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# Heart Attack Detection and Heart Rate Monitoring using IOT

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***Abstract* - The Internet of Things (IoT) is entombing correspondence of installed gadgets utilizing organizing advancements. The IoT will be one of the significant patterns in future; can influence the systems administration, business and correspondence. Right now, a remote detecting parameter of the human body which comprises of heartbeat and temperature. The parameters that are utilized for detecting and observing will send the information through remote sensors. Including an online watching assists with monitoring the standard well being status of a patient. The detecting information will be consistently gathered in a database and will be utilized to advise patient to any inconspicuous issues to experience conceivable conclusion. Trial results demonstrate the proposed framework is easy to understand, solid, affordable.**

***Keywords:*** IoT, Heart rate sensors, Health monitoring, Health diagnosis.

## I. INTRODUCTION

In this project, we are monitoring various patient parameters via the Internet of Things. In the patient monitoring system based on the Internet of Things project, real-time parameters of the patient's health status are sent to the cloud via the Internet connection. These settings are sent to a remote Internet location so that the user can see these details from anywhere in the world. Another advantage of using IOT is that this data can be viewed on a desktop computer, a laptop and an Android smartphone [1]. The user only needs a working internet connection to view this data. There are several cloud service providers with which this data can be viewed on the Internet.

Although most elderly and disabled people prefer to live at home, their activities and health should be constantly monitored so that immediate help can be provided. Smart homes can be described as technologically advanced homes that allow automation of household chores, easier communication, and greater security. Smart homes can significantly improve the lives of seniors and people with disabilities by being able to stay in their homes where they feel more comfortable. Because smart homes are tailored to the specific needs of the elderly and disabled, they can help service providers improve the quality of services provided in many ways. Smart home systems can generally be installed and maintained in residential environments without complexity [2]. They can be implemented with different visible and / or almost invisible components with different functions. In most cases, invisible components increase acceptance of the use of the intelligent home automation system in a domestic environment.

Smart home functions are typically based on a network of wireless sensors. The wireless sensor network consists of a series of distributed sensor nodes that are used in the environment to measure physiological parameters. At the hardware level, the wireless sensor network is generally in the form of a star topology and a central coordinator of sensor nodes collects data from sensors connected to various devices [3]. As the wireless sensor network collects data on the activity of the person being monitored, it detects the activities of daily life and the lifestyle of elderly and disabled people who live alone. The activity based model allows elderly monitoring and to predict any unusual behavior of the person to be monitored using the predicting and analysis model obtained from regular and irregular activity from sensors [4].

## II. PROPOSED SYSTEM

The proposed framework has an exceptional role in distinguishing cardiovascular insufficiency using pulse monitoring according to the network of things. Our strategy uses a heart rate sensor, an Arduino board and a Wi-Fi module. After configuring the frame, the heartbeat sensor begins to collect the pulse values and displays a person's heart rate on the LCD screen [5]. Likewise, when using the Wi-Fi module, information is transmitted over the Web. The framework allows for a set point that can help decide whether a person is healthy or not by checking their pulse and comparing it to the set point. After setting these limits, the

 

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frame starts monitoring the patient's pulse and the heart rate goes above or below the frame as quickly as possible to send an alarm message [6]. As part of this project, we are implementing an Android application model that tracks the heart rate of a particular patient, checks it effectively, and provides a crisis report on the likelihood of coronary heart failure.

## III. BLOCK DIAGRAM DESCRIPTION

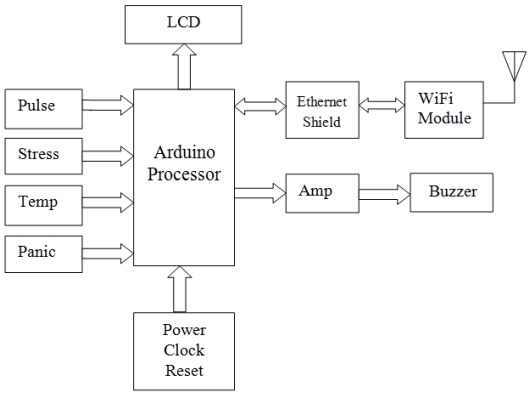


**Figure 1: Block diagram of Proposed System**

### 3.1 Pulse Sensor

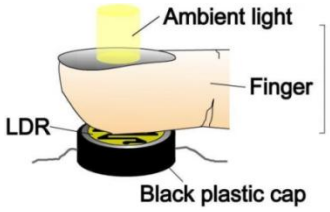


**Figure 2: LDR Pulse Sensor**

It consist of LED with current limiting register for transmitting light beam which will receive by LDR (10K ohm) to measure the resistance of changing transmitter light. We have to give voltage as input to microcontroller so, for converting resistance to voltage we have to connect a register along LDR to create potential divider circuit. Also we are connecting capacitor at the junction of potential divider circuit to block DC. Only AC pulse will be transmit at output by capacitor coupling. An op-amp will use to amplify the AC pulse before give to microcontroller [7].

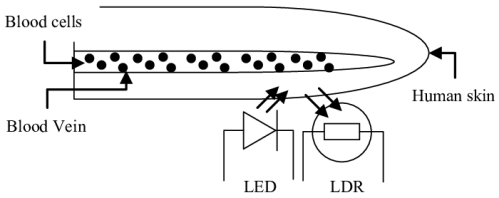


**Figure 3: Pulse Detection Principle**

In pulse sensor device the LED and LDR are place adjacent to each other, so at the time at heartbeat; light is incident on pulse and the LDR as used for calculating the reflection.

### 3.2 Temperature Sensor

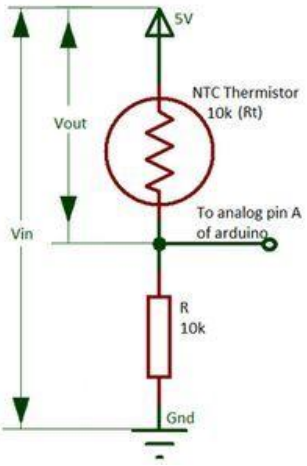


**Figure 4: Thermistor interface with Arduino**

Here a thermistor is used as the temperature sensor. Temperature sensors measure the amount of thermal energy, or even cold, generated by an object or system, and allow us to "capture" or capture the physical changes in that temperature, producing analog or digital output [8]. Here a NTC type thermistor is used which has its output resistance reduced with increase in temperature.

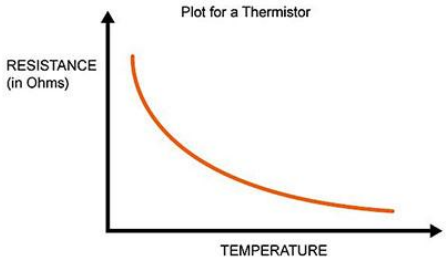


**Figure 5: Resistance vs Temperature Curve of Thermistor**

An NTC thermistor will show a decrease in resistance with increase in temperature which is shown in the figure.

### 3.3 Stress-Sensor

Grove - GSR Sensor stands for galvanic skin reaction and is a method of measuring the electrical conductivity of the skin. This reflects any emotional activity in humans. When we are emotionally stressed or have strong facial expressions, sympathetic activity increases and the secretion of sweat glands increases, which increases the electrical conductivity of the skin [9].

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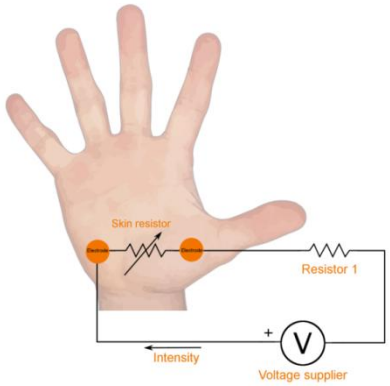


**Figure 6: GSR Measurement**

With Grove - GSR, you can identify such strong emotions by simply attaching two electrodes to two fingers with one hand [10]. It is an interesting piece of equipment for creating emotional projects such as the sleep quality monitor. This scientific principle is also used in certain galvanic skin reaction devices such as lie detectors.

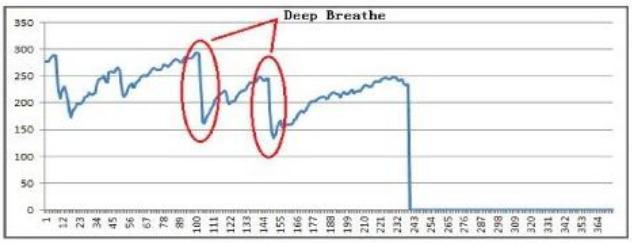


**Figure 7: GSR vs Time**

Since GSR measurements detect changes in electrical (ionic) activity due to changes in the activity of the sweat glands, the electrodes must be sensitive to these changes and able to transmit this information to the recorder.

### 3.4 Panic Button

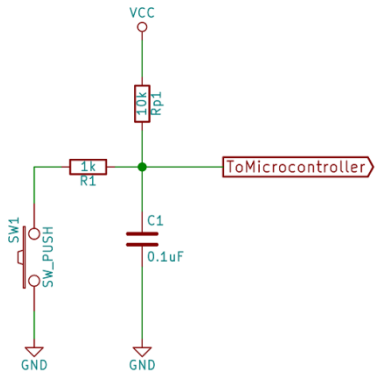


**Figure 8: Panic Button Interface with Arduino**

This is the button, which is provided for the person / patient to press, if he/she is feeling unconscious. During any uncomfortable conditions the user can press this button to send panic alert.

Here the Arduinos' internal pull-up resistor is utilized, which is around 10 k Ohm, and a 100 nF capacitor, which, when released, gives 0.001 seconds per millisecond. The panic switch uses a 1K resistor and must be significantly lower than the pull-up to ensure that the switch is set to a lower voltage. This is necessary to drain the capacitor directly through the switch causes undesirable high frequency voltage disturbances [11].

## IV. PROJECT OUTCOME

The hardware design is implemented using an Arduino microcontroller board. The vital sensors were connected to the IOs of the board which senses the physical parameters of the elderly person and sends signal to arduino.

**Figure 9: Implemented Hardware Prototype**

Output of hardware provides real time monitoring of physical health conditions such as the pulse rate, body temperature and stress are displayed in a LCD module.

## V. RESULT AND DISCUSSION

Smart home systems for monitoring the elderly aims to collect real-time information based on the daily activity level of the people monitored and thereby learn to recognize their personal patterns. If these monitored models deviate from the standard models, smart home systems alert caregivers and family members and let them take immediate action.


**Figure 10: Displayed Results of Hardware**

 

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The LCD display will show the rate of heart beats after sensing the pulse, and alert messages will be produce whenever the measured ECG levels vary from the normal ECG levels.

## VI. CONCLUSION

In this system, a heart attack can be recognized using IOT and lives can be saved. This system helps elderly people who have heart problems more often. In addition to the heart rate, this system can also measure blood pressure. Doctors or others are informed of the heart attack using an alert system. Thus this system ensures the safety of the elderly persons by assisting and monitoring their health and also personal safety.

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