
Understanding Monad from the Perspectives of Bioinformatics

Sachi Urano, Rajib Shaw

Graduate School of Media and Governance, Keio University, Fujisawa, Japan

Email address:

shaw@keio.jp (R. Shaw)

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Abstract: A monad is a strictly simple (unitary) entity that is not composed and has no parts, but nevertheless has state as an attribute. Biogenesis is the growth or origin of life or living organisms. The process by which a fertilized egg becomes an adult form is called ontogeny and the process of change by which a wide variety of forms have emerged from the simple organism that first appeared on earth is called phylogeny. In the Bioinformatics, for Obj, the observation process (approach) is called HACS (Hierarchical Autopoietic Clustering System) and the observation target (target object) is known as DSN (Dynamic Semantic Network). In this short paper, we explain the biogenesis process in terms of monad. If Monad is considered as life information, HACS represent logical thinking of person, while DSN thinks of emotion / image thinking. HACS is related to machine information, while DSN is related to social information. The society in which we live is always composed of multiple monads, each of which operates with its own experiences, values, goals, and will. In this context, the idea that living things are Aufheben is important because it connects technology and art, logic and emotion, and it is important to think about life holistically. Once we understand this phenomenon, it is easier to draw the combination of Merkaba and Point equilibrium to recognize both sides of art / culture and logic / rule. In this paper, we argue that going back to the mechanism of consciousness and creating a community based on value-based principles will lead to the creation of a sustainable social system consisting of collective knowledge by consolidating the consciousness that governs the times.

Keywords: Monad, HACS, DSN, Biogenesis, Merkaba

1. Introduction: Understanding and Defining Monad

“Monad” (from Greek monas “unit”), an elementary individual substance that reflects the order of the world and from which material properties are derived. Leibniz [1] believed that if one analyzes the components of what exists in reality, one arrives at an entity that cannot be further divided, that has no extension (neither breadth nor form). This is the monad. According to Leibniz, a monad is a strictly simple (unitary) entity that is not composed and has no parts, but nevertheless has state as an attribute. This is because without attributes all monads would be indistinguishable, and it would not be possible to say that there are multiple monads (indistinguishable person identical). Every monad is necessarily different from every other monad and from each other, and monads change.

The tendency to change from one state to another is called desire. This “state” reflects the state of all other monads. That is, the “state” of an individual monad corresponds to the state of the entire real world, which ultimately consists of, and only consists of, countless monads (i.e., the state of all monads). This is the “representational and perceptual” capacity of the monad (the monad is a mirror). However, since monads are strictly simple entities without parts, they cannot be “related” in the sense that composite objects are related to each other. They are strictly mutually independent. Therefore, this representational capacity, this correspondence with the states of other monads, is not due to external “interrelationships,” which is impossible given the definition of monads, but natural changes in monads arise from internal principles. The change in the state of a monad is the unfolding of what the monad itself possesses as a possibility and is strictly derived only from the prior state of the monad. This representational capacity has varying degrees of clarity,

congestion, etc., depending on the accuracy and clarity of its correspondence. Not all other things and states of the world are perceived and represented equally.

Representations that do not reflect their counterparts with clarity, however, affect the state of consciousness in a cluttered way. This is called micro-representation and is similar to the concept of unconsciousness that will be discussed later. For example, consciousness when asleep is composed of micro-representations that correspond vaguely and indistinctly to the state of the body and the external world. The psyche and life of humans and animals are explained by the capacity of this monad to represent and perceive. Conversely, it follows from this that everything has spirit and life in its own degree.

2. Biogenesis and Monad

Biogenesis is the growth or origin of life or living organisms. The process by which a fertilized egg becomes an adult form is called ontogeny and the process of change by which a wide variety of forms have emerged from the simple organism that first appeared on earth is called phylogeny. "Biogenetic Law" means Ontogeny recapitulates phylogeny [2]. In this short paper, we try to provide insights from system thinking approach of biogenesis process. We integrate the holistic perspective of cybernetics and the autopoietic social system of Maturana's theory [3] and take a unified model from the biological individual to the organic composition of society.

In this paper, we consider the smallest unit of life as monad [which is termed here as object and referred to as Obj from henceforth]. This is composed of HACS (Hierarchical Autopoietic Clustering System) and DSN (Dynamic Semantic Network). In the Bioinformatics, for Obj, the observation process (approach) is called HACS and the observation target (target object) is known as DSN. The two-way functioning of HACS and DSN is complementary and supports monad's activity. In other words, HACS aims at the stage of universality and acquires perspectives, while DSN aims at the stage of diversity and creates a networked consciousness. If we can define Obj, HACS, and DSN, we can track the expression of life forms and the source of their movement. A similar concept of biodiversity paradox is discussed in [4].

Things that work according to their intentions (things that

work on a subjective basis) are full of missing values as a result, because they do not make relative comparisons themselves. Normally, the relative comparisons we deal with, are limited to those in which we can see the same group of people beforehand. The reason why it is said that humans are more than 90% unconscious is because we have not been able to analyze things on this subjective basis. Without considering this reality, the development of Janz's Self-Organizing Universe [5], Miller's Living System [6], and Boulding's theory [7] based on individual behavior and social dynamics would result in the formation of a religious community based on selfless devotion to community and the abandonment of thought, as shown in Storm's New Age History and Present [8].

Each Obj heuristically searches for a local minimum, and the sequence of Obj heuristics acts as an algorithm to identify a global minimum for the lower Obj in a tree structure. Under the inseparability of the subjective Obj and objective Obj relations, the calculation is performed to compensate for the missing data in a semantic space full of missing values. Thanks to this complementary work, we will be able to show the "limited rationality" proposed by Herbert Simon in Administrative Behavior [9] as "conditional probability". Then, the data is taken from HACS, DSN, and Obj as the statistics of bounded rationality, which is the true nature of geometry, analysis, and algebraic systems. As science becomes more fragmented and there exist a large number of individual theories, it will be possible to draw cross-disciplinary theories from the life principles and allow science to support development according to the life principles (like Nature-based Solutions, NbS).

3. Manifestation of Monad and Laws of the Life Form

We view the phenomenon of life as originating from the expression of Monad (Obj). Figure 1 shows that when (1) Obj is expressed and (2) movement begins, the consciousness of "Real" from external observation and "Reality" from internal observation is born. The result of various observations is a bundle of information, that is generated in the observation process in the case of external observation and in the target of observation in the case of internal observation.

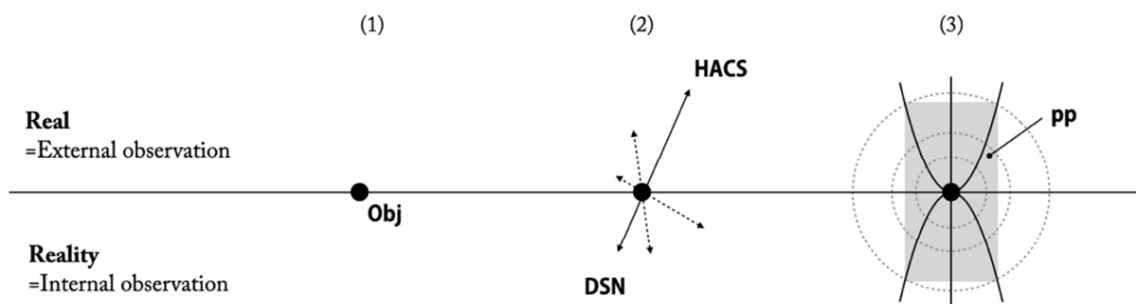


Figure 1. Monad (Object), HACS and DSN relationship in terms of Ontogeny.

In the range where DSN and HACS are complementary to each other, Obj provides a stable energy supply and can easily maintain its independence. This range is quantified as "energy amount", and we term the minimum unit of motion of HACS and DSN as "pp" [performance point indicator], as shown in Figure 1. The reason why fractal structure is generated in life phenomenon is that the energy of Obj is evolved from the interactions of a chain of pp.

The extent to which information is exerted is the energy of Obj. In this way, Obj is influenced by the Obj that was born before it, as Obj is born repeatedly at the same time so that they overlap. This Obj that was born before a certain Obj is the true nature of Upper-obj (Figure 2). Figure 2 also shows the HACS and DSN relationship in terms of energy, where HACS is the energy strength and DSN is the node of binding patterns.

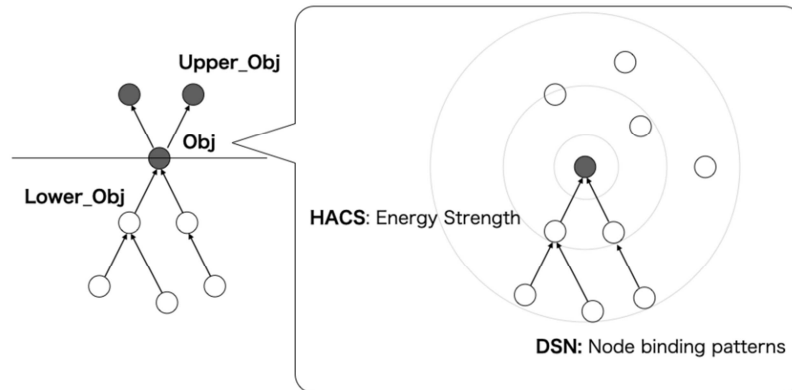


Figure 2. Monad (Object), HACS and DSN relationship in terms of Phylogeny.

The creation of information within a layer is the sum total of information transmission/ storage/ information processing that takes place between lower layers. If we focus on the phenomenon that information is exchanged simultaneously among Obj and visualize the flow of information, a Dynamic Semantic Network (DSN) is generated. Obj has a parent-child relationship. In each Obj, we can find DSNs that connect the relationships in the field and HACSs that depict objective laws.

The reason why Obj exchanges life information can be interpreted as the fact that HACS and DSN are oriented to be inextricably linked to *Aufheben*. *Aufheben* or *Aufhebung* is a German word with several seemingly contradictory meanings, including "to lift up", "to abolish", "cancel" or "suspend", or "to sublimate". Cessation means "to deny something as itself, but to preserve it as an opportunity and bring it to life at a higher level" and "to unify contradictory elements in a developmental way through a process of confrontation and struggle".

When we look over the world where colonies overlap each other in multiple dimensions, we can see that in the multiverse where multiple HACS overlap each other in countless ways, there are countless networks stretching around multiple hubs. Next, we consider the network structure seen in three-dimensional space. HACS and DSN, which are in a stable state in the real world (three-dimensional space), create a structure called "Merkaba" and "Vector Equilibrium" [10]. The difference between the Merkaba and the Vector Equilibrium is that the Merkaba and the Vector Equilibrium have a point at the center (Obj) (=HACS) or a space as the relational value of the three points (=DSN). What they have in common is that they both have a complete fractal structure. When this fractal structure reaches a certain size, it produces a state that is both a macabre and a

vector equilibrium in most cases (HACS and DSN are two sides of the same coin), but it is incomplete in that it has a slight bias toward one or the other structure. Macabre has different shapes, as shown in Figure 3 (left diagram). If one takes the center point of each corner, one gets the vector equilibrium shown on the right diagram of Figure 3. A sequence of vector equilibria becomes a semantic network in three-dimensional space, as shown in Figure 3. When size of Macabre or Vector equilibrium increases, "pp" [(performance point indicator) which is mentioned above, contain a stable Obj with a large amount of energy that has been repeated.

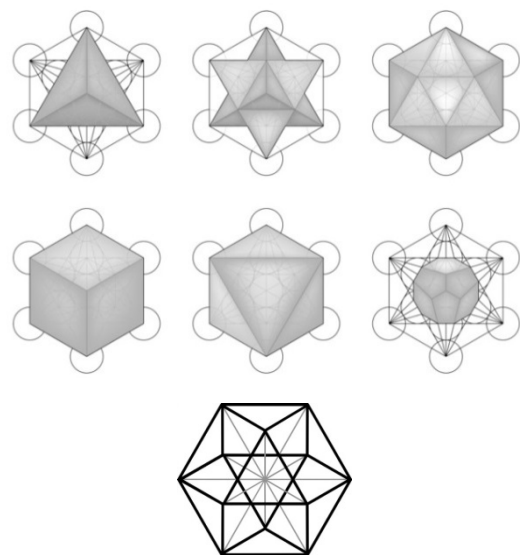


Figure 3. Left Diagram: Set of Sacred Geometry as Merkaba (Metatron's Cube, Platonic Solids, Tetrahedron, Star Tetrahedron, Icosahedron, Cuboctahedron, Octahedron, Dodecahedron and Transparent etc.). Right diagram: Vector equilibrium by taking center point of each corner.

4. Reaction Based on the Network Effects

We define Obj that is biased toward DSN as Obj+ and Obj that is biased toward HACS as Obj-. In this section, we will consider Obj+ and Obj- as a starting point. In the process of DSN and HACS moving toward complementarity, they are spinning right (Obj+: Obj→DSN→HACS→Obj) from external observation and left (Obj-: Obj→HACS→DSN→Obj) from internal observation (Figure 4).

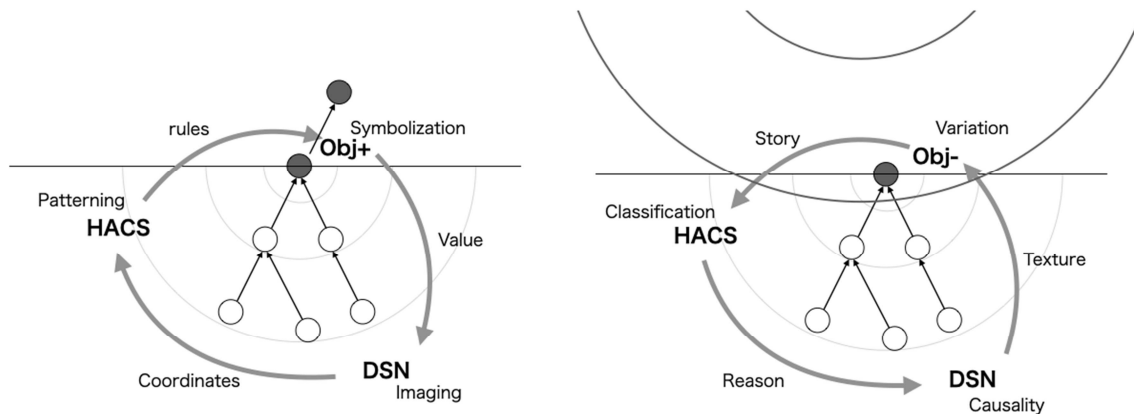


Figure 4. Left: Obj+ centric relationship, and Right: Obj- centric relationship.

Then, when Obj becomes tinged with a particular frequency band, a phase space with the same frequency band is generated, and Obj can be viewed as a tree structure with a parent-child relationship. The tree structure, which can be considered as Colony is the act of observing the parent-child relationship of Obj on a specific colony and can be understood as the refraction of light as a "conditional probability" that defines the direction of energy (vector) at a certain phase. Mathematics has been developed according to how to observe the refraction of light, and algebraic systems, analysis, and geometry. Specifically, the algebraic consciousness depicts set relations using Obj and Colony, the analytic consciousness depicts the will to change and accumulate using HACS, and the geometric consciousness depicts the understanding of properties (mental images) using DSN. The continuity of these consciousnesses leads to the objective recognition of other Obj as "a group with energy" in a certain direction.

Colony can be interpreted as a probabilistic treatment of the common stream of consciousness of other Obj. The common stream of consciousness generated in a colony propagates to Obj's belonging to the colony. A typical example of this is the time axis, and within the same Colony, a relationship is established in which the movements of each Obj harmonize and expand as they deepen their consciousness toward the future.

5. Discussion

As discussed above, if Monad / Obj is considered as life information, HACS represent logical thinking of person, while DSN thinks of emotion / image thinking. As previously stated, HACS is related to machine information, while DSN

To make up for this bias, the living Obj is constantly combining. As a result, the energy content of Obj increases and the entropy of Obj increases. In informatics, Obj centric relationship is systematized as "life information," DSN centric relationship as "social information," and HACS centric relationship as "machine information," but by understanding the relationship between Obj and Colony (see the explanation below), we can treat them all as being based on the same concept.

is related to social information [11]. While there is a clockwise movement (as shown in Figure 4), a person thinks more on value, texture etc., doing decision on emotion, and thus the "Art" and "Culture" part becomes more prominent. On the other hand, if a monad / Obj (life) focuses more on logical thinking, with counterclockwise movement, it becomes rule based. These are also influenced by the nature of upper or lower object. Once we understand this phenomenon, it is easier to draw the combination of Merkaba and Point equilibrium to recognize both side of art / culture and logic / rule. This is also influenced by flow of energy, which is an influence of outside environment and information, which is considered as pp based on the previous discussion.

This also brings the system thinking dimension. With roots in disciplines as varied as biology, cybernetics, and ecology, systems thinking provides a way of looking at how the world works that differs markedly from the traditional reductionistic, analytic view [12]. The more we understand systemic behavior, the more we can anticipate that behavior and work with systems (rather than being controlled by them) to shape the quality of our lives. By presenting the concept of systems as living organisms and data learning rules, we have integrated the early systems research of "organizational complexity" that cybernetics and systems theory originally aimed at, based on the assumption of a foundation with feedback loops.

By using the concepts of monad (Obj), HACS, and DSN, we explained the Origin of life and Biogenesis from the Bioinformatics. The society in which we live is always composed of multiple monad, each of which operates with its own experiences, values, goals, and will. In this context, the idea that living things as "Aufheben" is important because it connects technology and art, logic and emotion, and it is

important to think about life holistically [13].

By presenting the concept of systems as an organism and data learning rules for organizations with such mutually incomprehensible aspects, we integrated the early systems research of "organized complexity" from cybernetics and systems theory, based on the premise of a foundation with feedback loops. Checkland's goal [14] for "science" was to present an intermediate concept between organized simplicity and disordered complexity. With the development of Web 3, the time will come when networks with monads as nodes (merkaba and vector parallels) will actually be put up.

6. Conclusion

Traditionally, problems of origins and evolution, such as those that arise once in a thousand attempts, could not be addressed by science. In recent years, however, as more data has been accumulated and simulation techniques have improved, the Artificial life (Alife) technique has once again been put in the spotlight [15]. However, in reality they can bring about a complementary relationship. The definition of that equilibrium point between AI and Alife as a uniquely meaningful monad, and the circulation of semantics generated from collective knowledge, will make visible the bundling of people's values and the process of empathy. It is a digital transformation (DX) of co-creation that places the ingenuity of the field at its center. Thus, going back to the mechanism of consciousness and creating a community based on value-based principles will lead to the creation of a sustainable social system consisting of collective knowledge by consolidating the consciousness that governs the times.

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