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Development of an ECG-System using Android™
and Modified Bluebeatc Hardware

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Abstract

Electrocardiograms are important medical devices used to monitor the cardiac activity of patients over a period of time. Designed to provide convenient monitoring of patients, although most useful, ECG's however are expensive and usually not portable, limiting its availability and therefore usefulness. Taking advantage of current technological developments, the researchers developed an ECG System with Android™ smartphone based monitor, and Bluebeat® ECG Front circuit based electrodes. The system is divided into two, software and hardware interface.

The developed software interface code used an Android based Java language which displays the converted ADC values in the LCD. Saving and user friendly features were also included in the smartphone. The hardware interface is composed of the ECG front and the Data Acquisition Module. The ECG front contains the filters and amplifiers that will receive the human cardiac signal. The DAT Module will then receive it with its Gizduino (Arduino™ clone) microcontroller which converts the analog signals into ADC values, and finally sends it to the smartphone using Bluetooth® wireless communication. The first phase of data gathering used signal generator and indicates the system's accuracy and speed. The second phase testing of the study meanwhile utilizes the ECG front to get actual cardiac signals from human. This phase has already been done, though it still needs more polishing and further trials. For the final testing, nine patients of varying ages and cardiac health status will be taken with ECG readings, three replicates from the developed ECG system, and one from an actual ECG device. Using cardiologists' and patients' feedback, the user friendliness and accuracy of the ECG-system will be confirmed, and further modifications shall be made.

Lastly, the overall cost of producing the ECG system shall be compared to the

price of an ECG device, to see if the developed system is indeed cheaper. However, it is ensured that the system is far more portable than its bulkier ancestors. Once the project is fully finished, the accuracy, replicability and usefulness of the system shall be confirmed using F-test.

評語

In this work, the author makes a compact device to measure the ECG with a portable device. With a simple communication function by Bluetooth, the measured signal can be transmitted to the hospital in real time. It's an excellent work. Good job.