



Proceeding Paper

Factor's Space and Intelligent Incubation Project of Unified Intelligence Theory [†]

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Abstract: Industrial Intelligence, driven by a unified mechanism, bears a significant historical task. This paper demonstrates that the factor space will play a vital role as a mathematical tool in achieving intelligent incubation. Additionally, it points out notable risks in applying ChatGPT.

Keywords: information science research paradigm; unified intelligence theory; intelligence incubation; factor space; factor pedigree and coding

1. How to Take UIT (United Intelligence Theory) into IIP (Intelligence Incubation Project)?

The unified intelligence theory proposed by Professor Zhong Yixin [1–3] is not an empty dogma but a principle that can be put into practice. Knowledge can be generated in every knowledge field according to its principle. This process of knowledge generation is called intelligence incubation. The ultimate purpose of putting forward UIT is to realize the intelligent incubation of the whole people.

2. Can ChatGPT Do the Intelligent Incubation National Project?

Intelligent Incubation is a project that has yet to materialize, and many believe ChatGPT will lead the smart incubation project. Yes, Sum Altmann may have set out to do this, but it is a shame he cannot pull it off.

UIT, a product of the paradigm revolution, and ChatGPT, a product of the old paradigm, are not on the same track.

First, intelligent incubation must be understandable for data processing. The calculation of the human brain is to control data by thinking, transform massive data into small data, and carry out a heuristic forward and backward causal analysis. ChatGPT carried out non-comprehensible arithmetic based on sample statistics, which was a dead end that could not work because it could not afford electricity consumption. Second, UIT scatters the database to the most basic level of the knowledge field, quickly finds accurate answers in the small data at the basic level, and then structures the knowledge so that all problems can be solved in the corresponding small units. ChatGPT, on the other hand, builds a heavy and cumbersome Big Mac.

3. Factor's Space Is an Essential Mathematical Tool for Intelligent Incubation

The core of the UIT paradigm revolution is to introduce the cognitive subject into the cognitive process. The purposefulness and selectivity of the cognitive subject is the watershed that distinguishes information science from material science. Information is the reflection of cognition subject to objective things. Because of the different purposes and selectivity of the subject of cognition, the same thing will produce different information, depending on what angle you view things from. The factor is the angle and vision that people consider the problem, and the fixed vision determines the information obtained.



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The factor is a kind of mathematical mapping that converts concrete things into specific information. The factor is information mapping, and it is the mathematical meta network in UIT. All existing data are mapped by factors; the factor space is a unified platform for data processing [4].

To control data with thought, UIT must extract information through factors. The basic function of the factor's space is to calculate the importance of each factor to the target so as to realize the selectivity of the cognition subject, remove the factors unrelated to the target, and change the massive data into small data. Factor's space unified and improved the existing algorithms, carried out the forward and backward causal analysis, and carried out knowledge incubation in each basic knowledge unit according to the unified mechanism of intelligent generation. Factor space is the tactical arsenal of intelligent incubation.

To build a mansion of knowledge, UIT needs to structure complex knowledge. Factors describe the connotation of concepts, and the ontology of knowledge is the factors pedigree, which is the mathematical expression form of knowledge structure. With this form, UIT can disperse the database to the most basic level of the knowledge field. Each basic scene is rapidly intelligently reflected by small data passing through a factor's space, forming a tactical database. Then, through the linkage diagram of factor pedigree, UIT can expand the coverage of command campaign actions, which can be larger than any development of ChatGPT.

The factor is concept coding. Factor coding opens a new window for natural language understanding and provides an important tool for knowledge fusion [5].

Based on the generation mechanism of unified intelligence, intelligent incubation should be developed as a social engineering. We should establish the database at the forefront and the grass-roots level and oppose the monopoly of data by the illegal network data capital. They hoard data, reproduce it, and sell it without any local means. They preach data immortality, "After data are created, they never cease to exist." We insist that data can both be born and die; this is the nature of evolution. Plastic will not die to harm the earth; data will not die and will destroy human civilization.

We are data conservationists, opposed to illegal network data capital, serious waste of power and manpower, and the potentially serious threat to the environment.

Big data is the Gospel of factor space theory because factor space especially depends on the background distribution of factors; when the data sample is too small, the background distribution will be unreliable, and only big data can provide reliable parent distribution. However, once we know the background distribution, we can extract the background base and delete all the remaining interior points that can be generated from the background base. Factor space has always been the nemesis of big data by calmly churning out a small data set in real time.

4. Factor Space Is the Response to the AI Paradigm Revolution in the Field of Mathematics

Intelligence research needs a paradigm shift in worldview and methodology, as well as a corresponding movement as mathematics.

"Number" and "form" are two meta words in mathematics, which grew out of algebra and geometry, respectively. The Industrial Revolution added a variable word in front of the two words to get "variable" and "deformation," and then, through the combination of Cartesian coordinates came calculus. The information revolution requires mathematics to add new meta words.

In 1982, a new metamaterial, "attribute", appeared in both schools of mathematics. One is the formal concept analysis FCA proposed by German mathematician Wille [6]; the other is the rough set RS proposed by Polish mathematician Pawlak [7]. Because "attribute" is not the keyword to distinguish information science from material science, the two schools have different meanings of attribute: FCA refers to attribute value; RS refers to the attribute name. Their mathematical theories are not up to the challenge of the big data wave. In the same year, Wang Peizhuang established the factor's space theory FS and separately

proposed the monistic word “factor” [8]. The factor is the perspective of the subject of cognition, which is the key word to distinguish information science and material science. A factor commands a string of attribute values. A factor is something deeper than an attribute with a higher perspective. Mendel’s original name for a Gene was a factor, which was then narrowed to a gene by his successors. So factors are genes in a broad sense, and genes open the door to life sciences. The factor can open the door to information and intelligent science; it is the information revolution that needs the mathematical meta word.

Factor’s space is a generalized Cartesian space with factor as the axis. It is a universal mathematical framework for describing things and thinking. If calculus is the mathematical symbol of the industrial revolution, then the factor space is the new mathematical symbol of the information network era.

The factor space is a mathematical response to the paradigm revolution of intelligence research.

The scientific view of the new paradigm of intelligence research is the whole view of Chinese culture. There is a distinction between the local and the global view of mechanical materialism: the former focuses only on material objects, while the latter focuses on human subjects and material objects and their interactions. Chinese medicine places people between heaven and earth, observing the balance of Yin and Yang in the human body as a whole. “Yin and Yang” is the supreme “element” of observing all things, and “the balance of Yin and Yang” is the criterion for determining whether a person is sick or not. Factors can be gradually refined from top to bottom to form factor pedigree. The factor is the encoder of the concept; the factor pedigree is the whole description of knowledge ontology.

The methodology of the new paradigm of intelligence research is the dialectics of Chinese culture. When the two words Yin and Yang are applied to a specific thing, whether it is Yin deficiency, Yang deficiency, or Yin deficiency, Yang deficiency is relative and dialectical, which should be determined according to the specific scene, context, and purpose. This dialectical thought of universal logic needs to be set off by factor space. Factor space is the Cartesian space of variable dimension. The transformation of dimension makes the scene change with the change in the situation. Factor space is the stage of demonstrating dialectics.

5. Factor Space Is the Promotion of Intelligent Mathematics on a Unified Platform

Factor space highlights the correlation between factors. The mathematical concept representing the relationship between factors is a background set, which is an enhancement of Wille’s formal background. The background set of A and B factors determines all reasoning sentences from A to B. Master the background set and master the relevant causal laws. Wille’s formal background table takes attribute values as columns, which leads to listing difficulties. The rough set uses attribute names as columns, which changes the formal background table into an information system and becomes the library table of the relational database, which is a pioneer of data intellectualization. Their attribute name is a special factor. Unfortunately, they use the factor but do not know the importance of the factor. They used factor operations without giving a definition of factor operations, resulting in a mathematical loophole. They improved Wille’s formal background table but lost the concept of a background set, making their theory not suitable for the context of conditional factors. Factor space is also the enhancement of a rough set, which makes up the theoretical loophole, makes the ambiguous problem clear, simplifies the complicated statement, and makes the lengthy calculation faster. Whereas old mathematical paradigms could only provide data-driven incomprehensible black boxes, factor spaces could provide thought-driven incomprehensible algorithms.

6. Factor Space Provides an Algorithmic Revolution for AI

Since factor space is the response to the artificial intelligence paradigm revolution in mathematics, it must bring algorithmic revolution to artificial intelligence. The tide of big data in the network era has put the simplification of algorithms in the most important

position. All algorithms use the power consumed as a denominator to measure their merits. What is obtained in data processing is not the parent background set, but the sample background set, and the laws obtained can only be responsible for the given samples. Big data make factor space become a reliable parent theory, and factor space needs the supply of big data. However, factor space is opposed to data immortality; it is data's life and death theorist. It keeps only the vertices in the background base, which is called the background base. All the other inner points can be removed, and they can be generated if necessary. In this way, factor space takes advantage of the trend of big data, lines the reality of small data, consumes data in real time, always maintains the intelligent calculation of the bottom energy consumption, and becomes a member of big data. This is undoubtedly a revolution in the algorithm.

The classification algorithm is the breakthrough of machine learning. The dominance of classification algorithms has been the theory of support vector machines [9]. Deep learning has swept many cities, but it has lost an incomprehensible reputation, and people still respect it. Support vector machines can not only classify but also extract rules and make decisions. However, the weakness of existing SVM algorithms is programming packaging: the algorithm always ends up being converted into a convex quadratic programming, and no one knows how long the quadratic programming takes, so the arithmetic is still in the black box. Faced with the serious threat of super-large scale computing to power consumption, we must change brute computing into clever calculation and carry out algorithm revolution to defeat the enemy lightly.

The classification method brought by factor support vector theory, first, is to use the sweeping class vector to roughly extract the classification frontier points to generate frontier surface and screen whether the normal vector can separate the two types of points. Since the number of extraction points k of the leading edge points gradually increases from 2, similar to breaking the enemy by light riding, the running times of the algorithm can be greatly reduced. Second, the approximate algorithm of background basis is a mature and simple algorithm in factor space theory, and the support vector is the background basis near the frontier of the boundary. In this way, support vector machines can be connected with background basis theory, and, through background basis, support vector machines can be connected with deep learning to solve the understanding problem of deep learning.

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