

## ABSTRACT

Master's thesis: 95 pages, 17 figures, 27 tables, 1 appendix, 48 sources.

**Topicality.** Ensuring the safety of citizens is impossible without a rapid reaction of law enforcement agencies in the event of emergencies. However, humans can not provide 100% observation and are prone to errors. In order to minimize the impact of the human factor and prompt response, information systems are used. However, the usual approach to their construction, can not provide the appropriate level of performance. Therefore, it is advisable to use the technology of processing large amounts of data. Their application will solve the problem of processing a large amount of information, but it is still necessary to develop a certain model that can detect a relevant incident in incoming video streams.

Therefore, it is expedient to develop technology for a video surveillance and anomalies detection, that will provide capabilities to process giant amounts of video streams from a large number of video sources. By applying machine learning approaches, the system is able to detect unusual behavior and report to relevant authorities, thereby increasing the level of security, as well as simplifying the analysis of video streams from surveillance systems. In the same time system should ensure that analyzed material is removed, in order to ensure confidentiality.

**The work communication with academic programs, plans, themes.** The work was carried out at the Department of Computer-Aided Management And Data Processing Systems of the National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute" within the theme "Methods and Technologies for High-Performance Computing and Processing of Large Data Sources ". State registration number 0117U000924.

The purpose of the study is to improve the process of video surveillance by developing and implementing an information system that analyzes real-time video stream for unusual events and timely reporting about them.

To achieve the goal, we must complete the following tasks:

- carry out an overview of the known results for solving the problem of searching for anomalies in the video stream;
- among the analyzed methods, select one and improve it by increasing the accuracy of recognition and / or increasing the speed of the model training;
- create implementation of the modified method;
- compare results of the proposed method with analogues;
- analyze obtained results.

**Object of the research** is the process of finding abnormal behavior in video streams.

**Subject of the research** - methods of detecting the extreme behavior of people with video stream.

**The scientific novelty of the results is:**

- modifications of the neural network with the addition of two layers, which allowed to increase the accuracy of recognition;
- using a faster algorithm to optimize the model of the neural network;
- Implementation of technology using Apache Spark to achieve horizontal scaling. Due to the described improvement, the developed algorithm will be useful for processing real-time video streams in conjunction with processing technologies for super-massive data such as Apache Spark.

The analysis of existing approaches to finding anomalies in the video stream is carried out. Among the analyzed methods, the best was integrated with the

infrastructure for handling large amounts of data. An experimental study of the obtained complex was carried out and the obtained results were analyzed.

**Publications.** Results of the research were published in the the Kherson National Technical University Journal number 3 (66) as well as in the form of abstracts at the All-Ukrainian scientific and practical conference of young scientists and students "Information Systems and Management Technologies 2018".

BIGDATA, ANOMALY DETECTION, DEEP LEARNING, SURVILANCE.