ABSTRACT

Master's degree thesis: 102 pages, 39 figures, 13 tables, 3 attachments, 18 sources.

Relevance of the topic. According to statistics, the main cause of death among people of working age is cardiovascular disease. People at risk need help by providing early detection services. Electrocardiographic method is widely used to diagnose cardiovascular diseases. Often pathological changes in the heart are very quickly reflected in the information flow. Now the software should raise the alarm if the patient is at risk. However, at present it often generates false alarms in more than 80% of cases. The response quality of such an analysis can be considered random. That is why solving the problem of finding a successful algorithm for ECG signal processing and analysis is very important.

Scientific programs, plans, topics. The work was performed at the Department of Automated Information Processing and Control Systems within the theme "Intelligent Speech Recognition System in the study of foreign words based on machine learning".

The following objectives have been formulated to achieve this research objective:

Improve the accuracy and versatility of ECG disease recognition algorithms in patients by creating a new data analysis algorithm and selecting the best machine learning algorithm to classify these data. To achieve this goal it is necessary to provide a complete description of all the features of the time series with the help of parameters, as well as to bring the algorithm of the program to the algorithm of the human brain during the analysis.

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

−   to investigate and compare the existing algorithms for analysis and division of EC time series into a set of parameters;

−   to study and compare the available approaches to the classification of ECG time series in case of diseases;

−   to create their own algorithms for separation, analysis and classification of ECG time series, which will work with acceptable accuracy and cover various cases of anomalies in the sine wave;

−   to implement the proposed algorithms in the form of independent libraries that can be used in the future;

−   to implement a program for the user;

−   to investigate the created algorithms on efficiency of work.

The object of research. The process of ECG analysis, division of time series into signs and their classification by these signs.

The subject of research. Algorithms and methods of analysis and classification of ECG time series based on machine learning.

The scientific innovation is to create a new method of analysis and classification of sinusoidal time series on the example of ECG data using artificial intelligence, which has better efficiency.

The practical value of the obtained results is to apply the developed method in the application for ECG data analysis.

Approbation. The results were presented at the VI All-Ukrainian scientific-practical conference of young scientists and students "Information systems and management technologies" (ISTU-2021).

Scientific publications. Materials of work are published:

−   in the collection of abstracts of the conference "MODS 2020" Reutska SV, Baklan IV, Oliynyk YO, Lishchuk KI "APPROACH TO DETECTION OF ANOMALIES IN ECG DATA";

−   in the collection of abstracts of the III International scientific-practical conference "Modern trends in the development of information systems and telecommunications technologies" Reutska SV "MODERN METHODS OF SOFTWARE SELECTION OF PQRST INTERVALS IN ELECTROCARDIOGRAPHY;

−   in the collection of articles of the conference "Computational Linguistics and Intelligent Systems" (CoLins2021) I. Baklan, A. Oliynyk, I. Mukha, K. Lishchuk, O. Gavrilenko, S. Reutska, A. Tsitsyliuk, Y. Oliynyk "ECG signal processing based on linguistic chain fuzzy sets".