

## *Design and Enactment of Heart Attack deduction using IoT Measuring Device*

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**Abstract:** These days we've an enhanced range of heart diseases together with enhanced risk of heart attacks. We all heard and observed that heart attack can kill your life in 3 attempts but now days because of heavy stress it could be in first attempt also. If conscious about our health regularly on regular basis then we can detect so many different diseases by detecting them previously, and Co2 would be also varies in the heart attack situation, so in this paper carbon dioxide analyses and identified the intense of CO2 in different level of activities. Life is precious. In this era many people lose their life to coronary failure. Heart attack detection is not easy task. In today's world heart attack is more common, In order to overcome the situation and to reduce the death rate due to heart attack, this system is used and mainly it will useful for the society. In this system we have a tendency to area unit implementing a heartbeat observance and coronary failure detection system exploitation the Internet of Things. In this sensor the operator can fix the low as well as higher level heart beat, where the system monitor the beat and send those data to the internet, in case if the heart beat level go beyond the ;low rate which is set by the user, the alert will be given so that immediate action can be taken. One is that the transmittal circuit that is with patient and therefore the different is that the receiver circuits that is being supervised by the doctor or nurse. The main motive of the system which will take the heart beat rate and those data will be get displayed on the digitalized Monitoring screen.

### **1. Introduction**

Heart is one of the primary organ in the human body. It performances as a pump for circulating oxygen and blood all over the body, thus keeping the functionality of the body together. This system would detect pulse, temperature frequently the constraints of the threshold can be set with this sensor. [1]. If these constraints cross the maximum limit, system sends cautioning on server through WiFi.

Now a day's technology plays the vital roles in our daily life. The volatile growth of electronic devices, tablet and smart phones which can be linked physically or wirelessly has become the major tool of day-to-day life. IoT assumptions are going through very quick pace [10]. IoT is very wide topic with its applications from across various industrial verticals.

IOT is a physical object where the data can be retrieved over the net. Here the IOT device is assigned with an IP address, which will help to gather and transmission a data through the net for the ease access. [1]. The entrenched technology within the objects helps them to move with inner states or the exterior surroundings, which in turn affects the decision taken [7].

IoT realm where all the devices and machines are linked to a web and are used collaboratively to achieve multipart tasks the require a high degree of intelligence, and IoT is a communication between the physical and digital words using sensors and actuators. With the help of the device, the pulse rate and the temperature can be gathered, by frequently observes the pulse rate and the temperature surrounded, the same will be updated in an IoT device.[8]





**Figure-1** Internet of Things

The data can be collected from the IoT device with the assistance of the items, that are embedded with software, sensors, actuators electronic and web connectivity.

The objects resides in IoT which will be sensed and measured tenuously over the network. This will help to give the direct communication with the physical world through computerised system and results in enhanced efficiency, accuracy and profitable benefit.

## **2.Elevated Carbon Dioxide Impairs Heart Beat Rate**

The heart is a four-chambered organ with four main vessels, which either bring blood to or carry blood away from the heart. The four chambers of the heart are the right atrium, the right ventricle, the left atrium, and the left ventricle.

The great vessels of the hearts embrace the superior and inferior vena that bring blood from the body to the proper atrium, the arterial pulmonic is that transports blood from the proper ventricle to the lungs. The last of the good vessels is that the artery, the body's largest artery, that transports oxygen-rich blood from the ventricle to the remainder of the body.

When we inhale the fresh air entering the lungs carrying oxygen to heart and dissolve into  $PO_2$  in the alveolus is 104mmHg and the blood then travels to the lungs, wherever it receives chemical element. Next, it drains out of the lungs via the pulmonic veins, carbon dioxide is  $PCO_2$  in the alveolus is 40mmHg continuously releasing from body, it is called expired air. When it would be in lungs  $PO_2$  and  $PCO_2$  respectively 104mmHg and 40mmHg, could be measured in mmHg stands for millimetres of Mercury. When  $PO_2$  entered to the Arterial side the value would be changed  $PO_2$  in blood is 40mmHg, and  $PCO_2$  in blood is 45mmHg. When the carbon dioxide defused from body the blood  $PCO_2$  is value 45 mmHg. In the same way the venous side of  $PCO_2$  is value is 40 mmHg.  $PCO_2$  release from the tissue fluid and cells the value is 44 mmHg from tissue fluid and 46 mmHg from the cells. So the  $PO_2$  and  $PCO_2$  is simultaneously activity in our body. Carbon dioxide also important and play vital role in our body. If elevated  $PCO_2$  impairs Heart beat rate.

The average human exhales relating to 2.3 pounds of  $PCO_2$  on a median day. The precise quantity depends on your activity level—a person engaged in vigorous exercise produces up to eight times the maximum amount  $PCO_2$  as his inactive brethren. [2]

$PCO_2$  exhalation has usually been applied and could be a well-established investigational model of human dread. The dread signs may well be triggered to completely different extents, betting on the concentration of  $PCO_2$  used.  $PCO_2$  concentrations from four dimensional to sixty fifth and inhalation length from fifteen to twenty min were employed in these studies.[5,6]

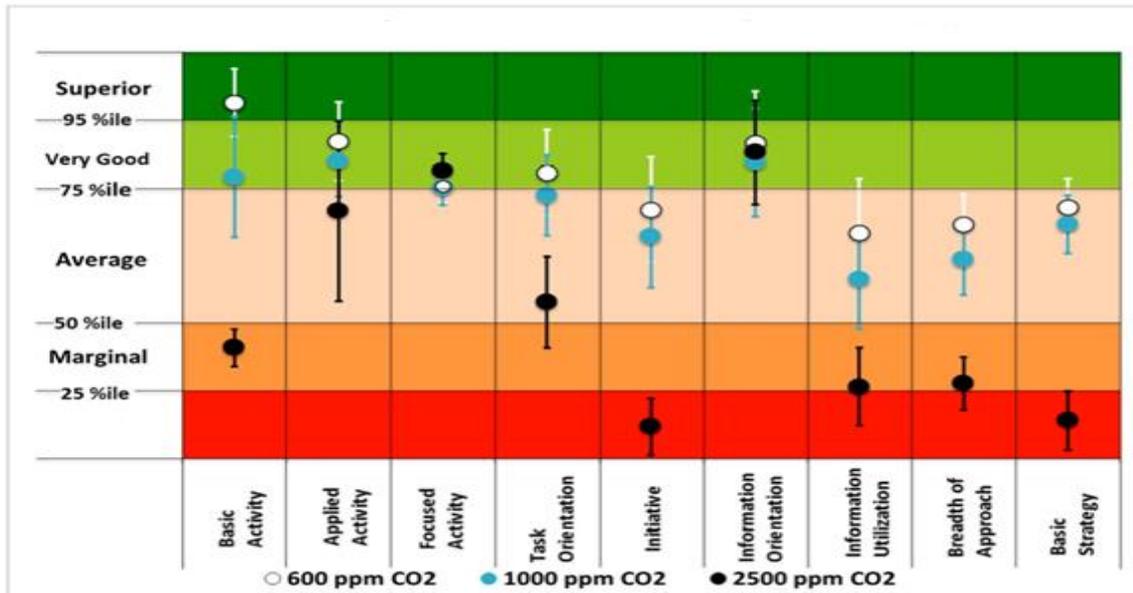


Figure-2 Heart beat zone

The utmost values of pulse throughout high intensity exercise (HI) were considerably over those throughout low intensity exercise ( $P < 0.05$ ) throughout high and low intensity exercise at 3800 altitude (HA) and 3800m altitude with twenty fifth  $PO_2$  and 5.0%  $PCO_2$  most values of pulse throughout 2 intensity exercises were considerably over those at same section. When there's exposure to terribly high level of  $PCO_2$ , in fare than 50,000ppm the body's antagonistic mechanisms will become weak, and also the essential nervous system functions are unit depressed, so fail death presently follows. Elevate  $PCO_2$  impairs heart beat rate is critical. Hyperventilation will cause insufficient  $PCO_2$  and end in pathology and it affects the heart beat rate.

### 3. Proposed System

The below figure depicts the architecture of the system and flow of the work.

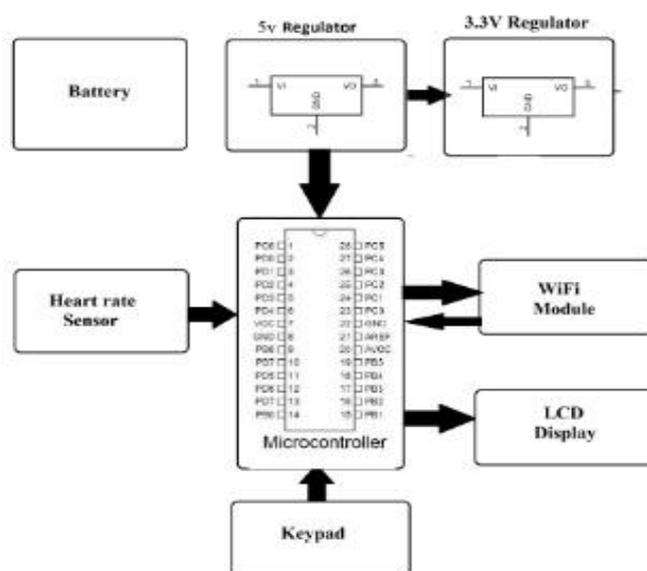
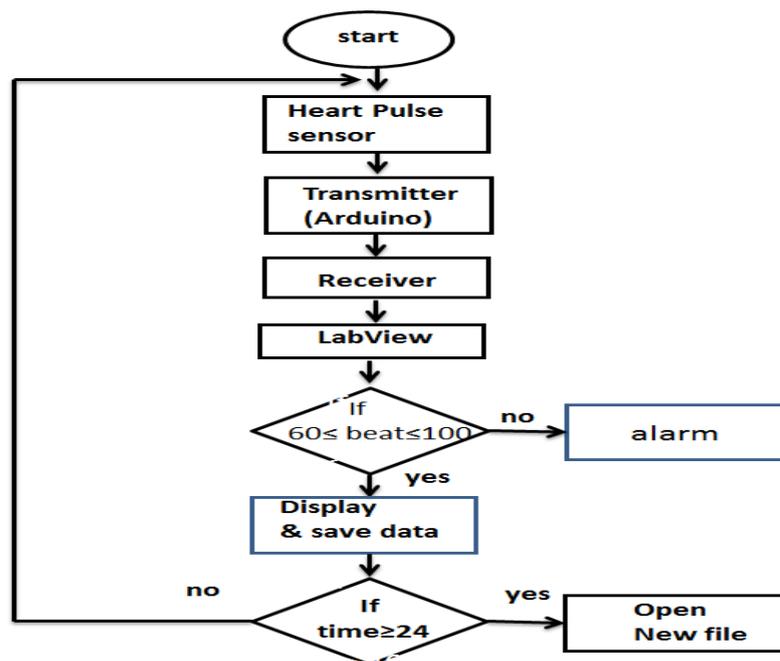


Figure-3 Block Diagram of Planned system



**Figure-4** Flow of Planned System

#### 4. Working Methodology

In this methodology two circuits have been used, they are.

1. Transmitting circuit
2. Receiver circuit

The heart beat sensor, the present level of the heart beat can be identified which is displayed on the digitalized monitoring screen.

The transmitting circuit includes automatic voltage regulator (AVR) microcontroller interfaced to digitalized monitoring screen and the circuit is powered by 12V transformer the microcontroller AVR and radio frequency of the receiver which also have a 12 voltage transformer, is included in this receiving circuit. In the receiver circuits LED light and buzzer will be used, in case during the monitoring of the heartbeat, if the level of heart beat has not reside within the regular level means, the LED light and buzzers will give the alert, by blinking the light and giving the buzzer sound [1]. This system has become universal use in every hospital rooms, where the operator can seated in a single place and can monitor all the patient's heart beat level.

Through the transmission to the light reliant resistor, the light is measured through the ear, by blinking of the light lobe. The heart rate sensor is gathered by LM358 Op-AMP and the pulse of the heart rate is deliberated by the heart beat level which is based on the movement of blood to fingertip. The light start emitting when the structure motorised on IR Tx towards blood cells with 100% intensity. Once the light start emitting after that the light reflects back to Rx with 100% -x from it, in this the value of x is our heart beat rate. The data that is gathered through this will be sent to the server room, so that in case of emergency fast action can be taken [9]. The function of the heart can be studied with this heart beat sensor, with the support of this heart beat sensor where one can measure the heart beat and also heart rate level can be recorded for the later study. With each heart beats the digitalized monitoring light flashes for each unit depending on the heartbeat. The digital format of the output is connected directly to the microcontroller to compute the beat in the form of beats per minute (BPM). All the data gathered can be displayed in the LCD, and simultaneously these information is moved to the control room. This

system is implemented as a universal in all hospitals so that the person can sit in one place and monitor all the patients [9].

## 5. Components Required

### 5.1 Heart Beat sensor



Figure-5 Heart beat sensor

The usual heart beat level is 78bpm, where the pulse rate of the heart beat level is measured with the help of the heart beat sensor, where the output will be in the digital format. By using this sensor, will get a direct output digital signals, where in order to calculate the temperature of the human body LM35 sensor is used. The output voltage of the device LM35-series is linearly relative to the centigrade temperature the light intensity reflected it depends upon the blood [4].

### 5.2 Pressure Sensor



Figure-6 pressure Sensor

In order to calculate the systolic and diastolic pressure level, the pressure sensor is used. The pressure of the blood is fluctuate in every minute and it can be measured in millimetre mercury (mmHg) , with the assistance of this pressure sensor.

### 5.3 Wifi Module



Figure-7 Wemos D1 mini - miniature NodeMCU

The Wemos D1 mini is a very popular enabled microcontroller , which requires a constant power supply and erudite programming method. It is skilled for accommodating an application or divesting all Wifi network functions grom other application processor.[2]

## 6. Advantages

Handy system save threat of heart bout as you can check it in home· Practical system· Temperature and Heart beat monitoring by solitary device· All Patient supervised by person who reside in the server room. This system also assistances for home and hospital monitoring system.

## 7. Conclusions

In this era heart attack is common alarm to everyone. Has technology is improving and detecting many medical issues. So in this system which assistance to detect and display heartbeat rate of IoT sensing even though the person in the house. This system also aids for hospital observing , all patient observed by person in server room. This system that helps to live blood heat, heartbeat, pulses of person. We will make this system for animals so we can save them. If this technology can developed then we are able to discover heart blockage through this technology by our project.

## Reference

- [1] Gowrishankar S, IoT based Heart Attack Detection, Heart Rate and Temperature Monitor, international Journal of Computer Applications (0975 – 8887) Volume 170 – No.5, July 2017
- [2] <https://newscenter.lbl.gov/2012/10/17/elevated-indoor-carbon-dioxide-impairs-decision-making-performance/>
- [3] <https://nettigo.eu/products/wemos-d1-mini-v2-wifi-module>
- [4] Mayuresh Yeole, Design And Implementation Of Wireless Heartbeat Measuring Device For Remote Health Monitoring, VJER-Vishwakarma Journal of Engineering Research www.vjer.in Volume 1 Issue 2, June 2017 ISSN: 2456-8465
- [5] Bailey J.E., Argyropoulos S.V., Kendrick A.H., Nutt D.J. Behavioral and cardiovascular effects of 7.5% CO<sub>2</sub> in human volunteers. *Depress. Anxiety.* 2005;21:18–25.doi: 10.1002/da.20048.
- [6] Jayant Shekhar, Temperature and Heart Attack Detection using IOT( Arduino and ThingSpeak,research gate, DOI: 10.30534/ijacst/2018/017112018
- [7] Dr.A.A.Gurjar, Heart Attack Detection By Heartbeat Sensing using Internet Of Things:IoT, International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056 Volume: 05 Issue: 03 | Mar-2018 www.irjet.net p-ISSN: 2395-0072.
- [8] B.Priyadharshini, Heart Rate Monitoring System based on IOT IOSR Journal of Engineering (IOSR JEN) www.iosrjen.org ISSN (e): 2250-3021, ISSN (p): 2278-8719 PP 41-48
- [9] <https://www.youtube.com/watch?v=dMeG75wqsRc>
- [10] <https://medlineplus.gov/ency/anatomyvideos/000067.htm>