

Vetrov A.N.

vetrovan@nwgsm.ru

RF, Saint-Petersburg city

“The Saint-Petersburg state electrotechnical university "LETI"”

THE FEATURES OF THE AUTOMATION OF DIAGNOSTICS OF THE FIELD OF VISION OF THE COGNITIVE MODEL OF THE SUBJECT OF TRAINING FOR THE ANALYSIS OF THE INFORMATION ENVIRONMENT OF THE ADAPTIVE TRAINING

The analysis of the information-educational environment (IEE) and the increasing in the efficiency of functioning of the created by author automated (remote) training (ART) system with the properties of adaptation based on the cognitive models (CM) is a difficult scientific problem, which causes the necessity of entering of changes into the organization (the complex of additional actions) and the technology of formation of knowledge of the contingent trainees (the modification of principles and algorithms of functioning of the main components and the means of training) for the usage of the developed cognitive modeling technology (CMT) and the parametrical cognitive models block (PCMB), and also the complex of programs, realizing the automation of the tasks of research.

The complex of programs realized by the author for the researching of the information environment of ART system with the properties of adaptation based on PCMB includes: the adaptive means of training (the electronic textbook) – operates on the basis of the new adaptive representation of information fragments processor and provides the individually-oriented generation of information-educational influences of different kind based on the innovative PCMB; the basic diagnostic module (DM) – provides the automation of estimation of the level of residual knowledge of the contingent of trainees in the form of testing; the applied DM – realizes the automation of diagnostics of the parameters of CM of the subject of training, which reflect the individual features of personality of the subjects of training (IFPST).

Each CM acts as the reconstructed in width and depth repertoire of parameters, which is echeloned on a row of portraits and stratified on a row of sets, located on two levels of its hierarchy.

CM of the means of training – accumulates a set of parameters, which reflect the potential possibilities of the means of training at the generation of training influences of different kind and type by the various ways.

CM of the subject of training – concentrates the parameters, characterizing the perception of information by the visual and auditory sensory systems (the physiological portrait), the processing of information (the psychological portrait) and the level of understanding of the content of information fragments in the subject of studying in a given language (the linguistic portrait).

The principle of functioning of the applied DM involves the usage of a selected set of methods of research of the certain IFPST, which allows to measure the values of parameters of CM of the subject of training.

The method of research of the parameters of CM in the basis of CMT allows to select a set of the methods of research, to provide their algorithmization and realization in the view of procedures, located in DB of the applied DM.

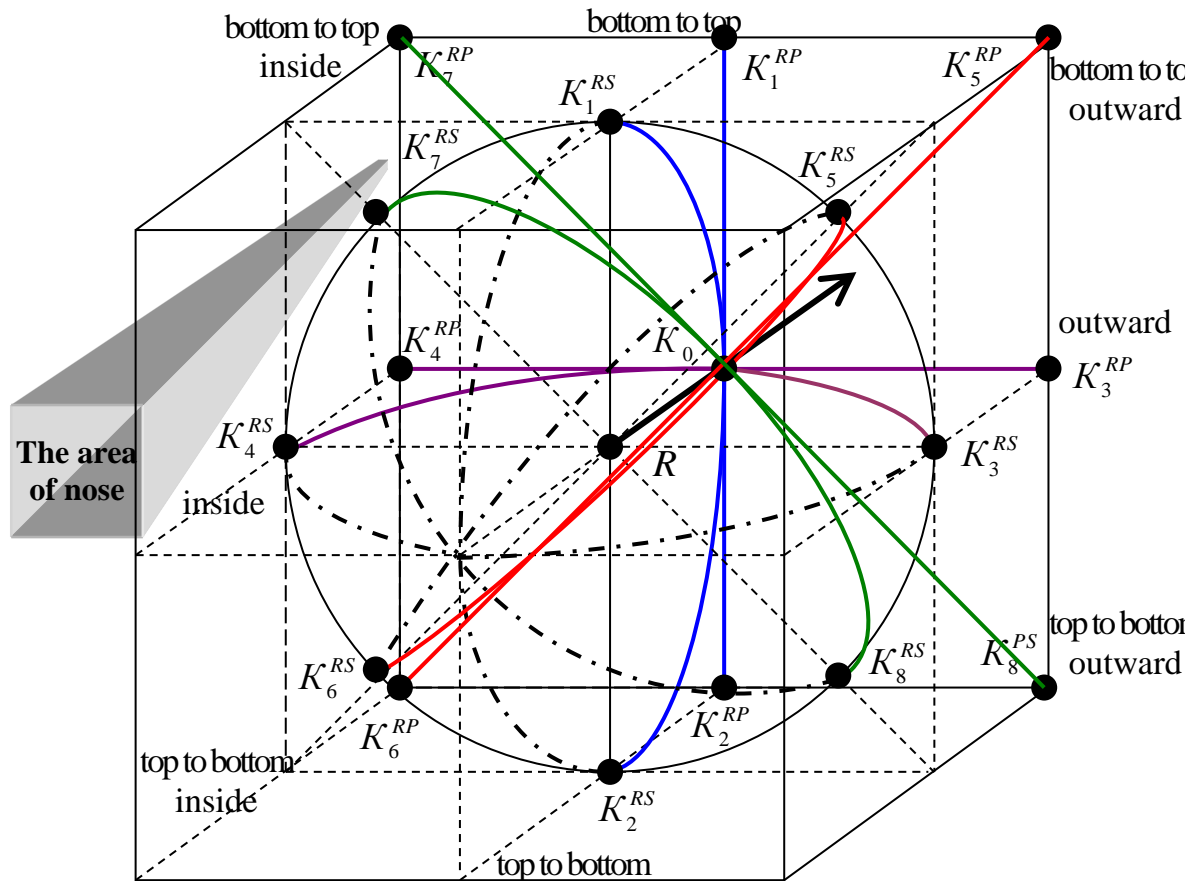
The new procedure of diagnostics of the achromatic and chromatic field of vision (FV) of the examinee realized during the management of the diploma project is located in DB of the applied DM (the diploma-student Prikhodko D.Yu.).

FV acts as a property of the directly looking eye as an optical device and biological construct, allowing to the examinee to register a target of a certain color and size in the vertical, horizontal and diagonal planes (meridians and points of measurement), which moves by steps according to the given procedure (algorithm).

The several kinds and types of the field of vision of the examinee: the achromatic and chromatic (monochromatic and polychromatic).

Historically, a row of ways of measurement of FV of the examinee are distinguished: *the control method of Donders* – has a large inaccuracies of measurement and allows to reveal only gross changes of the value of the indicator; *the perimetry using the manual spherical or arc perimeter of Ferster* – a diametrically rotating arc, on which the ophthalmologist carrying out the moving a white, monochromatic or polychromatic target; *the electrical projection-registration perimeter* – an accurate semi-automatic method; ***the computer perimetry*** – allows to determine the boundaries of FV of the examinee of more precisely due to the projections of the target in the point of measurement from the arc to the surface of flat ruler.

The geometric interpretation reflects the research of FV of the right eye of the examinee by the main and additional meridians (pic. 1), from which it follows, that at the realization of display of “the target” on the screen of PECM the minor spatial distortions are observed at the measuring of FV of the examinee, caused by the realization of displaying of the points of measurement not on an arc (hemisphere), but on a flat surface (ruler).



Pic. 1. The model of research of the field of vision of the right eye of the examinee

The program realization provides the correction coefficients, which take into account the size of diagonal of the monitor and the spatial distortion at the measuring of the achromatic and chromatic FV.

At necessary the developed procedure of diagnostics of the achromatic and chromatic FV can be used on the devices of display of information with a large size of the viewed diagonal: a wide-format board, a plasma panel and a projection unit.

The program realization of the procedure of diagnostics of the achromatic and chromatic FV of CM of the subject of training operates as part of the applied DM in the several modes: administrating, diagnostics and analysis.

Directly after the starting of the program the main button form is displayed, and each mode of functioning of the program contains a set of forms of interface, intended for the certain category of users: an administrator, an examinee and an expert-ophthalmologist.

At the working in the mode of administrating, the ability of view and modification of different parameters is realized, which directly: refer to the technique of research of the achromatic and chromatic FV; effect on the displaying of target in the mode of diagnostics; allow to analyze a posteriori data of measurement of FV of the contingent of examinees.

At working in the mode of diagnostics the automatic research of the achromatic and chromatic FV of one or both eyes of the examinee is provided by means of the step-by-step display of the target (circle, square, digit, letter) of different color and size in a certain points of measurement according to the selected quantity of directions (meridians).

In the mode of analysis provides the viewing of a posteriori data of measurement of FV of the examinee and the comparison of pie diagrams, corresponding to the average-statistical profile with the profile of examinee.

The practical use of CMT and the complex of programs for the automation of research of IEE with the purpose of increasing in the efficiency of functioning of ART system based on CM and the resultativity of process of the formation of knowledge of the contingent of trainees was carried out in the training process of “SPbSETU "LETI"” and “IBI”. It was received 3 copyright certificates.

The tendencies and dependences between the indicators by means of the mathematical processing of a posteriori data with using of a set of methods of the statistical analysis.