Master's thesis, 112 pp., Table 30, 29 figures, 2 appendixes, 29 sources.

There are two problems considered in this thesis: the problem of ECG filtration and the development of contactless tracking subsystem. The purpose of the first task is to compare the effect of different methods of digital signal processing to remove high and low frequency noise from the ECG. The essence of the second problem is filtering of non-uniformly sampled oxy-hemoglobin level time series to extract human heartbeat events.

The second problem consists of two parts: the choice of a uniform resampling approach and selecting the filter to operate in real time. Extracted pulse can form a data for machine learning system to detect hidden abnormalities of the heart, which is the actual problem within improve personal health through surveillance of heart health.

The review of uniformly resampling and real-time filtering methods is done. As the mat. apparatus for signal resampling the different types of interpolations were taken and adapted to work in real time. As the mat. apparatus for resampled time-series filtering the recursive filters and filter type moving average were used.

Within the master's thesis the module for the contactless pulse extraction is developed. This in turn allows the further analysis of the heart's health.

The object of the study is time series. The subject of the study – filtering and resampling techniques for time series.

We performed the study of the accuracy of extracted pulse according to specific criteria, resulting in a found of better resampling and filtration techniques in real time for use in the developed subsystem.

FILTER, TIME SERIES, CWT, FWT, INTERPOLATION, RESAMPLING, PERSONALIZED SYSTEM