Heart Rate and Growth Measurement with Abnormality Detection Using IOT

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ABSTRACT

Technological innovations in the field of disease prevention and maintenance of patient health have enabled the evolution of fields such as monitoring systems. Heart rate is a very vital health parameter that is directly related to the soundness of the human cardiovascular system. Heart rate is the number of times the heart beats per minute, reflects different physiological conditions such as biological workload, stress at work and concentration on tasks, drowsiness and the active state of the autonomic nervous system. It can be measured either by the ECG waveform or by sensing the pulse - the rhythmic expansion and contraction of an artery as blood is forced through it by the regular contractions of the heart. The pulse can be felt from those areas where the artery is close to the skin. It describes a technique of measuring the heart rate through Arduino and app interface. Heart Rate monitoring is a measure of detecting heart beats and analyzing any irregular patterns. This analysis is highly sensitive for risks linked with Cardiovascular disease, Diabetic Mellitus, disease states associated with Autonomic Dysrhythmia such as Hypertension and a large array of chronic degenerative medical condition.

Keywords: IoT(Internet Of Things), Arduino, Android, Wireless sensors

ARTICLE INFO

I. INTRODUCTION

Ccardiovascular disease is one of the main causes of death in many countries and thus it accounts for the over 15 million deaths worldwide. In addition, several million people are disabled by cardiovascular disease. The delay between the first symptom of any cardiac ailment and the call for medical assistance has a large variation among different patients and can have fatal consequences. One critical inference drawn from epidemiological data is that deployment of resources for early detection and treatment of heart disease has a higher potential of reducing fatality associated with cardiac disease than improved care after hospitalization. Hence new strategies are needed in order to reduce time before treatment. Monitoring of patients is one possible solution. Also, the trend towards an independent lifestyle has also increased the demand for personalized non-hospital based care. Cardiovascular disease has shown that heart beat rate plays a key role in the risk of heart attack. Heart disease such as heart attack, coronary heart disease, congestive heart failure, and congenital heart disease is the leading cause of

death for men and women in many countries. Most of the time, heart disease problems harm the elderly person. Very frequently, they live with their own and no one is willing to monitor them for 24 hours a day. In this proposed device, the heart beat and temperature of patients are measured by using sensors as analog data, later it is converted into digital data using analog to digital converter (adc) which is suitable for wireless transmission using bluetooth . Micro controller device is used for temporary storage of the data used for transmission. For a patient who is already diagnosed with fatal heart disease, their heart rate condition has to be monitored continuously. This project proposes and focuses on the design of the heartbeat monitor that is able to monitor the heart beat rate condition of patient continuously. This signal is processed using the microcontroller to determine the heart beat rate per minute. Then, it sends alert to the android app which will contact medical experts or patient's family members, or their relatives about the condition of the patient and abnormal details via android app. Thus, doctors can

monitor and diagnose the patient's condition continuously and could suggest earlier precaution for the patients themselves. This will also alert the family members to quickly attend to the patient. The remote heartbeat monitor proposed in this work can be used in hospitals and also for patients who can be under continuous monitoring while traveling from place to place, since the system is continuously monitoring the patient.
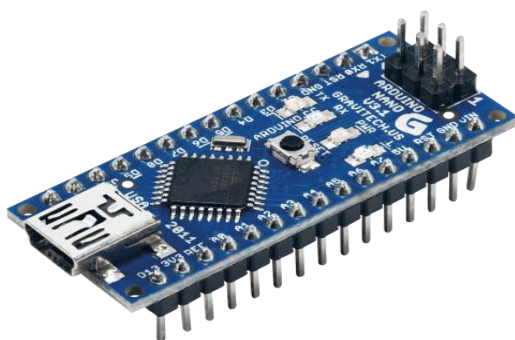
II. PROPOSED WORK
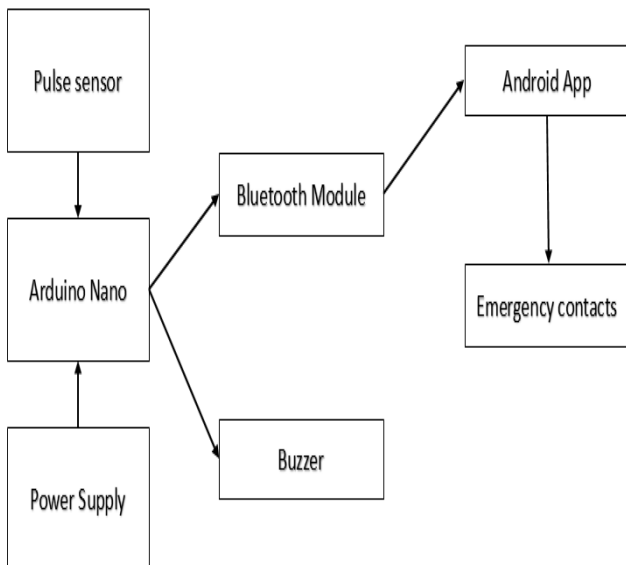
Fig1. Proposed system

A) Power Supply Unit
This unit was developed around, built and incorporated in the Arduino Nano board. The power supply source for the system would be mains AC. The circuit would use a 9V DC.

B) Arduino Nano

Fig2. Arduino Nano

Arduino is a microcontroller board and it is based on ATmega328. Board consists of 14 digital input/output pins. Out of which 6 input pins are used as PWM outputs, 6 as analog inputs, quartz crystal of 16MHz, having USB connection, power supply jerk, an ICSP header and reset button.

Simply we can connect the Arduino board to the computer using USB connection to get start. Also we can supply power to it with AC – to – DC adapter or we can use battery to get started. As we compare Arduino UNO board with other it differs from the proceeding board which doesn't use FTDI USB – to – serial driver chip. Instead of that the ATmega8U2 is programmed as USB – to – serial converter.
A) The Pulse Sensor Unit

Fig3. Heartbeat sensor

A Heartbeat sensor is a monitoring device that allows one to measure his or her heart rate in real time or record the heart rate for later study. It provides a simple way to study the heart function. This sensor monitors the flow of blood through the finger and is designed to give digital output of the heartbeat when a finger is placed on it. When the sensor is working, the beat LED flashes in unison with each heartbeat. This digital output can be connected to the microcontroller directly to measure the Beats per Minute (BPM) rate. It works on the principle of light modulation by blood flow through finger at each pulse.
The Pulse Sensor is a well-designed plug-and-play heart-rate sensor for Arduino. It also includes an open-source monitoring app that graphs your pulse in real time.

III. ALGORITHM

Step 1 : Initialize variables H1,D1

Step 2 : Read current analog heartbeat data

Step 3 : Convert analog value to digital

Step 4 : Check if value exceeds specified limit

$D1 <$ Abnormal_LOW_Heart_Rate

OR

$D1 >$ Abnormal_HIGH_Heart_Rate

Start Buzzer

Send Emergency Message data write command on serial

Bluetooth

Step 5: delay 100ms

Step 6 : Go to step 1

IV. CONCLUSION

The wearable on the hand is designed to monitor the heartrate of the patient using the sensor SFH7051. The heartrate values are uploaded to a web link where the any person with internet connection can access the link. So if the heartrate is less or more accordingly the doctor or family member can immediately inform the patient to take the necessary medication.

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