

Application of the Universal Meta-Formalism to Substantiate and Research Intelligence Properties

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Abstract. A formal scientific definition of Intelligence is a topical problem not only of the synthesis of AI but of the world science as a whole as a product of exclusively intellectual activity. It is due to the fundamental shortcomings of the modern general scientific paradigm that is limited to particular dogmatic concepts. This problem is solved by the transition to the universal general scientific paradigm by increasing the level of knowledge abstraction. Achieving a uniform initial Universal Axiom, in principle, allows you to deduce a complete system of Universe's concepts and get a Universal Definition and Formalism of Intelligence from it, which are supposedly applicable to all Universe's phenomena. The paper presents the main provisions of the new approach and deduces the initial components of the Universal Formalism of Intelligence, which follows directly from the Universal Axiom and is represented by exclusively the highest Universe's meta-concepts that can solve the said problem. Such Formalism for the first time qualitatively allows us to formally derive and objectively evaluate any of the innumerable properties of Intelligence, the initial of which are given in this paper. The obtained results are pioneering in this area and have important general scientific significance and the initial application in many technical and humanitarian research and development.

Keywords: The Universe, Universal Theory, Intelligence, meta-definition, meta-formalization, universalization

1 Introduction

Despite the enormous efforts, modern science cannot give a formal definition of Intelligence, which delegitimizes all research in this area and science in general as a product of exclusively intellectual activity [1].

This state has not been changed since the pioneering Dartmouth workshop in 1956, when, for the first time, J. McCarthy admitted: "The problem is that we cannot yet characterize in general what kinds of computational procedures we want to call intelligent. We understand some of the mechanisms of intelligence and not others" [2].

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As a result, in the 1980s, J. Searle's compromise philosophical hypothesis about the essential unity of any Intelligence was supported, which allowed us to divide it into two different concepts: 1) weak (private, machine) Intelligence, which performs separate intellectual functions that can be formalized and implemented now, and 2) strong (general, natural) Intelligence, similar to human, the formalization (understanding) of which is postponed until future [3].

However, such a division did not eliminate, but only transferred the said uncertainty to the problem of distinguishing intellectual functions in the diversity of all actions of living beings. The McCarthy-Searle paradigm has advanced, but has not legalized the above-mentioned works, and a person remained an informal general scientific standard of Intelligence, according to the well-known Turing test [4].

Obviously, the problem of a scientific definition and formalization of Intelligence is a consequence of the fundamental shortcomings of modern science and it can only be solved by substantiated development of a general scientific paradigm [5-6].

For the first time this was done by the authors by increasing the level of knowledge abstraction and moving from the modern system of particular Universe's axioms (in more general terms – dogmas), producing limited systems of concepts in the corresponding fields, to the uniform initial Universe's Axiom (Dogma, UA), producing the entire pyramid-like system of concepts/categories of the Universe (UAP) as the uniform Universal (Meta-) Formalism (UF, UMF). If particular conceptual areas can describe only simple phenomena that fit entirely into one area, then the UMF must obligatory describe all phenomena, up to the most complicated ones, which the Universe and its Intelligence are (Fig. 1) [6-10].

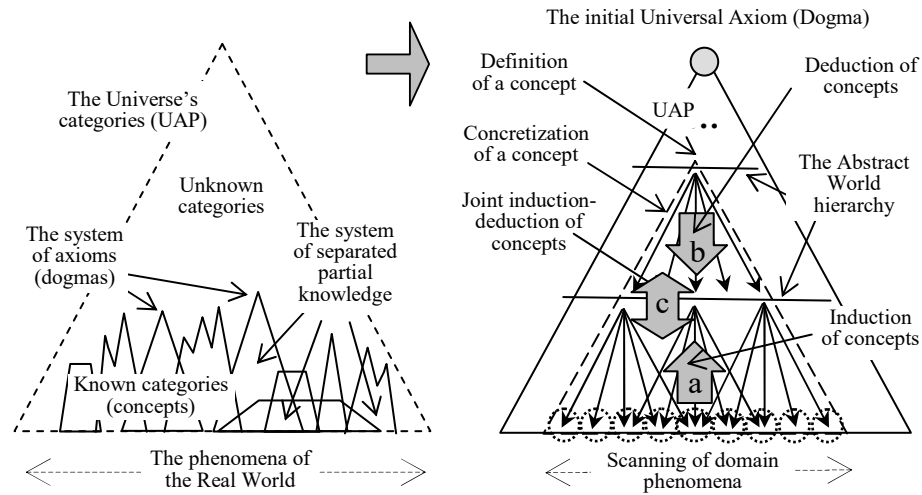


Fig. 1. The development of the world science scheme from dogmatization to universalization of knowledge. Directions of action: a - induction, b – deduction, c - joint induction-deduction

The UMF is a new scientific concept and its construction is problematic, however, it is simplified by the supposed homotropy and constancy of the categories of the Universe, allowing them to accumulate copies to form a uniform stable externally

(with the Universe) and internally (among themselves) consistent system of concepts that is then tested in practice. Naturally, such a UMF must be only one because our Universe has such a character, and the alternative attempts to create it must lead to a single result.

Thus, for the first time, it was possible to build the UMF and deduce from it the Universal (Meta-) Formalism of Intelligence (UMFI) that consistently coincides and extends the observed properties of Intelligence as its new cognition. The UMFI becomes a new standard of Intelligence instead of human, allowing for a deeper formal study of the origin, properties and classifications of the latter. Substantiation of the deduction of Intelligence concept is the goal of this work.

2 Universal Meta-Formalism of Intelligence

2.1 Initial Ontology of Intelligence

Intelligence comes from the concept of relation, which, by all the signs of an axiom, is accepted as the UA (Fig. 2). Thus, Universe's entities presumably have a structural nature and are adequately represented by exclusively multiple set-theoretic and ER-formalisms.

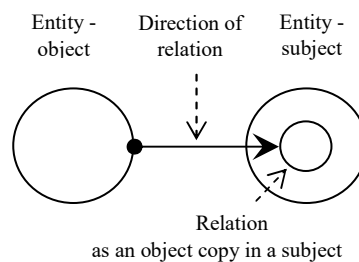


Fig. 2. The scheme of a meta-concept relation

Definition. A relation is a copy of a certain entity (object) in another entity (subject).

Definition. An entity is part of the Universe, singled out by a certain relation as a unitary whole.

Definition. The Universe is a complete set of directly or indirectly related entities.

Consequence. The Universe and its entities have a structural nature that is extremely infinite into breadth and depth.

Consequence. The Universe is its entity.

Consequence. The Universe is a self-determined entity.

Definition. Knowledge is a copy of an entity.

Definition. Cognition is the establishment of relations with entities.

Consequence. Cognition of the Universe is the establishment of relations by its entities with it as a unitary whole.

Consequence. The Universe is a mutual cognition of its entities.

An elementary combination of relations generates the initial ontology of cognition.

The advancement of an object copy generates 4 stages of cyclical cognition of a subject: 1) on the border of a subject (information), 2) inside a subject (knowledge), 3) coordination of the copy with other knowledge of a subject (understanding) and 4) additional cognition of an object (research) (Fig. 3).

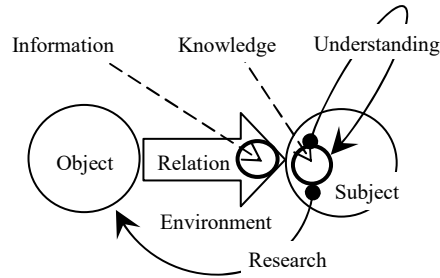


Fig. 3. The scheme of meta-concept cognition

Cognition of a multitude of objects gives rise to the scheme in Fig. 4.

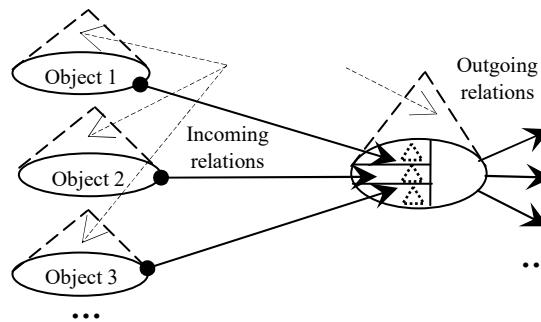


Fig. 4. The scheme of mutual meta-concept cognition

Transferring a copy of an object through an intermediate subject is teaching (Fig. 5).

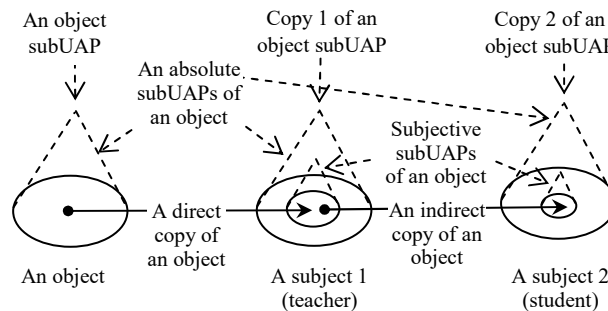


Fig. 5. The scheme of meta-concept teaching

Virtualization of a copy of an object within a subject (virtualizer) is an excess of the categories of an object on their copies (Fig. 6).

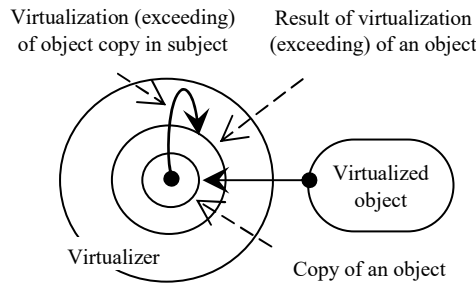


Fig. 6. The scheme of meta-concept virtualization

2.2 Abstract / Real Dichotomy of the Universe

According to Plato and Aristotle, the Universe is divided into the World of categories (Abstract World (AW)) and the World of phenomena (Real World (RW)), which, according to the modern understanding, have the scheme in Fig. 1. According to the universal ideas, the AW begins in the UA and develops further into a pyramid-like system of categories/abstracts/concepts, built into the RW in the form of Space-Time-Matter Complex (STM-Complex), consisting of interrelated Complexes of Space, Time and Matter, the initial properties of which are generally understood (Fig. 7).

Definition. The World is a relatively integral part of the Universe.

Definition. A category (abstract) is an entity of the AW.

Definition. A phenomenon is an entity of the RW.

Definition. A Complex is a phenomenon that is present in all the RW phenomena.

Definition. Space is a regular and invariable Complex of the RW.

Definition. Time is a regular and variable Complex of the RW.

Definition. Matter is an irregular Complex of the RW.

Definition. A thing is an invariable part of the Matter Complex.

Definition. A process is a variable part of the Matter Complex.

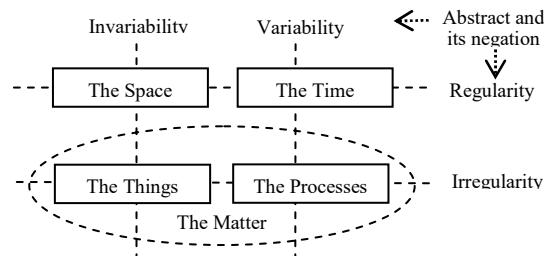


Fig. 7. The scheme of the Complexes ontology

The RW (STM-Complex) consists of interrelated phenomena with built-in categories that determine their properties. The existence of phenomena is determined solely by its categories. Presumably the categories of phenomena do not have internal contradictions. The nature of the category carriers is unknown, but it does not prevent formalization.

Consequence. Concepts are cognition of the abstract part (categories) of phenomena.

Consequence. Facts are cognition of the real part of phenomena.

Consequence. Due to indirect actions (through other categories), the categories are poorly recognized by phenomena.

Consequence. Due to the direct action, phenomena are strongly cognized by phenomena.

Hypothesis. The system of categories is the same throughout the (infinite) Universe.

Consequence. Facts determine the activated categories of phenomena.

Consequence. Knowledge is the concepts of facts and categories of phenomena.

Definition. A formula (formalism) is the system of categories / concepts of an entity.

Definition. An axiom (definition) is initial formula of an entity.

Definition. SubUAP is an abstract part of an entity.

2.3 Universal Harmonic Classification of Phenomena

Phenomena 1) exist in an STM-Complex and 2) are divided into 3 non-empty groups of relations: internal, external and intermediate among them (Fig. 8). Additionally, these relations are divided into the Past, Present and Future (Fig. 9).

Special states of internal relations development give rise to the universal harmonic classification of phenomena, the simplest (initial) of which is shown in Table 1.

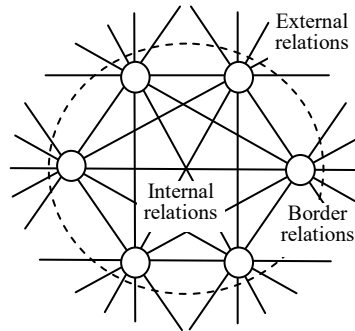


Fig. 8. The scheme of a phenomena harmonic structure

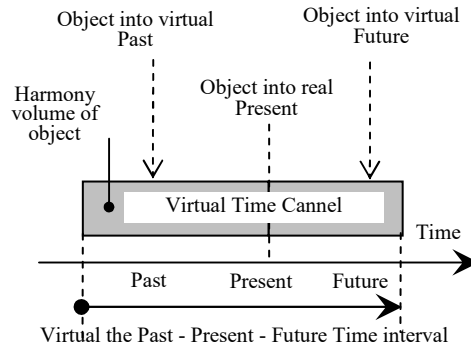


Fig. 9. The scheme of a phenomenon dividing into the Past, Present and Future and its Virtual Time Channel

Definition. A virtual relation is a copy of a real relation.

Class 1 (Thermodynamics) has relatively weak real intermediate relations and exists exclusively at the point of the Present, continuously moving from the Past to the Future.

Class 2 (Mechanics / Natural selection) has real intermediate relations comparable to internal and external ones at the point of the Present and is supplemented by virtual relations with the Past that make up an internal structure of a phenomenon (a copy of the Past in the Present of the phenomenon). Mechanics inherits and develops Thermodynamics.

Class 3 (Life / Intelligence) inherits Thermodynamics and Mechanics and is supplemented by virtual relations with the Future (the forecast of a phenomenon) by predicting the development of a phenomena over a certain time interval.

Class 4 (the Highest Reason) inherits Thermodynamics, Mechanics and Life and is supplemented by real relations along the entire axis of Time.

Thus, Classes 2-4 are directly related to Intelligence, have specific formalisms, definitions, properties, and further are concretized into the following subclasses. Class 2 conditionally got into this group due to the importance of natural selection for living phenomena.

Table 1. Universal harmonic classification of phenomena

Class	Name	Internal structure	Harmonious Resource	Harmony Type	Characteristic quantity
1	Quasi-chaos (Thermodynamics)	No	Real relations in the Present	Starting	Entropy
2	Natural selection (Mechanics)	Present	+ virtual relations during the interval in the Past	Passive	Energy
3	Life (Intelligence)	Copy of STM-Complex	+ virtual relations during the interval in the Future	Active	Harmony
4	The Highest Reason	Real STM-Complex	+ real present on all Time axis	Highest	Harmony
5	The Harmon	Absolute	Absolute connectedness	Absolute	Harmony
6	Absolute Chaos	No	There are no relations	No	No

2.4 Virtual Time Channel, Basic Dependencies and Characteristic Values of Classes

Intelligence sequentially forms and develops a Virtual Channel in Time (VTC), which is fundamentally different from the Shannon channel in Space [11] and provides additional internal (subjective) Time commutation of phenomena, creating a harmonious superiority of the upper Classes over the lower Classes (Fig. 9). The VTC is a key indication of Intelligence, in contrast to purely logical phenomena.

The VTC radically changes the interaction of phenomena (Fig. 10). Thermodynamic phenomena almost do not interact with external relations and pass them with small changes. Mechanical and living phenomena strongly influence external relations with an increase in the VTC and from the passive turn to active and destabilizing ones. The Universe is completely self-determined and depends only on internal relations.

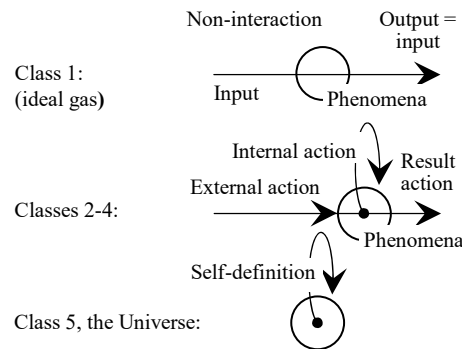


Fig. 10. Classification of the phenomena Classes interaction

The VTC radically changes the characteristic quantities of phenomena from passive entropy (that tends from complex to the simplest states) and conservative energy (that preserves phenomena) to active harmony that gathers itself back from the simplest to the highest states and thereby creates complex phenomena (Fig. 11).

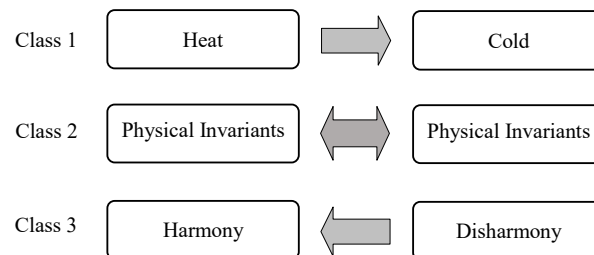


Fig. 11. The scheme of action of characteristic quantities on

phenomena Classes

Accordingly, Class 1 destroys, Class 2 saves, and Class 3 develops phenomena (Table 2).

The VTC and additional Time harmony correspond to the desired negative entropy of E. Schrödinger [12].

Table 2. Characteristic Quantities of Harmonic Phenomena Classes

Class	Class name	Characteristic quantity	Degree of phenomena harmony
1	Quasi-chaos (Thermodynamics)	Entropy	Degradation
2	Natural selection (Mechanics)	Energy	Conservation
3	Life (Intelligence)	Harmony	Development

2.5 The Harmony, Meta-Law and the Harmon

Cognition is embedded in the definition of the Universe and its UA, and therefore the highest Universe's characteristic quantity (that is based on connectedness) is naturally assumed. Let us call it 'harmony', the exact formula of which has not yet been substantiated (deduced), but it is qualitatively confirmed everywhere. The initial (Meta-) Law of the Universe assumes its successive increase (harmonization): all entities tend to increase their harmony.

The Meta-Law is the initial functionally complete method of harmonization that provides all the opportunities for ubiquitous increase in the connectivity of Universe's entities, the particular case of which is cognition.

The limit of an entity harmonization is the state of complete connectivity (local harmon) – a complete graph built on the components of an entity (harmony), the added arcs of which are the chaos of an entity (Fig. 12).

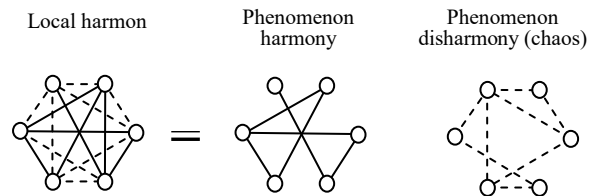


Fig. 12. The scheme of a dichotomy of a phenomenon into harmony (solid lines) and chaos (dotted lines) for $n = 6$

Definition. Harmony is connectedness of entities.

Definition. Chaos is the lack of connectedness of entities.

Consequence. Chaos is a resource of harmony of entities.

The limit of harmonization of the Universe is the state of the Harmon as the Complete Infinite Oriented Graph $\text{CIOG}(\text{CIOG}) = \lim \text{COG}_n(\text{COG}_n)$, number of vertices $n \rightarrow \infty$, whose vertices are the same graphs (Fig. 13). Harmon is a central concept of the

Universal Theory as an initial and final Universe's entity, the study of which is beyond the scope of this topic [9].

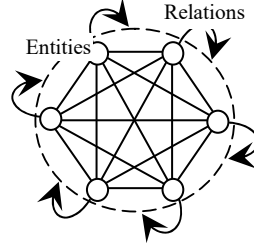


Fig. 13. The scheme of the Harmon (for $n = 6$), $n \rightarrow \infty$

2.6 The Universal Cognition Methodology

Harmonization begins with the cognition of phenomena, which in itself is an act of harmonization through the access of a subject to an object and copying its real and abstract parts. The real part activates the categories of an object, and the abstract part selects and transfers them into the concepts of a subject. This is implemented by various combinations of the available means of a subject at all stages of harmonization: access, selection, copying, formation of the VTC-representation, search and implementation of the required harmonic state of an object.

Due to the direct invisibility of the AW in the RW, the biggest problem is the abstraction of an object, which performs a subject with logical induction (a) and deduction (b) operations (id-operations (c)) that are understood to mean generalization and combination of selected concepts respectively (Fig. 1).

As a result, two opposing flows of inductive and deductive concepts arise in a subject, which coincide in nature and must coincide in a subject. The coinciding concepts form a certain subjective system of concepts, and the mismatched concepts are sent for additional cognition as initiators of new knowledge (Fig. 14).

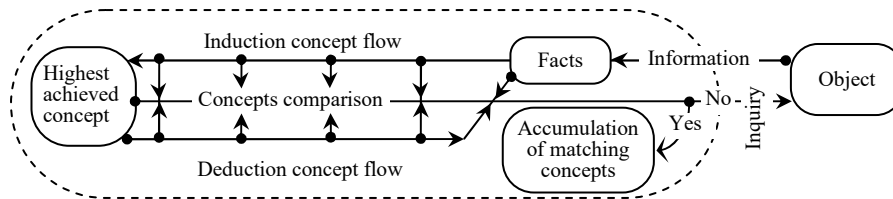


Fig. 14. The scheme of a conditioned reflex

This scheme corresponds to a conditioned reflex [13-14] and determines a typical dichotomy of the brain into two hemispheres [15], specializing in induction and deduction, which fundamentally ensures complete cognition, starting with the zero cognitive ability of any subject, which any Universe's phenomenon is (Fig. 15).

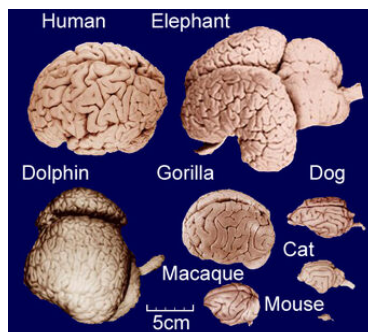


Fig. 15. Typical brain dichotomy
(<https://psychology.wikia.org/wiki/Brain>)

Consequence. Knowledge is subjective.

Consequence. Knowledge is hypothetical.

Definition. A hypothesis is a statement, the falsity of which has not been proved.

Consequence. The elimination of external (with the Universe) and internal (with themselves) contradictions of knowledge is a necessary method of cognition because our Universe has such a character.

Definition. The truth is the Universe.

Consequence. The criterion of the truth is the value of externally and internally consistent knowledge.

Consequence. A conditioned reflex provides unlimited knowledge of the Universe, starting with the zero ability of cognition.

A conditioned reflex and the elimination of contradictions substantiate the derivative method of sequential concretization of concepts by introducing additional hypothetical concepts with the supposedly overcome distance between the conflicting concepts to achieve the target formalization, which are then verified by the subsequent factual analysis as any consciousness does. The volume of such a system of concepts is the main measure of the truth of the required formalism (Fig. 16).

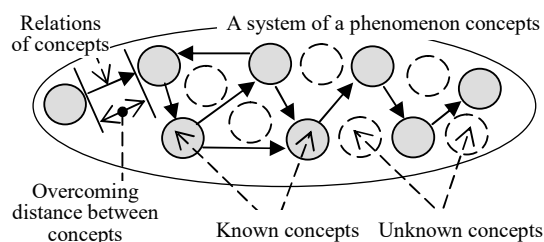


Fig. 16. The scheme of a method of sequential concretization of concepts

2.7 The Universal Meta-Definition of Intelligence

The Universe has 3 main divisions: 1) Abstract (AW, RW), 2) Time (Past, Present and Future) and 3) Categorical (categories as limiting harmonization), which are overcome only together under the influence of the Meta-Law through virtualization using the above-mentioned harmonization tools that make up the initial formalism (definition, relation) in the UMFI as an important tool of the Universe, further developed by the Highest Reason (Fig. 17).

Definition. Intelligence is a universal active joint harmonizer of the Abstract, Time and Categorical divisions of the Universe.

UMFI ontologically includes all of the above properties and mechanisms of action, suggesting further concretization and materialization to a variety of RW conditions.

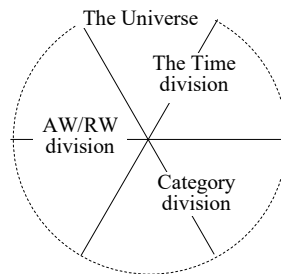


Fig. 17. Illustration of the Universe Abstract, Time and Categorical divisions

2.8 Concretization and Materialization of Intelligence

The UA is directly included in the definition of Intelligence, which is further specified, presumably, in all places of the Universe through an endless hierarchy of ecological niches of existence (ENE) with different categorical systems up to materialization at the lowest real level of abstract hierarchy.

Accordingly, the UMFI receives numerous additional concretizations up to and including materialization, which are consistently complicated various low-level formalisms up to the achievement of the status of phenomena that makes it possible to cognize the entire Universe (Fig. 18).

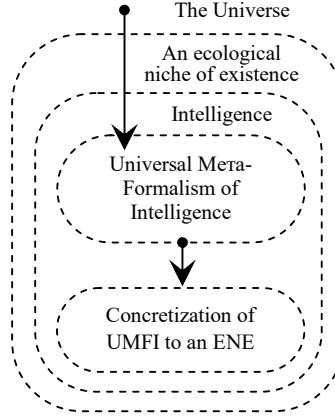


Fig. 18. Intelligence concretization scheme

3 Properties of Intelligence Formalisms

3.1 Ecological niches of Intelligence existence

Each category divides the Universe and creates a new ecological niche for the existence of Intelligence, the concretization of which effectively harmonizes this division under conditions of this niche with a harmonic advantage over the lower Classes of phenomena in it.

Definition. The division of the Universe is any difference from the state of the Harmon.

Thus, 1) the hierarchy of categories generates 2) the hierarchy of divisions, generating corresponding 3) hierarchies of ecological niches and further 4) the hierarchies of formalism 5) regarding its concretization and 6) materialization of Intelligence. As a result, a system of these hierarchies is formed, which is subsequently concretized and complicated as they become more detailed from the UA up to the RW (Fig. 19).

Intelligence ontologically originates from the UA, but, as far as categories are concerned, it arises at the level of the STM-Complex during the joint virtualization of the triad of divisions of 1) the AW/RW, 2) the UAP categories and 3) Time, and is further concretized up to the RW. Through meta-cognition, it is also able to virtualize the highest divisions up to the UA and thus achieves and harmonizes all Universe's divisions, which is fundamentally important for the Universal Cosmology.

All the said hierarchies sequentially inherit and develop their properties as the components are concretized. Intelligence formalisms develop from the UMFI to the RW with a loose mutual intersection of formalisms in conceptual and real niches with the obligatory inclusion of the UMFI, otherwise harmonization becomes unintellectual due to a fundamental reduction in harmonization resources (Fig. 20).

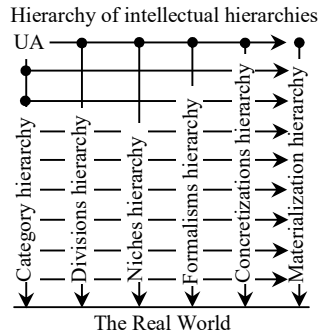


Fig. 19. The scheme of hierarchy of Universe's intellectual hierarchies

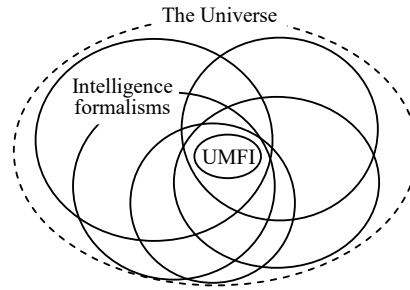


Fig. 20. The scheme of concretization of IMFI

3.2 Intelligence naturalization

Each niche is 1) a (maximal) simplification of the Universe, 2) including a niche harmonized separation and 3) a means of its harmonization 4) that also follow from the Universe. Obviously, intelligent formalisms inherit the Universe (macrocosm) and are its reduced copies (microcosms), which confirms the well-known philosophical hypothesis [16].

All the properties of Intelligence come exclusively from the Universe as a result of the naturalization of concepts, which explains and expands the base of mutual research of the Universe's phenomena and is part of universalization.

Naturalization obliges us to conceptually deduce any concept used from the sufficiently substantiated properties of the Universe, taking into account the fact that any knowledge is hypothetical and its truth is determined solely by the volume of the externally and internally consistent system of concepts and is relative to this system. Since any knowledge is incomplete and possibly contradictory, it is always ready to develop and eliminate contradictions.

The analogy of the Universe, brain, computer and program is shown in Table 3 to confirm naturalization.

Table 3. Mutual correspondence of the components of the Universe, brain, computer and a program text

The Universe	Brain	Computer	Program text
Space	Neurons	RAM	Data area
Time	Biorhythms	Clock & command sequence	Algorithm
Matter	Neural network	Data	Data
Entity	Connected group of neurons	Variables	Variables
Relation	Neuron connections	Data structures	Data structures
Movement	Change of neurons/connections	Data change / command flows	Data change / functions call
Categories	Properties and rules	Machine commands	Language operators
Goal	Desires	Desired result	Desired result

3.3 Universal intellectual harmonization mechanism

The UMFI projects the Meta-Law on three reduced components of an object that are hardly visible in the RW: 1) the AW (UAP), 2) the RW (STM-Complex) and 3) the UAP categories.

The AW is copied to the RW by means of induction / deduction according to the scheme of a conditioned reflex. Categories are copied by means of abstraction / concretization into the concepts of a subject. The STM-Complex is copied by the extreme simplification of only relevant components to take into account the goal of harmonization.

The UMFI cyclically harmonizes an object by the following stages: 1) observing the object over a certain time interval, 2) building a model of an object's process, 3) predicting the development of the model over the next time interval, 4) predicting the required harmonic state of the object taking into account the target of a subject, 5) calculating the control action on the object, 6) returning from the subjective into real time, 7) implementing the control action on the object, 8) comparing the predicted and actual state of the object and 9) correction of the process model (Fig. 21).

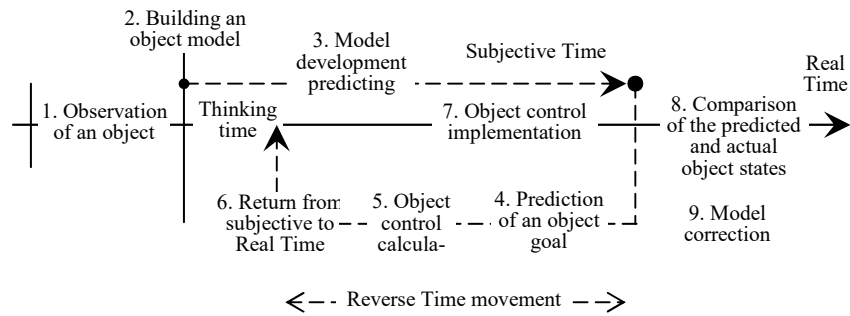


Fig. 21. The scheme of thinking act

3.4 Classification of states of object disharmonization

As a result of the UMFI operation, the following classification of the discrepancy (disharmonization) of the predicted and actual state of an object occurs (Table 4).

Table 4. Classification of the degree of internal disharmonization of an object

Name	The degree of internal disharmonization of an object
Coincidence	No difference between the prediction and the fact of object harmonization
Difference	Little difference between fact and prediction for an object
Evolution	The loss of goal harmonization, which can be removed by the resources of an object-subject pair
Problem	The loss of harmonization of the goal, which is hard to remove by the resources of an object-subject pair
Contradiction	Nonremovable by the resources of an object-subject pair loss of harmonization of the goal, which can be removed by the resources of environmental means
Crisis	Balance of harmonizing and disharmonizing forces of an object
Revolution	Object downgrade
Disaster	Destruction of the definition of an object and the cessation of the existence of the object

3.5 Intelligence as an active converter of chaos into harmony

Class 1 reduces (clears of weak harmony), Class 2 preserves (accumulates), and Class 3 increases the harmony of the Universe under the influence of the Meta-Law and the built-in VCT (Fig. 10-12).

Thus, Class 1 is a passive transducer of harmony into chaos, Class 2 is a preserver, and Class 3 is an active transducer of chaos into harmony. Since these Classes inherit the previous Classes, they can establish mutual relations.

Class 3 harmonizing ability depends on both 1) the VCT transmission capacity and 2) the state of environmental harmony, which together perform 3) various non-linear positive / negative / oscillating harmonization of objects with a general prevalence of the former up to self-reinforcing explosion-like transition into a limiting state of the Harmon (anti-Big Bang), characteristic of Class 4 and important for the Universal Cosmology (Fig. 22) [9].

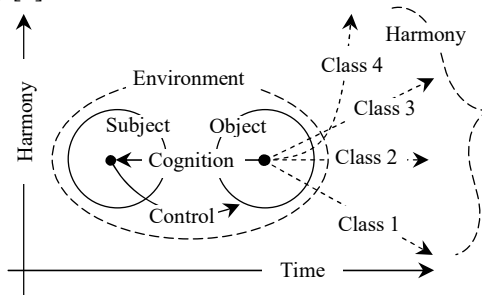


Fig. 22. The directions of phenomena harmony change of under the Classes 1-4 control

3.6 The prevalence of Intelligence in the Universe

The harmonious advantage of Class 3 over the other well-known Classes of phenomena should increase the presence of the former until the complete filling of the Uni-

verse, which is not really observed today. One of the reasons may be natural invisibility or a conscious hidden character of this Class under conditions of the infinity of the Universe in space and time, according to the hypothetical Universal Cosmology [9,17].

3.7 Intelligence as a subjective world

Living subjects move Harmony towards their subjective goal that must coincide exactly with the most harmonious state of an object. However, under conditions of always incomplete cognition, a goal is usually chosen causally approximately in this direction, or even vice versa if harmonization is included in the goal.

Under conditions of dogmatism, the goals are chosen inside subjects (the scheme of egoism), and under conditions of universalism – inside the society of subjects (the scheme of collectivism), between which there arise multiple combinations with the corresponding properties, the initial of which are given in Table 5. Thus, Intelligence creates multiple subjective worlds that ensure its special existence in real ecological niches.

Table 5. Classification of goals of subjects

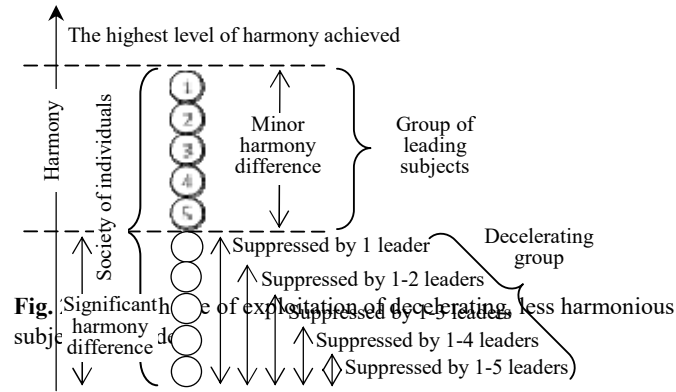
Target class	Target location	Object of harmonization
Egoism	Inside a subject	Subject
Altruism	Inside an object	Object
Collectivism	Inside a society	Society
Centralism	+ reasonable condensation of goals by special subjects	Society without duplication of control

3.8 Intelligence Aggressiveness

Living Classes (3-4) both produce and consume harmony from all the Classes with lower harmonizing ability. The social nature of Class 3 supports the interaction of living subjects with the transition of harmony to more harmonious subjects. Then they redirect harmony according to their goals.

Subjects contain multiple incoming/outgoing active relations and the corresponding flows of harmony/disharmony, the total amount/difference of which has a positive/zero/negative resulting value. Harmony is extracted from the environment/partner and is reciprocal for the latter, which determines the aggressiveness of subjects, which grows with intellectualization.

Society is usually very heterogeneous and ranked according to degree of harmony of its subjects with singling out of leading and decelerating subjects (Fig. 23). With a significant difference in their harmony, the former exploit the latter and increase this difference. Purely dogmatic societies are self-destructing and universalization consolidates society into a unitary organism.



Homogeneity and heterotrophy of Intelligence

Due to homogeneity of the AW and heterogeneity of the RW Intelligence has a supposedly single UMFI in different places (heterotrophy) of the Universe under any conditions, but in the order of successive filling of ecological niches (Fig. 24).

Homogeneity and heterotrophy generate Intelligence dichotomy on individuals and societies. Harmonization involves a variety of extremely important consistent actions and an individual must contain all of them (local Intelligence) in order to avoid their self-destruction. Society is a set of interacting individuals that can exist when part of individuals is lost.

Definition. An individual is a unitary whole Intelligence.

Definition. A society is a set of interacting individuals.

A society expands conceptual systems of individuals through the unification and distribution of individual concepts of all the members of a society and is, therefore, more harmonious (Fig. 25).

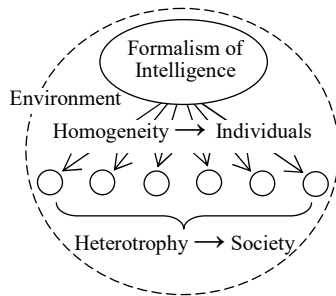


Fig. 24. The scheme of homogeneity/heterotrophy of Intelligence

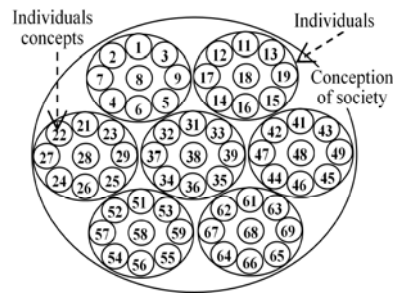


Fig. 25. Scheme of expanding a system of concepts of society regarding individuals

3.9 Passionarity of dogmatic Intelligence

Dogmatic Intelligence irregularly cognizes and causally identifies the higher concepts, the deduction from which, unexpectedly for a subject, produces new areas of knowledge and real possibilities for harmonization that are usually poorly understood but act strongly and change radically the activity of subjects like hit (impetus) (Fig. 26). This property is called passionarity that exercised a decisive influence on the formation of Eurasian ethnic groups and the development of world civilization [18-20].

Passionarity gives rise to unstable revolutionary oscillatory development of subjects and is the cause of the self-emergence/disintegration of peoples, states and empires for no apparent material reasons (Fig. 27).

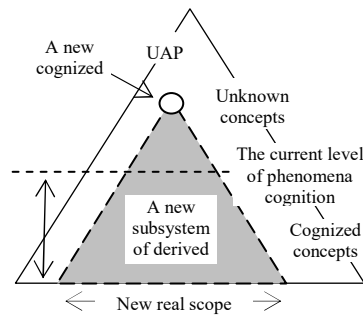


Fig. 26. The scheme of a passionary impetus

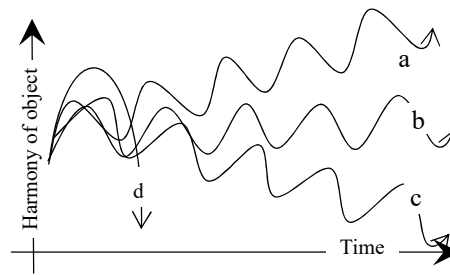


Fig. 27. The scheme of ascending (a), stagnating (b) and descending (c) oscillation or annihilation (d) of passionary processes

3.10 Instability/stability of dogmatic/universal Intelligence

Cognition begins with partial low-level dogmatic knowledge (Fig. 1) that naturally gives rise to 1) an unstable causal additional cognition with 2) a chaotic change in the direction of development/degradation, 3) an absent position of sustainable existence and 4) insoluble internal contradictions, 5) the only possible the method of resolving of which is the mutual suppression of all the opponents, except one.

On the contrary, universalization stabilizes cognition and the existence of subjects at the expense of the use of higher unifying concepts. On the one hand, it develops dogmatization, and, on the other – it radically changes knowledge up to the opposite one, so dogmatic and universal Intelligence can be considered different subclasses of Intelligence (Fig. 28).

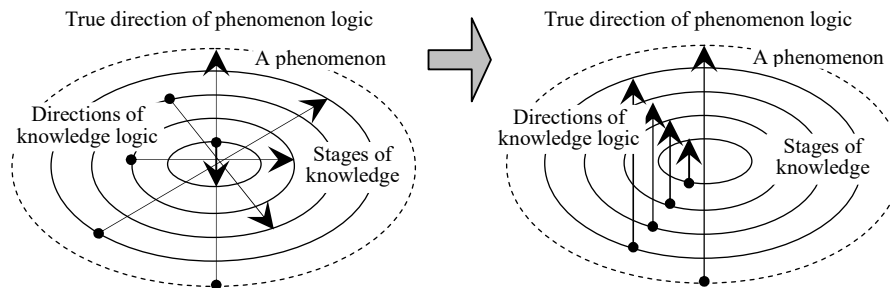


Fig. 28. The scheme of an instability of dogmatic phenomena cognition and its stabilization by universalization

4 Conclusion

Universalization uses additional resources of cognition and, for the first time, substantiates the Universal Meta-Formalism of Intelligence that allows to formally study and explain its basic properties and classifications. This is achieved exclusively by the transition from the particular dogmatic to the universal paradigm of cognition, revealing the highest universal meta-concepts and methods of cognition that change many traditional dogmatic conceptions. The meta-conceptual part of this work deduces the UMFI components, which are further concretized for different niches of materialization with the identification of important specific meta-properties that have their own fundamental practical and theoretical significance. Due to the special structure of the Universe, great originality and unusual nature of the topic and its content, this paper uses structural ER-formalisms that unambiguously allow both a natural verbal interpretation and set-theoretical representation up to the materialization of the obtained formalisms. This study has great scientific prospects and its further development leads to a full-fledged strong formalization of the living world in different environments with the execution on modern logical machines.

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