

## ABSTRACT

Explanatory note size – 142 pages, contains 23 illustrations, 18 tables, 3 applications, 20 references.

**Topicality.** The paper examines the problem of using face video processing for automated heart rate analysis in medical diagnostics and research, shows the main features of existing solutions to the problem, their advantages and disadvantages. The need for development and improvement of algorithms and software for effective measurement of heart rate based on facial video processing has been identified.

**The aim of the study.** The main target is to develop algorithmic and software for heart rate analysis based on facial video processing in order to improve the accuracy and speed of the analysis.

The object of research: algorithmic and software solutions for heart rate analysis based on facial video recording.

The subject of research: methods, models, tools for representing and transforming knowledge about face video heart rate analysis software.

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

- review existing heart rate analysis methods based on face video processing and identify their advantages and disadvantages;
- determine optimal methods of video processing, such as face tracking, extraction of key points, and others, taking into account their efficiency and speed;
- develop a combinational algorithm that integrates selected video processing methods, face recognition algorithms and accurate heart rate calculation;
- implement software based on the developed algorithm;

- conduct validation and testing of the developed software using video recordings of various conditions.

**The scientific novelty** of the results of the master's dissertation is an innovative approach to heart rate analysis based on face video processing is proposed, which is determined by the use of a combinational algorithm, which includes the optimal synergy of the best existing video processing methods and algorithms, accurate heart rate calculation, and effective adaptation to various conditions. The result was achieved by developing the appropriate software.

**The practical value** of the obtained results is developed heart rate analysis software based on face video processing can be used in medical diagnosis, fitness, psychophysiological research and wearable technology, providing an effective and non-invasive heart rate measurement method for health and activity monitoring.

**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 Fifth International Scientific and Practical Conference of Young Scientists and Students "Software Engineering and Advanced Information Technologies (SoftTech-2023)" dedicated to the 125th anniversary of Igor Sikorsky Kyiv Polytechnic Institute.

**Publications.** The scientific provisions of the dissertation were published in:  
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**Keywords:** PULSE, HEART RATE, SPECTRAL ANALYSIS, AHE, PROCESSING, VIDEO RECORDING.