# ABSTRACT

The volume of the master's thesis is 86 pages in 5 chapters, and contains 35 sources of scientific literature, 36 pictures, 25 tables.

The purpose of the work: to create a system that will recognize 4 classes of material using the temperature profiles of objects obtained by laser heating of samples.

Tasks of the dissertation:

1. Review a literature on the research topic.

2. Conduct an analysis of the existing methods of determining the type of material.

3. Develop a system for classifying the type of material.

4. Analyze the results of experimental studies.

The object of research: the process of laser heating of objects of various materials.

Subject of research: methods of automated classification of material type.

This work analyzed the problems of determining the properties of unknown objects in teleoperation tasks and proposed a non-contact solution based on active thermal non-destructive method and the use of neural network technologies for classification.

The obtained results confirm that the created system is able to evaluate the material of the sample based on the measured temperature signature of its surface. A laser source heats the object's surface, while an infrared camera captures its temperature signature and sends the data to a neural network-based algorithm for classification.

Keywords: infrared thermography, laser heating, neural networks, material classification.