

IMPLEMENTATION AND ANALYSIS OF HEART BEAT DETECTOR BASED ON ARDUINO MICROCONTROLLER

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ABSTRACT

This paper proposes to implement the heart beat detector and analyzer based on Arduino microcontroller. Heart beat rate or pulse rate can be influence by many things including age, weight, physical activity, stress, illness, injury and medications the person are taking. The objectives of this work are to design a simple and easy heartbeat detector using optical sensors compared to ECG electrode and can be analysed the heart rate. For this project, pulse sensor is used as the sensor to detect the heart beat by put on the fingertip, earlobe or any capillary tissue on the body part, and the heart beat is processed by Arduino Microcontroller. It displayed the heartbeat waveform by the Pulse Sensor Amped Visualizer using processing software then analyzed for overweight and body posture categories person. The function to analyse these categories is to make sure that this heartbeat detector can be used for medication. The picture of heart beat waveform from visualizer will be send to the webpage using Ethernet Shield for monitoring. This detector produced the heart rate data of waveform, interbeat interval and beat per minute on visualizer that can be analyze to see the difference condition of the various person category that can be monitored on the web using Ethernet shield. The function to monitor on web is to help both the doctor and patient for medication procedure which the patient that need regular check-up for heart beat does not need to go to hospital and just send their heartbeat data to the web for monitoring by the doctor. This method cannot been achieved by using the ECG electrode procedure since the ECG device only used on the hospital and conducted by expertise.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

Heart is the most important part in human body. There are different of heart beat rate for various peoples based on their lifestyle, age and diet. Changes in lifestyle and unhealthy eating habits have resulted in a dramatic increase in incidents of heart disease. It also can be affected by many things including age, weight, physical activity, body position, stress, illness, injury and medications person are taking. At rest, heart rate is at its lowest. The muscle in the body is relaxed and function normally with less effort. The supine position have lower heart rate than the upright position[1]. When the body move from lying down to sit up, muscle are engaged to hold the body in an upright position and gravity is affecting blood flow. These will increase the heart rate. When the body is move from sitting to stand, the lower body engaged and it takes effort to pump the blood through the body and the heart beat increases again [2].

In this study, this project detect heartbeat by put the pulse sensor onto the fingertip or earlobe or any sensitive part on the human body that have capillary tissue. It can be used as the portable device and just connect to the USB port or power adapter 9V since it have LCD display that showing the value of IBI and BPM. The heartbeat detector can display the heartbeat waveform, Interbeat Interval (IBI) and Beat Per Minute (BPM) values for the user to observe their heartbeat rate by using the Processing software and connected to the computer. This device also help the doctor to monitor their patient heartbeat from the hospital since it send the heartbeat waveform to the internet from the patient house. By using this monitoring system, the doctor work become more efficiently. Sometime the patient cannot go to the hospital