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Heart Failure detector

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I.ABSTRACT

Nowadays heart attack is becoming a very deadly disease of human. This attack cannot be predicted, but it can be known from the human heartbeat which is a very vital health parameter of the human cardiovascular system. Heart rate reflects the health conditions of the human cardiovascular system that determined by such as stress at work, before or after sports and the psychology factor. Unfortunately, some people do not know their heart rate before or after doing an activity. This paper proposes of measuring technique of heart rate by using pulse sensor, Arduino microcontroller, and Android Smartphone. It is based on the principle of measuring the variation of blood volume in our body using a light source and detector. We also measure the heart rate by using the ECG or EKG (electrocardiogram) waveform as the comparison result of the pulse sensor with ECG waveform. The sensor consists of an infrared light-emitting-diode (LED) and a photodiode. The LED transmits an infrared light into the fingertip which is reflected back from the blood inside of finger arteries. The results show that this tool can detect the value of the heart rate and is displayed on the screen of an Android. The sensor takes under 10 seconds to detect the value of the heart rate. Notification via SMS will be sent the heart rate such as under normal conditions (BPM, Beat Per Minute 100).

II.INTRODUCTION

In the new era of communication and technology, the explosive growth of electronic devices, smart phones and tablets which can be communicated physically or wirelessly has become the fundamental tool of daily life. The next generation of connected world is Internet of Things (IoT) which connects devices, sensors, appliances, vehicles and other “things”. The things or objects may include the radio-frequency identification (RFID) tag, mobile phones, sensors, actuators and much more. With the help of IoT, we connect anything, access from anywhere and anytime, efficiently access any service and information about any object. The heart is one of the most important organs in the human body. It acts as a pump for circulating oxygen and blood throughout the body, thus keeping the functionality of the body intact. A heartbeat can be defined as a two-part pumping action of the heart which occurs for almost a second. It is produced due to the contraction of the heart. When blood collects in upper chambers, the SA (Sinoatrial) node sends out an electrical signal which in turn causes the atria to contract. This contraction then pushes the blood through tricuspid and the mitral valves; this phase of the pumping system is called diastole. The next phase begins when the ventricles are completely filled with blood. The electrical signals generating from SA node reach the ventricle and cause them to contract. This phase of the pumping system is called systole. The tricuspid and mitral valves are closed tightly to prevent the backflow of blood; the pulmonary and aortic valves are opened. This system can detect pulse, temperature regularly with the help of sensor. Doctor can set the threshold for all parameters. If these parameters cross the maximum limit, System send notification

on server through WIFI. In the new era of communication and technology, the explosive growth of electronic devices, smart phones and tablets which can be communicated physically or wirelessly has become the fundamental tool of daily life. The next generation of connected world is Internet of Things (IoT) which connects devices, sensors, appliances, vehicles and other “things”. The things or objects may include the tag, mobile phones, sensors, actuators and much more. With the help of IoT, we connect anything, access from anywhere and anytime, efficiently access any service and information about any object. The aim of IoT is to extend the benefits of Internet with remote control ability, data sharing, constant connectivity and so on. Using an embedded sensor which is always on and collecting data, all the devices would be tied to local and global networks. The term IoT, often called Internet of everything, was 1st introduced by Kevin Ashton in 1999 who dreams a system where every physical object is connected using the Internet via ubiquitous sensors. The IoT technology can provide a large amount of data about human, objects, time and space. While combining the current Internet technology and IoT provides a large amount of space and innovative service based on low-cost sensors and wireless communication. IPv6 and Cloud computing promote the development of integration of Internet and IoT. It is providing more possibilities of data collecting, data processing, port management and other new services. Every object which connects to IoT requires a unique address or identification with IPv6. There are so many people in the world whose health may suffer because they do not have proper access to hospitals and health monitoring. Fig-1 Internet of Things the Internet of things (stylised Internet of Things or IoT) is the internetworking of physical devices, vehicles (also referred to as "connected devices" and "smart devices"), buildings and other items-embedded with electronics, software, sensors, actuators, and network connectivity that enable these objects to collect and exchange data. In 2013 the Global Standards Initiative on Internet of Things (IoT-GSI) defined the IoT as "the infrastructure of the information society." The IoT allows objects to be sensed and/or controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer based systems, and resulting in improved efficiency, accuracy and economic benefit.

III. LITERATURE REVIEW

HEART RATE MONITORING AND HEART ATTACK DETECTION

Heart rate monitoring is a vital aspect of maintaining heart health. People from different age groups have different ranges for maximum and minimum values of heart rate, the monitoring system must be compatible enough to tackle this scenario. In this paper, an IoT based system has been implemented that can monitor the heartbeat from the output given by a hardware system consisting of a NodeMCU and pulse sensor. Further, an alert system is added which is executed if the heartbeat goes below or above the permissible level given in the devised algorithm. The alert message is received by the doctor through a mobile phone application. By using this prototype, the doctors can access the heartbeat data of the patient from any location. The nurses or the duty doctor available at the hospital can monitor the heart rate of the patient in the serial monitor through the real-time monitoring system.

HEART ATTACK DETECTION & HEART RATE MONITOR

Now a day we have an increased number of heart diseases including increased risk of heart attacks. Our proposed system user’s sensors that allow to detect heart rate of a person using heartbeat sensing even if the person is at home. The sensor is then interfaced to a microcontroller that allows checking heart rate readings and transmitting them over internet. The user may set the high as well as low levels of heart beat limit. After setting these limits, the system starts monitoring and as soon as patient heart beat goes above a certain limit, the system sends an alert to the controller which then transmits

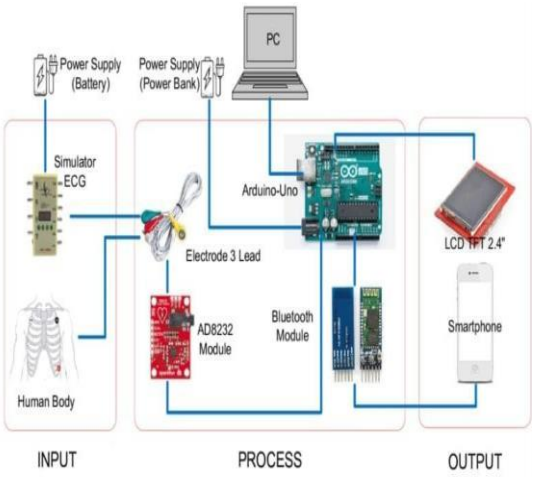
this over the internet and alerts the doctors as well as concerned users. Also the system alerts for lower heartbeats. Whenever the user logs on for monitoring, the system also displays the live heart rate of the patient.

Thus concerned ones may monitor heart rate as well get an alert of heart attack to the patient immediately from anywhere and the person can be saved on time.

HEART ATTACK DETECTION BY HEARTBEAT SENSING USING

We all know heart attack can kill your life in 3 attempts but now a day it can be dangerous in first attempt also. If checking our health regularly on daily basis then we can detect so many different diseases by detecting them previously, Life is precious. Many people among us lose their life to heart attack. This is because of their diet, age, less physical activity and many other factors. Heart attack is not easy to detect, to overcome and help our society from heart diseases and attack, we are developing such a system which will help to decrease the death rate and early detection a heart attack. In this system we are implementing a heart beat monitoring and heart attack detection system using the Internet of Things. The sensor is then interfaced to a microcontroller that allows checking heart rate readings and transmitting them over Internet

IV. METHODOLOGY



Small sticky electrodes are attached to the arms, chest and legs.

These electrodes are connected to the ECG machine through wires that help in detecting the electrical impulses occurring at each heartbeat.

These electrodes usually detect the very minute form of changes in an electrical path on the skin which arises from the heart muscles and the electrophysiologic patterns of the depolarizing during every heartbeat.

V. BLOCK DIAGRAM

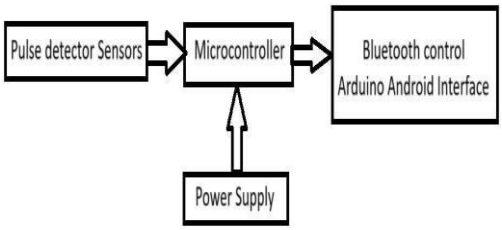


Fig. 1: The block diagram above is of the HEART FAILUREDETECTOR

VI. COMPONENTS USED

This section details the essential hardware components utilized in constructing the HEART FAILURE DETECTOR.

Microcontroller: A microcontroller, such as Arduino or Raspberry Pi, is used to process the data from the LDRs and control the movement of the servo motors. The microcontroller receives input from the LDRs, calculates the required adjustments, and sends commands to the servo motors accordingly.

Power Supply: A power supply is required to provide electrical power to the microcontroller, servo motors, and other electronic components in the system. This can be a battery or a DC power source, depending on the specific application.

ECG sensors(AD8232): An ECG sensor, such as the AD8232, is a device designed to measure and record the electrical activity of the heart over a period of time. It typically consists of electrodes that are attached to the skin, usually on the chest, and a sensor unit that detects the electrical signals generated by the heart muscle as it contracts and relaxes.

and 100.

Connecting wires: Connecting wires, in a general sense, refer to electrical conductors used to establish connections between various components within an electrical or electronic system.

Bluetooth modules: Bluetooth modules are electronic components that enable wireless communication between devices over short distances. These modules utilize Bluetooth technology, which employs radio frequency signals to establish connections and exchange data between devices such as smartphones, tablets, computers, sensors, and other electronic peripherals

These are the basic components used in a Heart Failure Detector. Depending on the specific requirements and complexity of the system, additional components and features may be added for enhanced functionality and performance.

VII. CONCLUSION

In These days we have an increased number of heart diseases including increased risk of heart attacks. Our proposed system user's sensors that allow to detect heart rate of a person using heartbeat sensing even if the person is at home. The sensor is then interfaced to a microcontroller that allows checking heart rate readings and transmitting them over internet. The user may set the high as well as low levels of heart beat limit. And IoT-based human heartbeat rate monitoring and control system is developed. This system uses the capability of a heart pulse sensor for data acquisition. A human's heartbeat is captured as data signals and processed by the microcontroller. The processed data are transmitted to the IoT platform for further analytics and visualization. Experimental results obtained were found to be accurate as the system was able to sense and read the heartbeat rate of its user and transmits the sensed data via Wi-Fi to the Android mobile app. From the results obtained, it was found that the heartbeat rate of low if >40 and 60

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