IOT BASED HUMAN HEALTH MONITORING SYSTEM

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Abstract - *Modern healthcare system introduces new technologies like wearable devices or cloud of things. It provides flexibility in terms of recording patients monitored data and send it remotely via IOT. In the recent years wireless technology has increasing for the need of upholding various sector. In recent years IOT groped the most of industrial area specially automation and control. This project aims to developing a system which gives body temperature, heart rate and blood pressure of patient. These sensors are interfaced with controller arduino Uno board. Wireless data transmission done by arduino through wifi module. This data is stored on web server so that it can be seen to who logged [1].*

Key Words: healthcare, arduino, pulse sensor, heart rate, temperature sensor, IOT.

1. INTRODUCTION :

Health has foremost importance in our day to day life. Sound health is a necessary to do the daily work properly[1]. Healthcare technology is one of the most popular studies now days. However, people in the rural area are still having a hard time to obtain professional healthcare Services due to the barrier of distance and lack of doctors. A remote patient monitoring system is one of the best solutions to overcome this issue[5]. The latest trend in healthcare communication method using IOT is adopted. Internet of things serves as a catalyst fir the healthcare and plays prominent in the wide range of healthcare applications[4]. In these IOT groped the most of industrial area specially automation and control. Biomedical is one of recent trend to provide better healthcare. Not only in hospitals but also the personal health caring facilities are opened by the IOT technology. In the recent years use of wireless technology is increasing for the need of upholding various sectors. In the present smart generation, researchers have found that internet of technology (IOT) has greater potential for critical data transfer in healthcare. At the same time, the integration of IOT features into medical devices going to reduce the overall cost and response time in the smart healthcare system.

2. LITERATURE SURVEY:

Smart healthcare monitoring system provides better healthcare service by improving the availability and transparency of the health data. However, it also posses serious threats to data security and privacy[6]. This projects aim to developing a system which gives body temperature and heart rate using LM35 and pulse sensor respectively. These sensors interfaced with controller arduino Uno board. Wireless data transmission done by arduino through wifi module[1]. This paper proposes an internet so things (IOT) based real time remote patient monitoring system that is able to guarantee the integrity of the real time electrocardiogram (ECG).

The internet of things (IOT) has already changed the world and it influences both the way we live and work. The internet is gradually becoming a necessary and important tool in our everyday lives. The number of nodes connected to internet are increasing day by day and this burst amount of connections give rise to an emerging technology named as internet of things(IOT). It is consisting of smart devices connected to internet and embedded with processors and sensors. These sensors collect the data and send through wifi module where collected data is analyzed[2]. ECG self interpretation algorithm can be implemented into the system so that the system can detect the abnormal ECG signal and generate an alert. This system also can be expanded by adding more e-health sensors to collect various health parameters. Research on reducing the jitter delay and eliminating the noise signal are also required to improve the performance of the proposed system.

High blood pressure, is a serious condition that can cause to damage heart and other organs and increase the risk of heart attack and stroke. It would be helpful to have a convenient way to automatically take many blood pressure readings throughout the day and over time to see how often one's blood pressure is high[7]. LM35 sensor is used for measurement of

body temperature. Sensor is put in touch with body and it senses body temperature. It is calibrated linearly in Celsius. It has low self heating capability. Pulse sensor. It starts working, LED on top side will starts blinking with each heart beat. To see output pin of the sensor is connected to controller[1].

3. PROPOSED METHODOLOGY AND DISCUSSION:

The core objective of this project is the design and implementation of smart patient health tracking system. Fig.1 shows the overview of the proposed system. The sensors are embedded on the patient body to sense the temperature and heartbeat of the patient. Two more sensors are place at home to sense the humidity and temperature of the room where the patient is staying. These sensors are connected to control unit, which calculates the values of all the four sensors. These calculated values are then transmitted through a IOT cloud to base station. From the base station the values are then accessed by the doctor at any other location. Thus based on the temperature and heart beat values and the room sensor values, the doctor can decide the state of the patient and appropriate measures can be taken.

3.1 ARDUINO UNO:

> **Technical specifications:**

- Microcontroller: microchip ATmega328p
- Operating voltage: 5volts
- Input voltage: 7v to 20volts
- Digital I/O pins: 14 pins (of which 6 can provide PWM output)
- UART: 1
- I2C: 1
- SPPI: 1
- Analog Input Pins: 6
- DC current per I/O pin: 20mA
- DC current for 3.3V pin: 50mA
- Flash Memory: 32KB of which 0.5 KB use by boot loader
- SRAM: 2 KB
- EEPROM: 1 KB
- Clock Speed: 16 MHz
- Length: 68.6 mm
- Width: 53.4 mm
- Weight: 25g

Fig.(1) Arduino Uno

> **General pin functions:**

- **LED:** There is a built-in LED operate by digital pin 13. When the pin is at high value, the LED operates, when the pin is low, it is off.
- **VIN**: The input voltage to the Arduino board when it is using an external power source (as against to 5 volts from the USB connection or other balance power source). You can supply voltage through this pin, or, if supplying voltage over the power jack, enters it through this pin.

- **5V**: This pin outputs a controlled 5V from the regulator on the board. The board can be supplied with power likewise from the DC power jack (7 - 20V), the USB connector (5V), or the VIN pin of the board (7-20V). Supplying voltage over the 5V or 3.3V pins bypasses the regulator, and can damage the board.
- **3.3v**: A 3.3 volt supply produce by the on-board regulator. Maximum current draw is 50 mA.
- **GND**: Ground pins.
- **IOREF**: This pin on the Arduino board supply the voltage reference with which the microcontroller operates. A properly configured cover can read the IOREF pin voltage and select the appropriate power source, or enable voltage translators on the outputs to work with the 5V or 3.3V.
- **Reset**: Mostly used to add a reset button to cover that block the one on the board.

3.2 SENSORS:

    3.2.1   Temperature sensor
    3.2.2   Heart beat sensor
    3.2.3   Blood pressure sensor
    3.2.4   ECG sensor

3.2.1   Temperature sensor:

LM35 sensor is used for measurement of body temperature. Sensor is put in touch with body and it senses body temperature. It is calibrated linearly in Celsius. It has low self heating capability. Also it doesn't require external calibration[1].

Fig.(2) Temperature sensor

3.2.2   Heart beat sensor:

Pulse sensor is designed to give along out put of heart beat when a finger is placed on sensor. It start working; LED on top side well start blinking with each heart beat. To see the sensor output pin of sensor is connected to controller. The working principle of sensor is based on light modulation by blood flow through nerves at each heart pulse[1].

Fig.(3) Heart beat sensor

3.2.3   Blood pressure sensor:

Many types of blood pressure monitors exist, including both wrist monitors and the more common arm monnitors. The arm band monitors are unfamiliar because typically are larger, require a separate module attached to the arm band. Arm band

monitors re less convenient than the wrist monitors. The wrist monitors are self contained, they have different module or any other attachments. Wireless blood pressure monitors take readings continuously to collect many readings from patient varies throughout the day[7].

Fig.(4) Blood pressure sensor

3.2.4   ECG(electrocardiogram):

ECG sensor is a cost effective module which is used to measure the electrical activities produce by the heart. The given sensor contains 6 pins named as SDN, LO-, LO+, OUTPUT, 3.3v and GND. The sensor is attached to the Arduino using hook up wires. The ECG fig. is shown below[3].

Pin name	Pin function	Arduino interface
3.3v	Power supply	3.3v
Output	Output signal	A0
LO+	Lead off detect+	10
LO-	Lead off detect-	11
GND	Ground	GND
SDN	Shut down	Not connected

Fig. (5) ECG sensor

3.3 WIFI MODULE:

Wi-Fi is a extremely efficient wireless technology, it is optimized for large data transfer using high-speed throughout. Wi-Fi is the most power efficient technology and would be ideally befit to large file medical data

Fig.(6) Wi-Fi module

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