Personal Heart Monitoring System Using Smart Phones to Detect Life Threatening Arrhythmias

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ABSTRACT
Wireless bio sensors and systems have evolved to the point that they can be considered ready for clinical application. The use of wearable monitoring devices that allow continuous or intermittent monitoring of physiological signals is critical for the advancement of both the diagnosis as well as treatment of diseases. Wearable systems are totally non-obtrusive devices that allow physicians to overcome the limitations of ambulatory technology and provide a response to the need for monitoring individuals over weeks or months. They typically rely on wireless miniature sensors enclosed in patches or bandages or in items that can be worn, such as ring or shirt. The data sets recorded using these systems are then processed to detect events predictive of possible worsening of the patient's clinical situations or they are explored to access the impact of clinical interventions. This paper discusses a personalized heart monitoring system using smart phones and wireless (bio) sensors. We combine ubiquitous computing with mobile health technology to monitor the wellbeing of high risk cardiac patients. The smart phone analyses in real-time the ECG data and determines whether the person needs external help. We focus on two life threatening arrhythmias: Ventricular Fibrillation (VF) and Ventricular Tachycardia (VT). The smart phone can automatically alert the ambulance and pre assigned caregivers when a VF/VT arrhythmia is detected. The system can be personalized to the needs and requirements of the patient. It can be used to give advice (e.g. exercise more) or to reassure the patient when the bio-sensors and environmental data are within predefined ranges.