

## ABSTRACT

Thesis: Convolutional neural networks and their application to road objects recognition under noise conditions.

The thesis contains 101 p., 19 fig., 10 tabl., 3 app., 38 sources.

CONVOLUTIONAL NEURAL NETWORK, RECOGNITION PROBLEM, IMAGE CLASSIFICATION, DIGITAL IMAGE NOISE, NOISE LEVEL REDUCTION, ROAD OBJECTS RECOGNITION.

The purpose of this thesis is research of possibility and attributes of applications of convolutional neural networks to the problems of recognition and classification of road objects in conditions with digital noise appearance on images, and also research of efficiency and comparison of noise level reduction algorithms in application to the mentioned problems.

Topicality of the theme: road objects recognition and classification is crucial for many rapidly developing research and application branches, and at the same time the decisions based on the solutions of these problems should be made in real time and only based on the received data, which may have high noise level that makes the systems operations more difficult. Because of this the models that are able to measure the noise level and have noise reduction mechanisms are needed.

The object of research are sets of digital images that contain road objects from different classes and that can have some level of digital noise.

The subject of research are the convolutional neural network models with optimized parameter usage and algorithms of noise level reduction in images in application to the recognition and classification problem.

Methods of research: applied convolutional neural network models, algorithms of noise level reduction in images, neural networks learning algorithms, implemented with the Python programming language.

Received results: the algorithms for recognition and classification of road objects with usage of convolutional neural network models and digital noise level

reduction were created, for what two variants of problem solution were implemented, for real-time application and with data preprocessing, and during that the optimal algorithm for problem solution was determined. On materials of the thesis abstract at the international scientific and practical conference «Intellectual systems and information technologies» (ISIT2019), Odesa, Ukraine, is awaiting publication.