

Standing Hypotension Prediction Based on Smartwatch Heart Rate Variability Data: A Novel Approach

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Abstract

The number of wearable and smart devices which are connecting every day in the Internet of Things (IoT) is continuously growing. We have a great opportunity though to improve the quality of life (QoL) standards by adding medical value to these devices. Especially, by exploiting IoT technology, we have the potential to create useful tools which utilize the sensors to provide biometric data. This novel study aims to use a smartwatch, independent from other hardware, to predict the Blood Pressure (BP) drop caused by postural changes. In cases that the drop is due to orthostatic hypotension (OH) can cause dizziness or even faint factors, which increase the risk of fall in the elderly but, as well as, in younger groups of people. A mathematical prediction model is proposed here which can reduce the risk of fall due to OH by sensing heart rate variability (data and drops in systolic BP after standing in a healthy group of 10 subjects). The experimental results justify the efficiency of the model, as it can perform correct prediction in 86.7% of the cases, and are encouraging enough for extending the proposed approach to pathological cases, such as patients with Parkinson's disease, involving large scale experiments.

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