

# Real Time Health Monitoring System.

PROJECT SYNOPSIS  
OF MAJOR PROJECT



Department of Computer Application

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## Introduction

In emergency situation, the patient monitoring system plays the vital role to maintain the patient's vital signs. The increased use of electronics and mobile technologies makes it easy to monitor and manage the patients remotely by using Internet Of things (IOT). With the increasing number of things on the internet, the concept of providing integrated services as a result of communication amongst heterogeneous networks is gaining momentum. Internet of Health (IoH) is a byproduct of all those efforts. Health experts are benefiting from the technology and embedding it with health monitoring systems to manage the patients remotely. Patient health monitoring by using IoT along with smart sensor system enables the health expert to monitor the patient from office, home or anywhere from this globe. Wireless Sensor Network (WSN's) are very promising for monitoring extraordinarily diverse environments. The use of WSN consists of wireless nodes that are able to sense some physical information, process and transfer to the destination by wireless ad-hoc networks. Sensor nodes can be strategically placed on the human body to create a cluster that is called wireless body area network (WBAN) that can be used to collect patient's vital signs. The sensor nodes can be embedded in living area or carried by the person for the purpose of the collecting information about the physiological, personal and behavioral states and patterns in real time situation. This proposed system consists of low cost components that are capable of processing sensed data which is BP, Temperature, Heartbeat and the proposed system is capable to transmit the data to the concerned sources. The proposed system is capable to provide the solution to encounter the existing problems and issue the alert regarding wear heart related problem. The system is capable of working independently and the patient can be monitored remotely without effecting the routine life.

## Technologies and Hardware Used

- Internet of Things.
- Sensors.
- Bluetooth Connectivity.
- Sensors.
- GPS and GSM.
- Embedded System.

## **Features Included**

- Wireless monitoring of a person's health condition.
- Emergency messages and alert messages when in danger.

There is a very wide scope for its improvements and the addition of many new features with the span of time and with advancement of technologies.

## **Rationale**

Health Monitoring can be used in:

- Saving a person's life in emergency.
- Reducing effort and time
- In improving the safety of a person.
- Can be of immense help to the people having heart issues.

## **Applications**

- Manages the health history of a person.
- Sends emergency messages or calls an ambulance to the location traced by the GPS.
- Eliminate the need to walk to the hospital for routine checkups.
- The expertise can also monitor a patient's health while staying away from the patient.

## **Objective**

The aim of this project is to provide people with proper records of that person's health and a convenient way to provide emergency measures.

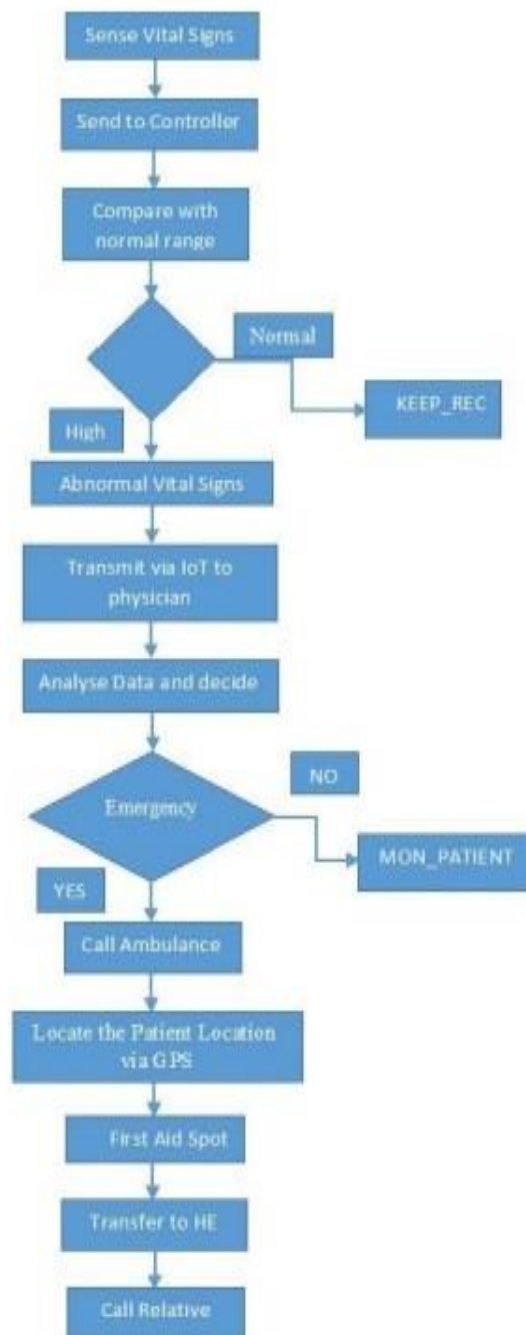
## **Key Features**

- Emergency message or call pop ups.
- Records of daily heart rate, BP, etc.
- Monitoring of patient's health
- Distance monitoring of the patient's health.

## Literature Review

wireless sensor networks (WSN's) and Internet of Things (IoT) have strongly emerged in the medical field for healthcare of the patient for data collection regarding the physical, psychological, cognitive and behavioral processes for monitoring purposes. During the literature review, we studied and representing some applications in the healthcare field T. J. Hodgetts and K. Mackaway-Jones and G. Super, S. Groth, and R. Hook application are directed towards Monitoring in mass-casualty disasters; while triage protocols for emergency medical services already exist [8], [9], their effectiveness can quickly degrade with increasing number of victims. However, there is a need to improve the assessment of the first responders' health status during such mass-casualty disasters. In the figure below it shows how the proposed system will work, and it takes all the vitals and processed the information and send it to the emergency services to initiate the alert. It is very difficult to monitor and treat the following diseases such as asthma, diabetes, high blood pressure, congestive heart failure, chronic obstructive pulmonary disease, and memory decline. These diseases can benefit from patients taking an active role in the monitoring process. The sensor nodes can be embedded in living area or carried by the person for the purpose of collecting information about the physiological, personal, and behavioral states and patterns in real time situations. The authors of [3, 4, and 5] adopted PPG in their design. The researchers [4, 10] presented their idea of a device under development to monitor the cardiovascular status of patients. It is used to monitor the cardiovascular status of patients. Body area and communication network [10] It stores all recorded physiological signals (PPG photoplethysmography) for medical post-processing. They also suggested that the family doctor may be notified by a text message sent automatically to the case of the critical value of the parameter measured occurs. However, no other results of this research will be presented. A practical system for monitoring heart rate, he does not use the auto-counting of blood signal pulse is generated. The sensor output is viewed by the number of hours of counting the counter display using the 7-segment display. An updated result in counter display for reading it every two seconds.

The proposed algorithm constantly monitors body parameters e.g. heartbeat, temperature and blood pressure and compares it against a predetermined value set. If measured values are higher than the described limit then the system automatically sends the alert the doctor by using Internet of Things (IoT). In such a case the patient gets very quick medical help and also saves time getting first aid as required. In the proposed algorithm the heart patient is considered as the highest priority for data comparison and analysis. The heart patient who has the medical history like they have heart attack before, the system detect heart health based on the current and previous data, after data analysis the system automatically call the emergency service and the affected person will be rescued before some medical condition. The rescue services provided him the first aid on the spot before transferring to hospital for further treatment. The proposed system automatically transmits the data to the base by using Internet of Things (IoT), where experts will take decisions. The proposed system enables medical professionals to monitor and manage patients remotely by using various technological devices along with Internet of Things (IoT). In the figure below the proposed algorithm is given.



## DATA FLOW DIAGRAM

## Proposed System Modules:

Following modules are the key part of the proposed system to monitoring and manage the patient

### a) Blood Pressure Sensor:

Blood pressure sensor unit is used to measure the arterial blood pressure flowing through the blood vessels against the walls of the arteries. The pressure signals are measured produced by the interaction between the cuff and the blood flow over the brachial artery. Blood pressure depends on the flow of the blood, if the is normal flow, then blood pressure is normal (120/80), but if there is problem in the blood flow the pressure goes up. If high blood pressure goes undetected, the person is at risk of severe medical problems. Figure below shows the blood pressure category.

Blood Pressure Category	Systolic mm Hg (upper #)		Diastolic mm Hg (lower #)
Normal	less than 120	and	less than 80
Prehypertension	120 – 139	or	80 – 89
High Blood Pressure (Hypertension) Stage 1	140 – 159	or	90 – 99
High Blood Pressure (Hypertension) Stage 2	160 or higher	or	100 or higher
Hypertensive Crisis (Emergency care needed)	Higher than 180	or	Higher than 110

### b) Temperature Sensor

This unit measures the temperature of a patient and it is also known as analog temperature sensor. The output voltage is linearly proportional to the temperature in Celsius and to measure the body temperature solid state technology is used. If the temperature increases mean voltage also increases.

The analog signal is generated due to the change of voltage that is directly proportional to temperature.

### c) Heartbeat Rate

A sensor unit is integrated in wrist band, and it is wearied by patient in left wrist and it measures the heartbeat by using the defined interval and send it to the central unit where it is processed. At central unit it is saved and compared with the standard and previous measurement, if it finds any abnormality in the heartbeat then it reported to concerned system and issues an alert.

## Resting Heart Rate Chart

**Men (beats per minute)**

Age	18 - 25	26 - 35	36 - 45	46 - 55	56 - 65	65 +
Athlete	49 - 55	49 - 54	50 - 56	50 - 57	51 - 56	50 - 55
Excellent	56 - 61	55 - 61	57 - 62	58 - 63	57 - 61	56 - 61
Great	62 - 65	62 - 65	63 - 66	64 - 67	62 - 67	62 - 65
Good	66 - 69	66 - 70	67 - 70	68 - 71	68 - 71	66 - 69
Average	70 - 73	71 - 74	71 - 75	72 - 76	72 - 75	70 - 73
Below Average	74 - 81	75 - 81	76 - 82	77 - 83	76 - 81	74 - 79
Poor	82 +	82 +	83 +	84 +	82 +	80 +

**Women (beats per minute)**

Age	18 - 25	26 - 35	36 - 45	46 - 55	56 - 65	65 +
Athlete	54 - 60	54 - 59	54 - 59	54 - 60	54 - 59	54 - 59
Excellent	61 - 65	60 - 64	60 - 64	61 - 65	60 - 64	60 - 64
Great	66 - 69	65 - 68	65 - 69	66 - 69	65 - 68	65 - 68
Good	70 - 73	69 - 72	70 - 73	70 - 73	69 - 73	69 - 72
Average	74 - 78	73 - 76	74 - 78	74 - 77	74 - 77	73 - 76
Below Average	79 - 84	77 - 82	79 - 84	78 - 83	78 - 83	77 - 84
Poor	85 +	83 +	85 +	84 +	84 +	85 +

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#### **d) GPS Module**

The Global Positioning System (GPS) module is a satellitenavigation system that can be used to locate positions anywhere on the globe. Designed and implemented by theDefense Department of the United States, which includes satellites, control and monitoring stations and receivers.

GPS receivers receive training transmitted by satellites and use triangulation to calculate the user's exact GPS location. This unit is very important to rescue the patient, by using the GPS, rescue services easily locate the affected person.

#### **Facilities required for proposed work.**

##### **Software Used**

- Arduino Programming using C in Arduino IDE.

##### **Hardware Used**

- Sensors
- Arduino Board
- A smart phone or Laptop.

##### **Expected Outcomes**

This work addresses the issue of rescuing a patient. in case of emergency along with tracking and monitoring the patient in emergency situation to provide the necessary medical treatment and transfer to the hospital.

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