ABSTRACT

Innovative method of diagnostics of selected heart diseases based on time and frequency analysis of phonocardiographic signals

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This dissertation aims at developing a method of diagnostics of selected heart diseases based on time-frequency analysis of phonocardiography signals, which can be used by nursing personnel. The dissertation presents the process of collecting diagnostic data, the process of system design and the results of phonocardiography signal classification.

The dissertation consists of three logical parts presenting subsequent stages of the work. The first part (chapters 1-2) presents the subject of phonocardiography, which is closely related to the way of functioning of the cardiovascular system and myocardium. In this part, the author also presents the problems encountered when collecting and acquiring diagnostic data and the methods of solving them.

The next part (chapter 3) presents the problem of evaluation of recorded data in terms of their quality. The author indicates the problem of interference signals, which negatively influence system operation. He describes the vector of features and the designed classifier used to evaluate the quality of the recorded diagnostic data.

The method of selection of features and comparison of classification results are presented in part 3 (Chapters 4-6). The main aim of this stage is finding optimal parameters of the classifier, ensuring the lowest possible classification errors, while delivering good separating properties.

The last part of the dissertation is a summary, proving the thesis of the dissertation on the basis of previously presented studies, as follows: ***it is possible to develop a diagnostic method, assigning recorded cases to a class of a healthy or ill patient, with probability sufficient for modern medical applications, using phonocardiography signals recorded in typical outpatient conditions.*** This section also presents the expected further areas of development of the presented system.

Keywords: phonocardiogram, spectral analysis, support vector network, genetic algorithms, selection of distinctive features.

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