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Improvement of Cardiovascular System Diseases Diagnostics by Using Multiparametric Data

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Abstract

The most common cause of death among humans is cardiovascular disease. An effective way to detect early signs of cardiovascular disease is to constantly monitor the patient's critical physiological parameters during their daily activities using a wearable device. Most of these wearable devices available on the market can only register one or two types of biosignals, which are processed independently. On the one hand, these data obtained in this way are sufficient to see some changes in the cardiovascular system, but on the other hand, this type of device is bulky and uncomfortable to wear for a long time. One of the most promising methods for studying the cardiovascular system today is the use of multiparametric data, namely the combination of ECG and PPG data. Multivariable data is already used today for continuous non-invasive (cuffless) blood pressure measurement. However, the use of this type of data for a more complete analysis of the cardiovascular system is possible only at the initial stage of the study. The authors proposed a method that allows, due to the continuous processing of ECG and PPG data strictly synchronized in time, obtained from a wearable device, to assess the general state of the cardiovascular system and the risk of its disorders. Physionet data were used for verification. As part of the implementation of the device, a prototype of a wearable analyzer of the cardiovascular system was created and the first results were obtained.

Keywords: multiparametric data, ECG, cardiovascular diseases, wearable devices



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