

ABSTRACT

Today, achieving high accuracy in real-time object recognition is an urgent problem in many fields, such as computer vision, autonomous vehicles, medical diagnostics, and many others. The rapid development of technology and the increasing amount of available data have made it possible to use machine learning and neural networks to achieve this goal.

In this thesis, we have developed an automated photometric system for object recognition. In the first part of the work, different types of automated systems for object recognition are considered and analyzed. Different approaches to the implementation of computer vision are analyzed. Neural networks, including various types of neural networks and convolutional networks, are discussed in detail. Particular attention was paid to the overview of frameworks used in this area, as well as applications for data collection and data markup.

In the practical part of the work, the system's block diagram and algorithm were developed, and the selection of hardware and software components was made. The data collection process was also reviewed. Mathematical modeling of neural network training was performed and the results were analyzed.