MEDICAL COMPUTER DIAGNOSTICS

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With development of informatics and computers there appeared new problems – how to "teach" computers to think like a man. Modeling of human brain activity calls artificial intelligence. Medical computer diagnostics is one of perspective ways in this science. These technologies can help to save life for thousands or even millions of people. Really, early diagnostics of different heart diseases or malignant tumours saves patient's life and makes treatment easier.

For computer recognition of medical research results to expert support system (ESS) are being created. Using such systems helps not only to diagnose correctly, but also for saves time. It in its turn increases of patient's chances for being cured.

Data input for ESS is done through magnetocardiograph readouts (for heart diseases diagnostics), biopsy results (for cancer). These data allow features, typical for different diseases. After to find comparising these features the program makes a decision about the patient's health condition. Thus, ESS is one of imagery recognition methods. The essense of any imagery recognition method is to process images and attach them to a definite class. In this case the word "class" means health condition (disease).

To increase the system accuracy research of secondary features of different diseases is necessary (for example, analysis of vectors of histological features in the case of oncological diseases, or vectors of positional relationship of cardiogram magnetic fields).

The first stage of ESS creation is learning. This process presupposes representative features separation for different diseases, forming a system of reference tolerances to choose distinguishing of features with the aim constructing optimal subdivision of input data into classes of recognition. The more is the differentiation of these classes the easier they are to distinguish, the higher is the probability of making a correct decision. There are a lot of ways to increase this differentiation. For example, to take more input data that belongs to each class.

The final work stage of ESS – is organization of exams. During an exam the program takes medical research results as test data and carries out

the recognition. Positive exam results mean that the image is assigned to the same class as at the learning stage.

Thus, ESS to is based on a physician knowledge. And this knowledge is registered by the programm as a package of separate differentiated diseases features.

To increase the probability of making right decision and diagnosing the patient correctly it is necessary:

- ✓ to carry enough medical research to describe different diseases;
- ✓ to assure that all the known diseases are included in the programm;
- ✓ to determine the main and secondary classification features of health condition (in this process it is necessary to doctors – specialists in a definite medical fields to «transmint» their knowledge to ESS);
- ✓ to build optimal division of input data on recognition classes;
- ✓ to compare a physician diagnosis with the results produced by the programm.

As a result a lot of time and efforts, spent on this system creation, are justified by the accuracy, and what is also very important, by speed of diagnosis definition. Very often the life of a patient depends on it. That's why it's an urgent problem for a lot of research institutes.

In conclusion we would like to say that specified ESS development is an urgent problem, because according to medical statistics cardiovascular and oncological diseases take first two places among causes of death in Ukraine.