

ABSTRACT

The thesis is presented in 97 pages. It contains 2 appendixes and bibliography of 47 references. 39 figures and 1 table are given in the thesis.

Topic relevance. Road traffic accidents caused by a car is a global problem in the world and is growing exponentially. The problem with parking is a major factor still remains a serious problem with an increase in the number of cars and limited parking places in the cities. Finding a place to park is a common activity for many people, which leads to burning millions of barrels of oil every day. Intelligent parking systems typically receive information about available locations in a particular geographic area, while real-time processing allows vehicles to be located in accessible locations. Such a system includes sensors, real-time data collection, automatic payment and parking reservations using a mobile application. The implementation of the intelligent parking system reduces environmental pollution in urban centers by reducing the search time of parking search in urban quarters, allowing for the control of illegal and empty parking lots.

Thesis connection to scientific programs, plans, and topics. The thesis was prepared according to the scientific research plan of the Applied Mathematics Department of the National Technical University of Ukraine “Igor Sikorsky Kyiv Polytechnic Institute.”

Research goal and objectives. The goal of this thesis is to reduce the time of finding a parking place and choose the most convenient parking lot with a mobile application.

To accomplish this goal, the following objectives were reached:

- analysis of the situation in cities related to the location of parking;
- analysis of approaches, algorithms and available software for locating a parking place;

- improvement of image segmentation algorithm;
- development of the intellectual parking system architecture;
- development of recommendations for parking to create a group of parking lots with all the services offered.

Object of research is methodologies, methods and algorithms for the recognition of graphic images, the classification of images based on images of webcams.

Subject of research is parking recognition models based on optimization methods, neural networks, pattern recognition theory, and optimization of finding free parking spaces according to driver criteria.

Methods of research. To solve the task, the following methods were used: image segmentation techniques and neural networks (for developing image filtering from a web camera); the theory of image recognition (for the development of image recognition algorithm); Methods of algorithm theory and programming (for software implementation of developed algorithms).

Scientific contribution consists of the following:

- improved methods of image segmentation due to the combination of the Otz method and regional segmentation;
- improved structure of the intellectual system.

Practical value of obtained results. Proposed method that can be used during image segmentation. Developed methods, mathematical and software reduce time of searching and reservation of parking spaces in cities.

Approbation of the thesis results. Basic ideas and results of the research were presented at the 10th Conference of Young Scientists "Applied Mathematics and Computing" 2018 and the International Scientific and Technical Conference "System Analysis and Information Technologies"

Publications. Thesis results are published in 2 scientific works:

- in 2 publications in the works and theses of reports of international scientific conferences.

Keywords: intelligent parking system, parking, computer vision, image segmentation.