



# HBTR Health Monitoring System

Gomathi<sup>1</sup>, Kiruthiga.C<sup>2</sup>, Geetha.S.A<sup>3</sup>, keerthana.S<sup>4</sup>, Durga.G<sup>5</sup>

Associate Professor, Dept. of ECE, SNS College of Engineering, Coimbatore, Tamil Nadu, India<sup>1</sup>

Students IV, Dept. of ECE, SNS College of Engineering, Coimbatore, Tamil Nadu, India<sup>2,3,4,5</sup>

**ABSTRACT:** The article mainly deals with designing a Biometric kit with concept of IOT. By using this single kit we can monitor the Temperature, Heart beat level, Blood pressure and Breathing level of the patient anywhere and at any time. The reason of using IOT feature into medical field is to improve the quality of service. Especially it brings high value for the elderly and those patients who need constant supervision.

**KEYWORDS:** Internet of Things

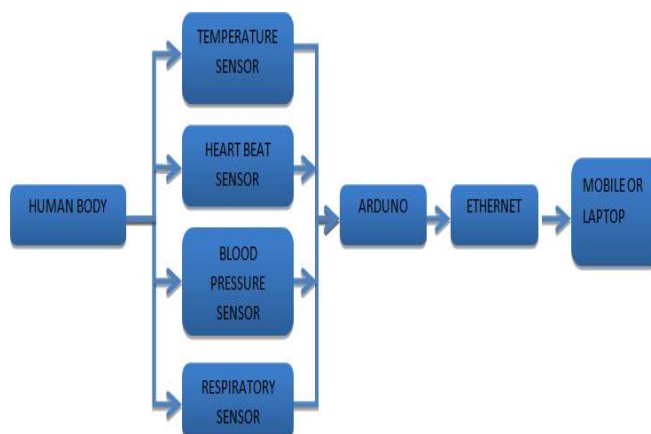
## I. INTRODUCTION

Healthcare is the essential objective to be done within us and also with the surrounding environment. In this project the Sensors along with the Arduino can work accordingly to detect temperature, Blood pressure, Respiration, and Heartbeat of the particular patient and through notification prevalence of disease in the human body can be identified, and the data can be sent to the Cloud in order to perform permanent storage or visualized in real time by sending the data directly to a laptop or Smartphone. iPhone and Android applications have been designed in order to easily view the patient's information.

## II. PROPOSED SYSTEM

In this system input is taken as a pulse from the human body as the analog signal and this is given to the Arduino board. This will convert these signals from analog to digital and the signal is then transferred through Ethernet to the mobile devices or computer. Then the data will be stored. Moreover from these obtained data, mobile applications are created. If there is any abnormal change in the observed data then the information will be sent to the doctors through the application which has been developed.

## III. BLOCK DIAGRAM





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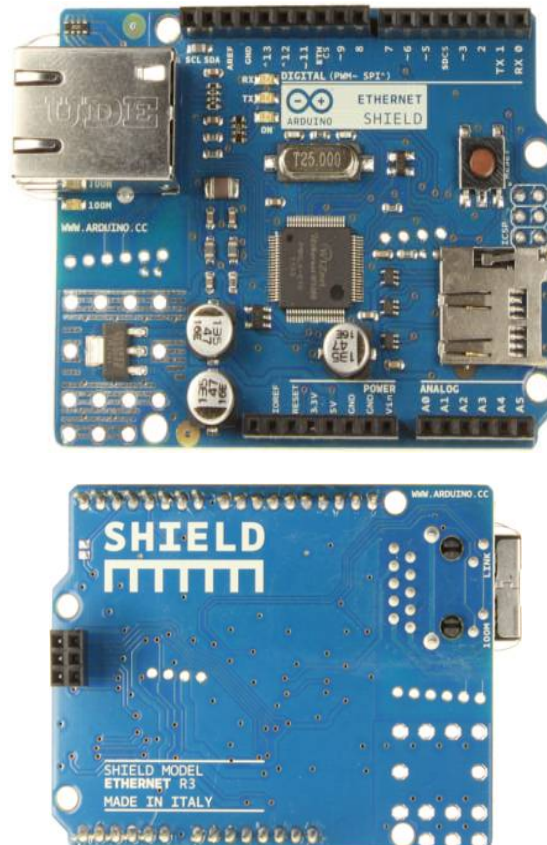
## IV. HARDWARE ARDUINO UNO

Arduino is an fast prototyping tool. It will adapts to the new challenges based on the needs of the user. Arduino boards are used in the development of products based on IOT, 3D printing and other embedded products. It is inexpensive comparing to other microcontrollers. The limitations of other microcontrollers are they mainly support only Windows. But Arduino software runs on Linux operating systems, Macintosh OSX, and Windows.

### ETHERNET SHIELD

To connect Arduino board to internet, the Arduino Ethernet Shield is used which is already assembled. Wiz net W5100 Ethernet chip is the basic of this shield. It provides a network stack (IP) which is capable of both TCP and UDP. And it is also capable of supporting four socket connections simultaneously. To write sketches Ethernet library is used, which will be connected to internet using the shield.

This Ethernet shield will connects your Arduino to the internet in few minutes. All we need to do is to just plug this module to the board and connect it to the network with RJ45 cable. Then follow the instruction to control your world through internet. Hardware, software and documentation of Arduino is freely available and open-source.



### POWER SUPPLY

It is a source of an electrical power. A device which supplies electrical energy to an output load or to a group of loads is called as power supply unit or PSU.

### ANALOG TO DIGITAL CONVERTER

The process of converting continuously variable electronic signal in to digital signal without altering the essential content is known as analog to digital conversion. The input for this converter has various voltage values that



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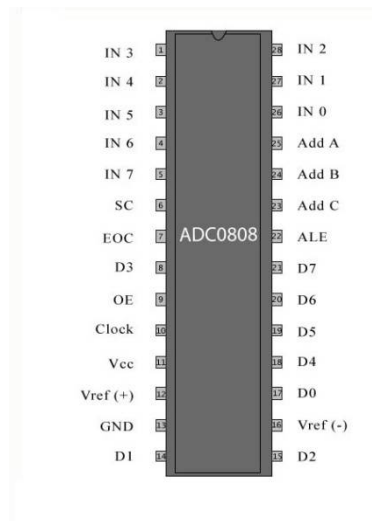
varies among infinite number of theoretical values. The output of analog to digital converter is defined as states or levels. The digital signal has only two states which is called as binary values. The whole numbers can be represented in binary as One's and Zero's.

The efficiency of digital signals propagates more than the analog signals. This is because digital impulses are well-defined and are in orders which are easier to distinguish between noise and the original signal. This is the main advantage of digital communication. The normal telephone modem use ADC to convert the incoming audio signal from a twisted pair line signals. ADC is necessary for the digital signal processing system since the input is an analog signal.

## ADC0808

The ADC0808 and ADC0809 are the data acquisition components which are monolithic CMOS device with an eight bit analog to digital converter microprocessor compatible control logic and an eight channel multiplexer. Successive approximation technique is used in the 8-bit A/D converter. The multiplexer which is used can access any of 8 single ended analog signals.

## PIN DIAGRAM



Latched and decoded multiplexer address inputs and latched TTL Tri-state output provide easy interfacing to the microprocessor. This device eliminates the external zero and full scale adjustment needs.

## BLOOD PRESSURE SENSOR

The pressure exerted by circulating blood upon the walls of blood vessels is termed as Blood pressure. It is also defined as the arterial pressure in the systematic circulation. It is expressed in terms of millimetres of mercury (mm Hg). Along with heart rate, body temperature, oxygen saturation and respiratory rate it is one of the vital signs. Normally blood pressure in an adult is 120/80 mm Hg (approximately).

Depending upon the situation, activity and disease states blood pressure varies. It is regulated by endocrine and nervous system. There are two states of blood pressure namely hypotension and hypertension. When the pressure level is low due to disease state is known as hypotension. When the pressure constantly increases then it is referred as hypertension. The risk factor for many diseases such as kidney failure heart disease, and stroke is long term hypertension. Both have many causes which can range from mild to severe. Both may be of sudden onset or of long duration. In western countries long term hypertension is more common as compared to long term hypotension. Because of absence of symptoms and infrequent monitoring Long term hypertension is often undetected.

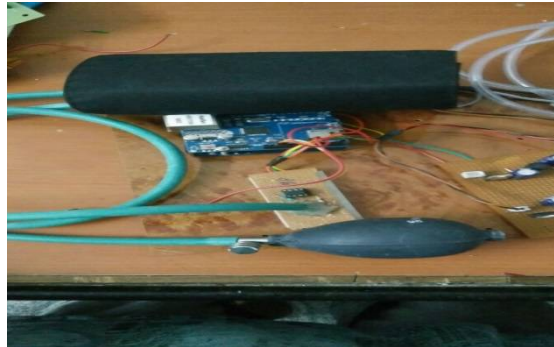


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## SYSTEMATIC ARTERIAL PRESSURE Classification of blood pressure for adults:

The table given here shows the various classification of blood pressure for adults.

CATEGORY	SYSTOLIC, mm Hg	DIASTOLIC MM Hg
Hypertension	<90	<60
Desired	90-119	60-79
Prehypertension	120-139	80-89
Stage 1 hypertension	140-159	90-99
Stage 2 hypertension	160-179	100-109
Hypertensive emergency	>180	>110
Isolated systolic hypertension	>140	<90

## HEART BEAT SENSOR

The digital output of the heart beat can be obtained by this sensor by placing a finger on it. The beat LED flashes in unison with each heart beat when the detector is working. The basic principle of this detector is the light modulation by blood flowing through the finger at each pulse. The output is measured by connecting the detector directly to the microcontroller. The unit of this detector is Beats Per Minute (BPM) rate

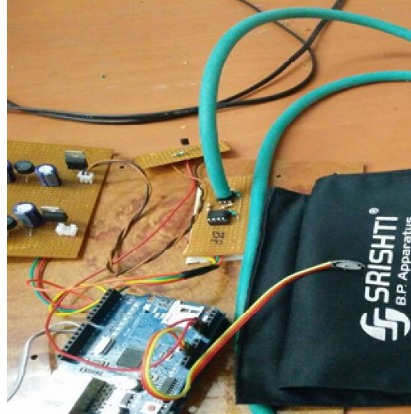


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## FEATURES

- DC voltage +5V
- Compact size
- LED indication
- SMD design
- Instant output can be obtained

## TEMPERATURE SENSOR

The most measuring variable in industrial automation is the temperature. It is used to convert temperature into an electrical value. These sensors are the key to read the temperature correctly and used to control it in industrial applications. The different properties of this sensor varies according to the contact way, temperature range, sensing element and the calibrating method. In this sensor sensing elements are enclosed with the help of plastic or metal. By using conditioning circuits this sensor is used to reflect the change in the environmental temperature.

In this paper LM34 series of temperature sensor is used to read the temperature of human body. This is an integrated circuit whose output is voltage is linearly proportional to the Fahrenheit temperature. Thus it has an advantage over linear temperature sensors calibrated in degrees kelvin as the user is not required to subtract a large constant voltage from its output to obtain convenient Fahrenheit scaling. LM34 does not need any external calibration.

## DESCRIPTION OF TEMPERATURE SENSOR FUNCTIONAL MODULE

The functional module consists of two parts: the probe head and the functional module box. the LM34 temperature sensor is mounted on the probe head . To get the output voltage which is proportional to the centigrade temperature we can use LM35 instead of LM34.

## RESPIRATION SENSOR

This is the sensor which is used to sense the value of respiration in the human body. We can read the ECG value with the help of this sensor.



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## V. CONCLUSION

By using this HBTR health monitoring system we can get the values of heart beat rate, respiration rate, temperature and blood pressure of a patient. All this can be done only with this one kit. The final values are transferred to the laptops or mobile through LAN. These reading can also be transferred to the doctor for the verification of the body condition. And the kit is portable and it can be used anywhere.

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