

Patient Health Monitoring System using IoT

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Abstract: Medical Infrastructure using technologies effectively increase the rate of success of treatment given to the patient. At present world is facing lot of tensions in regards to providing the medical facilities to the patients with the increase in number of diseases. So the use of technologies help doctors & health care system to do its job with much more ease in treating the patients. In this work we are facilitating with the solution for this problem of monitoring the health condition of sick person with the usage of wireless monitoring system. The crucial factors of patient health conditions of heart beat and any abnormalities are notified and the values of **BPM** are recorded on the web page for further reference.

KEYWORDS: patient Heart Beat, Internet of things (IOT), Data notification.



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INTRODUCTION

Health care service must be designed to meet the health needs of population so using the developing technology under this health care must seeks attention of the technology like IOT. We can't even imagine mankind's existence on the earth without health facilities. Due to this there must be a virtual system which is used for patient health monitoring is necessary.

OBJECTIVES

The prime intention of this work is to help health care sector in doing their responsibilities with much more ease using technology added to their services to patients. In the present days due to covid-19 patients doctors can't be able to available in contact with every patients so this project helps both doctors and patients in timely presence of doctor to the patient whenever his condition goes to critical state. This timely attention of the doctor in these critical conditions is very intensive in solving the problem and timely attention of the doctor impact the situation a lot.

Structure of paper

The paper is formed as follows: In section 1, consist of the introduction of the paper followed by the structure, objective and in section 2 we explained about literature review and section 3 Included with related works. In section 4 we proceeded with the system architecture and In section 5 we continued with the methodology. In section 6 gives the detailed future scope. In section 7 has conclusion of the proposed system.

LITERATURE REVIEW

In today's world many practices are there in the health care system which are designed for solving several problems related to well being of the human health and the impact of internet of things has been revolutionized in all fields of life, but this impacts on the healthcare system have been significant due to its cutting-edge technology. The ultimate need in the attention of the health care requires a prompt solution based on the resources such as IOT, mobile and network connectivity. A model is presented that is health monitoring using IOT and reporting process involved in it where we can collect, process, analyze and present measured data on web server. The notification or services provided through the internet that are

connected to the system and those made available for users via smart phones, web browsers.

RELATED WORK

In research work [1], the author included the sensors which are embedded on the patient body to sense the temperature and heartbeat of the patient. The control unit mainly receives the sensor values & calculated the values. Here the doctor decides the state of patient and appropriate measure can be, taken the author in the research article [2] concentrated on some disorders & diseases, like heart failure Which requires continuous monitoring procedure after diagnosis to restrict further damage as secondary to the mentioned disorders [3] The author preferred sending measured heart rate through SMS to concern person even time using device, the author [4] introduced GPS & GSM based human health care & monitoring

INTERNET OF THINGS [IOT]

IOT implies the network path which connects several devices like sensor, software which is used to solve the real time problems in the world.

Due to its vast functionality IOT is being used in many projects which involves the purpose of connecting and exchanging data with the other devices embedded in the project over the internet

Even the technology of IOT is being introduced in past year it is as a service may be one of the most interesting trends (for 2021) or present

IOT can free the utilization of highly manual, time intensive and less quantifiable process of the past and this will also create an interface between physical world & computer-based system to result in effacing & benefits.

SYSTEM ARCHITECTURE

Arduino Uno

Arduino Uno is a 8-bit ATmega328P micro controller which has crystal oscillator and which supports serial communication. Voltage regulator is present in order to provide safe voltage to the module Arduino Uno has 14 digital input/output pins (out of which 6 can be used as PWM outputs), 6 analog input pins.



**Figure 1 :Arduino uno
ESP8266**

The ESP8266 is a very user supportive and low cost device. The module can itself creates a network path or it can connect to other network path in order to support communication between transmitter and receiver , hence it can easily collects data and upload it to the internet making IOT very simple as possible. It can also fetch data from internet using API's hence using ESP8266 much easier. Arduino IDE is used for this module to program. ESP8266 is a Wi-Fi module developed by Espressif systems. It is used in Internet of Things.The Features of the esp8266 are with Frequency of 80-160MHz and it has 16 GPIO pins and 10-bit ADC .

LCD (Liquid Crystal Display)

An LCD is a electronic display module that uses liquid crystal to produce a visible image and in the 16x2 LCD it can display is characters per line and there are 2 such lines each character is displayed in 5x7 pixel matrix. It is used as the medium of indicator for the message to be viewed in order to check the output of the certain experiment .All the liquid crystal display works with same principles regardless of its size. The information to be operated by the human and the sensor values are displayed on the screen this LCD display.



**Figure 2: LCD
GSM**

Micro controller programming is used to write the programming code to transmit the input obtained from various sensor to SIM 900 GPRS/ GSM module besides

this it is also used for writing code to send for writing code to send at commands to SIM 900 GPRS/GSM module that will send SMS to and call to mobile devices in response to commands sent

AT commands have been used for the transmission of data from GSM module to a cell phone.

Following the path and commands are been used

- a) AT : Testing connection
- b) AT+CMGF : To define mode
- c) AT+CMGW: To define mobile number
- d) AT+CMSS : For sending message
- e) AT+CMGD: To delete stored message



Figure 3:GSM Module

HEARTBEAT SENSOR

Heartbeat sensor gives the digital output when finger is inserted in the sensor . The sensor consists of the bright red led light detector. The working of the heart beat sensor involves mainly led which spreads the bright light in finger and detector detects it .When heart pumps blood through vessels then finger becomes more opaque & less light reached to the detector and varies its values according to each heart pulsethis digital output is connected to Arduino Uno to measure heart beats per minute (BPM) rate.It works on the principle of light modulation by blood flow through finger at each pulse.

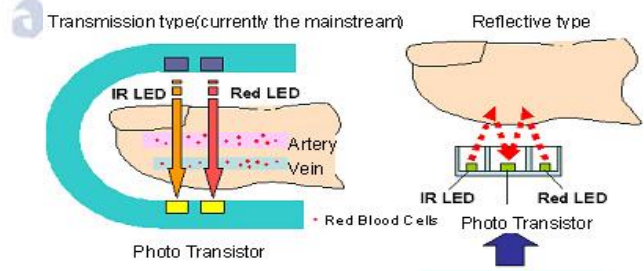


Figure 4:Heartbeat Sensor

CIRCUIT DIGRAM

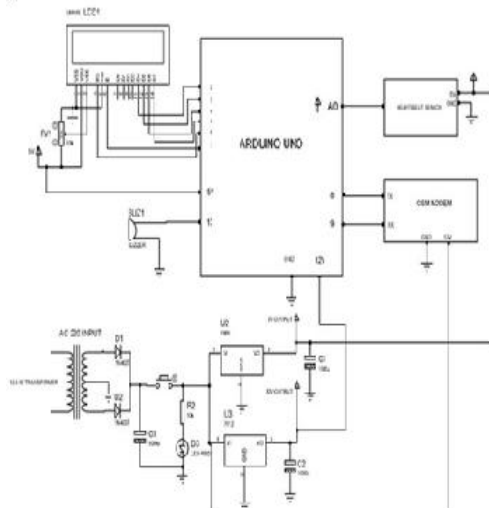


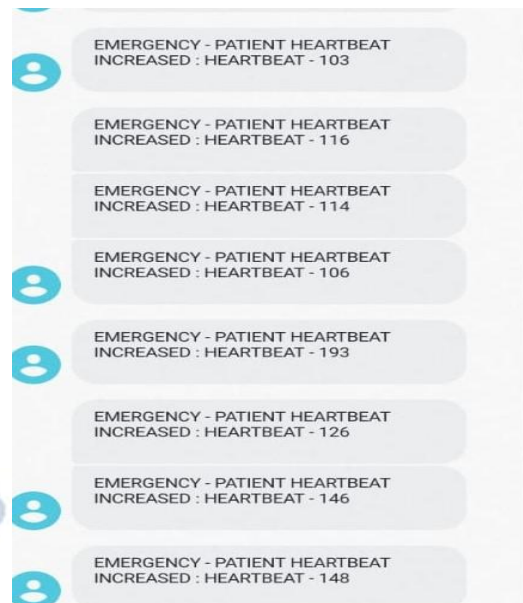
Figure 5: circuit diagram

METHODOLOGY

[1] The frame work of the proposed model deals with certain limits which are not safe for the health condition of the patient when the patient health status reaches out of the safe situations then an alert is sent to doctor and register mobile network that is patient family members and sms, call are sent when the patient condition is not normal as shown below[1][2] .The tabular values here show gives the illustration of the patient conditions according to the heart rate values.

Heart rate(x)	Case to be considered
$X < 60$	Not safe case (abnormal)
$60 < x < 100$	Safe (normal case)
$x > 100$	Not safe (abnormal case)

Table: 1



Process Description

Following table shows the heartbeat of the patients with there information with timely values presented.

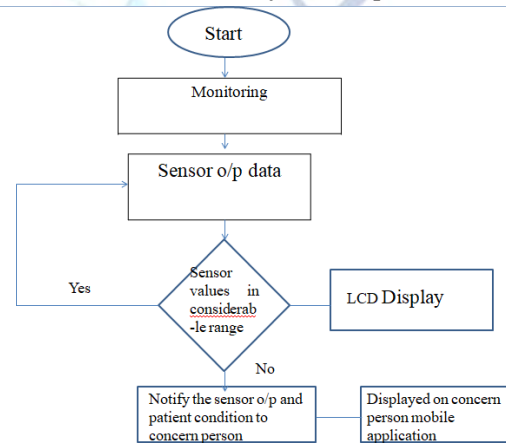


Figure 6: flowchart representation of patient monitoring system

1	Date	Time	patient info	Heartbeat(BPM)
2	20/4/21		11:15 R1	96
3	20/4/21		11:20 R2	103
4	20/4/21		11:25 R3	116
5	20/4/21		11:30 R4	114
6	20/4/21		11:35 R5	106
7				

Table :2

FUTURE SCOPE

In the pandemic of covid-19 the use of the virtual mentoring very essential from this proposed model the doctors can observe the patient situation without any direct contact with patients So this system is used for couid-19 patients we can make use of this for many people by linking with the doctor's network and also giving timely intimation to staff of the hospitals and for

the family members. The accurate results and Comparison and collection of all the data with appropriate accuracy to manage is the future scope of this proposed paper.

CONCLUSION

Improving health sector is very much required in these present days due to increase of the population to meet the needs of the people. Due to present life style of the people there is a major chance of getting chronic diseases and health issues. Thus from this proposed systems patients and doctor can relay on this trustful in assisting and monitoring them when the user logs on for continuous monitoring. This proposed system predefined with certain limits of heart rate and whenever the heartbeat of the person crosses this values then a alert is sent to the registered mobile networks and also the values is shown on the liquid crystal display and data is stores for further use of this patient data. This is very helpful for patient monitoring in these pandemic days.

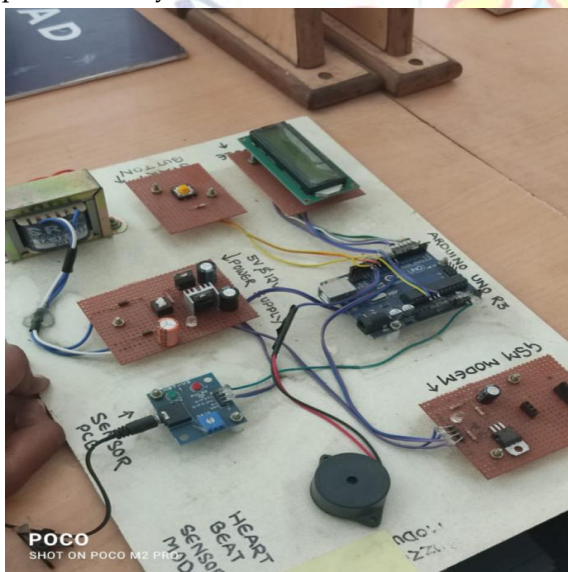


Figure 7:circuit kit

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