

## ABSTRACT

The topic of research: «Machine learning approach for heart age estimation based on R-R intervals»

Bachelor thesis: 133 p., 11 tabl., 37 fig., 4 appendixes, 29 sources.

In this thesis the problem of human biological age assessment according R-R intervals is studied. As part of the analyzed existing methods and approaches to forecasting heart age, the proposed feature extraction methods and biomarkers of cardionintervalogramme and comparative analysis of modern methods of machine learning for this problem including gradient boosting and its modifications, Regression and Random forest.

There has been made a review of methods of feature extraction of R-R intervals. The mathematical apparatus was based on Fourier Transform algorithms and gradient boosting. The features matrix for each person was constructed using different methods and the relationship between the number of biomarkers and estimated heart age was analyzed.

Within the thesis a computer program was developed to automate feature extraction according to the data of the cardionintervalogramme and it's subsequent application to construct a model estimating the age of the heart. This in turn allows the user to assess their biological age using the cardionintervalogramme obtained from any ECG reader.

There has also been done a study of the accuracy of the model, in which there was discovered a connection between the set of features derived from the R-R intervals and accuracy of the assessment of biological age of a human.

HUMAN BIOLOGICAL AGE, CARDIOINTERVALOGRAMME, BIOMARKERS, HEART, MACHINE LEARNING, R-R INTERVALS, REGRESSION, CLASSIFICATION.