APPLICATION OF ARTIFICIAL NEURAL NETWORKS FOR REDUCING DIMENSIONS OF GEOLOGICAL-GEOPHYSICAL DATA SET'S FOR THE IDENTIFICATION OF PERSPECTIVE OIL AND GAS DEPOSITS

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Problem statement and relevance of the research. The recovery and development of the oil and gas industry of any region are primarily related to the volume of hydrocarbon forecast resources, the state of the hydrocarbon reserves explored, and are determined by a variety of technological, economic, organizational and other factors. Ukraine is also one of the oldest oil and gas producing countries in the world.

Considering that the degree of exploration of Ukraine's oil and gas basins is extremely high, identifying significant reserves of new and economically sound hydrocarbon deposits under these conditions, using classical approaches, is an extremely difficult task.

Formulating the purpose of the article (statement of the task). Therefore, it is important to apply hybridization of methods of data mining of geological, geophysical and corresponding economic data.

Presentation of the main research material. Seismic exploration is the main method of geological and geophysical exploration, in search, exploration, and development of oil and gas fields. One of its main tasks is to study the nature of the distribution of various physical and filtration-capacitance attributes in some area of the reservoir, where the presence of hydrocarbon deposits is assumed. Currently, the list of possible attributes is about 500 names.

Thus, there are a huge number of seismic attributes, each of which can reflect certain properties of the physical environment. Therefore, it is necessary to select from the variety of attributes precisely those that are really important and carry the basic useful information in the seismic wave field in the specific studied areas and wells.

Unlike statistical algorithms for dimensionality reduction, artificial neural networks (ANN) allow finding and considering nonlinear dependencies based on the original data set, in addition to having the ability to generalize and the necessary statistical stability. ANN allow us to achieve a good degree of approximation of complex, non-linear functions of many variables in the absence of knowledge of the nature of nonlinear dependence. Geophysical prerequisites for the use of neural
networks are:
  - ANN are well suited to solving complex multifactorial problems that may not have a clear explanation within physical models;
  - An increasing number of interpolation problems does not have a direct algorithmic solution, but a set of points for which the measured values are known;
  - ANN can be used to solve similar problems and help to identify relationships that are geologically relevant.
  - The use of ANN for the approximation of nonlinear dependencies is particularly attractive in the context of geophysical data analysis.

Forecasting of petrophysical quantities and restoration of geological and geophysical regularities is carried out in the interwell space. It is best to combine several types of neural networks for this.

For example, generalized regression neural network (GRNN) and multilayered neural network (MNN), which perform a complementary approximation (since the MNN allows us to construct a global approximation of an unknown function with some extrapolation, and the GRNN performs a local approximation with some boundaries).

ANN are an alternative to linear models based on the multiple linear regression method to solve petrophysical prediction problems based on seismic data and geophysical well exploration.

**Conclusions.** In the process of the second stage of research, the efficiency of applying the algorithm of estimation of significance with the help of a neural network is shown to solve the problem of choosing informative seismic attributes. It has been proven that this method can be effectively applied to reduce the number of seismic attributes without losing useful information.

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**DEVELOPMENT OF A DEVICE FOR ARC WELDING WITH CONTROLLED MECHANICAL TRANSFER USING A METAL-CERAMIC STRIP ELECTRODE**

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Mechanical methods of forced transfer of electrode metal during arc welding and surfacing are simple and practically do not require additional energy [1]. Depending on the design of the feeder, mechanical pulses can be transmitted to the wire electrode in various ways.