Convergent use of neural network information technologies for monitoring and evaluating the performance of digital control operators of situational centers at critical infrastructure facilities

E L Loginov¹, ², V V Grigoriev³, P A Boiko³, V S Balandin³ and G S Ivanovskij⁵

¹ Expert and Analytical Service, Situation and Analytical Center of the Ministry of Energy of Russia, 42 Schepkina, Moscow, 129090, Russia
² Faculty of International Economic Relations, MGIMO (University) of the MFA of Russia, 76 Vernadsky Prospect, Moscow, 119454, Russia
³ Department of Finance and Credit, Russian State Humanities University, 6 Miusskaya sq., Moscow, 125993, Russia
⁴ Corporate Finance and Corporate Management Department, Financial University under the Government of the RF, 49 Leningradsky Pr., Moscow, 125167, Russia
⁵ Faculty of International Economic Relations, MGIMO (University) of the MFA of Russia, 76 Vernadsky Prospect, Moscow, 119454, Russia

E-mail: loginovel@mail.ru

Abstract. In the technology under consideration is proposed the convergent adaptation of neuro-monitoring testing services and packages of intelligent information coming to an individual by neuro-monitoring readout of the interests, emotions and mood of the observed standardized conditional operator with the measuring of workload exposed on the main sensor perceptual channels of a concrete digital management operator within smart community, meta-program and others. There are formed the conditions for the provision of a human with information taking into account the characteristics of the individual intelligence structure: its unity, integrity, and systematization within the behavioral model aimed at the duty performance. At the same time the information packages are formed in an automated way correlating with his personal socio-political position and attitude to the policy of the agents of control of smart-community segments with the future forecast of the possible deviant expressions in the network.

1. Introduction
Nowadays digital management operator's network access to the virtual reality is more and more becoming not only the way of getting information and doing management but also, which is by the way highly important, an interactive immersion into artificially constructed virtual worlds. For instance, a situational center operator of a nuclear power plant, a space system, a military compound is a digital management engineer with increased intellectual workload and spends a lot of time in a state in which his inner world is affected by the virtual reality within smart community and with feedback effects [1]. That poses high risks associated with the performance of duty which are attributable to...
changes in the psyche as well as in the way of ambient reality interpretation and in the patterns of situational behavior of a standardized conditional operator of digital management [2]. Neuro-monitoring in the forms of its various tools allows the construction of individual strategies of immersion into virtual environment taking into account the cognitive and psycho-semantic characteristics of a specific engineer staff representative [3].

2. Electronic semantization of states of consciousness and psyche as the ground of the imprinting of a duty-centered behavior pattern in the mind of a digital operator

The development of such technology within the application of neuro-monitoring technologies for the effective solution of the difficult cognitive problems, which are important in the swart-community by the immersion of digital management operators into the virtual reality, that more and more often satisfies their basic psychological needs, that can be hardly fulfilled in the real life, was stimulated by the necessity of the development of a constructive digital toolset for the risk reduction [4]. This toolset uses the new opportunities as a result of electronic semantization and semantic interpretation of states of consciousness and psyche including uncertain meanings, emotional responses and cognitive activity [5].

Technological abilities of the electronic semantization of states of consciousness and psyche allow the identification, i.e. mathematical description and analysis of the specific digital management operator’s behavior by his work in the cyber-physical system, which is recorded with the use of electronic monitoring tools [6].

The characteristics of conscious and psyche of a standardized conditional digital management operator determine his approaches to the handling of intellectual information which is primary in the virtual environment. In perspective, in the feedback mode they also take part in the development of consciousness of digital management operators within smart-community as a complex quasi-reality image. In this case the human is understood as a person comprehending the intellectual information and at the same time as the user of electronic communication services in a broad sense.

Electronic semantization is a semantics-oriented technology of data organization which allows the “package” within mathematical categories of the characteristics of operators of digital management with all its psycho-semantic and other peculiarities. It also includes prejudices and phobias, unconscious predilections and operational characteristics of thinking, for example, the virtual avatar characteristics, alter-ego, personal web-character in web-forums, messengers, chats, portals, blogs and social networks.

3. Agent based models allowing the regulation of acts of a standardized conditional operator

Agent based methods of the creation of a bank of neuro-descriptions, social descriptions and the descriptions of behavior of the digital management operators within smart-community in the amounts of information of communication networks consist in the construction of a computational model. This model itself represents a combination of agents each with a certain set of features including social characteristics and political preferences, as well as the interests of digital management operators with an increased intelligent workload and, in the first place, the interests of getting a reinforcing self-assessment of the chosen intelligent information package.

Agent based model is the ground of tuning of information systems that implement the elements of virtual reality including complex-structured optical, audio, audio-visual signals, virtual presence effect and others, subconscious and unconscious stereotypes and schemes of functioning of the formalized and non-formalized network collectives. This computational model allows conducting simulations of various real events in regards to the standardized conditional operator and his access to the intelligent network business-services, for instance, to the three-dimensional virtual platforms, which together form an online business office.

Here it’s especially important that the information coming to the human forms a system of relations between a person and the ambient reality including the socio-political one and his participation in the processes of the formation of intelligent information electronic content. This is particularly relevant in
regards to the generation of a network dynamic electronic content, which is created and constantly modified by the digital management operators.

The target activation of a strong emotional response and concentration can substantially change the forms of the expressions of irritation and aggression and will help to break the psycho-emotional tension of a standardized conditional digital management operator but by the participation in the street riots but by playing virtual games, “shooting games” or online strategies of virtual space conquest.

4. The formation of cognitive communication functional elements in a system “human – artificial intelligence – machine environment”

For the increase of social effectiveness of control of digital management operators in the virtual reality it's necessary to identify the linkage between the package of information which is interesting to operators including their behavior in the cyber-physical system which is recorded by the electronic monitoring tools with a concrete module of his intelligent predilections in the digital virtual environment. It's necessary, for instance, to find out the indicators of aggressiveness and rigidity of a standardized conditional digital management operator which makes it more efficient to use electronic neuro-monitoring and other testing services including those with his participation in multi-user competitive games.

In other words, it's necessary to form functional elements of the complex cognitive communications in an integrated sociotechnical model “human – artificial intelligence – machine environment”, which are rapidly adapting to the intellectual level of the identified, i.e. already studied concrete digital management operator with his personal characteristics, socio-political preferences and interests within smart-community.

The connection of human minds and artificial agents observed here allows the “package” of the studied digital model of a standardized conditional operator and his “digital-twin” in computer networks [7].

An important role here is played by neuro-interfaces – detectors, chips, programmed controllers and others, which allow to receive information about processes that mediate the thinking activity in a remote way [8–10]. Meanwhile, some kind of problem is the non-invasive, i.e. remote, detection of commands given down by the brain of a concrete operator within smart-community [11].

It is proposed to use automated detection and interpretation of mental commands according to indirect signs on the base of monitoring services of typical computers: the fixation of the character and dynamism of keyboard clicks and work with computer mouse, the identification of audio- and video-signals, the frequency of visits to the sites and of sending information messages. That will allow to find out the interrelationships and interferences of one logic constructions (views, predilections) and others. I.e. without the use of medical-nature sensors that are difficult to install and operate.

In this respect it is proposed to study the problem of formation of the authorization effect in the system of social communication and getting of information, i.e. the process of knowledge appropriation and filling them with a personal meaning within a duty-centered behavior model in the condition of mixing of information coming to a human from various perceptual flows.

It is proposed to compare the engineer staff personal data with the amounts of intelligent information needed for the solution of complex cognitive problems of smart community with the developed profiles of reflective matrices according to different extents of the identified operator’s life satisfaction as the basic element from which the process of living in an artificially-initiated reality starts. Thus the possibility for forecast is created, including that of non-standard behavior of the receivers of information coming from any possible source within artificial segments of psyche maintained by machines and synchronized with the natural psyche.

5. The imprinting in the human mind of a behavior model of intelligent activity for the solution of complicated cognitive problems of smart-community

The goal is the imprinting in the human mind on the base of his “digital twin” of a behavior model of intelligent activeness for the solution of complicated cognitive problems of smart-communities with
the preset characteristics of the impact made on the operators including his behavior in the cyber-physical system. This human more and more often realizes his interests immersing into the virtual reality which not only creates a comfortable business environment but also more and more often becomes a stimulator and a substitute of real life.

It is necessary for the digital management operators within smart-community to create individual imprinting constructions taking into account cognitive, nervous and emotional or other physiological responses of the organism and the management of the quasi-individual trajectories of behavior of the members of socio-economic processes with an increased intelligent workload. It’s required, for example, for the maintenance of transformation of a socio-politically active standardized digital management operator from an opponent to the government making deviant acts to the governments client and in the future to partnership with the government.

I.e. it’s needed to choose a toolset of management of quasi-individual behavior trajectories of the members of socio-economic processes with an increased intelligent workload. For this goal there can be used the peculiarities of dominant typological regularities in the operation of the cognitive mechanisms by the concurrent stimulation with the use of several perceptional channels of the process of formation of the stable artificial connections for the neuro-cognitive programming of the patterns of situational behavior. To reduce the risks of deviant acts there can be used the cognitive impacts of the virtual environments including the forms of expression of the effect of the person's identification with his digital image present in the global networks with regards to the peculiarities of his representational system and arising from this individual patterns of the attitude to the command signals from governmental structures taking into account the main perceptive channels of a concrete person.

The detection of cognitive and psycho-semantic peculiarities of the identified, in other words, the described and analyzed concrete digital management operator can be most effectively realized on the base of the study of the features of clusters of the expression of several significant factors of informational and cognitive character. In particular, instead of the operator we can put the voter as the participant of the mechanism of electronic democracy in the political market.

The informational base for this can be formed by analyzing the presence of digital management operators within smart-community in the electronic social networks, in the Internet and in other communication systems [12].

Thus, a stable convergence is reached of the factors that are difficult to compare. These are the factors of socio-political preferences and interests of the digital management operators including their behavior when working in the cyber-physical system, recorded with the use of electronic monitoring tools. Information packages brought to a human and adapted to his personality (“digital twin”) form a certain mindset with the expansion of the positive intelligent component, of the stimulation of the cognitive activity and of positive emotions.

These effects are reached taking into account the indicators determined in the global information networks and databases which characterize the module of the psycho-metric condition of the digital management operators within smart-community including those of suggestibility and susceptibility in the concrete moment of time in the future.

6. The formation in mind of a standardized conditional operator of an image of quasi-reality helping the solution of the complex cognitive goals

On this base is realized the formation of the neuro-descriptions, social descriptions and semantic descriptions of a standardized conditional digital management operator's behavior within digital behavior with the access to the possibility of finding an algorithmic consensus as the matrix of the interests of agents. This matrix of interests allows to find the solutions that meet the criterion of convergence in regards of the adaptation of the intelligent information packages taken as the elements of a digital quasi-reality with the forecast of emotional unconscious responses. The search for a solution is carried out on the base of forming a digitalized portrait of a standardized conditional operator including the characteristics of his thinking activity, memory, attention which affects his choice of the electronic content including various forms of the avatar-mediated network interactions.
When possible this process is realized with the use of neuro-interfaces: detectors, chips, programmed controllers and others which allow receiving data on the processes mediating the thinking activity in a remote way.

I.e. it’s necessary to receive data in the electronic information spaces for the filling of databases containing the needed information with numeral, categorical and temporal attributes which are most significant for the interpretation of reality and the creation of behavioral models for common and emergency situations. It’s also worthwhile to use the information from systems allowing facial recognition, human speech understanding and interpretation of the physical activity and emotional condition of the digital management operators within smart-community and to find out his attitude to the ambient reality.

The use of neuro-monitoring testing services as elements of the complex cognitive communications in an integrated sociotechnical system “human – artificial intelligence – machine environment” with a semantic resonance is realized taking into consideration the digitalization of the standardized conditional digital management operator with the network identification of his orthodox intelligent position or interests in the unclear environments of the “over-noised” electronic content. Here the intelligent position and interests can be described with the values – numeric parameters of the matrix of results of the neuro-monitoring testing services and the analysis of the materials from the space of electronic content of neuro-descriptions, social descriptions and the descriptions of the semantics of behavior of the operators.

In the present circumstances it seems to be appropriate to activate the processes of the formation of the profile of psycho-semantic qualities and reflexive matrices depending on the various levels of the life satisfaction of the identified conditional digital management operator as the basic point from which living in an artificially tuned reality can be started. In this way the possibility is provided of the operation of “gliding” of the network formalized and non-formalized groups towards the mutual encouragement of acts beyond the expressions of the behavior model impeding the concentration on the duty performance. The living of an artificially tuned reality is realized as a package of the information adapted to the human together with his described cognitive, nervous, emotional and other physiological responses of the organism. At the same time the nervous-linguistic programming and other similar technologies in the deep field of imprinted images with a respective sense transcription are maintained by the computer technologies and synchronized with the natural psyche with overcoming the disagreement of experiences – the effect of tuned reality with personal experience kept in mind.

7. Conclusion
The virtual reality more and more often satisfies the basic psychological needs at a high level that can be hardly reached in the real life. This determines the positions of the digital management operators within smart-community and the consequential process of formation of the electronic content of intelligent information which is the ground for their solution of complicated and important for smart-community cognitive goals.

I.e. the conditions are formed for the highly effective process of operation of the elements of typical form of thinking in regards to the positioning of a standardized conditional digital management operator in a certain segment of the intelligent information consumption. This information includes not only the professional skills but also socio-political views, stimulating the participation in the groups of some kind. The formation of the information electronic content resulting from here is the ground for the solution of the complex cognitive problems important for the smart-community with the new form of thinking – the artificial psyche maintained by the computer technologies and synchronized with the natural psyche.

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