ABSTRACT

Master's dissertation: 97 p., 21 pic., 24 tables, 36 sources, 2 appendixes.

Topicality. Heart diseases are quite common. Deviations must be diagnosed in time to prevent serious consequences. It should also be borne in mind that usually the analysis of patient data is performed by a person, which can also affect the outcome of the diagnosis. Therefore, the problem of data processing is quite relevant for further use in expert diagnostic systems and software.

Relationship of work with scientific programs, plans, themes. Work was performed at the Department of Automated Information Processing and Management Systems of the National Technical University of Ukraine «Igor Sikorsky Kyiv Polytechnic Institute» within the topic «Methods and Technologies for High-Performance Computing and Processing of Large Data Sources». State Registration Number 0117U000924 .

Aim of the research: enhance the capacity of analysis of electrocardiogram data using a linguistic model based on the fuzzy sets.

Task of the research:

- review existing solutions to the problem in the study;
- create a function for reading data and dividing the ECG signal into segments;
- improve the method of converting the ECG signal into a linguistic chain by adding the membership function and the rules of fuzzy sets;
- create a software to implement an advanced method;
- create a software module for visualization and storage of processed results;
- investigate the effectiveness of the improved method.

Object of the research: preprocessing of electrocardiogram data.

Subject of the research: methods of preprocessing of electrocardiogram data.

Methods of the research: based on the method of linguistic modeling and the fuzzy sets.

Scientific novelty of the obtained result: the method of converting the ECG signal into a linguistic chain by adding the membership function and the rules of fuzzy sets has been improved. This extension allows the use of fuzzy sets for further analysis of patient data.

Practical value of the results: the proposed method produces an electrocardiogram signal in the form of a linguistic circuit for further classification and detection of anomalies.

Link to scientific programs: The main points of the work were reported and discussed at the Fourth All-Ukrainian Scientific and Practical Conference of Young Scientists and Students "Information Systems and Management Technologies" (ISTU2020) as part of a report on the topic “Using a linguistic model for pre-processing ECG data”.

Publications. Oliinyk A. O., Baklan I.V. Using a linguistic model for pre-processing ECG data / A. O. Oliinyk, I.V. Baklan // Proceedings of the Fifth All-Ukrainian Scientific and Practical Conference of Young Scientists and Students "Information Systems and Management Technologies" (ISTU2020) - Kyiv: NTUU “KPI them. Igor Sikorsky”, November 26-27, 2020.

LINGUISTIC MODEL, LINGUISTIC CHAIN, ECG, FUZZY SETS, DATA PREPROCESSING