The Intelligent Cardiac Care Companion: A Compact ECG and SPO2 Device with Predictive Analytics for Early Detection of Cardiac Issues. (IC3)

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Nowadays, heart diseases are some of the most serious public health problems in the world, resulting in many deaths each year. Heart diseases are commonly referred to a group of cardiovascular diseases such as myocardial infarction, coronary artery or irregular heartbeat, etc. The cause of these diseases could range from insufficient exercise, unhealthy eating, to heredity. Currently, one of the ways of detecting such diseases is the measuring of an electrocardiogram (EKG) along with other vital sighs such as the pulse. The collected data would then be combined with the patient's history to be used for further diagnosis by a trained doctor. In order to measure these parameters, especially the EKG. There is constant need of traveling to the hospital for taking accurate measurements which results in high cost and lots of travel time. These inconveniences make EKG measurements impossible to do all the time, decreasing the chances of detecting heart problems.

With this problem in mind. The developers have decided to developed an EKG device. That in addition to measuring EKG values, other parameters such as pulse and blood's oxygen levels can also be measured in one device. The design is to be compact for the convenience in transportation and allow users to measure at any given time. In addition, this device is also able to calculate basic cardiac health analysis for the convenience of the users.

With the concept established. The developers then proceeded into development. The final device relied on analyzing values that have been detected by the sensors and then sending it to the Artificial Intelligence (AI) for further analysis before returning the analyzed data to be shown to the user. In order to get accurate readings two types of sensors were used the first being a Maxim Max30102 with the abilities to measure blood's oxygen and pulse levels. The second sensor is the uECG with the ablity to measure the EKG. With the AI receiving the data, it would then process and send out the analysis back to the device to be shown at the user's interface. After designing and planning, the developers then started modelling the case and using 3D printing, create it to be the exact size for our components. The code was then written to analyze, control and display data for the user. Lastly, all of the components were assembled into the full device and after a quality of control check to ensure its efficiency and longevity. In the end, the developers found out that the device is accurate in detecting EKG, pulse and the blood's oxygen level. The AI is also able to give clear and proper analysis, which can lead to better coping of the patient's cardiac issue.

Keywords: EKG; AI; Heart diseases