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THE FUTURE OF OUR SOCIETY AND TECHNICAL THINKING SYSTEMS

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БУДУЩЕЕ НАШЕГО ОБЩЕСТВА И СИСТЕМ ТЕХНИЧЕСКОГО МЫШЛЕНИЯ

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МАЙБУТНЄ НАШОГО СУСПІЛЬСТВА ТА СИСТЕМИ ТЕХНІЧНОГО МИСЛЕННЯ

Cardinal decision of actual and unsolved Problem of manipulation robotics and intellect prostheses – *capture reliability of non-oriented complex shape objects* – is based on application of simulation of methods of organization of material systems as *semiotic structure* of relations of contact points - the symbiosis of *informatiology*, discovering geometrical multi-agent foreshortening of unknown initial situation, and so *semiotics*, discovering semantic component of information. The application of methods and principles of Thinking Systems in Robotics - *as a new class of technical intellectual systems* - can stimulate widespread use of manipulation robotics in previously inaccessible areas'

Key words: relations, thinking systems, semiotic structure, capture reliability, virtual actions.

Кардинальное решение актуальной и нерешенной проблемы в манипуляционной робототехнике и интеллектуальном протезостроении – обеспечение надежности захвата неориентированных объектов сложных форм – базируется на применении семиотической структуры отношений точек контакта – симбиоза информатиологии, раскрывающей геометрический ракурс неизвестной начальной ситуации, и семиотики, раскрывающей семантический компонент информации. Применение методов и принципов технических систем в робототехнике в качестве нового класса технических интеллектуальных систем способно стимулировать широкое применение манипуляционной робототехники в ранее недоступных средах.

Ключевые слова: отношения, мыслящие системы, семиотическая структура, надежность захвата, виртуальные действия.

Кардинальне вирішення актуальної і невирішеної проблеми в маніпуляційній робототехніці і інтелектуальному протезобудуванні – забезпечення надійності захоплення неорієнтованих об'єктів складних форм – базується на застосуванні семиотичної структури відносин точок контакту – симбіозу інформатиології, яка розкриває геометричний ракурс невідомої початкової ситуації, і семиотики, яка розкриває семантичний компонент інформації. Застосування методів і принципів технічних систем в робототехніці в якості нового класу технічних інтелектуальних систем здатне стимулювати широке застосування маніпуляційної робототехніки в раніше недоступних середовищах.

Ключові слова: відносини, мислячі системи, семиотична структура, надійність захоплення, віртуальні дії.

Our Humanity has achieved well known success in Economy, Art, Domestic Sphere with application of manual labor within limited *zones of active manipulation* (with spherical radius in 3D space equal to the lengths of any human hand) in such areas as:

- power multipoint impact at material objects,
- manipulation with captured objects in 3D space.

Many paleoanthropologists use three main interrelated following *indications* to distinguish human remains from the rest of mammals:

1. *Developed brain.*
2. *Vertical walking.*
3. *Brush with “fine manipulation”.*

The first *sign – developed brain – is* associated with so maintenance of all organs and systems of human body in normal parameters and as performance 4 higher mental functions (*perception information, memory, thinking processes and speech*).

Some specialists, for example, considered [1] that human *thinking processes* are related with simulation as system relations of components and so phenomenon of external environment and based on objective principles and laws of our World, including the laws of physics and consist of processes of *system motivation, system goal setting, systems of actions with expected results and system control*.

This is reason to reflect the essential properties of objects and it's relations with stimulation the generation of our ideas of external World, including the processes of understanding of regularities of the World.

At the result *thinking processes* can allow to obtain such knowledge of external World, which are unavailable during application human biological First Signal System.

The second human *sign– vertical walking - is* associated with the necessity to release human hands for physical labor.

The third *sign – brush* is associated with all major outstanding achievements of our Civilization in Economy, Art, Domestic Sphere, etc, including the control of complex mechanisms.

It is necessary to note that all basic functions of human hands are implemented within the mentioned sphere in the space.

However outside the mentioned radius of sphere in 3D space there are achievements of our Civilization are more modest and to-day remain at the level of primitive society due to absent mentioned human functions there. The above can be shown, for example, by flights of any stones, spears, later replaced by the bullets, shells, missiles.

Now active manipulations with far non-oriented complex form objects remain to be impossible for us.

1 Thinking systems. Terminology

Last century Russian Academician A.N. Kolmogorov has considered [2] that *simulation of methods of organization* (as a set of information processes or actions, coming to expected results) *of material systems* (including biological) *is to use other material elements* (and useful algorithms of functioning and elements of structures) *to create new systems with essentially the same organization* (and their methods) *like the original system. Therefore, to his opinion, the quite complete model of a Living system should be called as a Living system, and the quite complete model of a Thinking system should be called as a Thinking system.*

In general it is known that *Smart Systems* can use *the principle of selection (by adopted criteria) the solution or need algorithm of limited actions from previously performed list.* Decision taking procedure of Thinking Systems is implemented by another way.

Thinking Systems as the original systems of simulation of human information processes of decision taking cannot contain ahead the list of solutions with specific limited algorithms of actions, for example, in natural indeterminate environment and so include the following features at autonomous level:

- *purposeful determination of environment (situation) with it's simulation at semantic and parametric levels,*
- *cognitive analysis of received information model of environment,*
- *estimation of received informational model by comparison with the model of expected purpose at parametric level,*
- *prognosis the results of virtual actions of taken solutions with possible application of self-organization processes,*
- *generation of adequate solutions and specific algorithms of actions.*

So the ability of Thinking Systems *to identify and represent the semantics of external environment adequately to semantics of solving tasks at parametric levels autonomously is a direct step from primitive level of thinking to professional level of thinking of Technical intellectual Systems.*

2 The example of Thinking Systems

The long absence of decision of one of actual and unsolved Problems of manipulation robotics and prosthetic devices – *capture reliability of non - oriented complex shape objects* – as the necessary stage of any object's manipulation in natural indeterminate surroundings *has a negative impact* on the expansion of using of manipulation robotics and prosthesis in Economy, Medicine, natural and extreme conditions for living.

The main reason for a long existence of this problem *is connected with the absence of active force projections of weight of any object* in the new multitude of contact points (at the stage before object's separation from the initial position), and obligatory *appearance of these active forces later as well as appearance of other passive forces* in these contact points during at the stage of object's manipulation due to objective physical laws on our planet (physical problem).

The latest generates paradoxical situation when at first it is necessary to take decision (by any man or robot) on capture reliability in initial conditions (before separation of object) but then the realization of that decision takes place in another conditions.

Therefore *manipulation possibilities of any robotics connected with capture of object, can be realized successfully only in the shot frames of beforehand created or estimated by man determinate conditions.*

Now it is able to deprive robotics the possibility of any autonomy in natural situations.

The project “Artificial Intelligent Hand“ [3] as the example of Thinking systems based on simulation of some *methods of organization and functional principles of human hand* of physical situations in the system “Brush-Object” base on the simulation of afferent connections (with their synthesis) of human hand – as the result of simulation of spatial sense of touch of human hand at semantic level during unstressed capture reliability of any non-oriented complex form objects. The project provides the possibility of as cardinal solution of the Problem and so of increasing radius of sphere of manipulation in twice and more in 3D space of mentioned *zones of active manipulation.*

Biologists consider that possibilities of mammals to prognosticate situation developments by estimations of future events have provided their domination among any birds, reptiles and etc. on our planet. Obviously well-known possibility of human transition from primitive levels of prognosis to high levels of one's could contribute first of human domination among the rest of mammals.

The cardinal solution [3-5] of mentioned Problem is based on simulation of only cardinal solution implemented by the Nature on human hand, and is associated also with the use of purposefully formalized interdisciplinary knowledge and results of the experiments of revelation of functional principles of motor activity of human hands.

The heart of the methodology is *application of semiotic structure of relations of contact points* as the symbiosis of *informatiology* discovering geometrical multi-agent perspective of physical situation into the system “Brush- Object” (B-O) and *semiotics* discovering their semantics.

Above consists of some stages as *determination* of physical situations in the system “B -O”, then *simulation with cognitive analysis*, using *geometrization* of these physical situations. At the result there is the possibility to transform any information from status “closed“ to status “opened“ for our consciousness by using images of information with creation *endo-physical* properties for looking for these processes by person.

Following stages are *estimations* of these physical situations and *prognosis* of capture reliability in the system “B-O”. It is the basis for taking decision of capture of non-oriented complex form objects.

In other words, it is possible to increase mentioned radius of sphere in 3D space manipulation with transfer main functions of human brush, or to overcome geometric shackles of manipulation at the level of primitive society.

The use of internal image language (based on the semiotic structure of relations of contact points) for *intellectualization* of information processes (receiving, processing, storage and transmission of information) in the system “Brush - Object” provides *semantic expressiveness* as these processes and so parameters of taken decisions with the ability to ensure their *endo-physical* properties.

Achieved *the analogy* of structure of “inner word” of internal image language with the structure of “inner word” of human language *is the basis of identity* (towards biological prototype) of accepted *method of organization of information processes as determination* of physical situations in the system “B-O” and *prognosis* capture reliability of non-oriented objects with *estimations* of physical situations, *taking decision* and the ability to *control physical situations* (in case of negative results of prognosis) by using *self-organization processes*.

The additional difficulties of research of cardinal decision of mentioned problem are connected also with the fact that *much of information processes* of any human taking decision *are on the subconscious level* (psychological problem).

The solution of the problem contains *the simulation* of physical situations in the system “B-O” with their *determination* and *cognitive analysis*, as well as the *geometrization* of physical situations, with *transformation* of original information from it's “closed” status to “open” status for our consciousness.

Some functional principles of movement actions of human hand in indeterminate situations and *unity of structures of words or informational units* of image language of robot (RL) and natural human language (HL) are *the objects of simulation methods of organization processes* of human activities for thinking processes and cardinal decisions of the problem.

Identity of taken decision can be estimated by the results of prognosis of it's results of virtual actions.

In our case *the simulation of methods of organization* of human hand's activities *as the set of information processes is able to generate the organization of targeted relations* between new contact points as the components of structure of new created model (as a feedback of any physical situations in the system “B – O”) with creation the internal non-verbal image language.

The codification of image language as the part of methodology of creation of mentioned feedback is application of mentioned semiotic structure of relations of contact points as the symbiosis of informatiology and semiotics.

The syntax of image language contents some different roles for creation necessary forms of images and presentation their semantics to us.

The morphology of image language provides structures of any images and their connections with another images.

The last provides the semiosis as the sign information process of formation of capture reliability prognosis with internal non-verbal image language.

At the result mentioned solution of the problem in the essence is the deductive logical system with using pseudo-physical logic when mentioned methodology provides the semantic expressiveness as procedures of decision taking and so parameters of taken decisions with such quality of information as cognitive relativity, clarity and brevity.

For the first time of historical period of evolution of our Civilization there is the exclusive chance to expend boundaries of mentioned spheres of manipulation by simulation of methods of organization and functional principles of human hand as unstressed scope, determination the physical situations in the system "B-O", estimations of the situations, prognosis of capture reliability of non-oriented complex form objects with taking decisions and their realizations by application the Thinking Systems as the models of human functional systems of capture with non-alive matter and expensive boundaries of application of human hand functions in Space.

The above must be based on expedient functional principles of movement actions of human hand in indeterminate situations identified experimentally in the similar conditions of these activities.

The successful application of functional principles of human motor hand activities in our case has been taken as the criteria of achievement appropriate functional parity between technical and biological systems (within the boundaries of general class of solving tasks).

Simulation of methods of organization at different levels of mentioned motor activities of human hand including human functional principles is able to base the Foundation for creation the Artificial Humanity in nearest future as the limited aggregate of models of expedient human functional systems as Thinking Systems.

Mentioned will be generally functional adequate to our biological Humanity and will include such models of human information systems, for examples, as thinking systems, system upright posture with motion, system of motor hand activities, speech, vision, hearing, est.

The main difference – non-alive artificial substance, resistant to Space radiation, gravity, temperature, gas components of possible extreme conditions in Space.

Conclusion

It is not difficult to estimate mentioned chance as phenomenon for possible future evolution of our Society in case of answer to the simple questions: how would be changed domestic environment for any person if suddenly human brush has been set on elbow of his hand with geometrical radius reduced by half, how would be changed clothes, furniture of any person, his relationship and lifestyle in that case. At the result in the nearest future it will be possible to create and study special Thinking Systems as the models of different human functional systems with non-alive matter and high reliability [anybody can see characters of fantastic novel "Solaris" by S. LEMM (Poland) especially in case when our Civilization will be able to use the laws of transformation future material Thinking systems

into energy state and back – E. TSIOLCOVSKY (Russia) about “Radiant Humanity”]. In that case it will be possible to begin to create *the new Artificial Humanity* using non - alive matter in the necessary numbers as the Thinking models of different human functional systems with Central Control, for example, to realize the ultra-long space flights, inaccessible to our biological matter in case of space threat. To-day the above as the possible technical *impulse* for development of our Civilization can stimulate large-scale replacements of working persons in negative and dangerous conditions of manual labor with increase limited zones of active manipulations including creation the new class of intellectual prosthesis for invalids of hands and legs, the new class of special thinking manipulators for smart plants – production, for example, of many objects with different forms and sizes in conditions of low cost of production, – smart hospitals, smart offices, smart houses, and etc, for biology – technical Thinking Systems for study their biological system functional analogies, for activities in Space. The above is able to generate the analogy with active role of a human hand *in material and spiritual spheres of our Society as the steps in evolutionary processes of our Civilization and of Humanity itself on our planet.*

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RESUME

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The Future of our Society and Technical Thinking Systems

The long absence of radical solutions to actual Problems in robotics and prostheses to Ensure reliable capture of non-oriented objects of complex shapes – associated with the objective physical laws - the lack of projections of active forces and moments in numerous new points of contact (before the separation of the objects from their original positions at the time of adoption of the decision on seizure) and the appearance of these forces and moments after separation of the objects, which generates uncertainty (the decision to capture – in some physical conditions, and the implementation of the solution – in other terms). Therefore, even today, the manipulative capabilities of any robot or prosthesis are successfully implemented only within the boundaries of a deterministic environment, pre-created or realized by a person.

The solution of the Problem is based on the application of interdisciplinary knowledge with modeling.

A cardinal solution implemented by Nature on the human hand with the use of the semiotic structure of the relationship of points of contact (the result of a symbiosis of Informatiology and semiotics), the results of an experiment to find the functional principles of the motor act of the human hand.

The results achieved are being implemented in creating a working model of an "Artificial" intelligent "hand" in Russia. Successful modeling of the mentioned Cardinal solution can be the achievement of adequate functional parity between technical systems and their biological analogues within the limits of the General class of problems to be solved.

Successful implementation of this Problem will allow us to bring closer the creation of "Artificial Humanity" and as a source of "spare parts" for humans, and our "smart" assistants in the Future, space threats and Space exploration.

РЕЗЮМЕ

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Будущее нашего общества и систем технического мышления

Длительное отсутствие кардинального решения актуальной проблемы в робототехнике и протезостроении – обеспечение надежности захвата неориентированных объектов сложных форм – связано с проявлением объективных физических законов – отсутствием проекций активных сил и моментов во множестве новых точек контакта (до отрыва объектов от исходной позиции в момент принятия решения о захвате) и появлением указанных сил и моментов после отрыва объектов, что генерирует неопределенность (решение о захвате – в одних физических условиях, а реализация решения – в других условиях). Поэтому и сегодня манипуляционные возможности любого робота или протеза успешно реализуются исключительно в пределах границ детерминированной среды заранее созданной или осознанной человеком.

Решение проблемы основано на применении междисциплинарных знаний с моделированием кардинального решения, реализованного природой на руке человека с использованием семиотической структуры отношений точек контакта (результата симбиоза информатиологии и семиотики), результатов эксперимента по изысканию функциональных принципов двигательного акта руки человека.

Достигнутые результаты реализуются в создании действующей модели «Искусственной "разумной" руки» в России. Успешное моделирование упомянутого кардинального решения может являться достижением адекватного функционального паритета между техническими системами и их биологическими аналогами в пределах общего класса решаемых задач.

Успешная реализация указанной проблемы позволит приблизить создание «искусственного человечества» как источника «запасных частей» для человека, так и наших «умных» помощников в будущем при космических угрозах и освоении Космоса.

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