

# DOCTOR'S COMPACT KIT USING IoT

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**Abstract:-** In India medical facilities are poorly available at rural areas, people are suffering to get the basic medical facilities on time. Most of the times, doctors are visiting patients at their home due to the lack of clinics and hospitals. To provide the ease to visiting doctors we propose a compact doctors kit. This smart kit will include the basic medical instruments required to measure body temperature, heart rate and ECG. This IOT based kit can allow to store all these readings digitally. Further these data can be used to generate patients report and can be sent to the specialist Doctor for the further opinion.

**Keywords:** *Arduino UNO, Heart rate Sensor, Temperature Sensor, ECG Sensor*

**Keywords –** *Aluminium, FSW- Friction stir welding.*

## I INTRODUCTION

In today's life internet of things is widely used technology. Internet of Things is the concept of connecting any device to the Internet. IOT is collection of embedded device, sensors, actuators, and network connectivity. The exchange of data through internet is possible in internet of things. IOT reduce human effort in day to day life. There are so many areas where internet of things is used like agriculture, smart cities, smart cars, home applications, healthcare, etc. Healthcare is one of the main application area of internet of things. Now a day's health related problems are increase day by day. Using some new technology and internet of things India is developed digitally. But there are some rural areas which are not developed. The peoples in rural area faced so many problems. Health is one of the major problem which they are facing. In rural area of India, where the hospitals are not available and if it is available then the hospitals do not have doctors or medical staff, do not have the proper equipment's, do not have lab technicians because of that people are facing so many problems related to the health. People also might not want to travel long distances to get routine checkups.

Because of that it can be hard to get the basic medical facilities in rural residents.

So to get the basic medical facilities to the rural areas people we are designed a doctor's compact kit. This smart kit includes the temperature sensor, heart rate sensor, ECG sensor. With the help of that kit doctor can check the patients at their home, So that patients do not need to travel long distance to get the routine checkups. The main aim of designing this kit is to provide the basic medical facilities on time. This system is lightweight and portable. Also this smart kit provides the facility to view the patients' previous data. This smart kit provide the efficient health service at patients home instead of expensive hospitals and clinics. This kit plays an important role in IOT which reduce the difficulties faced by patients. With the help of doctor's compact kit routine checking is done easily.

In this proposed system the parameters such as Temperature, ECG and Heart beat readings which are monitored using Arduino UNO. Here patients Body Temperature, ECG and Heart Rate is measured with the help of sensors and it can be seen in the android application and HDMI display. This compact kit is lightweight so the doctors can check the patients at anytime and anywhere.

## II LITERATURE REVIEW

To check the heartbeat, temperature, pressure and ECG regularly at home following systems are developed. We have done literature survey of the following papers. They are as follows

In [1] Ananda Mohon Ghosh proposed Remote health monitoring system through IoT. In this patient health is monitored with the help of e-Health Sensor, Arduino, Phidgets Sensors. It is useful in home healthcare monitoring system. With the help of this guardians and doctors can check the condition of the

patient's health. In this disabled patient health is also monitored. The system can measure 9 types of data with the help of e-Health Sensor.

Limitation of this is there is no message is sent to the doctor in case of emergency.

In [2] Shivam Gupta proposed a IoT based Patient Health Monitoring System for analyzing patient health using heartbeat and temperature sensor with the help of wifi module. In this the alert message is sent in critical condition to the patient only. With the help of this real time information is send to the users and also the alert message is send to the doctor if the user readings are critical. With the help of this many lives can be saved.

In [3] Sarfaraz Khan proposed a Health care monitoring system in Internet of Things (IoT) by using RFID for analysing the patient health. In this Raspberry Pi and RFID tags are used for measuring the weight of the patient. In this RFID senses the parameter and send it to mobile device. It used for to show weight using machine (scales) it is a machine that can be easily handle and shows the correct weighing of patient.

It does not provide medication and precautions according to condition of patient.

In [4] Himadri Nath Saha proposed Health monitoring using Internet of Things (IoT). In this patient pulse rate, pressure and temperature is measured. In this the system only mechanically alert the patient and shows the live readings over the internet. It is used to keep track of patient's pulse rate, eco rate of heart, pressure level rate, temperature. If system detects any abrupt changes in patient heartbeat or temperature, the system mechanically alerts the user.

In [5] R. Kumar proposed An IoT based patient monitoring system using raspberry Pi for reducing the human error. In this respiration sensor, accelerometer sensor and heartbeat sensor is used to monitor the patient. In this amplifier is used for transmitting the signals. It sends the patients' health data on the web database. So that patient can check the data anywhere and anytime.

In [6] JuGao proposed ECG feature detection using randomly compressed samples for stable HRV analysis over low rate links. In this Electrocardiogram (ECG), Heart Rate, Python-II, Raspberry pi is used. It is developed for identifying the type of abnormalities. In this results are presented using MATLAB and Raspberry Pi. It has been identified using heart rate abnormalities and ECG analysis. Authors carried out work on tachycardia and bradycardia which is the heart beat abnormalities. MATLAB is used for development and implementation of algorithm. It happens due to the flow of oxygen and blood to vital body organs too fast in tachycardia and too slow in bradycardia.

In [7] MendrelaBiswas proposed Raspberry Pi Based Patient Monitoring System using Wireless Sensor Nodes. In this patient data is sent wirelessly using RF transmitter module and GUI is created to display patient data on monitor. ADC0809 is used to convert the analog signal into digital signal. RF transmitter, the data is sent wirelessly to the monitor screen of the doctor. So, the doctor can visualize the patient's data just by sitting in his cabin. When a critical condition occurs, the visual indications will be sent onto the screen.

In [8] RashimaMahajan proposed Identification of Heart Beat Abnormality using Heart Rate and Power Spectral Analysis of ECG. In this Power spectral analysis using the fast Fourier transform (FFT) is performed to detect and characterize strength of variations in ECG with respect to frequency. Power Spectrum is used for identifying the heart beat abnormalities. MATLAB is used to display the accurate result and to analyze the heart rate variations.

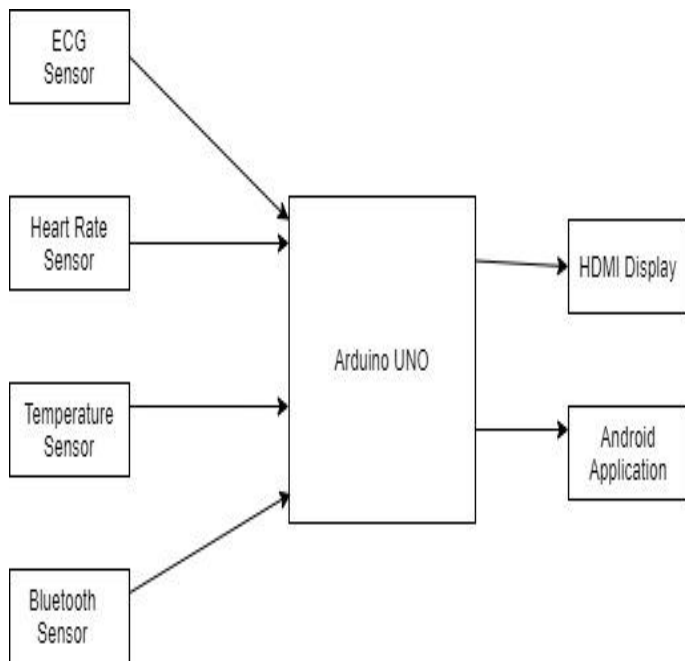
In [9] V.G.Girhepunje proposed Realization of Low Power Telemedicine System to Monitor Temperature and Heart Beats. In this low cost, less complex and real time ECG monitoring system is developed for checking the patient.

### III PROPOSED SYSTEM

The aim of this system is to provide medical facilities in rural areas. To provide the proper

diagnosis and give the proper treatment to rural areas patient. This system is easy to carry and doctors can take it anywhere. This system is cost effective, easy to maintain. The system consists of Heart rate sensor, ECG sensor, LM35 temperature sensor and android application for displaying the result of the patient.

#### IV SYSTEM ARCHITECTURE



**Figure 1. System Architecture**

#### ARDUINO UNO

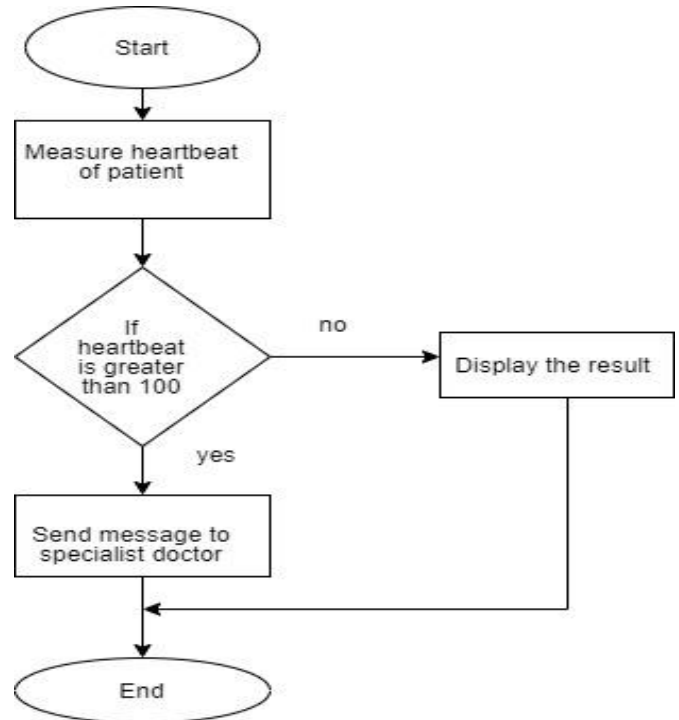
The microcontroller Atmega 328 is the main part of the arduino uno. It has total 13 digital pins which is used for display the output. Analog pins are used for sensor connectivity or sensors interfacing. This pins are used as input pins. The USB port of arduino is used to upload the program. It requires 5V power supply.

#### HEART RATE SENSOR

Heart rate sensor measure the heart rate in beats per minute. It is placed on the finger of the patients. Heart beat is the sound of valves of human heart. It is the rhythmic beating of the cells present in the heart. To measure the heart rate of the patient it is used. This sensor has 3 pins GND, VCC, output or

signal pin. The heart rate sensor works on photoplethysmography principle. According to that principle the change of volume of blood in an organ is measured by the change in the intensity of light passing in that organ.

The normal range of heart rate for adults is 60-100 beats per minute while the range of old person's heart rate is between 54-91 beat per minute.



**Figure 2. Flow chart of heart rate sensor**

#### ECG SENSOR

ECG is electrocardiogram which is collection of electrical signals generated by the heart. ECG sensor records the electrical activity of the heart. ECG sensor is used to take the readings of the human heart and it will records the activity generated by the heart muscles with the help of the graph. It displays the reading in the form of the graph. ECG is placed on the chest of the patient and it has 4 electrodes. RA=right arm, LA=left arm, RL=right leg, LL=left leg. It requires 3.5V power supply. ECG sensor has total 9 pins out of that we are use only 4 or 5 pins. With the help of this the result are displayed in the form of graph. It consists of 3 waves. First is 'P' wave, second is 'QRS' wave and third is 'T' wave.

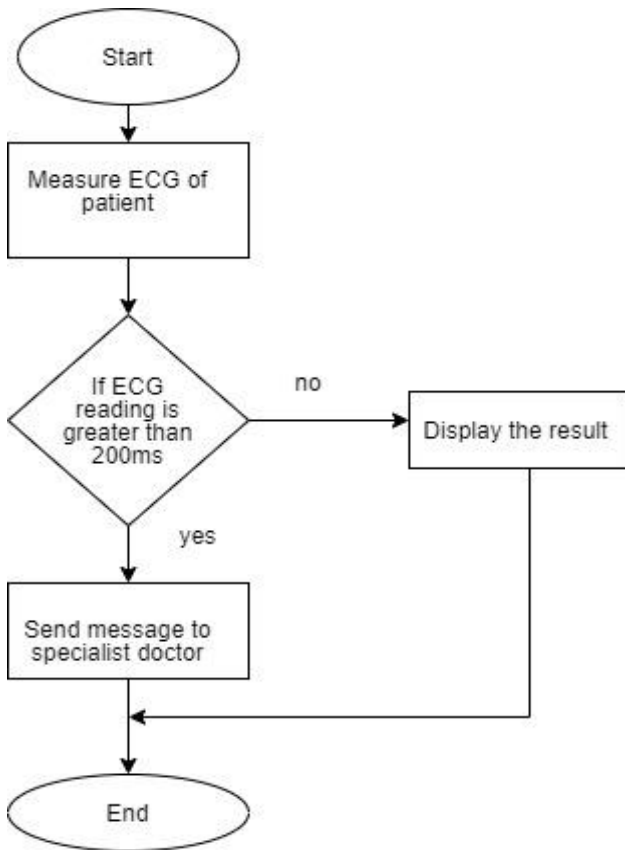
### VI FUTURE WORK

Further we can train this system using Machine Learning algorithm to get proper result within less time.

We can implement the System using the Raspberry Pi also.

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**Figure 3 Flowchart of ECG sensor**

### TEMPERATURE SENSOR

Temperature sensor measure the temperature. There are different types of temperature. The most common frequently used is thermometer. The LM35 is most commonly used temperature sensor. LM 35 measures the temperature more accurate than the thermister.

Temperature sensor is used to check the patient body temperature whether it is normal or not.

The normal body temperature range is between 97F (36 degree C) to 99F (37 degree C). If the temperature is above from 100F (38 degree C) then it means the patient has fever.

### V. CONCLUSION

With the help of compact kit we provide the medical facilities in rural areas, so that people are not suffering to get the basic medical facilities solution. Doctor can check the patient anywhere with this help of the kit.

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