The EU is the world leader in carrying out environmental policy who is successfully solving many environmental problems of the continent and world in general.

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УДК 614.841

RESEARCH OF DISEASE INCIDENCE RISK DEPENDENCE ON CHEMICAL INDICATORS OF DRINKING WATER QUALITY ON THE BASIS OF NEURAL NETWORK APPROACH

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Определены основные химические показатели воды, влияющие на заболеваемость населения. Проведено исследование зависимости риска заболеваемости от превышения содержания химических показателей качества питьевой воды с помощью нейросетевого подхода.

***Ключевые слова**: химические индикаторы, заболеваемость, нейросетевой подход.*

The key water chemical indicators influencing disease incidence of the population are defined. The research of disease incidence risk dependence on chemical indicators of drinking water quality on the basis of neural network approach is made.
Keywords: *chemical indicators, disease incidence, neural network approach.*

The most part of chronic diseases of the person is connected with consumption of the drinking water which isn't meeting sanitary standards which contains in the structure impurity of the heavy metals (cadmium, lead, nickel and others) causing development of diseases of cardiovascular, respiratory, urinogenital systems skin and oncological diseases, congenital anomalies.

The main reason for pollution of water objects and soil resources is economic activity of the person which leads to increase in concentration of chlorides, nitrates, compounds of the metals, oil products, phenols, household garbage and other dangerous substances getting with sewage of the enterprises to a surface water. Concentration of these of unhealthy substances of the person increases during the spring and summer period when the drain of thawed snow from agricultural grounds and also "blossoming" during temperature increase and reduction of speed of a current is observed.

The analysis of the key chemical indicators of quality of drinking water has been made, problems, the purpose and research problems are defined, the plan of a research is developed and research methods are chosen. On the basis of the plan researches of risk of dependence of incidence on excess of maintenance of chemical indicators of quality of drinking water by means of neural network approach are conducted. Results of a research are analysed.

24 indicators exerting the greatest impact on health of people are chosen from all chemical indicators.

All diseases are united in 18 groups. The dependence of disease probability of each group on the exceeded chemical indicators of water is defined. Each disease is estimated by weight value – quantity of the chemical indicators influencing a disease. This weight coefficient will be used at creation of probabilistic model of identification systems assessment. Thus, the made model of influence of levels of water chemical indicators on development of diseases can be used as a basis in creation of diseases identification system.

The problem of system creation of diseases identification of water quality indicators belongs to the class difficult formalized (the tasks which are badly giving in to algorithmization) which mathematical model has uncertainty. Therefore for synthesis of the disease identification system (DIS) the mathematical apparatus on the basis of artificial neural networks as he has a number of advantages in comparison with other techniques is chosen (overlapping of functioning, automatic adaptation, stability of work, etc.).

Along with advantage of neural network methods, there are certain difficulties of use of the device identification neural network (INN) which limit use of INN or use of INN doesn't give to the procedure of identification of diseases wished accuracy. These difficulties are connected with the wrong choice of ar-

chitecture of INN. The architecture of neural network is understood as her structural and topological and analytical description. Therefore the problem of the choice of optimum architecture of INS increasing probability of identification of diseases is relevant. For this purpose it is necessary to consider the INN various models on the basis of the same training selection and to compare probabilities of identification.

For the analysis of work of neural network methods we will compare probabilities of identification [3] for the solution of a problem of definition of diseases on chemical indicators of water. For this purpose we use the created model of influence of levels of chemical indicators of water on development of diseases as the training set for training of neural networks.

Each neural network consists of 24 entrances corresponding to the unified chemical indicators and 18 exits. An exit of each neuron characterizes degree of belonging to the corresponding disease. The architecture of regression and probabilistic network doesn't assume use of several intermediate layers. The training algorithm for these INN is simplified too as the procedure of training is based on "storing" of the training set and the subsequent estimation of degree of similarity of new indicators to the "remembered" data.

We make the analysis of functioning of INN regarding the generalizing ability with use of probability theory and mathematical statistics. For this purpose it is necessary to develop model of evaluation of the work of INN. An inspection of operability of INS was carried out on real chemical indicators of water on the Astrakhan region for 2010–2014. Data of INN can be used in the analysis of tests of air and the soil as raised concentration of harmful substances in them will come to an organism at inhalation of air and with the agricultural products accumulating them in the structure.

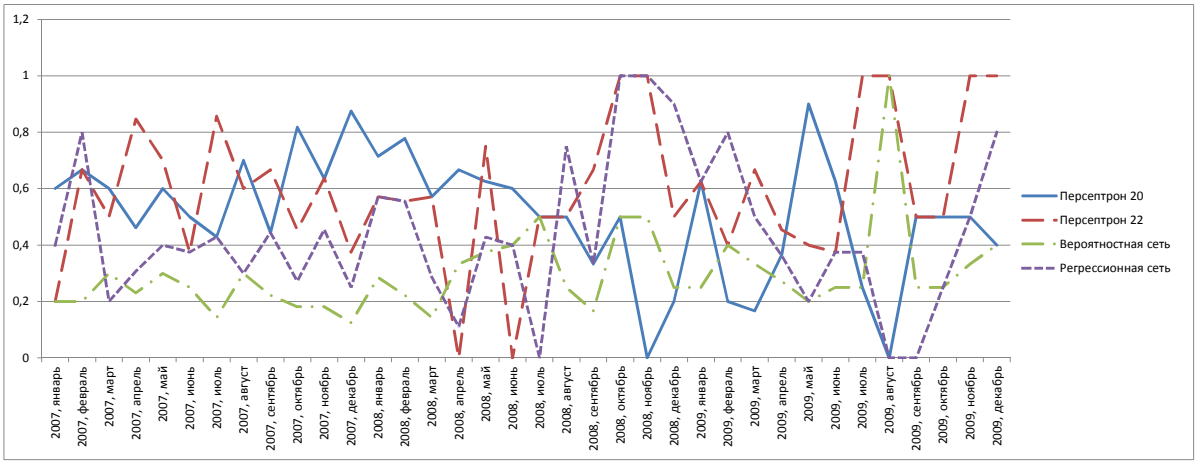

Fig. 1. Distribution diagram of identification probabilities

It is possible to determine by the distribution diagram of identification probabilities (fig. 1) that the greatest probability is shown by INN "Perseptron 22".

Thus, the offered approach on creation of system of identification on chemical indicators of water allows to increase probability of identification of

diseases. This approach is based on use of the multilayered INN trained at the unified data. The offered probabilistic model of evaluation of the work of INN, can be used also in other subject domains (the analysis of chemical indicators of air and the soil).

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УДК 327.7

THE EU AND RUSSIA INTERACTION IN THE ECOLOGYFIELD

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В настоящее время вопросы охраны природы и защиты окружающей среды приобрели важное социальное значение и для России, и для Европейского союза, для достижения реальных результатов в решении экологических проблем сотрудничество становится не только целесообразным, но и необходимым. В работе представлены этапы развития сотрудничества ЕС и России по экологическим вопросам.

Ключевые слова: *Программа Сотрудничества, сохранение, экологическая задача, охрана окружающей среды.*

Now questions of conservation and environment protection have gained important social value both for Russia, and for the European Union, for achievement of real results in the solution of environmental problems cooperation becomes not only expedient, but also necessary. Development stages of the EU and Russia cooperation on environmental issues are presented in work.

Keywords: *Cooperation Programme, conservation, ecological task, environment protection.*

Russia and the European Union cooperate in the field of environment protection since 1995 when the first joint projects have appeared. Since 2001 the program of bilateral cooperation on environmental issues directed to environment protection and rational use of natural resources is implemented. Cooperation between Russia and the EU is implemented within Dialogue about environment protection in several directions:

- climate change;