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Mykola Lohvinenko¹, Svitlana Voitenko²

¹ student of group SC-614m NU “Zaporizhzhia Polytechnic”

² senior teacher NU “Zaporizhzhia Polytechnic”

REVIEW OF METHODS FOR RECOGNIZING OBJECTS IN A FRAME

Modern computer vision systems are widely used in robotics for autonomous machine learning. One of the key areas is automated object recognition and tracking in real-time. This technology is actively developing due to scientific research, algorithm improvements, and the increasing computational power of hardware devices.

There are several main methods of object recognition:

- image segmentation – dividing a digital image into parts for further analysis;
- template matching – comparing a sample object with image fragments;
- feature detection – using key points and descriptors;
- categorical recognition – applying machine learning methods for object classification.

To choose the optimal method, the following criteria should be considered: resistance to lighting changes, invariance to rotations and scaling, processing speed, and recognition accuracy. Analysis has shown that the segmentation method is the most effective in terms of simplicity and functionality.

For object recognition in this study, the OpenCV library is used. It includes a wide range of tools for image processing, video stream analysis, machine learning algorithms, and object detection. Thanks to active support from developers and the community, OpenCV is a powerful tool for solving computer vision tasks.

Object recognition methods are applied in various fields:

- autonomous transport – autopilot systems use computer vision to analyze road conditions;
- video surveillance – automatic detection and identification of objects in surveillance cameras;
- medical diagnostics – analysis of medical images for detecting pathologies;
- robotics – navigation and manipulation of objects in complex environments.

Due to the efficiency of computer vision methods and the growth of computational power, their use continues to expand. Further research focuses on improving recognition accuracy and optimizing algorithms for real-time operation.

The obtained results can be useful for developing intelligent video surveillance systems, unmanned vehicles, and other fields where accurate real-time object recognition is required.