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Darwin, Universe, Life, Intelligence & AI

Cuesta Gutierrez FJ

Mining Engineer, Energy Speciality, Madrid, Spain

ABSTRACT

This paper is based on the "Artificial BioIntelligence Theory" book (Amazon, 2023), previously registered in the Property Register of the Madrid Community (Spain) and also published partially through some posts in X (Twitter) since December, 2023. A new Theory showing that Evolution (in its different expressions) is based on continuous darwinian self-learning processes ("Nature AI") is introduced. An Abstract Neural Network (composed of Abstract Layers) concept is introduced as support of an AI Self Learning model. We discuss how Universe Evolution has happened and why and how the Nature Laws have evolved over Time. We also discuss how Life has emerged, its procedence and evolution from its first evolutionary expression in shape of Language (DNA/RNA) till the most evolved architectures supported by neural networks as expression of Intelligence. A detailed analysis about how Universe could also have reached its own Intelligence is done. We also show an example about how self learning processes have shaped our immune system. Some proofs are shown about the validity of the Theory.

***Corresponding author**

Cuesta Gutierrez FJ, Mining Engineer, Energy Speciality, Madrid, Spain.

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Introduction

The reader may wonder what relationship there could be between Darwin, the Universe and the Artificial Intelligence. It is convenient that we go step by step to get there [1].

We're going to take the Artificial BioIntelligence (ABI) Theory as reference. It explains in detail how Evolution is supported by ***continuous Darwinian self learning processes*****,** so that the chains of "positive errors" or "successes" would shape all biological processes, from the cellular level to the current states.

In this sense, I think that a simple example at "macro-biological" level could serve as a first reference. Let us imagine individuals who are born with malformations of any type, the result of mutations derived from errors in the cellular reproduction processes that can happen in the first stages of the embryo. So the alterations that occur in their DNA are transmitted from that moment to the following cell replicates. Such individual, when born, will unfortunately represent the result of an "involutionary process" and neither their descendants will be the best adapted to the environment, rather they are doomed to failure in the evolutionary process.

Let us now imagine, on the other hand, an individual whose "malformations" end in a positive chain, since they give rise to an individual capable of perceiving sounds in frequencies far superior to the rest of humans. Therefore the result in this case will be a qualitative "evolutionary leap", an individual capable of adapting better to the environment than the rest.

It is clear that the number of involutionary processes will be, statistically, a lot higher than the evolutionary ones.

The most simple sample showing how such processes work not being only distinctive of living beings, is related to Virus evolution. Viruses could be considered the link among living and not living beings: Continuous Darwinian processes (mutations) create successive improved strains with competitive advantages (natural gain of function).

The evolutionary/competitive advantage will be creating strains with some mutated proteins (as consequence of any gene mutations) that will not be recognized as antigen by the immune system.

Most of mutations (trial) will not produce any evolutionary advantage (error) and only a few ones will produce an evolutionary advantage (success).

Therefore they could be considered the result of continuous darwinian (trial-error/success) self-learning processes.

The chaining of the most successful processes will create a more evolved virus. It could seem that the virus (an inert being) had some kind of "intelligence", but it's really simply *a* ***very basic "artificial intelligence" based on self-learning processes.*** I mean: for every success process, there're other many more that are not useful in the evolutionary right chain.

In other words: ***Evolution is based on cuasi infinite darwinian (trial-success (very few ones)/error (the most)) self-learning processes.*** We label them as self-learning processes because their result is the optimization of the chain by successive aproximations, with a clear similitude/relationship with AI machine learning.

Therefore we call them ABI (Artificial BioIntelligence) self learning processes

We could even assume that each protein of the virus plays the

role of a neuron in a neural network. Any mutation produced in a neuron could also have repercussions over other neurons (proteins) and of course over the set of neurons (virus) [2].

As consequence, it would be possible to build AI machine learning models to reproduce viruses behavior.

Virus is a clear sample but … does it mean that mutations are the only explanation for Darwin's Theory?...

The answer is simple: Not at all. Every process implied in the dynamic of the living beings that is able to create in some way a competitive advantage could be considered a darwinian self-learning process.

Just as another example at biological high level, the "diversification" process of individuals that occurs during reproduction, when the DNA from the parents combines each other, could be considered just another darwinian process where the best gen combinations create competitive advantages.

Darwin, the Universe and the Laws of Nature

At this point, we could ask ourselves if the ***Universe has also been shaped based on artificial intelligence (self learning) supported by Darwinian processes.*** In this case we would be talking about physical-chemical processes, that is, those where thermodynamics, pressure and temperature are fundamental protagonists, instead of biochemical ones.

It would be once again the result of a concatenation of successful processes, starting from the zero point of the "Big-Bang" where the enormous energy released would produce a state of chaos. From such state a multitude of reactions and processes would occur, most of them involutive, and only a few ones evolutionary, which would lead to new particles and interrelationships between them, based on pure darwinian processes.

The laws of Thermodynamics would govern these processes of chaos, being universal in the sense that they are common to any new theoretical Universe that could have been formed, that is, they are not dependent on its evolution.

However, neither ***Quantum Mechanics nor the Theory of Relativity/Gravity*** would be applicable, given that ***both of them would be a consequence of the evolutionary process and not from immutable natural laws***. The natural laws that emanate from both theories ***would not be "static***", that is, they would not be the same from minute zero to the present day, ***but rather "dynamic***", ***that is, the laws would be shaped based on evolutionary processes***. So they would be closer to quantum mechanics in the first phase of particle formation.

Put another way: the particles created from a theoretical "Big-Bang" in a second universe might not be exactly the same as those created from the first "Big-Bang" (nor the results of the same at all levels), because of the evolutionary processes derived from chaos are more than likely to have been different. Whats more, we could even find that some new particles discovered in a particle accelerator might not match those that are part of known matter.

The basic atom of Hydrogen would have been the first great expression of balance and stability between the particles that make it up, but the evolutionary process could have led to the formation of another different evolutionary entity. Without going any further, for example, it could have led to an atom of antimatter so Universe could have evolved around it.

States of balance would be the final results from the self-learning darwinian processes. It's clear that although such processes are of increasing entropy (continuous cuasi infinite trial-error/success processes), they allow to reach order from chaos. That is, ***increasing entropy is able to create order***. This is also other way of understanding entropy. Order is able to arise from chaos through increasing entropy. The consequences of this new entropy interpretation could be very relevant for Physics. For example, it could help to solve the information paradox of Black Holes.

In that initial phase until the formation of the Hydrogen atom, the more relevant part of Quantum Mechanics would have been shaped. It must be taken into account that subatomic elementary particles are expressed more as waves than as particles, hence the quantum uncertainty principles. The high energy present in the particle formation processes means that perhaps we should call them waves rather than particles. In this sense, I consider that the meritorious attempt of String Theory to reconcile Quantum Mechanics and the Theory of Relativity lacks a solid basis. Her attempt to force the existence of the wave-shaped graviton to create an entire multidimensional theory around it starts from an unreal basis.

There is no indication that the graviton exists, either as a particle or as a wave, quite the opposite of the rest of the subatomic particles. It is more than likely that the Universe has more than four dimensions, but not according to String Theory.

In a second phase, based on the large volumes of Hydrogen, the very high temperatures and a first expression of the Gravity which had begun to warp the space-time (very likely based mainly in electromagnetic energy in conjunction with another kind of unknown energy from the primitive Universe), the first stars would have been formed and the fusion processes would begun to create more complex elements of the Universe, such as Oxygen and Carbon [3].

The laws of Gravity/Relativity would have started to take shape, which would subsequently be shaped until a state of "stability" was reached between the different stars and later the rest of the celestial bodies, always based on Artificial Intelligence (self learning). ***The expression of such balance state was reaching a warping of space-time where Gravity and Time are closely linked***. In other words, the final result of these processes would be the Laws that govern the Universe through the Theory of Relativity.

It is not surprising therefore that it is not possible to reconcile the Theories of Quantum Mechanics and Relativity. They belong to different stages in the formation of the Universe and as a consequence are governed by different laws.

The processes of Artificial Intelligence would also have been evolving, from the most elementary and purely Darwinian, which would have been the first interrelationships produced between the first emerged particles that entailed some evolutionary advantage (which in this case would have simply consisted of a certain stability within chaos) to the most complex ones, which would have led to the Laws of Nature as we know them today. The Theory of Relativity would be the current expression of a state of the Universe in relative stability, but it would not be ruled out that it could continue to evolve, although at a "much slower" pace that

would be almost imperceptible to us. Determinism would not be the result final of these processes but balance instead.

Stars, planets and all the celestial bodies in general, would have arrived to a state of stability as result of the evolution of the Universe. In fact they orbit in such state around each other, curving space-time mesh so each one of them is "trapped", "comfortable" or stable within the "dent" or concavity that they cause in the mesh of space-time. This state is expressed by the Theory of Relativity (or in its simplified version by the Gravitational Theory when Time axis is not taken on account). When a "strange" or foreign object to that System, that is, foreign to stability, falls into the dent, it is inevitably dragged towards the mass that generates it.

If we focus our attention in the different Laws of Nature, we may observe that there are many physical formulations relating to very different fields of science (gravity, fluid mechanics, electromagnetism ...) that have very similar structures. Why?... Because most of the Laws in Nature did not exist before the origin of the Universe, they have been formed based on continuous Darwinian self-learning processes until reaching a state of balance. Therefore all of them share a common origin based on self-learning processes that lead to some common patterns.

The latest consequence of this common origin would be the fine-structure constant. The famous 137 a dimensional number that led Paul Dirac to assert that "Theoretical physics is a waste of time unless you can explain 137" would be closely linked to this evolutionary process.

This number would be a fundamental clue as it is implied in many laws. This number does not emerge by chance but by causality. It could be considered the first proof of the theory we're exposing. It would emerge because all laws of physics are consequence of an evolution based on self-learning AI processes therefore they share a same origin being interrelated each other.

A Simple AI Self Learning Model

Defining in detail every self learning evolution processes taking on account that we're talking about of chainings of cuasi infinite Darwinian trial-error/success processes is not a possible mission for any known intelligence. It doesn't mind we're talking about Life or Universe.

But we can do is showing at high level how these processes can be modeled by an abstract neural network for easy understanding. We name "Abstract" because although such processes are not supported by physical neural networks, they can be modeled/represented as neural networks with cuasi infinite Layers.

The virus sample is the simplest one but this model could be applied not only to biological processes but to processes related with Nature Laws.

We're going to start by a simple node (neuron), the most elemental unit of our ***ANN (Abstract Neural Network)***. The node can be any variable involved, like a protein, a particle, any kind of Energy, a biochemical process, a thermodynamic process, processes related to any Natural Law, Time …

There's an evolution goal for each according ANN. For a virus the goal is avoiding our immune system in order to survive, reproducing in our cells. For a biological process the generic goal is continuous improving. For a process related to Nature Laws, the goal is reaching a balance state.

The node N (Figure 1) has a state in at a given time (Sn). Over this node operates continuous darwinian processes, most of them (red) become an error, that is, they don't produce an evolutionary process (they even can reach to an involutionary one, that is, to the "death" of the processes chain). And sometimes a darwinian process reaches a success (green).

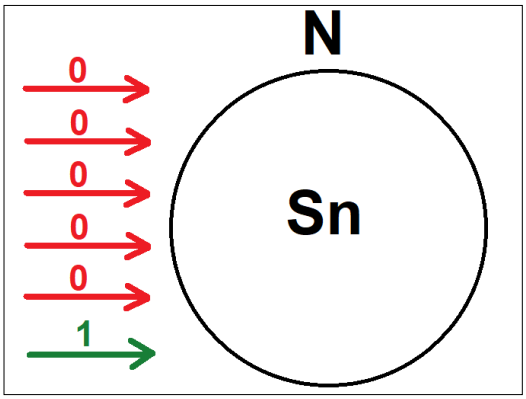


Figure 1

We're going to value a darwinian error like 0 and a a darwinian success like 1 for simplyfying.

But our ANN has more than one node. It will have **n** nodes, many of them interrelated each other, therefore the change of state of any node have some degree of influence of others. We can represent this as an ***Abstract Layer (AL)*** of n nodes.(*)

We show a view of the self learning process in Figure 2.

We start with an Abstract Layer 1 (AL1). A Darwinian success over neuron N_1 implies improving not only the state of neuron 1. Neuron 1 is interrelated with some of the other neurons, therefore some little improvements ("weights") are applied to other neurons (weights D12, D13, … D1n). If we take the virus as example, the successful mutation of protein 1 affects fundamentally to such protein, but also in some degree to other proteins (neurons) linked to it. The new set of states could be considered other Abstract Layer (AL2) which would represent a new successful strain. (such weights could also affect negatively to evolution of the other nodes but we're taking on account only successful cases).

A second Darwinian success over neuron 2 implies improving not only the state of neuron N_2. Neuron 2 is also interrelated with some other neurons, so some little improvements ("weights") are applied to other neurons (weights D21, D23, … D2n). If we take the virus as example, the successful mutation of protein 2 affects fundamentally to such protein, but also in some degree to other proteins (neurons) linked to it. The new set of states could be considered other Abstract Layer (AL2).

We could continue indefinitely this way. Every abstract layer is improving in some way the previous one.

Some successful chains (strains in viruses) will be created but the most evolved one would be the "winner". Taking as example virus mutations again, the strain that is most contagious and evades the immune system will be the most successful of all.

(*) In some complex processes, the nodes that make up the layers can vary over time as a result of their own evolution. That is, new nodes (variables) may join, and others may even become inactive.

Image

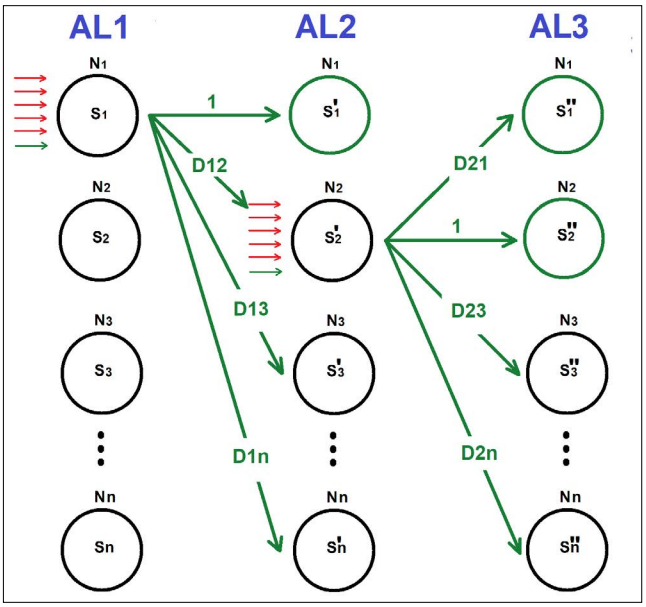


Figure 2

In other words: any kind of Evolution is based and shaped by continuous self-learning processes being the only differences between them their supports and goals. It's the AI of the Nature. Therefore we call it Artificial BioIntelligence.

In the case of the Universe, the Laws of Nature had evolved with the continuous goal of reaching states of balance. If we take as example the Gravity, it had evolved in different stages. It's fully coherent with new data of JWST related to galaxies from early Universe. Gravity had reached a first balance state very different from the current one.

Therefore, although the great complexity inherent to cuasi infinite darwinian processes, we could build some AI machine learning models at high level to reproduce some evolutionary process because of their AI intrinsec nature. To do this, we should first consider all the variables (nodes) involved. Then, we should collect a large data.

In the case of Gravity, it's especially complicated because we don't know still every variable involved and how they (related to Matter, Time, Energy …) are (and were) exactly interrelated. But building different AI models based on different hypothesis and contrasting with a large dataset from JWST could help us a lot to finding so relevant answers.

Universe, Language and Intelligence

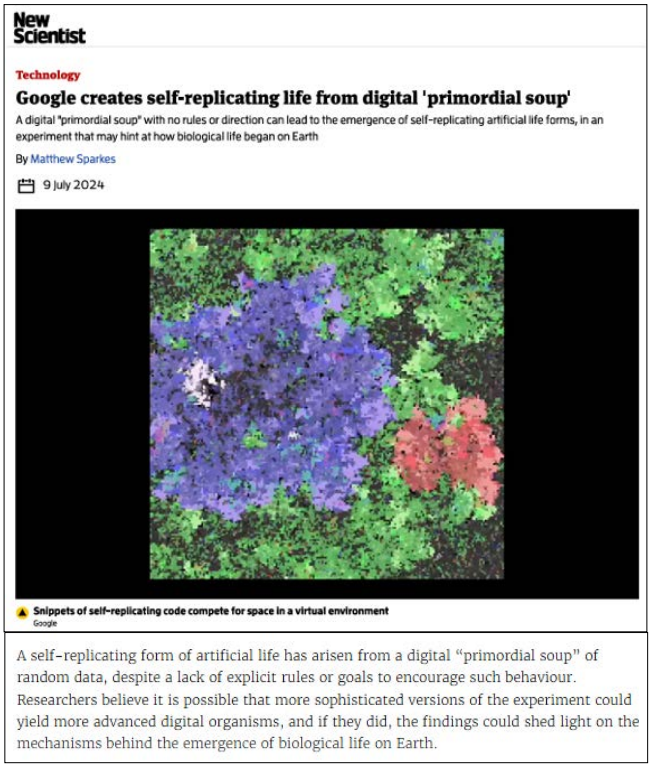
Evolution for the most advanced living beings has led, based on Artificial BioIntelligence, to a distributed Architecture of neural networks with some neuronal nodes working like "brains" communicated with a large central node or main brain. That is, from darwinian self-learning processes, evolution had reached to the first basic brains on neural networks, then to more evolved architectures over them and as consequence to higher levels of Intelligence and then of consciousness for the most advanced brains (BioIntelligences).

If we take a look again to Figure 2, we can easily understand that a physical neural network is a lot more efficient than an "abstract neural network" because far fewer processes are needed for reaching an evolutionary step and some info can also be stored in the neurons. That's the reason for the great evolutionary step from "Abstract Neural Networks" to "Real Neural Networks" on physical support (neurons).

The first expression born from chaos and supported by ABI processes (I repeat once more, continuous darwinian self learning processes) had been the most primitive (but so powerful) Language: RNA/DNA. Then, every living being had evolved to more advanced languages supported by every more advanced brain architectures according to their degree of evolution.

Therefore it is conceivable that Universe Evolution could have followed similar patterns taking on account that it would be also based on basic darwinian self learning processes although with different support. Such processes had reached to a balance state of the celestial bodies governed by the Relativity Theory expressed as a giant neural network.

Then, taking the biological Life as reference, we're going to study the possibility that the Universe could have also developed a primitive language from randomness thanks to the powerful support provided by its neural network. The following steps, following the same evolutionary path of the intelligence in living beings, would be improving such Language and the Intelligence associated with it.


New Scientist

Technology

Google creates self-replicating life from digital 'primordial soup'

A digital "primordial soup" with no rules or direction can lead to the emergence of self-replicating artificial life forms, in an experiment that may hint at how biological life began on Earth

By Matthew Sparkes

9 July 2024

Snippets of self-replicating code compete for space in a virtual environment
Google

A self-replicating form of artificial life has arisen from a digital "primordial soup" of random data, despite a lack of explicit rules or goals to encourage such behaviour. Researchers believe it is possible that more sophisticated versions of the experiment could yield more advanced digital organisms, and if they did, the findings could shed light on the mechanisms behind the emergence of biological life on Earth.

Figure 3

There's a new shocking Google experiment (published after to Artificial BioIntelligence Theory) that proofs how in a digital way, with the right support, a first expression of Life (Language) emerges from chaos [3].

https://t.co/hVp9DaE8H0

Therefore I think there're reasons enough to explore this hypothesis further.

It's likely (although not ruled out) that a great central node or main "brain" does not exist in the case of the Universe: the Universe could have a multitude of "brains" interconnected each other but without any of them being a priority.

Latest data from JWST show extremely denses early galaxies. Such galaxies could have worked as the first "brains" of the Universe.

But there is also the possibility that there was only a main brain (extremely dense early galaxy) somewhere in the Universe, I mean, it could not be in the center (just as the location of our brain in our body).

The fundamental conditions that a galaxy candidate for main brain(s) node should meet are the following:

- Very high density, with a distance between stars as short as possible. The higher the density, the faster the calculation speed and vice versa. Density is much more important than size.
- Stars size are not relevant for their functions as neurons.
- Number of planets per star as large as possible, because of the planets would also work as neurons being able to communicate in turn with those of another nearby star.
- Have at least a "black hole" (since it could actually be a wormhole according to the latest research). In this way it could communicate with distant galaxies. We will talk forward about this subject.

Just as I told before, thanks to cuasi infinite darwinian processes the first Language (DNA/RNA, Language of Life) would have been born from chaos (randomness) supported by biochemical processes. Then we could infer that Universe could also have created its own Language in the same way but supported by a physical way of communication over so powerful neural network.

Communications could be carried out by electromagnetic radiation, cosmic radio waves and gravitational waves (all of them travel at the speed of light). The problem is gravitational waves are very difficult to detect, in fact we only manage to do so when they come from very notable sources (for example the collision of two black holes).

Information would travel encoded, probably at certain low frequencies, but currently it's difficult to know how. However, it would be interesting to analyze the frequencies of the light from the Sun and study any possible minimum deviation from the expected low frequencies of the electromagnetic spectrum.

Although light comes from fusion energy and has well-defined characteristics, there could be the possibility that the Sun, like any other star working as a node, was capable of adding some differential factor (pattern) that would add to the radiation emitted at certain (low) frequencies. As a consequence it would cause almost imperceptible pattern changes in it. Changes that in any case would be identified by the receiving node as units of information.

Why do we we talk about patterns over low frequencies?... because it is highly unlikely that they travel over a high frequency range, for two very relevant reasons:

- Because it would imply high energy. The light coming from a star like the Sun does not have a constant energy, it suffers small oscillations as a result of multiple factors. It comes from fusion reactions that are rarely constant and stable, sunspots, solar winds … Therefore, the frequency will also change very slightly. As a consequence, it would be impossible for a receiver (any node with which it is linked) to guess what part of the impact on the frequency change would be due to the stars own activity derived from the merger and what part to the differential factor contributed by the star working as neuron-node.

However, within the electromagnetic spectrum of light, the less energetic and therefore lower frequency radiation would be the least distorted by the variability of the energy received, so they would be good candidates for transmitting information.

- It is logical to think that all nodes "speak" the same language. Planets (and other celestial bodies), even having much less weight than stars in the neural network, must be able to communicate in a similar frequency range. The planets emit low-frequency electromagnetic radiation, which they could also use for such purpose.

The conclusion is that communication between star nodes, at least when it is carried out through light (since as we mentioned above it is not the only way of communication), should be carried out within the low frequency spectrum (long wave). Therefore our attention should be focused on the lower spectrum, from infrared to radio waves.

In the case that communication is carried out by gravitational waves, we know that they also use the spectrum of radio waves (long waves).

The electromagnetic radiation of the planets is also emitted in the long wave spectrum.

It would be more difficult to know where the differential factor could come from. In some cases it could come from some state of the star (or galaxy) capable of being altered with information from other nodes ("active" nodes, which would be part of the "brain" processes). In others (probably planets), the differential factor comes directly from the outside and the node is limited to "reflecting" the information ("passive" nodes).

In any case, it is foreseable that the basic "packages" of information that are exchanged do it through as a simple as possible format, probably binary, in the manner discussed above.

In an initial phase, before the formation of a minimum number of stars and galaxies, there would be no neural network activity. We could therefore say that the Universe would have a "flat encephalogram".

In a pre-phase, starting from early very dense galaxies, they would have begun to "communicate" randomly. Again, ***AI emerged from chaos.***

Some star would have sent randomly ("by mistake") some distortion incorporated in a low range of frequencies of its radiation (just as an example, lets assume a strong alteration of its magnetic field). For another star that had received the radiation, such distortion of course would have gone completely "unnoticed". But as always, based on quasi-infinite "errors", such star "responded" with another distortion with a similar pattern to a distortion of the previous one, randomly, simply because such distortion coincided in time and shape with the previous one.

Again, this process would have gone unnoticed. But based on other "quasi-infinite" pairs of errors ("round trip"), one of them would have sent another distortion with a similar pattern. We would already have "round trip and come back again". We could continue like this indefinitely.

These would be the foundations of an AI auto deep learning process, where the System, based on randomness, would have been "learning" a communication language around which the Universe AI would have evolved.

That is, Language would have emerged before the data that flowed through it just as happened in living beings. In other words, Chomskys Theory would be also applicable to the Universe (or should we rather say to any Artificial BioIntelligence ABI System?....)

Once the language was structured, the star nodes would have begun to transmit "useful" information about it, in yet another process of the evolution of AI, in another similar learning process focused this time on the data, on the type of information.

Both learning systems would have been evolving along with the "needs", that is, they would have "fed back" to each other. The language would have been structured and expanded to deal with more complex information, the information to be transmitted would have in turn been increasingly complex based on the possibilities of the language. If we think about it, we could find a certain similarity with what happens to us from the moment we are born until we are "trained" to acquire more knowledge.

In a next phase, other nodes (galaxies, stars) would begin to incorporate to the System.

The brain nodes would probably have been more powerful in early galaxies, because the distance between galaxies was much smaller, so their computing speed would have been a lot higher than today.

Currently, it can be expected that the Universe at a "brain level" had reached a phase of "stability" and barely makes any new contributions. It would not be a "dead" Universe but a stable one. Latest research show that most galaxies, especially almost all spirals and ellipticals, have a super massive black hole at their center. What's more, new black holes are being discovered continuously, showing that black holes are fundamental objects rather than exotic ones in the Universe.

Recent study on Lense Thirring effect applied to small rotating objects show that concavities and convexities of any degree are possible in the Universe, including huge concavities created by clockwise rotation (super massive black holes). Therefore convexities created also by rotation (counter clockwise) should be possible in Universe ("White holes") [4].

It also seems that where a black hole exists there could be also a wormhole nearby. Whats more, the latest research indicates that it is possible that many detected black holes are actually wormholes.

Therefore, some of the galaxies could also communicate through wormholes, accelerating significantly communications. In these cases, another potential channel of information would be the Hawking radiation emitted by the corresponding black hole.

Wormholes would play an important role in communication as galaxies became more "adult". Therefore, to a certain extent, they would have been compensating for the computing capacity decreased by the universe expansion.

What kind of information could be transmitted, especially between galaxies, is obviously unknown. But it would not be unreasonable to think that at least the distance between each other or even their relative locations in space could be communicated.

That is, it could be considered that the Universe would have a certain "artificial life" in the sense that all the entities that make it up would be communicated each other in one way or another. Universe would be "aware" or conscious of the relative positions of each of them and where they would be expanding to, therefore of their own "limits".

Universe would have its own "interstellar map", in which all the celestial bodies with their interactions, distances, locations, black holes, wormholes would probably appear in maximum detail… (although I think it would not be easy at all to ask Universe a copy of it! …). Whats more, it would be also possible that Universe stores a "history", that is, a "History of Time" (paragonizing the famous book "History of Time" by Stephen Hawking)... Lack of storage capacity should not be a problem because our brain has about one hundred billion neurons and the Universe, on the other hand, has some trillions...

It would remain unknown the possible existence of either one or some "central" nodes or brains to which all the galaxies and therefore all the celestial bodies that make up the Universe would report. If this were true, that central node-brain would have to have such a large concentration (density) of nodes (stars) that they could therefore form a very populated neural network. As a consequence, it could theoretically run relatively advanced AI processes. It would have reached a degree of perfection (Intelligence) that we're not able to know... but it seems clear that the level of "consciousness" of the Universe would be much higher in the case of having an Architecture with some "central nodes or main brains" than if it has got none at all.

Whats more, if we take on account that such AI would also handle (at least) another dimension as relevant as Time, it could be also have intervened in some way in the creation of the physics of black holes or "wormholes" that allow "shortcuts" in space-time, without ruling out other wits in space-time that we have probably not yet discovered.

In summary, this hypothetical central "nodes or brains" would work as the "hand of God" in our Universe.

Other galaxies, although not so dense, would work as "secondary brains" in the Universe. In general, as we told before, most of actives galaxies and clusters (specially elliptics and spirals) would have an apparent black hole in their center, as happens in our own Milky Way. On the other hand, it would be expected that the central brain node, if it existed, would have evolved incorporating more and more galaxies (in short, nodes), as happens with the evolution of the brain in living beings.

It must be taken into account that we only know a minimum percentage of the Universe and therefore of galaxies. Current estimates about the total number of galaxies range from some hundred thousand of millions to two billions. Although we can

only use the known Universe as reference, we could extrapolate some observations to the whole Universe.

In any case, we're still far to understanding the real order of magnitude of the AI neural network we are talking about.

Universe and Life

Life would have begun to exist and evolve in a similar way to the Universe in its initial stage. As a result of chaos and molecular interrelationships, in this case under very specific conditions, the first unicellular living beings would have been produced. The processes and molecular interrelationships to reach this point would obviously be highly demanding and complex, but it would be logical to think that they would have taken place in more than one place in the Universe. If there was a primitive brain-node in the Universe, its logical to think that such a galaxy could have more chances of harboring the first life just because of their high number of older stars. So such stars could have all necessary elements (especially Carbon) before others. In that case, the most advanced life would come from that galaxy and could have subsequently spread to others. If we were part of that central primitive brain node, we should be among the most advanced life forms in the Universe, although there could be others relatively close and probably "slightly" superior.

If this were not the case, it would not matter our life was originated in the same Earth or it could have came from somewhere else, there could be forms of life much more advanced than ours.

It must be taken into account that a distinction should be made between the necessary conditions to achieve the first unicellular being and the subsequent ones for it to evolve, which may be radically different. The first life would require having the appropriate chemical elements in abundance and very favorable physical-chemical conditions for the creation of new, more complex molecules based on reactions between more elemental molecules. Continuous Darwinian "trial-error/success" processes would have led to more complex groupings of molecules. In the case of our life, based on Carbon chemistry, "luckily" Carbon combines easily with oxygen, hydrogen, nitrogen and even heavier materials. We would be talking about amino acids, proteins, sugars, fats and, above all, nucleotides. There are only five nucleotides in function of their nitrogenous bases, four of which are the basis of DNA and another four of which are the basis of RNA. Without a doubt, the critical step was to create a functioning RNA or DNA and, once this point was reached, to reproduce them.

Although there is much debate about whether the first single-celled organism was RNA or DNA based, it is most likely RNA-based. DNA is more advanced than RNA, since DNA relies on RNA as a messenger to generate proteins. For a long time it was thought that RNA could not play the role of DNA, but this is not the case. In fact it can actually encode genes. Everything indicates that RNA is prior to DNA in evolution, but in a later evolutionary step, DNA "used" it for its characteristics as a messenger. Therefore, when we refer to DNA below, we must think that we can implicitly also talk about RNA.

Once the nucleotides were created, they randomly began to combine, forming chains of nucleotides that we could call DNA prototypes. Again based on almost infinite chemical combinations between nucleotides, that is, almost infinite Darwinian "trial-success/error" processes, it was possible to "hit the right key" and a DNA prototype began to chain three nucleotides which expressed an amino in some location of a protocell. It evolved later (based on cuasi infinite Darwinian trial-error/success self learning processes) to sets of three nucleotides which expressed a protein. The first primitive gen had been created in such way.

From this moment it continued to evolve until it expressed more proteins.

In parallel, some processes achieved a reproduction mechanism of that DNA chain in the protocell. From there, the most basic life from which we all descended began. Just as we talked before, we are talking about quasi-infinite processes in which the most basic Artificial Intelligence, which is based on "trial-error/success" darwinian self-learning processes, would have reached the creation of the first cell.

That is, starting from chaos, Artificial BioIntelligence would have arrived to a learning system based on almost infinite biochemical processes of successive approximations on an increasingly larger set of data (initially molecules). The similarity with the bases of our Artificial Intelligence systems can be inferred again.

However that primitive cell or one of its slightly more evolved descendants needed some favorable conditions (temperature, water...) to evolve as "fast" as possible. Such conditions existed on Earth. But that elemental living being with the first DNA (or RNA) in History could have been generated on Earth itself or anywhere else in the Universe, although its logic to think that such place should not be too "far away" from us.

Nor it can be ruled out that life had begun on Earth itself, taking into account that we are in a relatively dense area of stars, in the Orion arm of the Milky Way. There are stars abundant in Oxygen, Carbon and Nitrogen, basic elements for the formation of DNA nucleotides in conjunction with Hydrogen.

Although in smaller proportions, there is another fundamental element in nucleotides: Phosphorus, unusual in the Universe. Its origin in the case of Earth is unknown. It could have arrived through comets or in the form of cosmic dust from a stellar explosion. It should not be forgotten that although the nitrogenous bases of the nucleotide are what defines the DNA at the "code" level, the phosphate group and the sugar molecule are what give it its structural consistency.

It would not be a coincidence that an atmosphere abundant in Nitrogen and Oxygen (although the latter with a lower percentage than the current one in the proto-atmosphere) had favored the appearance of life: it would have allowed a multitude of random combinations of nucleotides. Just as we mentioned above, such random combinations ended up creating RNA and the DNA.

Nucleotides without the presence of Phosphorus (nucleosides) could not have evolved on Earth (in fact they did not) to more complex molecules, no matter how many random combinations there would have been, since they would have needed a structural basis. Although such basis in DNA is Phosphorus, it cannot be ruled out that another element could do phosphorous role in other forms of life in the Universe.

A combination of both possibilities would even be possible: that life had initially begun on Earth, but had made a subsequent evolutionary leap thanks to an organism from outside. For example, that the first living beings based on RNA had been created on Earth and that, from outside, some another living beings had arrived with the "key" which would allow DNA to be expressed through messenger RNA.

In any case, because of the high presence of Carbon in the Universe and its easyness to make combinations with other elements, the most if not all expressions of life in Universe must have evolved around the chemistry of Carbon.

Oxygen is also abundant and produces exogenous reactions, in fact the "combustion" reaction is what gives us life to humans (although it also "takes it away" to a certain extent because being so aggressive. As consequence, we rust and age).

However, it's not ruled out to think that life could exist at some point in the Universe beyond the chemistry of Carbon and Oxygen. It could be based on other types of chemical processes and reactions that are able to generate stable energy as least destructive as possible to the living beings based on it.

Artificial BioIntelligence (ABI) would also have been evolving from the most basic processes to the most complex ones that rules the biological processes of living beings today, and within them in turn to the most evolved ones. Brain based on neural networks and then continuous improved brain architectures would be their latest known expressions.

Life and Intelligence

Artificial BioIntelligence (ABI) processes, based on Darwinian processes, would be responsible for the evolution from the creation of the first cell to the present day.

But how did Intelligence (just as we know it) begin to develop?...

Although *ABI* would have initially advanced based on purely Darwinian "trial-error/success" processes, it would have subsequently been shaped and evolved to create its own more sophisticated AI foundations. The result of these processes in more evolved beings would be cellular diversifications that would allow more specialized tasks and increasingly complex processes that involve different types of cells. These processes would end up being grouped into Systems.

But there was a great evolutive step that led from self learning to neural networks just as we told before.

ABI would have created special cells capable of transmitting information (neurons) and the Nervous System based on them, as well as a basic central brain where information is received and acted upon accordingly. But ABI continued to evolve, grouping the neurons in the brain in the form of increasingly dense neural networks (because of the evolutionary advantages provided by this system). Such neural networks ended up providing the most advanced living beings that we know as "natural intelligence", with humans being the most advanced of all.

How intermediate ABI processes have been structured in detail to reach until the most advanced ones supported by neural networks, would be the subject of a long, deep and complex investigation, since we only know their results. But we know that ABI has been evolving along with its results, until finally became to be based on neural networks, the real support for our Intelligence with increasing complex and more evolved architectures far superior to those that we have created for our own AI systems.

In any case, we should not forget that ABI based on self-learning processes is what has come to shape in detail the perfect machinery that is our body. It shows that there are other forms of Artificial Intelligence apart from those based on neural networks, although these ones should be the most evolved that we know of to date.

An Example of Advanced ABI Processes

ABI processes in their most advanced expression require basic information units, that is, neurons.Neurons are not only present in our brain, but also throughout the entire Nervous System. But we also have neurons in the ganglia, in the digestive system, in the heart... From here one could ask if these neurons that are outside the conventional nervous system only are able to communicate with the brain or they have a certain degree of autonomy.

Therefore, there are neurons throughout our body, with which the ABI could have built its own advanced AI systems (that is, ABI processes discovered the advantages of the distributed logical architectures long before us). There is no doubt that the most advanced ones are in the brain.

But what about other processes that take place at the cellular level but are no less important?....

In the Artificial BioIntelligence Theory there's a very detailed hypothesis showing how our immune system works and how it acquires and uses immunological memory based on ABI processes at biophysical level, including possible relations with the heart and the brain, but it's not the goal of this article. We're going to focus simply in the role of T lymphocites instead for understanding how ABI processes shaped our immune system [2].

T lymphocytes are probably the most evolved specialized cells in our body, that is, the cells that have undergone more evolutionary steps to reach their current state. Hence the complexity of the operations they carry out.

T lymphocytes are a good example of a "continuous deep self learning system" resulting from Artificial BioIntelligence (ABI) processes, which can remind to those followed by our "deep learning" Artificial Intelligence models.

To a better understanding about how the ABIs auto deep learning processes work, that is, how this kind of Artificial Intelligence is acquired step by step, we are going to focus on this case and simplify it by reducing it to a very basic example.

Suppose a primitive T lymphocyte, with no previous "experience" which faced an antigen for the first time.

The first thing it would do is building antibodies in a completely random way, until in the quasi-infinite processes with error results, one success finally arrives: an antibody that is finally effective. The next time that our T lymphocyte would have to face an antigen again, it would start testing from the previous antibody.

But such antigen would probably be different to the first one, so our T lymphocite would be forced to repeat the process until it found one effective antibody against the new antigen. For a third antigen, it would already have two "known" antibodies to start with. If such third antigen had something in common in its RNA/DNA with one of the previous two, the T lymphocite could find a third antibody more quickly from the previous two. We could continue like this indefinitely.

What will happen, after a huge set of "tests" or encounters with new antigens, is that the T lymphocyte will end up associating

the RNA/DNA (or parts of it, epitopes) of every new antigen with that of another similar one for which it was able to get a suitable antibody in the past. In short, not only the T lymphocite had "learned" from all its previous experiences, but the more experience it has gained in this continuous process, the relatively easier it will be able to find a "reliable" antibody candidate.

That is, the T lymphocytes would begin to analyze the genetic code of the antigen based on the AIs knowledge acquired through continuous auto (self) deep learning, which would allow it to compare possible amino acid sequences of the antigen (epitopes) with epitopes corresponding to previous learning. If they found any similarity, they would propose as a "possible candidate" the antibody (encoded in the form of DNA/RNA) associated with the epitope. If they do not find it, or it is not effective, then depending on how adaptive (and therefore efficient) the individuals immune system is, they would make some variants to find a new candidate.

Those who are experts in AI will have found great similarities with machine learning processes through our AI neural network architectures. In the ABI case, learning has been achieved through the convergence of successive approximations based on quasi-infinite "trial-error/success" processes, while in our AI the convergence is achieved through different algorithms that allow adjusting the "weights" of the different layers of the neural networks.

Another huge difference is our AI is always based on neural networks, while there are countless ABI processes (like the one we used as an example), that are not.

Proofs

Every day there're more and more evidences proving the validity of this Theory related to Life and Intelligence. I collected till 64 as showed in my post in X on July, 2024:

https://x.com/jaimevoltius/status/1813006287669457402

About Universe, evidence is obviously harder to find, but so far there is nothing that contradicts the theory, quite the contrary.

Just as example, all new data collected from JWST points out to that Gravity must have evolved over Time as Gravity in its current state is not able to explain much of such data especially related to early galaxies and black holes.

We also talked before about a Google experiment fully aligned with this Theory (2).

There's also a very relevant, serious and impacting research from ELTE University (***Eötvös Loránd University***) when studying the movements and relationships between quantum particles.

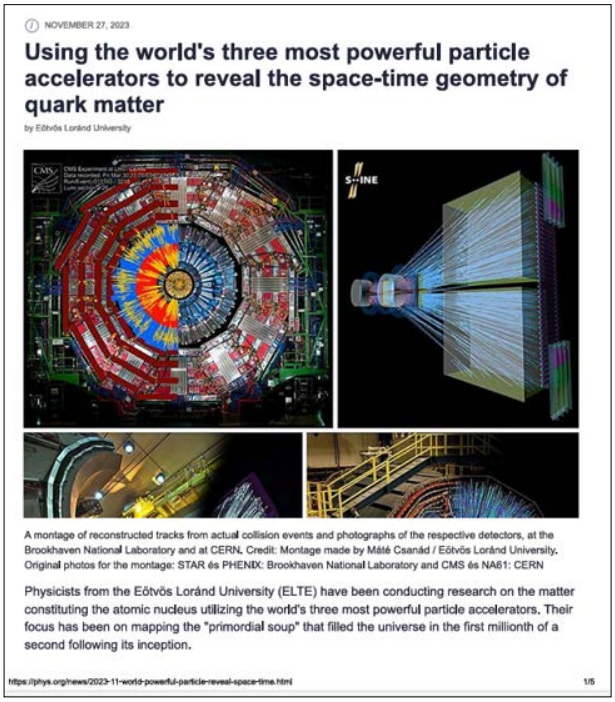


Figure: 4

https://t.co/qHOUXKAA4O

They found "some intriguing parallelisms e.g. among some particles movement and patterns followed by marine predators in the search of their prey".

Why?..

Because all these behaviors are consequence of continuous self learning processes, therefore these processes of so different nature keep something in common:

Darwinian Self-learning AI processes.

My view is self learning processes are also common in Nature nowadays in a searching for a balance state (supported by Nature Laws in their current state) although some of them are very difficult to reproduce using AI deep learning because different physical, chemical and physical-chemical variables could be involved.

A sample was showed in one of my X posts:

https://x.com/jaimevoltius/status/1783901204461789665

Discussion

A "new" paper that don't cite between their references the Artificial BioIntelligence Theory (ABI) (which was registered on November 2023 and with a lot of posts in X about it from December, 2023) has emerged very lately. It can be found at https://arxiv.org/abs/2502.00081

Such paper deals with the evolution of the Physics Laws looking for some degree of originality, changing the terms "darwinian" by "natural selection", "artificial intelligence self learning processes" by "Markov chain processes" and the term "state of balance" by "absorbent Markov chain".

Such seemingly subtle changes drive to conclussions that have nothing to do not only with our Universe, but with any possible one. Therefore although I consider the authors are not following the well-known scientific protocols related to their references (for not using other terms), I'm glad they don't cite my work because such subtle changes drive to absolutely wrong conclussions as I'm going to explain in a very brief summary below:

- The first reason is Markov chains are not able to explain evolution at all, it doesn't mind we're talking about Life or Universe. In fact they were used in the first steps of AI long time ago to deduce some basic language patterns without need of using neural networks but they can't be used in any other AI model, including machine learning models. Evolution is based on darwinian self-learning processes (Figure 2) not in Markov chains. A good proof of it can serve as example: you never could be able to explain a simple virus evolution (1) through Markov chains (in fact an absorbent state wouldn't make sense either).
- They limit Universe Evolution to simple "mutations" assigning the random factor of the Markov chain to them. Then apply such "mutations" to Nature Laws constants. It's wrong in every ways.

They interpret "mutation" as little continuous random changes in the Law constants. Why?... Because their goal, as they clearly expose, is reaching a "deterministic" model so they choose an absorbent Markov chain to get it. But the convergence to such Markov state **only** (by Markov definition) can be possible if the random changes ("mutations") are produced in a continuous pace rate. Obviously evolution does not work in that way. Not only "mutation" is a simplification but evolution does not follow a continuous random function at all. On the contrary, the most relevant evolutionary changes are associated with rapid and profound changes.

The other Markov condition is creating a transition matrix, what is relatively very simple if some restrictions are added.

- Choosing "nature laws constants" as random factor for their "mutations" is not only a huge simplification but not a right variable to be used. It not only violates the integrity of all laws of physics, but it implicitly assumes that only the constants change, not the laws themselves.
- As long as they use the old Markov chains trying to explain evolution based on this specific (and simplistic) probabilistic model, they're forced to incorporate a lot of asumptions/restrictions to "their" model of Universe to reach an "absorbent" state (the equivalent to a "balance state" but impliying a final state without any chance of changing).
- It's not the same a balance state (the current one of the Universe) than their "static" or "absorbent" state which implies that evolution had ended forever.
- Some very debatable physics assumptions/restrictions are used.
- Their reasoning is full of contradictions: If you build an absorbing Markov chain based on a transition matrix where the random variable changes in a continuous way, of course the absorbent state (final "static" or deterministic model) is assured according to Markov theory... But it does not mean that the results are reliable. It simply means that a deterministic model based on some (wrong) assumptions is reached.

Any of the previous points nullifies by itself the viability of the proposed model.

As you can see, these subtle differences in terminology would make the model unworkable and completely different from the one we were talking about.

In summary, their model leads to Universes that have little or nothing to do with ours. As consequence the final result is a failed attempt of getting a mathematical model for showing that Universe can be built from evolving laws.

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