Myocardial Infarction Detection System ECG Based That Integrates Signal Processing and Machine Learning for Early Diagnosis

Hamouda, Mariam (School: The Red Sea STEM High School)
Abdalla, Habiba (School: The Red Sea STEM High School)

According to the World Health Organization, The world’s biggest killer is ischaemic heart disease, responsible for 16% of the world’s total deaths. Since 2000, the largest increase in fatalities has been for this disease, rising by more than 2 million to 8.9 million deaths in 2019. Depression of the estrogen levels in older women increases their risk of MI. The project therefore aims to develop a wearable device that early diagnose MI in women, particularly those in rural areas that restricted access to healthcare. The physical suffering of these women is frequently underestimated. Furthermore, they are less likely to recognize tracking their health. A smart chest strap has been designed with an electrocardiogram (ECG) sensor coupled to an ESP32 board, which is then connected to a buzzer as an MI alert system. When the device detects MI, the buzzer is activated, and then the message is sent to the website demonstrating the patient's condition regularly to the physician. The MI detection mechanism provided by the system relies on the Random Forest algorithm, due to it is mostly used in bioinformatics. Its function is to compare the system readings to the data fed to the algorithm beforehand. Clinical tests were performed on the applicable system, where the participants were divided into two groups. 11 patients with MI made up the first sample, and 16 participants who were both genetically and non-genetically prone to MI made up the second sample. The aim was to keep track of their heart status and detect MI. By analyzing the experiment data, the Random Forest algorithm achieved an average accuracy of 97.42% with a fitting time of 198.845 seconds. As a result, Heart Appeal has proven to be a reliable tool for MI early detection for women in rural areas. Based on the experiment's data, the chest belt provides a dependable and affordable option for MI early detection.

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