

## ABSTRACT

Explanatory note size – 96 pages, contains 16 illustrations, 32 tables, 4 applications, 34 references.

**Topicality.** Addresses the issue of collecting and analyzing data on road traffic state, highlighting the key features of existing methods for assessing traffic density and intensity based on data from surveillance video cameras, along with their advantages and disadvantages. The need to develop a method for assessing traffic conditions that would allow simultaneous acquisition of data on both traffic density and intensity is identified.

**The aim of the study.** The main target is to enhance the efficiency (accuracy, speed) of existing software methods for analyzing the state of road traffic using real-time data from surveillance video cameras.

The object of research: methods and tools for analyzing the state of road traffic based on real-time data from video cameras.

The subject of research: methods and software tools for processing data from surveillance video cameras of traffic flow in real-time.

To achieve this goal, the **following tasks** were formulated:

- improve the TLCR (Traffic Load Capacity Ratio) index;
- develop a method for determining traffic intensity using data from video cameras;
- design a software tool capable of computing a system of indexes for both load capacity and traffic intensity based on real-time data from video cameras.

**The scientific novelty** of the results of the master's dissertation:

- the method for calculating the TLCR index has been improved (modified as MTLCR), eliminating the influence of vehicle width and perspective on the indexes values. This enhancement has increased the accuracy of the index calculation on larger road sections.

- the TLIR (Traffic Line Intensity Ratio) index has been introduced for the first time to assess traffic intensity on a road section. It is based on processing video data using the calculated values of the MTLCR index and the current average speed of vehicles on the road section.
- a system of indexes, MTLCR and TLIR, has been introduced for the first time, providing a comprehensive description of the traffic conditions on a road section.

**The practical value** of the obtained results. The obtained results allow for the assessment of both components of traffic: static in the form of the MTLCR index and dynamic as the TLIR index. A software tool has been developed, enabling the configuration of traffic state assessment processes using data from surveillance video cameras. This tool can initiate these processes, generate results in the form of calculated MTLCR and TLIR indexes, which can be valuable for further analysis, modeling, and forecasting of traffic conditions.

**Relationship with working with scientific programs, plans, topics.** Work was performed at the Department of Informatics and Software Engineering of the National Technical University of Ukraine «Kyiv Polytechnic Institute. Igor Sikorsky».

**Approbation.** The scientific provisions of the dissertation were tested at the V International Scientific and Practical Conference of Young Scientists and Students "Software Engineering and Advanced Information Technologies (Soft Tech-2023)"-Kyiv.

**Publications.** The scientific provisions of the dissertation were published in:

- 1) Savastru, S.V., Stetsenko, I.V. (2023). Methods for processing data from surveillance video cameras of traffic flow in real-time. Interdepartmental scientific and technical journal "Adaptive Systems of Automatic Control," 2(43), 164-173. <https://doi.org/10.20535/1560-8956.43.2023.292269>
- 2) Savastru, S.V., Stetsenko, I.V. Methods for processing data from surveillance video cameras. Software Engineering and Advanced Information Technologies (Soft Tech-2023): Proceedings of the V International Scientific and Practical Conference of Young Scientists and

Students, December 19-21, 2023, Kyiv, National Technical University of  
Ukraine "Igor Sikorsky Kyiv Polytechnic Institute," FIOT. Pp. 281-284.

**Keywords:** ARTIFICIAL INTELLIGENCE, CONVOLUTIONAL NEURAL  
NETWORKS, COMPUTER VISION, VIDEO STREAM ANALYSIS, ROAD  
TRAFFIC.