Introduction

The length of the normal heart contraction cycle, called the RRinterval, varies depending on the body's current needs for oxygen and other nutrients. There is a lot of evidence that a series of RR-intervals carry information about the complex interdependence of various physiological processes, reflex loops, complex mechanisms operating at different time scales and often spatially distant. It is believed that heart rate variability represents the organism's ability to respond to internal and external challenges, and therefore is an indirect (and also non-invasive and inexpensive) method of assessing the overall state of human health. In healthy people, this variability is mainly associated with the activity of the autonomic nervous system - a part of the central nervous systems which stays apart from a human conscious action. Interdisciplinary cooperation has been intensively developed aiming on reading the information contained in RR-intervals. The thesis will be done in collaboration with the Institute of Theoretical Physics and Astrophysics, University of Gdańsk, who will provide support and data. They have access to long time series, consisting of ca 20000 observations of RR-intervals.

Classification of cardiovascular age by single-particle tracking method of deep learning

The set of signals with RR-intervals will be provided. The signals were collected from healthy people at different age and present heart beats of four hour of nocturnal rest.

The successful solving the thesis involves:

- constructing of the convolutional neural network which best performs the classification task [1].

References

[1] Kowalek P, Loch-Olszewska H, and Szwabiński J, (2019) Classification of diffusion modes in single-particle tracking data: Feature-based versus deep-learning approach. Physical Review E 100, 032410