AEROSPACE SYSTEMS FOR MONITORING AND CONTROL

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A NEW METHOD OF UNIFIED PROCESSING OF THE INFORMATION, REFERRED IN THE FORM OF THE THREE-DIMENSIONAL ASSOCIATIVE-LOGICAL STRUCTURE FOR OPTIMIZATION OF THE MULTIROTOR UNMANED AVIATION SYSTEM

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Abstract

Purpose: *This article presents a mathematical model and a new way of unified information processing.* ***Methods:*** *Three-dimensional associative-logical synthesis.* ***Results:*** *Obtained a new experimental data.* ***Discussion:*** *The present invention can be used in the following directions: 1) in epistemology, the basis for a more effective and purposeful scientific search in all branches of science; 2) in psychology and pedagogy - the basis for a more effective and universal thinking of man in almost all sections of science; 3) in electronics and computer science - the basis for the creation of artificial intelligence systems and high-quality systems for speech and images recognition, provided that are created the chips in which the storage elements are interconnected in three dimensions; 4) in the aerospace and robotics sectors - the possibility of developing a new, more advanced autopilot systems, capable of working according to the principles of the neural network of biological objects.*

Keywords: analysis and synthesis of information; artificial genius; genius; neural network; three-dimensional associative-logical structure; neuroelectronics; neurocybernetics; philosophy; psychology; pedagogy; technologies of genius thinking; oktacopter; passenger policopter; policopter; policopter flyer; UAV.

1. Introduction

The brain of man is the highest achievement of earthly evolution. The scientific work of the scientist is an example of the most complex and high-tech use of the structures of the brain as a tool of thinking. The uniqueness of the brain and the psyche of the scientist is the ability to display the elements of objective reality in the mind as objects of research and logical connections between them, to analyze and synthesize the information received, and using this knowledge to influence the course of events in that part of reality, with which these research objects are connected [1].

The first analogue of the proposed method (approach, device) is the visual models of linear logic chains of information - thinking using such models allows to making the small conclusions and inventions of the applied value. The second analogue of the proposed device is the visual models of the logical systems, branched in two dimensions - thinking using such models allows for the synthesis of information within a more or less known part of science, but if the part of the studied objects of research is at the junction of various specialties or sciences, or outside of the known part of science, such a system of thinking becomes insufficiently effective for the completion of an unknown part of science [2].

Sometimes among the representatives of our civilization there are scientists who are able to think equally effectively in all areas of science, scientists are able to build a new scientific sections, working on the joints between several related sciences and beyond the limits of the known sciences. Such scientists in the course of their life make complex inventions, difficult scientific conclusions and sometimes scientific discoveries, but they do not fully understand how they all do it [3].

How does the brain and psyche of the genius function? What is a algorithm of thinking of a ingenious scientist is a different from that of an ordinary person? As usual, the average person learn to think also effectively as geniuses think and at the same time do not damage your psyche? How to create an artificial intelligence that does not yield to the intelligence of the most famous geniuses of our civilization according to our abilities? How to "put on the conveyor" the process of invention and the pursuit of scientific discoveries, and to make such a unique and mysterious phenomenon as genius, commonplace and accessible to every person from an early childhood, when the first "why" and " as" is born in the child's brain for the first time?

No one today is able to answer these questions, but the key to understanding these issues is the human brain itself, the only tool for thinking today that can address such issues.

2. Analysis of the latest research and publications

According to psychology and neurophysiology thinking process in humans occurs in the neural networks of the brain. According neyrohistology - the human brain consists of different neurons with many synaptic connections, branching out in all directions, thus creating a three-dimensional neural network, in which implemented following the interaction of neurons - convergence (convergence of the axons of many neurons in a one neuron - the basis for the logic synthesis of information) and divergence (divergence of the processes of one neuron to contact with multiple neurons - the basis for the logical analysis of information). Thus in terms of anatomy, histology, physiology and biochemistry there is no significant difference between the brain of the human of scientist labor and the brain of the human physical labor, the only difference in the number of synaptic connections formed in the neural networks of the brain structures [4].

3. Research tasks

To develop a mathematical model and a new approach (method, device) for unified processing of information displayed in the form of a three-dimensional associative-logical structure that will simulate the basic processes of thinking of the brain of the scientist beyond the limits of the real brain using three-dimensional models.

4. The solution of the problem.

The device (method) for the unified processing of information displayed in the form of a three-dimensional associative-logical structure, which is one of the types of visual means of studying and processing scientific information, is a network of connecting rods of balls, so that the whole network is composed of the many tetrahedrons, while the balls (the angles of the tetrahedrons) simulate the objects of research, and the rods (the faces of the tetrahedrons) are the logical connections between them, with each logical link quantified by the corresponding mathematician formula that creates a three-dimensional model of visual associative and logical card of slice of science within which are located the interest objects of research [10].

According to this design, obtained a Ukrainian patent for a utility model on 10.10.2008 [10], which partially confirms the scientific novelty and patent purity of this development.
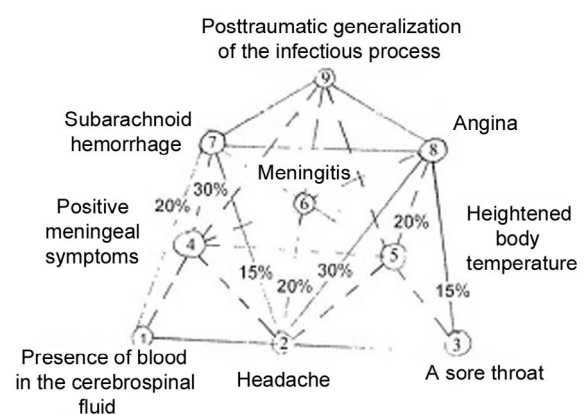

Fig.1.

Fig. 1 shows a device and method for unified processing of information displayed in the form of a three-dimensional associative logic structure (a fragment of 8 tetrahedrons), and also shows the use

of the present invention in neurology for the diagnosis of a clinical diagnosis, where the symptoms of the disease are related to logical diagnoses by the logical links and quantified by the percentage of the relationship between them, namely: 1 – the presence of blood in the liquor; 2 – headache; 3 – sore throat; 4 – positive meningeal symptoms; 5 – elevated body temperature; 6 – meningitis; 7 – subarachnoidal hemorrhage; 8 – angina; 9 – post–traumatic generalization of the infectious process.

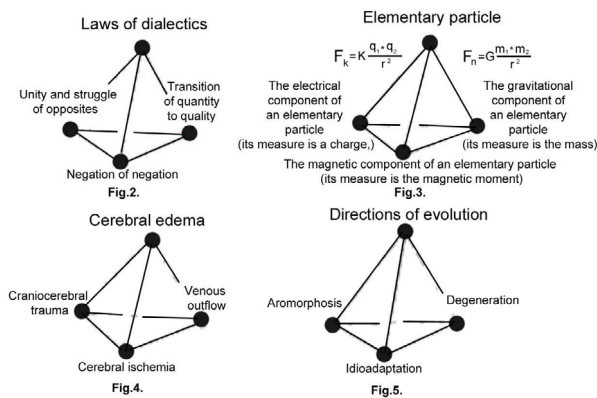

Fig.2.

Fig.3.

Fig.4.

Fig.5.

Fig.2, Fig.3, Fig.4, Fig.5 show separate fragments of philosophy, physics, pathological physiology and general biology modeled using this approach (method, device).

The device (method, approach) for the unified processing of information represented in the form of a three-dimensional associative-logical structure consists of metal rods of the same length (15 cm), interconnected with plasticine balls in a network, the structural unit of which is a tetrahedron (see Fig. 1).

Device and method for uniform processing of information displayed in the form of three-dimensional associative logical structure is implemented as follows: Stage 1 - construction of three-dimensional associative logical card of the slice of science where are the research objects of interest (material substrate such cards is a network of rods interconnected by plasticine balloons), using all known research facilities and logical connections between them that are in this segment of science, so that would be the closest of interconnected objects of research were directly related to logical constraints (the object of research and logical tie-adjacent (closest) the object of

research in all areas of the three-dimensional structure). Stage 2 – mathematical (quantitative) clarification of the existing logical connections using mathematical formulas or quantitative indicators of the relationship between neighboring objects of research. Stage 3 – using fragments constructed logical structure for applications performing operations analysis and synthesis of information within previously constructed piece of three-dimensional associative and logical system.

Thus all the information concerning the objective reality is firstly decomposed into discrete elements (objects of research and logical connections between them), all of these elements are located in a three-dimensional associative-logical system whose geometric unit is a tetrahedron, so that the objects of research are located at the angles of the tetrahedron and the logical connections between them are arranged along the lines connecting the angles of the tetrahedron, with each logical connection quantitatively specified by the corresponding mathematical formula - thus constructing a "three-dimensional associative-logical map" of a piece of science within which are the objects of interest; further, through analysis and synthesis of information, unfinished logical connections connecting unidentified research objects with already well-known, while the more logical connections with the subject of study we are aware of, the greater our ability to use this research object.

5. Results and discussion

The present invention relates to neuro-electronics and neuro-cybernetics and can be used in the following directions: 1) in epistemology, the basis for a more effective and purposeful scientific search in virtually all branches of science, even in the most complex and secretive sections thereof, as according to the aforementioned system, all science - have a common structure, are parts of a unified informational associative-logical structure, and differ only in research objects and logical links between them, filling corners and faces of the tetraedrons above information network [1]; 2) in psychology and pedagogy - the basis for

a more effective and universal thinking of human in almost all sections of science, regardless of the specialty and profession of this person, which makes such a rare phenomenon as genius easily accessible to anyone capable of mastering the technology of the use of this invention (the approach, device) [3]; 3) in electronics and computer science - the basis for the creation of systems of artificial intelligence and high-quality speech and images recognition systems, provided that the chips are created in which the storage elements are interconnected in three dimensions, such as the objects of research of the aforementioned information structure interconnected by the logical connections [5,6,7,9]; 4) in the aerospace and robotics sectors - the possibility of developing more advanced systems of autopilot, able to operate according to the principles of neural networks of biological objects[5,8,11,12,13].

In medicine [4], this approach (method) is implemented as follows (see figure 1): after detecting the symptoms of the disease and the degree of their severity, the synthesis determines the disease with which the greatest number of symptoms with the highest degree of interconnection is associated (ie the maximum percentage of the presence of the disease in the presence of a specific symptom). For example, the patient has headache 2 with 20% severity and positive meningeal symptoms 4 by 60% expressiveness. In synthesis of these symptoms, two probable diagnoses can be obtained: meningitis 6 and subarachnoidal hemorrhage 7. Using the percentage of the relationship between the specific symptoms and the specific diseases, one can determine the probability of each possible in this case, for this it is necessary to multiply the percentage of the expressiveness of the specific symptom on the percentage of its interconnection together with a specific disease and make a percentage of probability of symptoms associated with one disease.

For example, in our case, headache of 20% expressiveness (0.2) is multiplied by the percentage of the relationship with meningitis 25% (0.25) = 5% or 0.05. Positive meningeal symptoms are 60% expressiveness (0.6) multiplied by the percentage of the relationship with meningitis 60% (0.6) = 36%

or 0.36. We add up these two values and get the probability of meningitis in this case, namely 5% + 36% = 41%.

In the same way, we determine the probability of subarachnoidal hemorrhage in this case, namely, the headache of 20% expressiveness (0.2) is multiplied by the percentage of the relationship with the subarachnoidal hemorrhage of 5% (0.05) = 1% or 0.01. Positive meningeal symptoms at 60% expressiveness (0.6) are multiplied by the percentage of the relationship with subarachnoidal hemorrhage of 30% (0.3) = 18% or 0.18. We add up these two values and get the probability of subarachnoidal hemorrhage in this case, namely 1% + 18% = =19%.

Thus, in this case, in this case the probability of meningitis is 41%, and the probability of subarachnoidal hemorrhage is 19%, which allows us to plan treatment that is more aimed at meningitis.

Fig.2, Fig.3, Fig.4, Fig.5 show separate fragments of philosophy, physics, pathological physiology and general biology. We see that despite the fact that all of these are different scientific sections, but from the standpoint of the present invention, they all have a common structure, common principles of construction and use, as if certain "fragments" of a unified "scientific crystal" or as it was called earlier scientists of the past – of the "philosophical stone", which includes well-organized all known and unknown knowledge.

6. Conclusions

The developed new approach (method, device) and the mathematical model provide the following new possibilities:

- the possibility of more effective and purposeful scientific research in practically all branches of science, even in the most complex and secret sections of it, and most importantly, it is a way for more effective use of long-standing knowledge that will solve the most important problems of our civilization;

- the possibility for a more effective and universal thinking of a person practically in all sections of science, regardless of the specialty and profession of this person, which makes such a rare phenomenon as genius easily accessible to anyone who can use this approach;

- the possibility of creating artificial intelligence systems and high-quality systems for speech and images recognition, provided that the chips are created in which the storage elements are interconnected in three dimensions, as the objects of research of the above-mentioned information structure of the present invention are related logically;

- the ability to analyze and synthesize information at the junction between several sciences and beyond the known sciences;

- the opportunity to combine all knowledge of our civilization into a unified three-dimensional information network.

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Новий спосіб уніфікованої обробки інформації, відображеної у вигляді тривимірної асоціативно-логічної структури для оптимізації мультироторної безпілотної авіаційної системи

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Мета: У цій статті представлено математичну модель і новий спосіб уніфікованої обробки інформації, відображеної у вигляді тривимірної асоціативно-логічної структури. **Методи дослідження:** Тривимірний асоціативно-логічний синтез. **Результати:** Отримані нові експериментальні данні. **Обговорення:** Цей винахід належить до нейроелектроніки та нейрокібернетики й може бути використаним у таких напрямах: 1) у гносеології – основа для ефективнішого та більш цілеспрямованого наукового пошуку практично в усіх розділах науки; 2) у психології та педагогіці – основа для більш ефективного та універсального мислення людини практично в усіх розділах науки, незалежно від спеціальності та професії цієї людини, що робить таке рідкісне явище, як геніальність легко доступним кожному; 3) в електроніці та інформатиці – основа для створення систем штучного інтелекту та якісних систем розпізнавання мовлення та образів, при умові створення мікросхем у котрих запам'ятовуючі елементи зв'язані між собою у трьох вимірах; 4) у авіа-космічній та робототехнічній галузях – можливість розробки нових більш досконалих систем автопілотування, здатних працювати за принципами нейромереж біооб'єктів.

Ключові слова: аналіз та синтез інформації; БПЛА; геніальність; нейроелектроніка; нейрокібернетика; нейромережа; педагогіка; психологія; полікоптер; полікоптерний флаер; технології геніального мислення; тривимірна ассоціативно-логічна структура; штучна геніальність; штучний інтелект геніального вченого; філософія.

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Новый способ унифицированной обработки информации, представленной в виде трехмерной ассоциативно-логической структуры для оптимизации мультироторной беспилотной авиационной системы

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Цель: В данной статье представлена математическая модель и новый способ унифицированной обработки информации, представленной в виде трехмерной ассоциативно-логической структуры. **Методы исследования:** Трехмерный ассоциативно-логический синтез. **Результаты**: Получены новые экспериментальные данные. **Обсуждение**: Данное изобретение относится к нейроэлектронике и нейрокибернетике и может быть использовано в следующих направлениях: 1) в гносеологии – основа для более эффективного и целенаправленного научного поиска практически во всех разделах науки; 2) в психологии и педагогике – основа для более эффективного и универсального мышления человека практически во всех разделах науки, независимо от специальности и профессии этого человека, что делает такое редкое явление, как гениальность легко доступным каждому; 3) в электронике и информатике – основа для создания систем искусственного интеллекта и качественных систем распознавания речи и образов, при условии создания микросхем в которых запоминающие элементы связаны между собой в трех измерениях; 4) в авиа-космической и робототехнических отраслях – возможность разработки новых более совершенных систем автопилотирования, способных работать по принципам нейросетей биологических объектов.

Ключевые слова: анализ и синтез информации, БПЛА, гениальность, искусственная гениальность, искусственный интеллект гениального ученого, нейроэлектроника, нейрокибернетика, нейросеть, педагогика, поликоптер, поликоптерный флаер, психология, технологии гениального мышления, трехмерная ассоциативно-логическая структура, философия.

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