عنوان مقاله:

Development of an application for creation and learning of neural networks to utilize in environmental sciences

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خلاصه مقاله:

Machine learning methods originated from artificial intelligence and today are applied in several fields concerning environmental sciences. Thanks to their powerful nonlinear modelling capability, machine learning methods today are utilized in satellite data processing, general circulation models(GCM), weather and climate prediction, air quality forecasting, analysis and modelling of environmental data, oceanographic and hydrological forecasting, ecological modelling, and monitoring of snow, ice and forests. Currently, the popularity of neural networks is growing; their areas of application are constantly expanding. In these conditions, the task of choosing a convenient tool for utilizing in environmental science with neural networks becomes urgent. There are many tools for working with neural networks, but each of them has its own drawbacks. So most of the existing tools require users to have programming knowledge; there are no tools to help quickly select the optimal network structure for the problem being solved. The purpose of the research is to simplify the process of choosing the optimal structure of an artificial neural network by developing an application with a graphical user interface with a visual representation of the stages of creating and learning neural networks in environmental sciences. The object of research is artificial feed-forward neural networks. Research work on the study, comparison and analysis of existing tools for the creation, learning and use of artificial neural networks has been carried out. Based on the research results, an application with a graphical interface aimed at solving the assigned tasks has been developed. An application developed to achieve this goal works correctly, without failures, and allows creating and learning feed-forward neural networks without programming knowledge.

کلمات کلیدی:

Machine learning, Artificial Neural Networks, Gradient descent, Qt, Clean architecture, Environmental science

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