Developing of an Open Source Electrocardiogram Prototype

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Abstract

The software research has an objective to develop "Open Source Electrocardiogram" for applied with microcontroller, studied pulse rate and Electrocardiogram. Then we can used data to studied standard heartbeat rate in sanitation or sub-district health promoting hospital by trial with people with heart disease. Electrocardiogram monitor uses cardiac operating process when cardiac cells have metathesis until electric charge is unequal, then there is electric potential and electric current moves. Electric current moves through the atrium chamber of the heart to the ventricle chamber of the heart makes the heart pump. Vector of electric current moves from the origin to the end, the right artrium to left ventricle so we can find that the electric potential follows the way electric current moves. We received value by electrodes that are connected to wires and board circuit connected with filter and potentiometer amplifier for increasing accuracy. The value will be sent to a Microcontroller that controls transducing the electric signals to electrocardiogram graph and the graph is showed on the monitor. We use Arduino board as Microcontroller and program in C language. From the way electric current moves then we can analyst the value by 3 points: right chest, left chest and fourth ribs. The right chest is positive electric charges, the left chest is negative electric charges, the fourth ribs is ground point to show as a graph that have the way electric current moves. Board circuit connected with filter and potentiometer amplifier. Both of them are integrated circuit (IC) until OPA2604 and INA2126PA. The OPA2604 can decrease noise from electronic devices. Because electrocardiogram has a value nearby 0 then we use INA2326PA as a amplifier to amplify electrocardiogram to be more accuracy and moves to resistor and capacitor to take electrocardiogram to be more stable. We decided circuit by calculating electric current's direction and control by different resisters, capacitor, filter and potentiometer amplifier that has to use mathematic calculation and to get the needed magnification to Arduino board and to use result testing the circuit. The graph's scale is controlled by us so we can transfer the graph to a number for easy to study. When "Open source Electrocardiogram" completed and trialed with patient show that "Open source Electrocardiogram" can show graph similar standard electrocardiogram graph compared with other various scale then the accuracy changed but it could be used with standard electrocardiogram.

Keywords
Microcontroller, Electrocardiogram [ECG].

Acknowledgements
Developing of an open source Electrocardiogram prototype wouldn't be completed without the helping from our advisor, Mr. Vichien Donram. He always gives us many advices and even supporting us in this project.

We also receive help from Mr.Tatun Sangpo, the physician of HRH Princess Maha Chakri Sirindhorn Medical Center-MSMC Hospital Rayong. And the professor from Faculty of Engineering, Burapha University. They also give us many advices and ways to improve the project to be better.

We would like to sincerely thank Ms.Sunantha Pairin, Mr.Eliseo Bravo and Mrs.Duanporn Balee, the foreign language department teachers. For checking and correcting our English project. And last but not least, we would like to thank to Princess Chulabhorn Science High School Chonburi for giving us an opportunity to make this project.

Finally, we immensely grateful to all of supporters for giving and helping us many things and we couldn't make it through without them.

Biographies

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