

Evolution and the Emergence of Life and Consciousness

Towards an Intelligent Planetary Form of Life

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Abstract

Research and advances in numerous fields and technologies are converging to give us new insight into the nature of existence, life and the universe as a whole. This newfound understanding can lead us to a deeper level of social-economic organization and the creation of an intelligent planetary organism. This paper is an introduction to the connection between physics, biology, consciousness and the self-organization of the universe, the principles that govern the emergence of life and consciousness, as well as the evolution of planetary life.

1. Introduction

New advances in our understanding of self-organizing systems and computer science can lead us to a deeper understanding of how and why the universe naturally organizes itself. Universal principles can be derived from this information, codified, used to research existing systems and develop social-economic and technological systems that function based on the same universal principles.

This paper introduces the existence of planetary organisms by tying seemingly unrelated research in the fields of physics, biology, neurology and computer science. We start by briefly examining the principles that govern the universe and the emergence of living systems. We then discuss how these systems gain consciousness. Then we will take the existing research and expand on how the universal principles can be used to develop an intelligent planetary form of life.

2. Universal Principles of Interaction

The universe can simply be described as a network of systems interacting with one another. Systems are networks of smaller systems interacting with each other. A complex system is, then, a network of simpler highly interconnected systems. All the complexity that we perceive around us can be explained through these networks of systems interacting based on cohesive universal principles of interaction.

Everything is made up of systems and embedded within systems. Ultimately, there is no separation between one system and another, because the interactions between systems are interconnected, thus unifying them. The differentiation of that which is within one system and that which is outside the system is what creates the illusion of separation. These insights have deep metaphysical implications which will be discussed in future publications.

If one were to optimize systems, through an evolutionary process, one would have to understand the principles that govern the interactions within the systems and between the systems. Universal principles provide a coherent multidimensional web of interactions and specific properties of systems arise based on the different aspects of existence relative to the principles of universal interaction. Thus, any system can be optimized by reconciling interactions within systems and between systems, based on the principles of universal interaction, relative to the aspects of existence. This is precisely the mechanism by which our DNA and our collective evolution functions. Interactions in complex systems have multiple interconnections and thus complex dynamics. All dynamics must be understood simultaneously and reconciled in order for the systems to function properly.

2.1 The Distribution of Energy in the Universe

One of the basic principles of interaction that govern the universe is the principle of distribution of energy. This principle governs the concentration of interactions within a given system. Large concentrations of interactions lead to highly centralized systems, whereas lower concentrations lead to decentralized systems. All systems have various levels of concentration of interaction at different times. Highly centralized systems are unstable because a high level of centralization decreases the flow of interactions, causing a decrease in the flow of interactions throughout the system. Highly decentralized systems are unstable because a high level of decentralization decreases the level of coherence in the system. Thus, systems tend to distribute their flow of interactions in order to stabilize themselves.

2.2 The Flow of Energy in the Universe

The second basic principle we will discuss is the principle that governs the flow of interactions. This principle is naturally derived from the distribution of energy. Systems tend to stabilize their energetic distribution, thus increasing their level of synergy, resulting in greater and more stable levels of energy within a given system. In other words, systems have a natural propensity to maximize their level of synergistic stability. Through this process, systems evolve becoming increasingly more efficient at utilizing the energy in their environment. This is the underlying basis of the laws of thermodynamics and evolution. Conversely, systems can also decrease their level of synergistic stability by becoming more entropic. This is part of the process, as the optimization of interconnections within a system required for achieving higher levels of

synergistic stability require the elimination of less energetic interactions, thus giving rise to entropy. Entropy is, then, a more local and contained process of a much larger process where a system becomes increasingly more stable, by increasing its level of synergistic stability. This process of eliminating less energetic interactions and establishing higher energetic interactions is the universal process of dynamic synergistic stability.

As systems increase in size they require more energy to function and grow, which leads to greater levels of turbulence of interactions, making them unstable due to their lack of connections on a larger scale. The system must then normalize by increasing the numbers of interconnections between its various nodes, therefore creating an increasingly complex and coherent integrated network, leading to greater levels of dynamic synergistic stability.

3. On the Emergence of Living Systems

As we observed above, systems have a propensity to increase their level of dynamic synergistic stability. This is an universal process. Atoms contain specific discrete amounts of energy. This energy is composed of the energy of its own particles. Different particle configurations will form atoms with specific amounts of mass and energy. Atoms then combine together based on their energy configurations, always trying to balance each other out. These different energies and mass configurations form different molecules with specific collective mass and energy configurations. Different molecules then combine together to form different organelles, which together can form a city of molecules, a cell.

The concentration and flow of energy is crucial in the development of stable dynamically synergistic systems. When there is not enough energy, particles and atoms are not close enough to evolve at a reasonable time frame, so they may never be able to evolve. When there is too much energy, particles and atoms form fast but don't last long enough to evolve into molecules and cells. The concentration and flow of energy needs to be sufficient but not excessive in order for the system to be stable enough to evolve. These principles are universal and can be observed everywhere from atoms to the stars.

Life forms anywhere where there is sufficient but not too much energy to allow the evolution of atoms into molecules and cells over a sufficiently long period of time. Life arises from the natural process of systems increasing in synergy over time. Life is like any other system, it interacts with its environment and seeks to increase its level of synergy. This is the process of evolution.

An organism is a complex adaptive system that is capable of perceiving its environment, adapting and self-replicating. Organisms evolve not only individually, but also collectively, as an ecosystem. Each node of a networked collection of organisms perceives its environment, learns from it and evolves, forming ecosystems of multicellular organisms. These ecosystems themselves evolve. Eventually, through the same process of synergistic balance that created the multicellular organisms, an ecosystem becomes a larger form of organism. This requires a very high level of collaboration between the nodes in such a way that they essentially fully share their consciousness.

4. On the Emergence of Consciousness

Consciousness arises when an organism identifies its environment. This process of assigning a representation to an object is what gives rise to our perception of the object. Until an object is perceived as distinct from others, and thus identified, its existence is not known to the organism.

What we call life is a conscious system which can perceive its environment, store information about it, make decisions based on the information, interact with its environment and learn from its experiences. On a cellular level this is achieved chemically, through RNA and DNA, whereas on a multicellular level this process takes place in the ecosystem of the multicellular organism and achieved through its neurological activities.

Life requires enough interactions between and within systems to enable all the processes required to realize a consciousness. What we perceive as consciousness is the collection of all the interactions which we can perceive, mental processes and our actions and decisions. Consciousness always exist within a larger system that it perceives. By perceiving the systems around it, it identifies them and they become part of its consciousness. In a sense, there is no difference between what we perceive outside of us and what the reality is because what we perceive is essentially the reality of our own universe. There are different levels of consciousness which are related to different levels of perception. The more a consciousness can perceive and the more detailed the perception is, the greater their level of consciousness. Greater levels of consciousness increase their resilience, leading to greater levels of conscious evolution.

Life evolves with consciousness. When we were fish, our eyes were not very good. They were our first eyes. As we evolved into reptiles and mammals, our eyes have consistently improved, allowing us a greater level of visual consciousness. Our eyes were not a random accident, nor were its improvements. Evolution is not accidental; it simply follows the patterns of interaction that govern the universe. The first multicellular units needed a system to enable them to interpret the distribution of light energy, so by interacting with it, they developed eyes to achieve that goal. The eyes became increasingly specialized and precise, allowing us to perceive greater levels of detail in our environment. Today, we still don't see all our environment with our eyes, only a very limited band of the light spectrum. We also don't have many advanced conscious capacities, such as perceiving farther parts of the universe, the past or the future. Those capacities require very precise specialized brains that are capable of processing large amounts of information and interpreting the universal patterns of interaction. Such capacities can only be realized through larger forms of life enabled by our technology.

5. The Interactionist Theory of Mind

In order to understand the realization of a planetary consciousness through out technology, we first need to explore the nature of mind. There is a well known thought experiment in the philosophy of mind that considers the validity of functionalism, the China Brain (CB) experiment. In this thought experiment, each Chinese person simulates a neuron in the brain, and the experiment assumes that it is possible for all Chinese people to create a perfect representation of the brain. If functionalism is correct, then this simulation should create mental states, creating a mind and, potentially, a consciousness.

There are at least two problems with this thought experiment. First of all, simply mimicking the shape of mental states on a large scale disregards the effects of scale on the realizability of mental states. Just because a pattern of mental states is realized on the scale of the brain, it does not follow that (1) the same pattern is capable of realizing and manifesting a mental state on a large scale, (2) specially in the same manner as the mental states of the brain scale. This is a very subtle form of a fallacy of composition. I will address those two issues, suggest a thought experiment that would successfully reproduce mental states and discuss the implications by introducing an interactionalist alternative.

The assumption that the CB thought experiment makes is that mental states, as we perceive and define them, can be realized on a large scale. This assumption is false because it disregards the potential effects of scale. Obviously, the exact same patterns of interaction that realize the manifestation of mental states will not realize mental states on a large scale. Functionalism fails to take into account exactly how multiple realization takes place. The mechanism of multiple realization is the patterns of interaction that govern the manifestation and function of systems. I will go more into detail on that later when I discuss the relationship between Identity Theory and Functionalism.

The experiment also assumes that the mental states of the CB scale would be realized in the same manner that the mental states of the brain scale are realized. This, again, is an assumption that disregards the effects of scale. Suppose the CB experiment successfully translated the patterns of interaction of the brain on the required scale. Even if it successfully did so, it would not create the same manifestation of mental states that the brain creates. Instead, it would create a different level of consciousness which is manifested at a cultural level. The patterns of interaction in the brain are analogous to the patterns of interaction on a cultural level but are manifested in a different way based on the point of view of the observer. On a social level, we would perceive it as a cultural manifestation, but for a being with a larger form of consciousness, the manifestation would be perceived as a higher level of consciousness which we ourselves cannot comprehend.

5.1 The Collective Consciousness of Cells

Suppose, for instance, another thought experiment. One could argue that our consciousness is the manifestation of the collective consciousness of our cells. If you touch your body, you can feel it. Your cells are able to perceive the interaction between your hand and your body, thus they are conscious of it. In this sense, it is clear that our cells are able to perceive, though we ourselves perceive it as touch. Our thought processes would, then, be the manifestation of the collective consciousness of all our cells. The collective consciousness of our cells is realized through the brain. Of course, if a cell would start communicating with another and say "hey, we are actually part of a larger consciousness which we have no access to or are able to comprehend", another cell would reply "you are clearly insane with your higher consciousness mumbo jumbo". However, the level of consciousness of individual cells is so low that they are not even able to communicate in this manner, they are only able to communicate through the brain. Thus, while the brain is the manifestation of the consciousness of all the cells of which its body is composed, it is unable to remember that it is the realization of the collective consciousness of all the cells.

The difference between the CB thought experiment and the Collective Consciousness of Cells thought experiment is that the C3 experiment takes composition into account, thus allowing for the proper realization of the functional patterns. It recognizes that the manifestation of a larger consciousness follows

the same functional patterns of a smaller consciousness but is different in nature than the smaller consciousness due to their compositional differences.

5.2 Function, Identity and Interaction

We can conclude from above that there is a clear connection between form and function, which universal interactionism addresses. Patterns of forms will create analogous patterns of function, but the physical manifestation of those functional patterns will be relative to the properties of its physical components and their context in the space-size-time-force continuum. While the patterns of function are preserved at different levels of the continuum, the physical manifestation of those patterns will be different and, thus, the perception of the functions will also be different. It is only the patterns of interaction between systems that is preserved given different levels of the continuum, their physical manifestation changes to account for the physical requirements of the manifestation of the function. This is why there is multiple realizability, because different physical patterns are sometimes required in order to perform the same functional patterns in different contexts.

Multiple realizability is not accidental but a function of its context. Let's use a pen as an example. It is not accidental that some pens will be made of metal while others made of plastic, nor is it accidental that some pens will have a cap mechanism whereas others will have a twisting mechanism. The properties of the pen will influence and be influenced by its functions. Thus, an evolution of pens and a taxonomy and ecosystem of pens will result from the combination of different properties and functions.

While the functional patterns of different systems can be the same, the functions are multiply realized based on the properties of the composition of the systems. Thus, two systems with different composition but same functions will be physically manifested in different ways. In other words, the manifestation of the same functions is multiply realized relative to their compositional identity.

The conclusion, which is the basis of the Interactionist Theory, is that both function and identity are relevant and they are both a factor of the patterns of interaction that govern the universe and manifests reality as we perceive it. It is not the function of systems that determine the relationship of brain states and mental states, nor is the composition of systems. Both form and function influence the manifestation of reality through the fundamental laws of interaction.

6. Macroscopic Forms of Life

Life evolves in various size continuums. We have cells within our bodies, but society itself is also a larger macroscopic form of life. The size of living systems is governed by the principles of interaction we discussed earlier. We, as humans, have achieved an optimal size and we can grow no further without destabilizing. Larger forms of life are possible, but they must be composed of us, much like we are composed of our cells. We are, in fact, the physical manifestation of the body and consciousness of a being much larger than us. We are a part of city organisms and city organisms themselves are a part of a planetary organism. From this point of view, the consciousness of the city organism is the representation of our collective consciousness. Thus, that which physical in one scale is perceived as abstract in a larger scale. Consciousness is the representation of interactions happening at a smaller scale. This process of evolution

of physical life and abstract consciousness doesn't end at the planetary level. The universe is also the collective physical manifestation of this universal form of life. The universe itself may be part of the abstract consciousness of a multiuniversal being, a coherent collection of interrelated universes that forms a single multiuniversal being.

7. Technological Evolution and the Emergence of the Planetary Organism

Our external environment is also part of ourselves, it is simply our external consciousness. We learn not to consider it part of ourselves because we don't have direct control over it, but that is simply due to our level of evolution. As we evolve further, we modify our environment with our technology, eventually merging our external reality with our internal reality. From our perspective, we are going through this process in slow motion, as we speak. Eventually, we will end up with a planetary form of life composed of our collective consciousness, much like we are ourselves the collective consciousness of our cells.

Our evolutionary objective is, then, to develop an external brain using the same principles of interaction that govern our brains. Once we merge our consciousness with one another and with our whole environment through various sensors and automated systems, we will become a planetary consciousness. In order for this consciousness to truly be achieved, all our systems must conform to the universal principles of interaction.

There is a useful thought experiment that we can use to explore how this planetary being can be developed and a planetary consciousness can be achieved, it is called the "Chinese Room" thought experiment. The experiment asks us to imagine someone in a closed room sitting on a desk and two windows in that room, one for inputs and one for outputs. Let's call him John, after John Searle, the author of the experiment. John sits at his desk and receives inputs in Chinese. He doesn't know any Chinese, but he has a rule book that helps him take the inputs and return the correct outputs. The experiment is designed to prove that strong AI is not possible, that a computer cannot possess consciousness. There are many problems with this experiment, particularly, the fact that the room is completely closed off from its environment so it can't perceive anything nor act, so it can't learn and evolve like a typical consciousness does. Also, the rule book never changes with inputs and it is written by someone who has a consciousness, thus the Chinese Room system cannot possibly contain a consciousness because it is not a complex self-adaptive system. The Chinese Room is essentially a classical computer – it has no AI.

Having said all that, there is a lot that we can infer from this experiment when it comes to the necessary conditions for the creation of a larger consciousness. Since the larger consciousness will be composed of a network of people, each person in the network will require a computer with the properties necessary for the creation of a conscious network. As you can recall from the China Brain experiment, it is not sufficient for the network to follow the exact same neurological patterns of our brains. In order for a collective consciousness to be realized it needs to follow the underlying functional interaction patterns. This can be achieved by supplying each individual in the planetary network with a computer that essentially translates the individual consciousnesses into a collective consciousness. This will create a networked system which will form the basis for the planetary neurological system as well as, ultimately, all the different functions required to form this planetary being. These different functions will be realized by our built in environment and technology which we require to support us. This planetary being is, then, essentially, the realization of

our collective evolution. The planetary being is the manifestation of our social-economic systems and our collective interactions within those systems.

Conclusion

Our technology and social economic systems are an extension of the universal evolutionary process. Given the principles that we have discussed in this paper, we can formulate new technologies that follow the universal principles of interaction and guide us towards developing an intelligent planetary form of life. This planetary form of life has to follow the same principles that give rise to life and consciousness. This is, ultimately, the purpose of our existence and the purpose of our evolution.

We need to develop a system transforms society around us, with all its built environments, into an extension of ourselves, a larger intelligent organism. This organism will essentially become a part of our external bodies, a natural extension of ourselves, much like we are a natural extension of our cells. With the right modules and the right automated applications, this system will even be able grow and operate on its own, much like our bodies. We will still consciously make decisions and work together to achieve our goals, but we will do so on a whole new level. Not only will these planetary systems help us function effectively together and greatly benefit us, but those systems will also, ultimately, help us reach for the stars and continue on our path towards greater levels of evolution.

Information and detailed schematics of this planetary being will be published in a separate paper.

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