

ABSTRACT

Master's dissertation: 113 p., 22 pic., 28 tables, 2 appendixes, 50 referring sources.

Actuality of theme. At present, the 4P Medicine paradigm is common in the world – personalized, predictive, preventive, participative medicine. The concept is to prevent the disease, detecting it at an early stage (when it is still possible to warn it) [1]. It is in this paradigm that you can create devices that allow you to monitor your health at home. Including – personal cardiographs [2]. Personal cardiographs are especially relevant, because cardiovascular disease (CVD) is, according to official statistics, the "killer" number 1 in the world [3]. The problem is that such devices do not have a function to validate the quality of the signal, and as a result, the accuracy of the algorithms analyzing the electrocardiogram (ECG) can be significantly reduced, due to the lack of validation of the signals entering the input of the analysis modules. This is a critical factor, since modern bio-medical signal processing algorithms are personalized [4].

In this regard, the development of hardware and software complex, which allows you to remove ECG at home, is relevant. Scientific research conducted in the framework of the master's thesis allows to significantly improve the signal received from single-channel cardiographs, due to the fact that the user during the process of catching the signal receives information about the quality of the signal, which makes him find the position in which the best signal.

The theoretical basis for the implementation of such an approach is laid down in the writings of Clifford G., Rajakopalana Ts, Morgano E., Alonzo-Athenia F., Silva I. .. The results of their research are methods that allow to investigate the quality of the ECG signal, with high accuracy. But the proposed methods do not work with single-channel cardiographs.

The purpose and tasks of the study. The purpose of the dissertation work is to simplify the diagnosis of patients, by establishing a signal validator, which in real time will determine the quality of the signal of the electrocardiogram, sent to the analysis.

To achieve the research goal, you must complete the following *tasks*:

- staging an experiment on collecting datatypes of cardiographs;

- carry out an overview of known results in solving the problem posed within the framework of the work;
- develop a method for validating an ECG signal that is taken in real-time;
- develop a software implementation of the developed method;
- perform the analysis of the results.

Object of study – the process of transmitting the signal of an electrocardiogram shot from a single-channel cardiograph.

Subject of study – the quality of the electrocardiogram signals and the methods for checking the quality of the electrocardiogram signals.

Research methods. The following methods were used to perform the tasks: system analysis (in the design of information technology); the theory of pattern recognition, the theory of neural networks (in developing methods for solving the problem of assessing the quality of the signal).

Scientific novelty of the obtained results. The method of validation of ECG signals taken from a one-channel cardiogram, working in real-time mode, is developed. The method of neural networks is used to classify ECG signals.

Publications. The materials of the work are published in the collection of articles of the International scientific-practical conference "Informatics and Computing Technology-IOT-2018", Kyiv, National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute" April 23-24, 2018 [5].