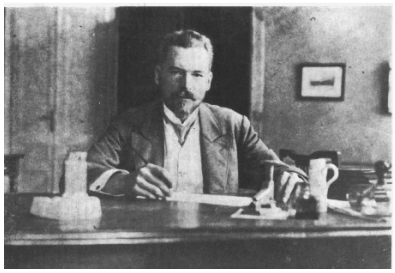

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Machine learning methods in estimates of heart rate variability

Friday, 20 September 2019 17:00 (30 minutes)

Enormous progress in machine learning achievements, going together with their excellent implementations on user-friendly platforms, have pushed many of us towards this
methodology. Can we get better explanations for studied data? Can we get the explanation easier? In the following we deal with data formed from recordings on healthy people with different age and sex. The problem is how the age and/or sex influence the normal rhythm of a healthy heart.

The healthy human heart remains under the permanent influence of both branches of the autonomic neural system (ANS): the parasympathetic (considered to slow down heart rate) and the sympathetic (considered to speed up heart rate). Many measures estimating heart rate variability (HRV) have been proposed in order to quantify the regulatory function of the ANS. Intensive studies on healthy population have found a correlation between an increase in age and a decrease in many HRV indices. Therefore higher values of HRV have been attributed to better organization of feedback reflexes driving an organism's response to actual body needs. However, there are observations suggesting that abnormal levels of some indices should be related to erratic rhythms, i.e., rhythms resulting from remodeling of the cardiac tissue due to disease or aging. We hypothesize that increase of measures of dynamical patterns in elderly indicates at unhealthy autonomic activity, or possible erratic rhythm associated with degradation of cardiac tissue, or both. Such erratic rhythms might be the first stage of developing silently arrhythmogenesis.

The task of separating different cardiac patient groups on the basis of HRV parameters is an urgent problem. If there are differences, it might be possible to find noninvasive marker for specific cardiac diseases. Answering to these questions demands wide knowledge about the way in which information hidden in heart rate variability displays the actual state of the heart regulatory system.

Summary

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