An Electronic Device with an Integrated Mobile App for Early Detection of Cardiovascular Diseases: A Low-Cost, Easy-To-Use, Non-Invasive Device and Comprehensive, Multi-Parametric Smartphone App

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Cardiovascular and Arterial Diseases are leading causes of death and responsible for more than a fourth of US deaths. Current Detection Methods are only implemented when symptoms appear, by which point the condition has already reached life-threatening levels. Additionally these methods are expensive, invasive, or time-consuming. Cardiovascular diseases are preventable and sudden “silent” deaths can be largely eliminated through monitoring of the progression of cardiovascular condition in middle-age adults and accordingly directing them to specialists for optimal treatment early on. The most direct and proactive way for early detection of this condition is to make its diagnosis part of an annual wellness visit at primary care physician's office. Recent research shows that analyzing the continuous blood pressure waveform for the rate of blood pressure rise during systolic, rate of pressure fall during diastolic, and the timing/magnitude of reflected pressure wave immensely improves early detection of cardiovascular diseases. In this research, a low-cost, easy-to-use, non-invasive electronic device was designed to obtain a continuous blood pressure waveform at the Brachial artery. The device was integrated with a user-friendly "Blood Pressure Analytics" Smartphone App for real-time, multi-parametric analysis and comprehensive assessment of the cardiovascular condition. The device was tested on male and female family members. Minimal training and expertise required in operating the device and App allows for its integration in any environment including the home-setting thus creating a major global impact. Based on the results, it can be concluded that the device is very powerful when used to study the progression of cardiovascular condition on a yearly basis.

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