

EXPIRIENCE OF A NEURAL NETWORK IMITATOR APPLIED TO DIAGNOSIS OF PRE-PATHOLOGICAL CONDITIONS IN HUMANS

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ОПЫТ ПРИМЕНЕНИЯ НЕЙРОСЕТЕВОГО ИМИТАТОРА ДЛЯ ВЫЯВЛЕНИЯ ПРЕПАТОЛОГИЧЕСКИХ СОСТОЯНИЙ ОРГАНИЗМА ЧЕЛОВЕКА

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The Governmental Resolution of the RK «Program of Medical Rehabilitation for People Influenced by Nuclear Tests at STS in 1949-1990» was published in March 1997. Implementation of the program requires first of all to create the effective methods of operative diagnostics of arid zones' population. To our mind, for this aims systems analysis with elements of neural network classification is more effective. We demonstrate such an approach using the example of the modern diagnostics system creating to detect the pre-pathological states among population by express analysis and personal particulars.

The following considerations were used in the base of the training set:

- any formalism must be based oneself upon wealth of phenomenology (experience, intuition, the presence of symptoms);
- typical attributes of disease can be divided on 2 groups - subjective and objective. The common state of patient is characterised by the first group and it can have no intercommunication with disease. The second one is obtained by laboratory inspection and it is not connected with patient sensations. Each of the objective attributes can be the attribute of several illnesses at once. In this case both the subjective and objective features must be used together;
- acceptability of any scheme can be substantiated only statistically. The question about justifiability and sufficiency of training set always demands separate discussion. Personal particulars are more available for creating training set. The set must be professionally oriented in order to reduce of selection effects.

For our experiment the fully-connected neural network (the software for PC, imitating the work of neural computer) «MultiNeuron» was chosen. Feature space using for the net work was created from the 206 personal particulars. The research aimed to determine pre-pathological states of the urinary system organs among industrial, office and professional workers in the mining industry connected with phosphorus extraction. The personal particular included answers on subjective group questions (for example: weakness, pain) and objective group question contained laboratory analysis of urine. The training set contained 169 examples of three groups of people: healthy, so called group of risk and ill were created. The test set consisted of 37 examples not including the training dataset. Our results showed 86.5% correct classification and allowed us to correct previous tests results.

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