Health Monitoring Of Patient Using Body Area Network

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Abstract – **In this busy world most of the working people are failed to care about their health. They think that is not the big issue, but the truth is, this leads to severe health problems. These are due to the lack of routine monitoring the health. this system is mainly used to monitor the person's health who are busy at their work. In this innovative project, we monitor the patient's health routinely by using the respective sensors. By using our project we can know whether the person is having the danger of cardiac arrest, fever. The parameters here we measured are temperature, heartbeat, and pulse by using respective sensors. The data from the sensors are given to the Arduino Uno. The biomedical sensors here are connected to Arduino UNO to read the data which in turn interfaced to an LCD /serial monitor to see the output .The LCD gives information about parameters continuously. The Arduino sends the info to the wifi module. The patient's parameters are transmitted to the smartphones and laptops of authorized person using cloud server. Form the cloud we can access the data over the internet anywhere at any time. The data can be access using any android device or ios. This system doesn't have any issues like limited range, high energy consumption due to the concept called clustering.**

Keywords – Wireless network, Body area network, clustering, Arduino Uno.

I. INTRODUCTION

Aging is a natural and unavoidable thing in human life. The healthy and age are the two factors that are inversely proportional to each other. As the age increases the immune system of human get reduces gradually. This innovative project is general-purpose and suitable for all aged persons. This project is particularly useful for infants and aged persons. Because these two category persons are having a poor immune system when compared to adults.

[7] The proposed system comprise of tiny wearable physiological equipment's, sensors, transmission modules. This body wearable device doesn't lead to any skin problems like rashes. It is also compatible to wear. We also installed the buzzer and LED to alert the patient when the readings go abnormal.

The patient can contact the doctor for any problem in his/her health by observing the readings in the LCD. The size of the LCD used here is 16*2. The doctor can also see the patient 's health detail by visiting the website URL and suggest to the patient. [6] The paper begins with design and implementation of a basic Health Monitor for remote monitoring and tracking of pulse rate and body temperature of patients treated in hospitals.

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[8] The goal of this paper is to design and implement a low cost, portable effective patient monitoring system that can transmit the vital signs of a patient in emergency case without delay through a wireless communication system.

From the statistical data, it is proved that the rate of a person visiting for the primary care to the hospital in the village is greater than the metropolitan cities, this is mainly due to the lack of primary health care centers in the rural area. this problem can be solved by using our project.

II.   RELATED WORKS:

[4] A Divya Priya and S Sundar proposed the **"HEALTH MONITORING SYATEM USING IoT".** In this system, The patient's body will be monitored continuously and the doctor can know about the patient's condition while sitting somewhere in front of a computer screen.

[6] Avelet Maria Ferrnandes, Anusha pal and Louella m Mesquite Colaco proposed the **"SECURE SDLC FOR IOT BASED HEALTH MONITOR".** In this system, the paper begins with design and implementation of a basic health monitor for remote monitoring and tracking of pulse rate and body temperature of patient treated in hospitals.

[5] Akshat, Gaurav, Zahid and 8 others proposed **"A SMART HEALTHCARE MONITORING SYSTEM USING SMARTPHONE INTERFACE".** in this system, the vital health parameters like electrocardiograph (ecg), body temperature, blood pressure (bp), heart beat rate, glucose level detection and galvanic skin response of patient are collected and evaluated through the use of smart devices.
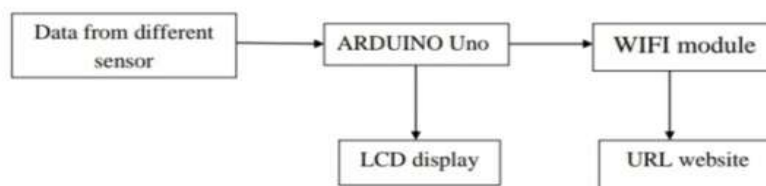
III.   OPERATIONAL DIAGRAM

Fig 1(a).

The data's from the sensors are sent to the microcontroller ie, Arduino Uno. From the sensors informations are given to the wifi module. The Arduino Uno and LCD are interfaced , so that the readings are displayed in LCD. The output can also be seen in the website/URL.

IV.   HARDWARE   REQUIREMENTS.

   a)   Arduino Uno
   b)   Wifi module(esp8266)
   c)   Temperature sensor(dth11)
   d)   Pulse and heartbeat sensor
   e)   LCD display (16*2)

   SOFTWARE REQUIREMENT:

           Arduino, Thingspeak

ARDUINO UNO:

Fig. 1(b) Arduino Uno

The microcontroller ie, Arduino UNO is based on the ATmeaga328 as shown in Fig.1(b). It has 14 digital I/O pins.

Atmega328 is the single-chip microcontroller created by Mattel in the megaAVR family.it consists of modified Harvard architecture 8 bit RISC processor core. It receives the data from different sensors and sends it to the wifi module.

- Operating Voltage: 5 Volts
- Input Voltage: 7 to 20 Volts
- Digital I/O Pins: 14
- Analog Input Pins: 6
- DC Current per input and outputPin: 20 mA
- DC Current of 3.3V Pin: 50 milli Ampere
- SRAM: 2 KB
- EEPROM: 1 KB
- Clock Speed: 16 MHz
- Length: 68.6 mm
- Width: 53.4 mm ,Weight: 25 g

WI-FI MODULE:
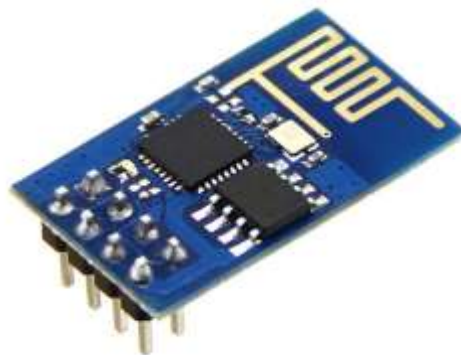
Fig.1(c) Wifi Module

The esp8266 wifi module is shown in **Fig.1(c).** It is the low-cost wi-fi microchip, with full TCP/IP stack and microcontroller capability. The Arduino Uno Wi-Fi module can be used as a Wi-Fi modem[2]. It is the 32-bit microcontroller.Features of esp8266;

a) Processor: L106-32 bit RISC microprocessor core
b) It running at 80MHz
c) Memory: It consist of 32 Kb instruction RAM, 80Kb user data RAM, 32 Kb instruction cache RAM.

LCD DISPLAY:

Fig.1(d) LCD display

The 16*2 LCD is shown in **Fig.1(d**). it the type of panel display that consists of the number of digital pins(both input and output pins). The LCD modules are used for displaying modes and dustbin status in the running device. Pixels are used for most flexible ones[2].
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Types of LCD displays;
a) monochrome
b) multi color

SENSORS:

Pulse sensor   **Heartbeat sensor**

Temperature sensor

V.   WORKING PRINCIPLES & OPERATION

Here we use different types of sensors namely, temp, heartbeat, and pulse sensors. each sensor are working on the different principles of operation.

A)TEMPERATURE SENSOR:

The Specification of the temp sensor is dth 11. The temp sensor works on the principle of the thermocouple. The thermocouple is the electrical device that consists of two dissimilar metals forming an electrical junction. It is based on the thermoelectric effect. It produces the temperature-dependent voltage.:

B)HEART BEAT SENSOR:

It works on the principle of photo modulation by blood flow via finger at each pulse. Heartbeat sensor is designed to give the digital output of the heartbeat. When heartbeat detector is working ,the beat LED flashes in unison with each heartbeat.

C) PULSE SENSOR:

It is a well-designed plug and play a heart rate sensor for Arduino. It also includes an open-source monitoring application that show your pulse in real-time. It can be used by students, athletes, and game developers.

VI.   OUTPUT
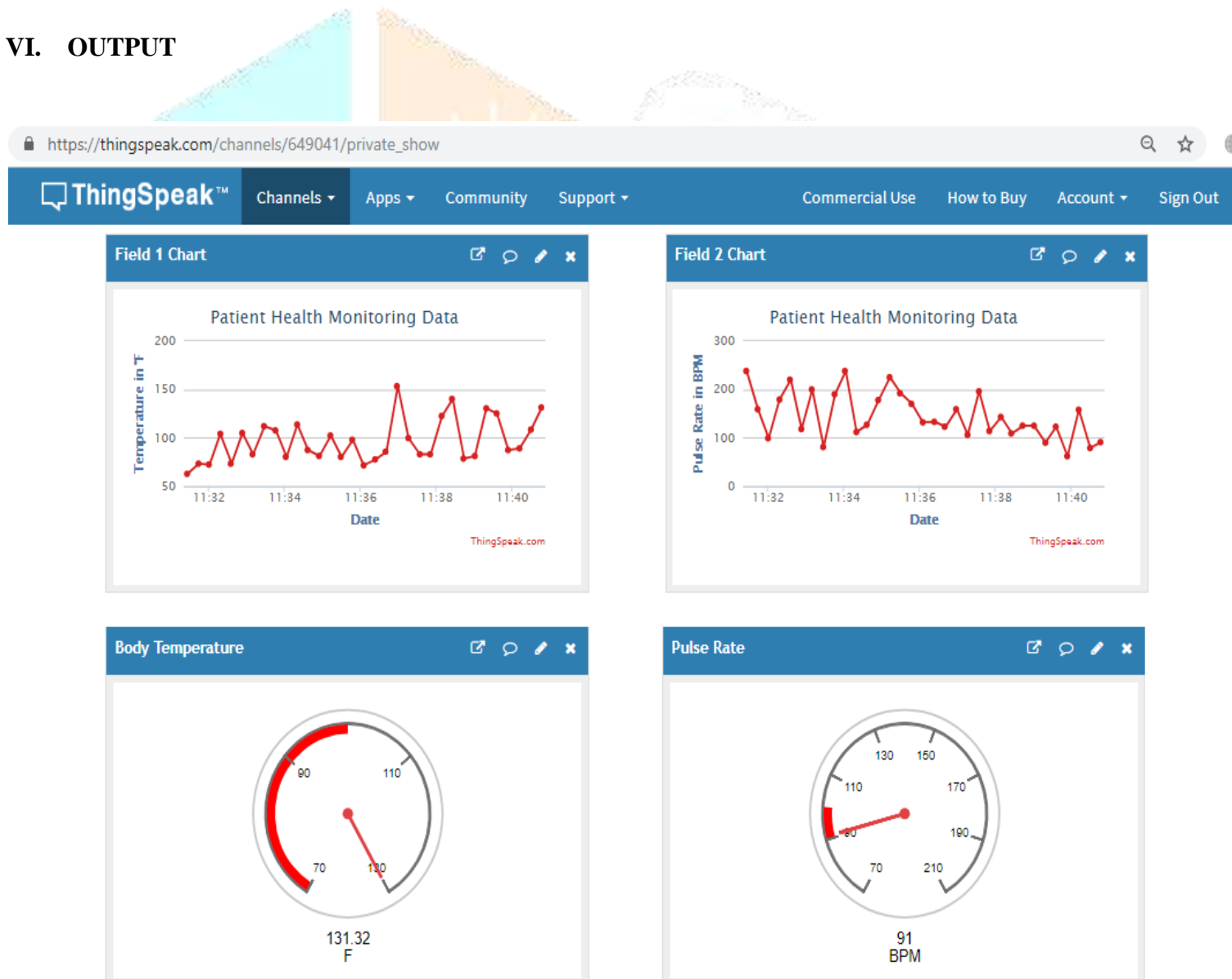
The sample output of this system is shown in above fig. In our system, we using digital sensors so values are displayed in digital form. The cloud used here is thingspeak.

VII. CONCLUSION

The usage of a wireless network in health monitoring reduces cost and makes the system more efficient ie, measuring data without any loss or interruption. By using the clustering concept in this project, we can enhance the range, data rate, and bandwidth. It also provides easy and secure access.

VIII. REFERENCE

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