

ABSTRACT

Master's Thesis: pp. 90, fig. 14, tab. 21, app. 30, sources 1.

Topicality. The problem of classifying the image of buildings by architectural style differs from other problems of classification by the presence of interclass relationships between different styles, ie a large number of features and characteristics are common to several architectural styles. Another factor that makes the task more difficult is the existence of certain differences in each style depending on the area and time when the building was built. The need to be able to determine the style for images from different angles and different quality imposes additional requirements on image classification algorithms. Defining the architectural styles of buildings is a common task in documenting the architectural heritage and modeling, designing new buildings in cities, because there is a need to maintain a single architectural style.

The development of an algorithm that allows the classification of images with close interclass relationships is relevant today not only for the classification of architectural style of buildings, but also in other areas.

Relationship of work with scientific programs, plans, themes. The work was performed at the Department of Automated Information Processing and Control Systems of the National Technical University of Ukraine «Kyiv Polytechnic Institute. Igor Sikorsky» in the framework of the «Effective methods for solving problems of schedule theory» (state registration number 0117U000919).

The aim of the research is to improve the algorithms for classifying images with close interclass relationships, reducing the learning time of the neural network while maintaining the accuracy of learning.

To achieve this goal the following tasks have to be completed:

- to analyze the existing methods of image classification;
- modification of existing methods to improve accuracy and reduce training time;
- creating a sample of images of buildings;
- software implementation of the algorithm and software development;

- compare the efficiency of the modified algorithm with the existing ones to solve the problem of determining the architectural style of the building.

The object of study is the process of learning a neural network for the classification of images with close interclass relationships and the classification of images of buildings by architectural style.

The subject of study is optimization algorithms and methods used during neural network training to change its attributes, such as weight and learning speed.

Scientific novelty of the obtained results is to obtain an algorithm-optimizer to reduce losses in the training of the neural network to solve the problem of classifying images with close interclass relationships.

The practical significance of the obtained results is to create a system for recognizing architectural styles of buildings and a method of learning the neural network, which in less time achieves greater accuracy.

Publications. Materials of the work were published in the abstracts of the scientific-practical conference of young scientists and students "Informatics and Computer Engineering-IOT-2020", "Informatics and Computer Engineering-IOT-2021" and accepted for publication in the scientific professional publication "System Technologies".

MACHINE LEARNING, NEURAL NETWORKS, OPTIMIZERS, IMAGE CLASSIFICATION, ARCHITECTURAL STYLES