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STEPS OF BUILDING AN ARTIFICAL NEURAL NETWORK

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The rapid introduction and targeted use of the achievements of science and technology are becoming the key to the future development of our society. In this regard, in the education system, there is a need of introducing new teaching methods into the educational process along with traditional teaching methods. In accordance with modern requirements, the priority of activity and quality indicators of training in harmony with the description of the theoretical and practical foundations of knowledge in the course have a special characteristic property.

When building an Artifical Neural Networking (ANN) model, it is necessary to accurately determine the tasks that will be solved with its help. Currently, neural network technologies are successfully used for forecasting, recognition and generalization.

The first step in building a neural network model is a careful selection of input data that affects the expected result. From the source information, it is necessary to exclude all information that is not related to the problem under study. At the same time, you should have a sufficient number of examples for ANN training. There is the empirical rule that establishes a recommended ratio X between the number of training examples containing inputs and correct answers and the number of connections in the neural network: $X < 10$ [1].

For the factors that are included in the training sample, it is advisable to preliminarily assess their significance by conducting a correlation and regression analysis and analyze the ranges of their possible changes [2].

At the second step, the transformation of the initial data is carried out, taking into account the nature and type of the problem displayed by the neural network model, and the ways of presenting information are selected. The efficiency of the neural network model increases if the ranges of input and output values are reduced to a certain standard, level for example, [0.1] or [-1.1].

The third step is to design the ANN, i.e. in designing its architecture (the number of layers and the number of neurons in each layer). The structure of the ANN is formed before the start of training, so the successful solution of this problem is largely determined by the experience and skill of the analyst conducting the study.

The fourth step is associated with network training, which can be carried out on the basis of a constructive or destructive approach. In accordance with the first approach, ANN training starts on a small network, which is gradually increased until the required accuracy is achieved according to the test results. The destructive approach is based on the principle of “tree thinning”, according to which “extra” neurons and connections adjacent to them are gradually removed from a network with a deliberately excessive volume. This approach makes it possible to investigate the influence of remote links on the accuracy of the network. The learning process of a neural network is a refinement of the values of weight coefficients for individual nodes based on a gradual increase in the volume of input and output information [1]. The beginning of training should be preceded by a procedure for choosing the activation function of neurons, taking into account the nature of the problem being solved. In particular, in three-layer perceptrons on the neurons of the hidden layer, in most cases, the logistic function is used, and the type of the transfer function of the neurons of the output layer is determined

based on the analysis of the results of computational experiments on the network. A histogram of the values of interneuronal connections can serve as an indicator of ANN learning ability.

At the fifth step, the obtained ANN model is tested on an independent sample of examples.

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