is quite commonplace in the case of machines to speak of a *blueprint* and several different *material parts*; thus, we can regard the blueprint as a kind of comprehensive *emergent additive* to create the *specific structure* of the machine. Similarly, which is the same problem just at a higher level, it is quite commonplace in the case of certain machines, usually called computers, to speak of *software* and *hardware*. Hardware is a complex system of simpler machines which are the *material body* or, more exactly, the material components of the computer, and thus we can regard software as a kind of comprehensive *emergent additive* needed for this material body to function.

However, is it true then that the machine or the computer, due to this plus component, is not material? Practically nobody wants to acknowledge that. But, *in practice*, it is clear that there are no machines without added blueprints and comprehensive structure, and there are no computers without added software which guides them as a navigator guides a ship by his senses and experience.

So, what is the problem, what is the reason for this huge conceptual difference between *theory* and *practice*? In my paper, based on Samuel Alexander's original concept of emergence, I will investigate these problems and contradictions, and I will argue that these problems stem from the materialist interpretation of the concept. We use it because it is really practical and helpful; however, we use it not in its original meaning but *in a materialist theoretical framework*.

Contrary to this, I will present a coherent emergentist concept of machines and emphasize some of the consequences. According to this genuine emergentist approach, machines are really a unique kind between simple material things like rocks and living beings like us; they are not just incapable piles of physical quarks but neither are they brilliant intellects of (living) bodiless minds. Regarding the concept of artificial intelligence, it means that computers are really capable of manipulating data, way, way better and faster than us; this is their knowledge, but still, they are not intelligent at all; this is our profound knowledge, to regard them as such is only a kind of modern materialist anthropomorphism.

## 2. The problem between theory and practice

We have seen that, for example, in the case of computers we can speak of software and hardware, and we can regard software as a kind of emergent additive to the more clearly material hardware, but then the question arises as to whether the computer, due to this plus component, is not material? So, what is the problem, what is the reason we see a huge conceptual difference between *theory* and *practice*?

This contradiction stems from the different tacit meanings of the term "material." First of all, in practice, based on an old Aristotelian tradition, we usually regard *every kind* of component or part as material which causes some confusion. For example, in the case of computers, we have just spoken about the software as a kind of emergent additive and about the hardware as the *material components* of the machine. However, in the case of simpler machines, where there is only hardware, we regard *this* level as the comprehensive emergent additive compared to the further material parts. So, in one case, the blueprint and the hardware are the *higher-level* comprehensive emergent entity, but in another they are simply part of the *lower-level* material one.

However, in a sense, this is a proper understanding of the phenomenon because it just shows that, contrary to our explicit idea, tacitly, we are already using the emergentist approach—which, by the way, is a neo-Aristotelian one. But, then, what is the real problem?

The main problem is that in our concept we still always define the term "material" *in contrast to* the Cartesian concept of mind or, in a wider, more cultural approach, to the Christian concept of soul, and we do not care about machines and computers and blueprints and software. And in this theoretical sense, since it is obviously not a Cartesian mind, the blueprint is, of course, rather material. But consequently, and this is the point, we will lose *the clear meaning of the difference* between the blueprint and the material components, between the software and the hardware, we otherwise see in practice. For a coherent emergentist concept of machines, to solve this contradiction between theory and practice, we have to define both the meaning of the comprehensive additive and the meaning of the material components *on genuine* emergentist grounds.

So, what is the genuine meaning of emergence? And where is the place of machines in this genuine understanding? To understand this, we first have to reflect on how the materialist reinterpretation of the concept works in science and philosophy today; otherwise, we will not be able to see the original meaning.

## 3. The concept of emergence: The evolution of the materialist understanding

The usual and unfortunately superficial approach to emergentism in science and philosophy today is that it is *half dualism* and *half materialism*. Let's explore these terms further.

1) Dualism—which is the ontology of our traditional Christian belief—claims that there are *two substances*, *mind* and *matter*—or, traditionally, soul and body—and, at the end, *everything* in the universe is composed of these *two*. This means that mind and matter can be separated, and the mind is regarded as the more important of the two because it is, of course, the "image" of the ultimate mental substance, that is, God. This is, of course, an *anthropomorphic* understanding of what reality really is, since it is based on the assumption that mind is an extraordinary entity over and above nature. For example, there is something in someone's body which can be downloaded and, then, uploaded into a different body, and he/she will still live happily afterwards without his/her original body. Although, in theory, science is materialist and has left behind these old "mystic" and "obscure" concepts of the "dark ages," many artificial intelligence specialists still wonder about these ideas. We, unfortunately, are not coherent and tend to be anthropomorphic.

2) Materialism, on the other hand, claims that there is only *one substance*, *matter*, and *everything* is composed of only this *one* material substance. However, we have already seen that what matter does mean is a really hard question. Is it wave? Particle? Quantum? Fields? Quantum fields? Strings? Dark matter? Dark energy? Molecules? Or just body? In one case, the hardware is a plus additive to the material components; in another, it is the system of material components itself.

In a positive sense, *there is no definite answer* to the question in the sciences. We do not know what these things really are, or, at the end, what matter really is; just think about the famous dark matter and dark energy that allegedly make up 95 percent of the universe. And, as we have seen, the different special sciences like engineering or sociology regard and treat very different things as matter in practice; for example, the quarks of physics, the DNA sequences of genetics, the respiratory systems of biology, the means of production of economics, the hardware of informatics, the environmental conditions of sociology, etc., have, in fact, very different qualities and are treated quite differently in their respective scientific fields.

Similarly, historically, the different so-called materialist scientists and philosophers claimed very different things about the nature of matter and the nature of the whole universe. For example, the ancient Greek atomists like Democritus and Epicurus are regarded as materialists because of their atomist physics; however, it is clear that for Epicurus man has free will and a moral life that is not determined by the motions of atoms; this dualistic ethics defines his philosophy, rather than atomist physics. The same is the case with the early modern so-called materialists like Thomas Hobbes and Pierre Gassendi, or Galileo Galilei and Isaac Newton; they are regarded as materialists because, in a sense, they argued against Cartesian dualism or against the old, so-called geocentric Aristotelian science, but otherwise, as is now fortunately very well known in the case of Newton, they were not materialists at all in the sense that everything in the universe is composed of only one material substance.

The term "materialism" became widespread in science and philosophy in the 18th century, especially due to the so-called French materialists like Julien la Mettrie, Paul-Henri d'Holbach, and Denis Diderot, and became popular and really influential at the beginning of the 20th century thanks to primarily Marx's so-called

dialectical materialism for obvious reasons. However, in the modern analytical and scientific sense, they were still not "real" materialists, especially the French; their position can rather be defined as, in fact, Marx himself did: materialism is the right historical and scientific *antithesis* of the wrong idealism (dualism) and religion of the exploitative ruling classes.

In contrast to this, modern *analytical materialism*, which became the ruling ontological concept in the middle of the 20th century in science and Anglo-Saxon philosophy, is defined by *reduction*, a strictly scientific method by which a deductive logical relationship can be established between the concepts and laws of the special sciences referring to higher-level phenomena like DNA sequences, hardware, etc. and fundamental physics referring to matter itself (see especially Nagel's *The Structure of Science* [1961, 345–359]). However, at the end of the 20th century it became clear that *in practice* reduction does not work and, thanks especially to the discoveries of dark matter and dark energy and to the still insoluble contradiction between our two fundamental theories (i.e., quantum mechanics and the Theory of Relativity), it is not even clear anymore what we should regard as matter in the scientific sense.

Thus, what has been left is what we have seen with the earlier materialists, especially in the cases of the French and Marx, namely that materialism can rather be defined in a *negative sense*: it is the very general ontological or metaphysical claim that denies the existence of minds, including God himself, but provides nothing specific concerning the existing only one substance. So, in reality, it is indeed the *modern* (so-called scientific) *antithesis* of our traditional dualist ontological belief—which thus, as we will see, in a disguised way, conserves the original anthropomorphism of dualism.

One contemporary example of this loose negative ontological tradition is the so-called New Materialism which, especially in the humanities and social sciences, tries to focus more on the different material (in fact, lower-level) conditions of social institutions and human agency toward the environment and emphasizes the social and technological entanglement of the human and the non-human, since both are the "organic" parts of the same material world. However, this tradition is not based on any scientific concept of matter. Moreover, usually, it is explicitly anti-reductionist, or even in line with a more traditional philosophical concept of matter or materialism, and the different authors, from Judith Butler via Jane Bennett to Gilles Deleuze, labeled by this term usually claim very different things about man, society, technology, and nature. So, New Materialism is clearly not a coherent positive ontological claim about man and machines as the original concept of emergentism is (see below).

3) Emergentism is half dualism because it claims that there are at least *two kinds of entities* in the universe, in this case mind and matter, of course; and it is half materialism because it claims that there is only one substance: matter, that is, matter is *fundamental compared to* mind. This means that, although there is mind, *there is no* emergent mind *without* substantial matter; for example, one cannot download it from its original body because it does not stand on its own, not even during the "short" time of downloading and uploading; it simply needs its original body to even exist.

So, at the surface, it is true that emergentism is half dualism and half materialism, but then we define and understand emergentism by Cartesian dualism and materialism. And since, as we can see now, in reality materialism is *also* defined *negatively by* Cartesian dualism, that is, by the negation of the existence of the mind as an independent substance, emergentism, ultimately, will *also be defined* by the Cartesian concept of mind and *also will conserve* the original anthropomorphism of the concept.

And yes, by the way, be honest; in fact, this is the question we are really interested in—just go up, for example, to the pages of the famous and influential *Stanford Encyclopedia of Philosophy*, and you will see that everything revolves around the question of mind—but this *anthropomorphic approach*, unfortunately, poisons our understanding of emergentism and, which is more important for us now, the understanding of emergent but mind-less machines.

In the case of the concept of emergence, this anthropomorphism and this negative definition come from C. D. Broad's *The Mind and Its Place in Nature* (1925). Broad is regarded as one of the great British Emergentists and it is clear that he is the most influential one. Broad, already in the early 20th century, even before the concept became widespread in the middle of the century, realized that the analytical reduction of special sciences does not work, or, more precisely, was not going to work. He defined the concept of emergence *analytically* as the logical *contrary of reduction* (i.e., emergent equals non-reductive) and claimed that, thus, the scientifically most grounded ontological position toward mind is *emergent materialism* (Broad 1925, 647). However, it is materialism *only in the broad sense of the antithesis* that there are no Cartesian minds because *there are* emergent minds, so, although there is only one substance, matter, still *not* everything is composed of only this one material substance.

At the end of the 20th century, after the realization that reduction in practice does not work, Anglo-Saxon analytical philosophy and science adopted Broad's terms but not his position; so, *this* is the materialist and now widespread understanding of the concept that has become quite popular during the last decades in almost every field of science. Today the most popular ontological position in philosophy and science is, thus, *non-reductive materialism*, which, at the explicit surface, that is, at the level of the term, is the same as Broad's emergent materialism; however, today it means that *everything* is composed of only one material substance—*in theory*, because *in practice* we simply accepted that there are terms and laws and concepts, etc. that refer to non-material phenomena. That is, in theory the software is material; however, in practice we treat it as something non-material, and this is the reason we sometimes call it emergent.

## 4. The concept of emergence: The original understanding

So, what is emergentism in reality? Why is it, in fact, not half dualism and half materialism but, on the contrary, that materialism is half dualism for obvious reasons and emergentism is *the real antithesis of both*?

From a genuine emergentist approach, regarding their points, *both* dualism and materialism claim *the same*, i.e., that in the universe, at the end, *everything is composed of* (one or two) *substances*. These are *old* ontological or metaphysical concepts, going back into the ancient Greek era of philosophy, which are, in fact, thinking in a *static* universe where the substantial, meaningful fundaments of reality do *not* change.

However, emergentism is a *new* concept, formulated by Samuel Alexander (1920) at the beginning of the 20th century, and the main point of it is that the universe in which we live is *always evolving*, so there are no static substances at the bottom of it. Reality is defined not by substances but by *the process itself* by which new and new levels of reality arise. This process was called *emergence* by Alexander—and in this strict sense it has nothing to do with the analytical concept of reduction.

According to Alexander, the evolving universe starts with an *infinite singularity* of space-time; the main emergent levels of reality to date are *space-time*, *matter*, *life*, and *mind*. Alexander, contrary to Broad, emphasizes that we should not try to understand reality based on our mind or by an analysis which revolves around the mind or matter because the fundament of reality is not mind or matter *but space-time*—man and mind are only the latest developments of reality (Alexander 1920, 8). Alexander's main goal is "to de-anthropomorphize: to order man and mind to their proper place among the world of finite things" (Alexander 1914, 279). This is the reason that he is a realist.

In short, there is no matter or man without space-time, but there is space-time without matter or man. This is the real difference between original emergentism and any kind of materialism, including now Broad, Einstein, and the New Materialists; ultimately, reality is defined by *emergent space-time relations* and not by material forces as, in fact, is the case, for example, in a specific structure of a machine described by the blueprint and not by any composite matter, part, or force (i.e., by a comprehensive plan for the specific space-time relations for these composite parts having material forces). The original coherent concept of emergence cannot be reconciled with any kind of dualism or materialism.

Nonetheless, the really important part of this for us now is that the *living body by evolution* is *not* material. Contrary to this, life is regarded by *both dualism* and *materialism* as only a kind of (complex) matter, which, according to the modern concept, is a kind of *mechanical body* (a specific machine); however, *in practice*, *nobody* believes anymore that animals are senseless machines like the famous locomotive of Stevenson (non-reductive materialism). Thus, according to Alexander, the mind has a very *peculiar relationship* with the living body contrary to the mainstream concepts.

As we have seen, dualism, in an anthropomorphic way, regards mind as the most important composite entity of the universe, while materialism denies even its existence, holding that there is only material body, in this case the brain. However, according to Alexander, any mind is the development of a *specific living body*, where there is a unique (especially neurological) space-time defined by that body and there are unique space-time relations (through experience) with other bodies and minds.

With an easy example, the walls of any room define a unique space-time which is not the same as space-time itself because, in fact, the earth rotates around its

axis and, at the same time, it orbits the sun at a crazy space; still, the space-time of the room (if we are not speaking about Einsteinian so-called relativistic speeds, of course) *preserves* its *unique* integrity. According to Alexander, these are important and definite facts regarding the nature of space-time and reality; however, mainstream science, according to its materialist conviction, simply disregards these facts. For example, for Einstein there are material points and *every kind* of space-time is only the relative mathematical property of those material points described universally by his equations; consequently, there are no unique space-times; as a matter of fact, in this way, space-time is not even an entity (Einstein 1920, 94–95). This is the reason that physicists, now, for a century, cannot accept that gravity is the process of space-time, which, otherwise, should follow from Einstein's theory, and want to describe it with much more reputable quantum (i.e., material) processes, that is, by so-called quantum gravity.

The point is that for Alexander, contrary to the traditional Cartesian concept, any mind has a concrete *extension* in both space and time, primarily or originally in its biological body but not just, and the human person him/herself is the *unique* and inseparable *compresense of* the mind and the body.

> The higher self [i.e., the mind] is thus in all its stages a continuation and expansion, and refinement of the bodily self. The body, it may be observed, is capable of indefinite extension. We feel the ground at the end of the stick we carry, not at the finger which holds the stick: the stick has become part of our body. … All these things may become extensions of my body and the experiences I get from them may be for a time of a class with my organic and other bodily sensations … Many or most of these extensions of the body are only possible to a life which has gone far beyond the interests of the body itself. (Alexander 1920, 105–106)

At the beginning of the 21st century, for pragmatic reasons, the concept of *extended mind* or extended cognition became well-known even in Anglo-Saxon analytical philosophy and cognitive science (see originally Clark and Chalmers 1998)—but, of course, in a problematic non-reductive way because, *in theory*, the mind does *not even exist*, it is just another name for the brain—which, by definition, *cannot* extend into, for example, a carried stick.

However, in Alexander's original theory, there are no such contradictions. The only reason the original living body is able to extend is because of the already extended comprehensive emergent mind in that body which, according to its higher interests, through sensation and experience, in the literal sense, extends into, for example, the carried stick. This means that the unique space-time of the mind, as we open a door to another room, flows into this new body, that is, into this new composite part of the person. Nonetheless, this process is, of course, only temporary because the center (its space-time singularity) of the mind, where it is anchored, is the original living body where it has been evolved.

I believe that the scientific discoveries of the last century rather prove Alexander's theory than refute it. For example, it is clear now that the universe starts with

an infinite singularity of space-time—which, by the way, also follows from Einstein's Theory of Relativity. Still, even Einstein himself famously thought that this could not be the case; the universe, according to his traditional ontological beliefs, had to be static. This is my main argument in this paper that scientific practice *is coherent with Alexander's original concept* and not with materialism, including the widespread Broadian non-reductive concept of emergence. Still, the reader must know that the vast majority of the scientific community and philosophers do not agree with me; they are, of course, still materialists or perhaps dualists and usually have not even heard about Alexander's original concept of emergence.

Nonetheless, now, our question is what the coherent emergentist concept of machines is, and how, in the light of this genuine understanding of emergence, we can understand what a machine really is.

## 5. What is a machine?

First of all, as, I hope, the reader can already suspect, there is no one definite answer or definition to this question because, as with the universe and reality itself, machines can evolve too; and they *did*—because they are emergent. Still, before the evolutionary details, I will provide a general starting picture reflecting on our theoretical problem, now, in the case of machines and engineering. And perhaps it is worth emphasizing that this coherent emergentist concept cannot be classified into the well-known categories of philosophy of technology because it is based on a unique and usually unknown positive *ontology*. For example, Andrew Feenberg distinguishes between four types of philosophy of technology: instrumentalism, determinism, critical theory, and substantivism (Feenberg 1999, 9). However, these are not ontological categories; thus, this coherent emergentist approach is a kind of instrumentalism since technology is, in a sense, a mere instrument of humans but, at the same time, also a kind of substantivism. This is because, as we will see in a moment, machines are existentially different compared to humans and, in a sense, autonomous to some extent. Similarly, although Martin Heidegger's influential view on technology is based on different ontology and has a significantly different approach on it, in a sense it still has very similar results, especially concerning the relationship of technology and society (Heidegger 1954).

So, machines can evolve too; however, on the other hand, they are not evolving by themselves, as life does, but were *created by man*, which makes an important and meaningful difference in their emergent place of reality. There was life before and without man, but there were no machines. Life and technology, evolution and programming are not the same things and processes. They are only the same in a dualist or materialist theoretical framework which *disregards* the definite importance of the *evolutionary origin* of things; see, for example, Turing's famous and influential so-called functional (i.e., non-reductive materialist) definition of artificial intelligence, which I will touch on at the end (Turing 1950; and perhaps see my detailed evolutionary interpretation of it in Paksi 2022).

So, perhaps the main consequence of our living in an evolving universe which creates a *hierarchical order* in reality is that there is *no one* scientific method, no one conceptual toolbox by which one can describe and define every phenomenon because, by new and new emergent levels, new and new *ordering principles* come into operation.

> Engineering and physics are two different sciences. Engineering includes the operational principles of machines and some knowledge of physics bearing on these principles. Physics and chemistry, on the other hand, include no knowledge of the operational principles of machines. Hence a complete physical and chemical topography of an object would not tell us whether it is a machine, and if so, how it works, and for what purpose. Physical and chemical investigations of a machine are meaningless, unless undertaken with a bearing on the previously established operational principles of the machine. (Polanyi 1967, 39)

Polanyi, an emergentist, here simply describes how engineering *in practice* works and acknowledges the existence of the unique principles of the field. He can easily do that because he is not a materialist. His conclusion is the following: "A physical and chemical investigation cannot convey the understanding of a machine as expressed by its operational principles. In fact, it can say nothing at all about the way the machine works or ought to work" (Polanyi 1962, 329). The same is true for biology and physics: "a complete physical and chemical topography of a frog would tell us nothing about it as a frog, unless we knew it previously *as a frog*" (Polanyi 1962, 342).

Biology is not physics, body is not matter, and engineering is not biology. These are *facts* about science. *In practice*, we regard and handle biology and engineering very differently compared to physics. The Standard Model and the Theory of Relativity do not—and, in reality, *cannot*—include any blueprint or operational principles of machines; they are *unique* structures of space-time, while physics tries to describe the properties and laws of matter in the *most universal* way. Nonetheless, *in theory*, according to our materialist vision, we, of course, still wonder about the unity of science and a final physical theory of everything—meaning that we suppose that *everything* is composed of the only one material substance physics can describe.

So, a machine, *in its origin*, is but an *achievement* of an *invention by man*. It is a comprehensive, rational *tool* that we use during an act for the sake of some *goal* to reach some benefit. The use and operation of a tool or a machine is based on comprehensive *rules of act* (in this case, *operational principles*) that cannot be determined by their details and which allow the successful usage of a tool or a machine. The machine is, thus, defined by its *patent* that tries to describe the machine in the broadest possible sense; it does not include the concrete realization and the different possible material conditions of the machine, but only defines the specific structure and the operational principles, due to which the machine can properly function and fulfill its goal (produce its benefit).

Therefore, these two forms of knowledge—practical engineering sciences and theoretical natural sciences—are *highly different*. *Both* are relevant regarding ma-

chines, but while engineering refers to the comprehensive emergent whole (i.e., the specific space-time structure) and the operational principles (i.e., the practical knowledge of its successful functioning and control), the *physical sciences* refer only to the *tangible parts* and *material conditions* of the machine.

The theoretical problem one can see here comes from our modern ontological convictions. Aristotle was right when he differentiated between *techne* and *episteme*, that is, in our terms, between practical engineering sciences and theoretical natural sciences, on the ground that tools and machines are the particular and teleological (purposeful) creation of the human mind. However, this differentiation was eliminated by modern dualism because nature *too* became the particular and purposeful *creation* of the ultimate mind—God—but worse, at the same time, thanks to the simple dualist concept of reality (that is, at the end, everything is mind or matter), nature itself, and thus the living body became a complex *material* machine—since it is obviously not a Cartesian mind. Therefore, without the ultimate mind, that is, according to the now ruling antithesis, there can be no real (purposeful and meaningful) difference between life and machines and between machines and matter; the hierarchical structure of reality, we see everywhere in practice, has utterly collapsed, and engineering has become the simple practical application of physics.

Aristotle was right because he differentiated between *techne* and *episteme on the ground of concrete practice*; however, his theoretical explanation of (static) forms about the hierarchical nature of reality was rightly discredited by modernity—creating our problem of practice vs. theory. Emergentism is neo-Aristotelian in the practical sense, that is, it acknowledges the hierarchical nature of reality we see everywhere, but it explains these different levels by the new (dynamic) concept of emergence.

So, then, what is a machine, according to a coherent emergentist concept? In other words, what are the emergent *origin* and the different emergent levels (types) of machines as they have been created?

## 6. The coherent emergentist concept of machines

First of all, there was life. And then, on a certain higher level, clever animals that had higher interests outside of their original living body realized that they could use certain non-living things from nature to reach their goals. Their reasoning was that in certain circumstances their natural *bodily tools* could not do the job. A stick with a chewed end by which a chimpanzee can reach termites through a ventilation opening is a tool which *literally* is the *extension* of his arm, and works accordingly.

I deliberately use the words “clever” and “reasoning,” etc., because in a coherent emergentist approach animals are neither physical nor machines and higher animals clearly have neurological systems, minds, and primitive cultures according to the gradual evolution of these phenomena; so, to call an animal intelligent or to

speak about its reasoning is not an anthropomorphization of physical or lifeless phenomena but a based positive philosophical position.

1) So, what is a tool? A tool is an *emergent object created*, *operated*, and *controlled* by man. As we saw in Section 4, this *direct control* of man is described even in non-emergentist literature as a kind of *extended mind*. The tool is emergent because it has a specific, functional, higher-level, comprehensive structure defined by its purpose. It is a *mechanical body* which, by the control and extension of the mind, due to certain rules of act, complements our biological body. And it is emergent because it necessarily has some lower-level, material fundaments without which it cannot exist and function.

| **The three-level structure of an operation of a tool** |
|---|
| 1) *direct* comprehensive *control* of man over both his body and the tool<br>a kind of extended emergent mind |
| 2) *biological body* + *mechanical body*<br>a kind of technical extension of the body |
| 3) *material parts* and *conditions* in both bodies |

*Table 1.* The three-level structure of an operation of a tool (own editing)

2) What is a machine? All bugs are insects, but not all insects are bugs, as is well-known. However, similarly to biological evolution, the emergent structure of reality develops in the case of technology too, that is, all machines are tools, but not all tools are machines. What is the main difference?

The difference, on the one hand, is a higher level *blueprint*, according to which different lower-level, *tool-like parts* are arranged into a functional whole. For example, springs and gears and pointers are arranged into a clock. And, on the other hand, there is usually *a built-in source of power* which, due to certain operational principles, can work the machine instead of the muscle-power of man. In the case of a clock, it is originally a coiled spring. This means that at a higher operational level the emergent tools as lower-level parts become the necessary material conditions of the emergent machine. In a genuine emergentist approach, as in our traditional (i.e., Aristotelian) use of language, the material always refers to *the actual lower-level conditions* and not to some undefined substance.

To make it clear, the higher emergent level of the machine is created from *mechanical tool-like parts* and *not* from a living biological body; thus, it *has no mind*, it has no neurological system, it is *not part* of biological evolution. The meaning of the blueprint is only the *knowledge of man*. For example, the clock does not know how it was created, what the text of its patent was, or what the time is, exactly the way the stick does not know what a termite is despite the fact that it helps catch it; the clock can only function due to its unique comprehensive structure, which means that its pointers are moving, and a living human person, if he/she knows how, can read it. This will be particularly important in a moment.

So, a machine is an independent (i.e., contrary to tools, due to its operational principles, can function in itself) *mechanical body* which is usually controlled only partly and indirectly by man.

| **The three-level structure of an operation of a machine** |
|---|
| 1) the comprehensive emergent machine |
| 2) emergent tool-like parts |
| 3) further material parts and conditions |

*Table 2.* The three-level structure of an operation of a machine (own editing)

3) What is a computer? Finally, the great invention of the 20th century that is the computer is a kind of machine where the original machine or, more exactly, a system of machines *as the hardware* becomes *the lower-level material condition* of *a higher-level, emergent, functional whole* operated *by the software*.

The main difference between simple machines and computers is that computers have *sensors* and *data*; usually this is their main purpose—not to just do some kind of physical work, for example rotating pointers, but *to manipulate data for us*, way, way faster than we could do using only our minds. The operational principles of a simple machine have to be *incorporated into* the concrete structure of the machine which, as a matter of fact, could be very complex as is the case, for example, in the case of a traditional pinball machine. However, in case of computers, the whole point of the software is that there is a higher-level *operational center* in the machine where the operational principles are *electronically coded*; this opens up enormous opportunities for the functioning of this kind of machine.

So, the software crates a partially independent *control mechanism* over a complex system of machines, and this is the reason we should regard the computer as a new higher-level emergent entity. However, it *still has no mind at all*; it is just an always *physically* (i.e., electronically) *realized mechanical control system*, still "just" a new comprehensive mechanical structure (body) of lower-level machines (bodies) as hardware. The computer, as the stick or the clock, still *has no* living body; it still *has no* neurological system; it is still *not part of* biological and cultural evolution; and, after all, it is still *controlled by man*.

| **The four-level structure of an operating computer** |
|---|
| 1) the comprehensive emergent computer |
| 2) emergent machines as parts |
| 3) emergent tool-like parts |
| 4) further material parts and conditions |

*Table 3.* The four-level structure of an operating computer (own editing)

So, a computer is an independent *mechanical body* which, on the one hand, can manipulate data independently and, on the other, can control other machines. That is, contrary to simple machines and due to our new technological knowledge of *programming*, it is always controlled only partially and indirectly by man; of course, even in this way, it is *still* always controlled by man.

Therefore, the meaning of the programming as the meaning of any data of the computer is only the *knowledge of man*, as, in fact, one can represent and read data even by the simplest tools like a paper and a pencil, and as, in fact, it was already the real function of the pointers of the clock. In the ontological sense, *there is no difference* between an always physically realized electric mechanism and the pointers: *both are mechanical bodies*; similarly, an electromagnetic condition in the memory of a computer, in the ontological sense, is *exactly the same* as any ink on a paper. The difference is only *epistemic* and *practical* in relation to how that material condition was created, and which data represents something meaningful for us, if we know how to read it, of course. The ink, because we are speaking about simple tools, had to be manually and directly created by man; contrary to this, the whole purpose of the computer is to do it more efficiently, that is, necessarily indirectly by partially independent control-mechanisms, that is, by programming. Thus, as we would never think that the paper knows the meaning of the ink (in this sense, of the text), similarly, we should never have to think that the computer knows the meaning of any material conditions (in this sense, data) in its memory.

However, because of our ruling non-reductive negative materialist approach, *in our theoretical reflections* we are not able to differentiate between the independent comprehensive control mechanisms of computers and the more direct mechanical functioning of simple machines or even simplest tools; as we, in fact, are not able to differentiate between biological processes and evolution and mechanical processes and technology, not to mention the difference between the cultural knowledge of minds and the electromagnetic discharges in our brains or the lower-level "material" structures and conditions of cultural institutions and phenomena in the case of social sciences. In the absence of a positive ontology, we can only state that none of these are Cartesian minds or Christian souls; therefore, they all have to be the same, that is, material. These are clearly different processes only *in scientific practice*.

## 7. Conclusion: Why is the popular concept of artificial intelligence a materialist anthropomorphism?

Simple tools were first created to extend the abilities of our body; but, then, there were also clay tablets and paper. As a matter of fact, from an emergentist approach, this representational function of simple tools which did not just extend our minds for a concrete purpose, as a stick does, but, at the same time, created new intellectual abilities was their more important part in cultural evolution (see, e.g., Donald 1991, 269–360, or my interpretation in Paksi 2019, 151–177).

Machines, by their own power source and more comprehensive and more functional structure, became independent from our bodies and created new possibilities to represent and manipulate data—just think about Gutenberg's printing press.

However, finally, computers were primarily created for the purpose *of really extending the abilities of our minds* by their representation and manipulation of data. And this is fascinating—we are still dazzled like a newborn baby.

But, if this emergentist approach is right, then machines have no minds based on living biological and psychological and cultural conditions, as we have; therefore, only we can understand anything about the meaning of any software, data, or sign, because each is still *an extension of our minds*.

Evolution is not a one-way process. Birds are not mammals and insects are not vertebrates—as machines are not animals like us. But both birds and mammals are vertebrates—as technology is a development of human cultural evolution.

| **The three levels of evolution and the three sublevels of technology** |
|---|
| 1) comprehensive control of man<br>a kind of *extended emergent* mind |
| 2) biological body + mechanical body<br>a kind of *technical extension* of the body<br>→ 2a) tools → 2b) machines → 2c) computers |
| 3) material parts and conditions in both bodies |

*Table 4*. The three levels of evolution and the three sub-levels of technology (own editing)

The Turingian concept of artificial intelligence is a non-reductive materialist one. It is based 1) on rejection of the existence of the extension-less Cartesian mind which, according to dualism, is, of course, the only source of meaning and intelligence (materialist antithesis); and 2) on the spectacular functioning of computers (non-reductive-ness), meaning that the evolutionary origin of man, that is, the significance of the living, biological body and the surrounding culture, is simply neglected.

A more consistent reductive materialist approach should claim that there is no intelligence at all, since there are no Cartesian minds, the only source of meaning and intelligence. But without any positive answer as to what intelligence really is, this Turingian approach just opens the door to regarding independent and fast data-manipulating computers as intelligent *only because* they, in a superficial sense, *seem to be* intelligent. This, instead of a principled positive answer, is, in fact, the same kind of *anthropomorphization* of fascinating phenomena as we did when we had only simple tools like hand-axes, and regarded *every fascinating moving object* from waters through bushes ruffled by the wind to the moon and the sun *as animated by some kind of spirit*—that is, by intelligent minds.

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