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Information technology imaginative thinking in the person – reasonable systems

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Abstract
The intelligence of the person is an ability of the person to find solutions of creative problems on a minimum of information output in his consciousness. The analysis and statement of such problems are carried out by the scientist or group of scientists in the course of the creative activity and for which at the moment time of the decision isn't present. For their decision creation of a special type of systems which were called person-reasonable systems is offered to Bekhtereva N. P. The driving force of their development declared creative potential. Such approach assumes creation of information technologies of support of adoption of creative decisions which considered and would use opportunities and abilities of scientists and groups of scientists. Person-reasonable system represents the information technology of a special look allowing to intensify subconscious and intuitive processes of the scientist or group of scientists which they use for the solution of problems.

Keywords: decision-making, indistinct conclusion, agent, purposeful state, indistinct programming

1. Introduction

The fundamental problem of creation of methodology of development of person -reasonable information technologies of support of the solution of the problems demanding intellectual efforts is considered. They are focused on development of intuition and opportunities of subconsciousness of the persons and groups making decisions on the basis of a feedback loop (information – mind – the solution of problems – information) with use of methods of artificial intelligence, heuristic procedures of formation of creative and intuitive decisions, their statistical indistinct assessment and the coordinated optimization in the conditions of indistinct uncertainty. Complexity of the solution of this problem is that we practically don't know about anything and mechanisms of creative thinking in general and intuitive logic in particular. About it the academician of the Russian Academy of Sciences Bekhtereva N. P. so writes: "today there is no methodical and technological approach to understanding of some "strange" phenomena of human mentality – at least or maybe to the mechanism of the difficult phenomena of mentality in general" [1]. Subsequently this problem received the name "wall" of Bekhtereva N. P. In this regard interdisciplinary researches with use not only are necessary for philosophy, methodology of management, psychology, ethics, etc., but also with application "not absolutely scientific" researches about consciousness and a brain. The technique of interdisciplinary researches has to provide reliability and approach to truth or idea of a gap between true and intuitive reliability. A kernel of such researches is the system analysis of problems of decision-making formulated by Moiseyev N. N. and assuming use of information of various physical nature, and also concept of postnonclassical scientific rationality and transdisciplinary approach of Stepin V. S. For overcoming of "wall" of Bekhterova N. P. it is expedient to use reasonable hypotheses and assumptions in the field of research of consciousness and a brain. It, first of all, hypotheses and assumptions of consciousness, superconsciousness and subconsciousness; about intuition, its opportunities and mistakes; about figurative thinking; about focuses of language; about belief and their change; about influence of emotions on decisions and behavior of the person; about multilevel neurolinguistic behavior models, about neurolinguistic behavior models of SOAR, SCORE, TOTE, ROLE, BAGE; about forecasting of emotions and lie of the person on his face and minimum behavior.

"Postnonclassical" type of scientific rationality expands a reflection field over activity. It considers correlation of the gained knowledge of object not only to feature of means and operations of activity, but also to valuable and target structures (the scientist, his personality and team of scientists). And communication of the intra scientific purposes ("pleasure" of the scientist, "spirit" of school of sciences, novelty) with extra scientific, social values and the purposes. Therefore the approach based on coordination of the personal theory of the scientist and personal theories of several scientists is expedient. The account and coordination of valuable purposes of the scientist and his ethical standards with the standard norms is a movement condition to objective scientific knowledge. As interdisciplinary researches have to include personal theories of concrete scientific different specialties and therefore there is a problem of coordination of personal knowledge. They are formed at the person during all his life is the childhood, youth, a maturity, an old age. Have forms of a sleep, dream, the imagination, the fairy tale, the myth, mysticism, logical constructions. Reflect subjective understanding of interests, ideals, meaning of life. Their basis are the abilities, talent, genius allowing to find the correct solutions of complex problems on a minimum of information output in consciousness, conscious and unconscious figurative thinking, a trance, hypnosis, the right emotional and left rational thinking, a feedback loop between left and right. In them it is reflected individual unconscious and collective unconscious ancestors and religion.

1. Technique of interdisciplinary researches of creation person-reasonable systems of support solutions of creative problems

Are a part of person-reasonable systems except information

and program technologies the scientist or group of the scientists, and also persons and a group of persons making decisions. They allow to integrate cognitive, somatic and field reason of the people who are their part. The technique of interdisciplinary researches for their creation assumes inclusion of the following sections:

1) reflections;
2) intuitive logic, mathematics, the theory of games, mathematical programming, games with not opposite interests, theories of active systems, theories of a choice, as a reliability control basis;
3) synthesis of formal and heuristic procedures of decision-making;
4) algorithmic instructions;
5) conditions of indistinct uncertainty;
6) logic of information and program systems;
7) an assessment of reliability and reasonable approach to truth;
8) "paradigmatic inoculations" of ideas, assumptions and hypotheses; 9) synthesis of "human", "information" and "program" approaches in informatics language.

It allows to offer the following approach. The general is created, to all disciplines the clear description with use of the basic concepts and logic of informatics which are applied by all in life, in scientific, educational, organizational, economic, business and other activity at computer and network information processing on the basis of use:

1. Information, information streams, information field.
2. Information technologies: measurements and obtaining information, reception and information transfer, processing and transformation of information, storage and information search, display of information, production of information, management of information.
3. Information systems.
4. Information networks.
5. Knowledge, as reliable information.
6. Knowledge – formation of reliable information.
7. Interdisciplinary researches – exchange of information between disciplines and scientists.
8. Computers and computer networks.

The only way to find the solution of a creative problem is the reflection. The reflection represents a method of generation by the scientist and group of scientists of new information which allows to solve the considered creative problem and expands borders of knowledge and experience. This additional information leads often to uncertainty growth. Therefore the main problem of interdisciplinary researches is the problem of ensuring reliability of new knowledge at expansion of borders of a reflection. It is expedient to apply to ensuring reliability as a kernel of interdisciplinary researches to the mathematician, the logician and system the analysis of problems of decision-making in conditions uses of information of various physical nature, including mental information.

The main objective of the system analysis is development of the concept of association of mathematical and informal methods of the analysis, strict ways of research of the formalized models with experiment, heuristic receptions, judgments of experts and value judgment. [2,3,5] which includes:

1. Formal procedures: bases of the mathematical theory of active systems, the theory of management, research of operations, problems of management in social and economic systems, mathematical and network programming, a complex assessment.
2. Informal procedures: ideas and language models of the theory of management, research of operations, theories of decision-making, social and economic sciences, including psychology, psychology of work, psychology of will, motivation and motives, emotions and feelings, practice of work.
3. Synthesis of formal and informal procedures: indistinct concepts, judgments, assumptions and belief, fuzzy and inductive logic, algebra of logic and the logician of belief of indistinct conditions, plausible reasonings and decision-making in indistinct conditions; measurement, description and processing of subjective information.
4. Computer model and computer experiment: problems of management in social and economic systems with use of methods of mathematical and network programming, the analysis and synthesis of difficult systems, theories of a choice, methods of measurement, the description, use and processing of subjective information with application of indistinct algorithms of computer experiments. The complex assessment of usefulness in indistinct conditions can be used.

2. Principles of information technologies of coordination

On the basis of application of approach of the system analysis of problems of decision-making in conditions uses of information of various physical nature the methodology of coordination of interests in information systems which differs from other approaches of coordination of interests in the following was developed.

1. The problem of increase of efficiency of administrative decisions on the basis of development and application of formal methods and means of processing and display of information, and the coordinated optimization is put and solved.
2. As strategy of research models of the theory of active systems which are supplemented with components, necessary for the description of human-machine processes of coordination and optimization, are used:

- models of human-machine processes of coordination and optimization in language of the theory of active systems and games with not opposite interests;
- models of problems of multicriteria optimization with the unknown functions of usefulness describing interests of users of active system in language of heuristic procedures and the theory of active systems;
- heuristic algorithmic models of human-machine processes of coordination and optimization in the form of algorithms of "reducibility", i.e. in the form

of algorithmic instructions;

- The formal algorithmic models of human-machine processes of the solution of extreme tasks described by means of algorithmic methods of optimization;
- Model of stability of collective strategy of users of active system in language of the theory of games with not opposite interests;
- mathematical models of the extreme tasks solved on each iteration of human-machine processes in language of research of operations and active systems;
- the structural models of information processes describing information technology of coordination and optimization in language of structural programming;
- experimental models of human-machine processes of coordination and optimization in the form of computer models, imitating and role-playing games in active systems;
- models of intellectual support to the coordinated optimization.

Managing and integrating environment of these models with each other and with models of the theory of active systems is the conceptual model of human-machine processes of coordination and optimization giving a substantial idea of essential properties of these processes and the main communications between them.

3. The developed principle of the coordinated optimization on a set of compromise solutions which allows to consider is applied: { the coalition of participants of coordination of decisions + the principle of the optimum coordinated planning of conditions of the coalition + human-machine procedure of coordination and the coordinated optimization on a set of compromise solutions + the description of a problem of the coordinated optimization on a set of compromise solutions + the scheme of functioning of active system with the coalition of coordination of decisions + the collective strategy of the coordinated optimization providing stability of collective decisions }. Due to application of this principle possibly finding of decisions optimum according to Neumann - Morgenstern. These decisions belong to the set of compromise solutions possessing properties of internal external stability which consist that the received optimum agreed decisions can't be opposed each other and in opportunity to each not belonging decision on Neumann - Morgenstern and applying for a role of more effective to oppose the optimum agreed decision belonging to this set.

Algorithmic instructions of human-machine processes of the coordinated optimization are under construction on the basis of algorithms convex programming, network programming, the analysis and synthesis of difficult systems, the theory of a choice, etc. For example, are applied Frank's method – Wolf and gradient methods. They possess good convergence on the first steps of search and are steady against a choice of the direction and a step of descent. It provides convergence of human-machine processes and resistance of speed of convergence to the accuracy of definition of gradients on each step of search. In this case on each step of search it is possible to apply also value judgment of the direction of three-dimensional motion of criteria or value judgment in the form of coefficients of their importance.

3. Algorithms of information technologies of imaginative thinking

We will consider process of conscious figurative thinking.

1. k = 0.
2. k = k+1.
3. Formation in consciousness of an image of the decision.
4. Measurement of intensity of feeling of satisfaction and intensity of conviction.
5. Statistical indistinct estimates of satisfaction and conviction
6. If two types of estimates exceed some threshold value, transition to the item 7 of process of search, otherwise continuation of search of the decision and to item 2.
7. Comparison of images of the decision (ranging) and choice of the best.

The person has a quality, expressiveness which degree very widely varies from an individual to an individual, allowing to speak in one cases about abilities, in others – about talent, and in the third - about genius. It is about ability to find the correct solutions of complex problems on a minimum of information output in consciousness. This basis of information in consciousness very difficult is found or as if it isn't found in general. Analogies and something else, very close to "common sense" are used. Why it so? I just like that think, that's all.

We will consider algorithm of unconscious imaginative thinking.

1. k = 0.
2. k = k+1.
3. Input in subconscious of an image of the decision from memory of consciousness from a room condition in memory of information on an image.
4. Scrolling of an image in a light slumber at falling asleep.
5. A recall of an image in a light slumber at awake, fantasy.
6. Pronunciation of an image, input information on an image in consciousness.
7. Input of information on a data carrier.
8. Measurement in consciousness of intensity of feeling of satisfaction and intensity of conviction.
9. Statistical indistinct estimates of satisfaction and conviction.
10. If estimates satisfactory, transition to the item 7 of process of search, otherwise continuation of search of the decision and to item 2.

We will consider process of coordination of conscious and unconscious imaginative thinking according to R. Dilts:

1. k = 0.
2. k = k+1.
3. Formation in subconscious of an image of the decision.
4. Formation in consciousness of an image of the decision.
5. Measurement of intensity of feeling of satisfaction and intensity of conviction (achievement of the purpose)
6. Statistical indistinct estimates of satisfaction and conviction
7. Consent assessment
8. If these estimates exceed some threshold value, transition to the item 7 of process of search, otherwise continuation of search of the decision with item 2.
9. Comparison of images of the decision (ranging) on satisfaction and choice of the best

4. Information technology of coordination network the relations in the intellectual organizations

In an external cycle computer modeling by the intellectual agent (IA) of the state according to the figurative thinking, measurement of IA by means of linguistic criteria and the purposes of estimates of the spiritual and moral component, processing of subjective information of IA, and the message by other IA of results is carried out. In the course of communicative interaction of IA the analysis of results consistency of representations is made, the collective model of the coordinated representation is formed and the decision on the end of procedure for consent with all IA is made. In an internal cycle representation IA of the received results and extreme estimates, and revision of the estimates by it is carried out.

In this procedure the idea about free discussion in which everyone can cover the point of view including the morals can be applied. Its result – formation of the consolidated opinion of all interested participants. The role of the researcher of operation consists in carrying out for centuries of the developed idea of people of ideal, originally human relations and formations of the coordinated result on this basis. As criterion the post-nonclassical criterion of rationality – consent is applied. This approach allowed on the basis of idea of applied ethics to develop heuristic procedure of the interactive coordinated optimization of creative decisions in the intellectual organizations taking into account spiritually – a moral component.

The internal cycle represents interactive procedure of formation of three options of alternatives of the decision about spiritually - a moral condition of community, the subsequent their indistinct assessment and ranging. On each step of a cycle of alternative are reconsidered. In an external cycle in the absence of consent of IA search of IO or spiritually - the moral coalition of ways of coordination of interests of IA and influence on IA in the course of communication is carried out (conversations, consultations, discussions, negotiations, coaching, meetings, computer calculations and presentations).

5. Information technology of coordination of the budgetary target programs of the region

On the basis of this methodology of coordination in information systems the program system of the coordinated optimization of the budgetary target programs for the solution of problems of development of the village of the Tver region is developed. Development is carried out on the basis of the method of the coordinated optimization in indistinct systems offered in [4]. The program system is intended for support of program drawing up the regional budget on the basis of "practical" optimization (not less than two versions of the budgetary target programs are analyzed), and coordination of interests and the purposes of executive authorities, performers of the budgetary target programs and the population of area.

The program system is developed with application of means of Delphi and the Oracle database and turns on modules of support of the system analysis of the purposes and tasks of the budgetary target programs, supports of formation of options of statements of problems of the coordinated optimization, their decisions and after the optimizing analysis, support of the analysis of versions of the budgetary target programs, support of their presentation and procedural consultation on the coordinated optimization and formation of the budgetary target programs. The program system carries out support of the following procedures.

1. Creation of three-level structure of the purposes and factors (third level) of influence, including actions for development and restructuring of object of the program.

1.1. Definition of the list and contents is more whole than the first and second levels and factors of influence of the third level.

1.2. Definition basic, predicted and the planned periods (by years).

1.3. Definition for each i=1,2,…,n of the purpose of the second level of the indicators of k_{ij}, j=1,2…., m of use of the budgetary target program.

1.4. Creation of a qualitative scale of differences or a quantitative scale of the relations for measurement of increments of Δk_{ij} of indicators of the purposes of the subsequent period rather previous with use of linguistic coordinates or rated values of indicators of $\Delta k_{ij} = (k_{ijt} - k_{ij(t-1)},)/ k_{ijt}$, $0 \le \Delta k_{ij} \le 1$.

1.5. The description of functional dependence of the indicator of achievement of the purpose of $\Delta w_o(t)$ of the budgetary target program on indicators of achievement of the objectives of the second $\Delta w_{ij}(t)$, level, increments of their indicators of $\Delta k_{ij}(t)$, increase in the amounts of financing of $\Delta s_i(t)$ at restructuring on the purposes of the second level:

$$\mu(\Delta w_0(t)) = \sum_{i \in I} \mu((\partial w_0 / \partial w_i)(t)) \times \mu(\Delta w_i(t)),$$

$$\mu(\Delta w_i(t)) = \sum_{j \in J} \mu((\partial w_i / \partial k_{ij})(t)) \times \mu(\Delta k_{ij}(t)),$$

$$\mu(\Delta k_{ij}(t)) = \sum_{i \in I} \mu(\partial k_{ij} / \partial s_i)(t)) \times \mu(\Delta s_i(t)),$$

$$\mu(\Delta w_0(t)) = \sum_{i \in I} \sum_{j \in J} \mu((\partial w_0 / \partial w_i)(t)) \times \mu((\partial w_i / \partial k_{ij})(t)) \times \mu((\partial k_{ij} / \partial s_i)(t)) \times \mu(\Delta s_i(t)),$$

where: $\mu(.)$ - function of accessory

Thus it is considered that there is a dependence of an assessment of achievement of the purpose of $w_o(t)$ on estimates of achievement of the objectives of the second $w_i(t)$, level, their indicators of $k_{ij}(t)$, the amounts of financing of $s_i(t)$ on restructuring on the purposes of the second level $w_o = W (w (k (s)))$, $w = (w_1, w_2, ..., w_i, ..., w_n)$, $k = (k_1, k_2, ..., k_{ij}, ..., k_{nm})$, $s = (s_1, s_2, ..., s_i, ..., s_n)$, $\Delta w_o(t) = w_o(t) - w_o(t - 1)$, $\Delta w_i(t) = w_i(t) - w_i(t - 1)$, $\Delta k_{ij}(t) = k_{ij}(t) - k_{ij}(t - 1)$, $\Delta s_i(t) = s_i(t) - s_i(t - 1)$. Also it is considered that there are derivative $\partial w_o / \partial w_i$, $\partial w_i / \partial k_{ij}$, $\partial k_{ij} / \partial s_i$, by means of which expert estimates in the form of weight coefficients by the rule of full differential increments of functions are determined by increments of arguments.

2. Calculation of indicators of achievement of the objectives of the budgetary target program for the predicted year rather basic:

2.1. Data collection on indicators, the different levels describing the purposes and factors of influence of the budgetary target program for the basic and predicted year. For the predicted year three versions of data for pessimistic (probability of risk r=0,3), for the most probable (probability of risk r=0,5), for an optimistic situation in internal and environment decide on anticipation.

2.2. Determination of weight by experts of coefficients in the importance of the purposes of the second level of rather common goal and coefficients of weight of indicators on the importance of rather corresponding purposes of the second level. For the predicted year three options decide on anticipation.

2.3. Definition by experts of linguistic estimates of differences of quality and quantitative indices of the purposes or calculation of quantitative rated values of increments of indicators of the purposes of the second level. For the predicted year three options decide on anticipation.

2.4. Calculation of indicators of achievement of the objectives of the budgetary target program. For the predicted year three options, average value and an average square indicators of achievement of the objectives and use of the earth decide on anticipation. The average square is applied to an assessment risk at anticipation.

3. Multistep iterative process of an assessment and choice of administrative decisions on implementation of the budgetary target program:

3.1. Beginning of process.

3.2. Creation of the tree of decisions considering two stages of decisions on restructuring and two stages of strategy of the nature at the choice of pessimistic (probability of risk r=0,3), the most probable (probability of risk r=0,5) and an optimistic situation in internal and environment.

3.3. Definition by experts of three options of coefficients of weight of $\partial wo / \partial wi$, $\partial wi / \partial kij$ on the importance of the purposes of the second level of rather common goal and coefficients of weight of indicators on the importance of rather corresponding purposes of the second level.

3.4. Definition by experts of three options of coefficients of weight $\partial w / \partial wo(t)$ in the importance of the purpose of the budgetary target program on all predicted period of $t \in T$ concerning the purpose on the concrete periods of time *t*.

3.5. Definition by experts or systems analysts of three options of coefficients of weight $\partial k_{ij} / \partial s_i$ on the importance of influence of additional financing on increments of indicators of the second level and restrictions on financings of decisions on restructuring c_i and $c_0 = \sum_{t \in T} c_i(t)$.

3.6. Calculation and after the optimizing analysis of three options corresponding to a tree of decisions, an optimum task of calculation of optimum additional financing of decisions on restructuring

$$\mu(\Delta w_0(t)) = \sum_{t \in T} \sum_{i \in I} \sum_{j \in J} \mu((\partial w / \partial w_0)(t) \times \mu((\partial w_0 / \partial w_i)(t)) \times \mu((\partial w_i / \partial k_{ij})(t)) \times$$

$$\times \mu((\partial k_{ij} / \partial s_i)(t)) \times \times \Delta s_i \Rightarrow \max, \mu((\Delta s_i \le c_i(t)) \wedge (\Delta s_0 = \sum_{i \in I} \Delta s_i(t) \le c_0 = \sum_{i \in I} c_i(t)) \ge \mu^*.$$

3.7. A choice of the best option of additional financing by criterion of a maximum of an average prize and the analysis of risk on an average square the indicator of use of the budgetary target program.

3.8. Formation of factors of influence on the purposes of the second level, i.e. the plan of measures and their additional financing by years and the purposes of the second level. Check of security of financing. If it isn't provided, transition to 3.5.

3.9. Specification of indicators is more whole than the second level for specification by systems analysts of expert estimates of weight coefficients on 3.3 – 3.5.

3.10. A stop of process or transition to 3.1.

Process of optimization is presented in the form of a tree of decisions, two stages of decision-making to which there correspond two stages (the decision on a state in the current year and the decision on financing for the periods) and two stages of a choice of conditions of the nature are carried out (a state internal and environment in the current year and next years). In the course of optimization the criterion of a maximum of average risk is applied to the accounting of risk future periods and three options of problems of optimization of financing are solved. The problem of the coordinated optimization according to [4] will have an appearance.

$$\mu(\Delta w_0(t)) = \sum_{r \in R} \sum_{t \in T} \sum_{i \in I} p_r \times \mu((\partial w / \partial w_0)(t) \times \mu((\partial w_0 / \partial w_i)(t)) \times$$

$$\times \mu((\partial w_i / \partial s_i)(t)) \times \Delta s_i \Rightarrow \max, \mu(\Delta s_i \le c_i(t)) \wedge (\Delta s_0 = \sum_{i \in I} \Delta s_i(t) \le c_0 = \sum_{i \in I} c_i(t)) \ge \mu^*$$

Or

$$\mu(\Delta w_0(t)) = \sum_{r\in R}\sum_{t\in T}\sum_{i\in I}\sum_{j\in J} p_r \times \mu((\partial w/\partial w_0)(t)) \times \mu((\partial w_0/\partial w_i)(t)) \times \mu((\partial w_i/\partial k_{ij})(t)) \times$$

$$\times \mu((\partial k_{ij}/\partial s_i)(t)) \times \Delta s_i \Rightarrow \max, \mu(\Delta s_i \le c_i(t)) \wedge (\Delta s_0 = \sum_{i\in I} \Delta s_i(t) \le c_0 = \sum_{i\in I} c_i(t)) \ge \mu^*,$$

$$I = \{i/i = 1,2,...,7\}, J = \{j/1,2,...,m\}, R = \{r/r = 1,2,3\}.$$

After the solution of three options of problems of the coordinated optimization of financing for three versions of forecasts year gets out the best on the greatest value of the indicator of use of the earth of a property land complex of the Tver region for the period. It is the solution of a choice for the most probable forecast.

7. RESUME

On the basis of the above it is possible to draw a conclusion that use of the described technique allows to build more adequate forecast of behavior of the person in organizational systems at various ways of management of his behavior.

8. CONCLUSION

Comparison of the given theoretical provisions with known analogs allow to draw a conclusion that the proposed method based on the principle of subjective rationality would overcome the disadvantages of known regulatory and behavioral approach for modeling decision-making man. On the basis above stated it is possible to draw a conclusion on prospects of the proposed solution on possibility of its application at decision-making support development of systems. Further development of the considered scientific problem assumes consideration:

- Algorithmic and information and functional approach to the description in the conditions of indistinct uncertainty of processes in a brain, consciousness and subconsciousness
- Information technology of imaginative thinking and information technology of nervous system of the person.
- The algorithmic functional description of the person – reasonable program system of intellectual support of formation of solutions of creative problems.
- Intellectual information and program systems of support of individual and collective consciousness and subconsciousness of scientists.
- Systems of accumulation and use of knowledge.

CONFLICT OF INTERESTS

Authors confirm that the presented data don't contain the conflict of interests.

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