Wireless Patient Monitoring System

R. Karthikamani, P. S. Yuva Prasath, M. Vidhya Sree, J. Sangeetha

Abstract: Wireless patient monitoring system plays a major role in the world wide based on Internet of Things (IoT). It is an easy task to monitor patients without direct contact using wireless. Hence they do not need to go to Hospitals for regular checkup and updates of the health. The high speed data combines with rapid decisions, treatment and send datum to the concerned physicians over mobile and server. The physicians consults and medical examinations. This project will continuously monitor the temperature of the patient using CC3200 microcontroller with inbuilt WIFI and the data is stored into the database. It is sent to the Doctor's mobile in the form of application called as an ANDROID through the web server. Then the feedback is instantly sent to the required station. Therefore the IOT enables effective and fast care of patient at any situation or environment. The Internet of Things (IoT) has been widely used to interconnect the available medical resources and offer smart, reliable, and effective healthcare service to the elderly people. In this paper, we present an IoT architecture customized for healthcare application. The proposed architecture collects the data and relays it to the cloud where it is processed and analyzed. A prototype of the proposed architecture has been built to demonstrate its performance advantages.

Keywords: Health monitoring, Internet of Things (IoT), Medical devices, sensors, platform implementation, cloud computing.

1 INTRODUCTION

In olden days the medical was poor and not developed hospitals in remote areas. Hence the losses of lives were more because of not developed in telemedicine for the patients. There was the major problem. Therefore in the modern era, IOT has been developed in all the areas in smart way. This has been achieved by the development of android mobile phones in the hands of people. It is not only for patients also for older people, physically challenge and children. The necessity for healthcare applications arises from the demographic exchange in industrialized nations where existence expectancy is at the rise and the beginning price is in decline. A generation for accumulating and forwarding essential (health) facts for chronically ill and aged human beings to monitor the fitness repute and compliance in remedy. KIT is based totally on RFID in combination with cellular phones and Near Field Communication (NFC). NFC is a wireless connectivity era which allows quick-range verbal exchange between clever gadgets. If any symptom is observed by means of the sufferers, they could interact with the doctors and they will prescribe with appropriate medicines to therapy the illness. These sources encompass differing types of medical gadgets such as blood strain, thermometers, pulse-oximeters, glucose meters, ECG monitors, imaging systems in addition to gadget which include fitness and power machines, mobile gadgets, social community feeds and other net assets.

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The embedded machine performs a critical function in monitoring patients in IoT like temperature, heartbeat, blood glucose stage, and so forth., for all the problems of human life. Using mobile telephones it also reduces the value, saves time and power. Though the usage of the modules like CC3200 with Wi-Fi enables to try this venture in efficient way. The Internet of Things (IoT) platform offers a promising generation to acquire the aforementioned healthcare offerings, and might similarly enhance the medical provider structures. IoT wearable structures may be used to collect the wanted facts of the person and its ambient environment and talk such facts wirelessly, where it is processed or saved for tracking the records of the consumer. Used a sensor era integrated in a home-primarily based gadget that video display units affected person's health. They additionally proposed a framework for facts processing. The existence of physically challenged people are difficult in daily foundation is depicted. They can't do their ordinary works in their personal. Hence they want others assist to live on. Therefore the health of physically challenged humans is monitored in the use of the modules temperature and ECG by using CC3200 microcontroller. The end result is obtained in cellular thru web site [1]. The work depicts a patient tracking using Arduino microcontroller, which senses the health situations of patient the usage of sensors of temperature and heartbeat. Therefore the output is shown through net using message and vicinity in mobile. The GSM technology used in transmitting statistics of patients [2]. Telemedicine plays a crucial position in hospitals for the fast choice-making and treatment thru the excessive-speed scientific records send the switch to the physicians. The scientific records ship to physicians over cellular and server for consulting and remote clinical examinations. This paper elaborates the enjoy; a practice followed and places of hobby in several approach sides to be considered for creation telemedicine in affected person looking at method more operative [3]. Monitoring of patients' important parameters very regularly is limited to hospitals or different fitness care centers, which makes the system time eating and high priced. Rapid advancement in data and verbal exchange technology gives first-rate opportunities for improvement of far off tracking systems, which on one hand, will lessen charges and travel time, and on the alternative will increase health provider efficiency and user pride [4].

2. FLOW DIAGRAM

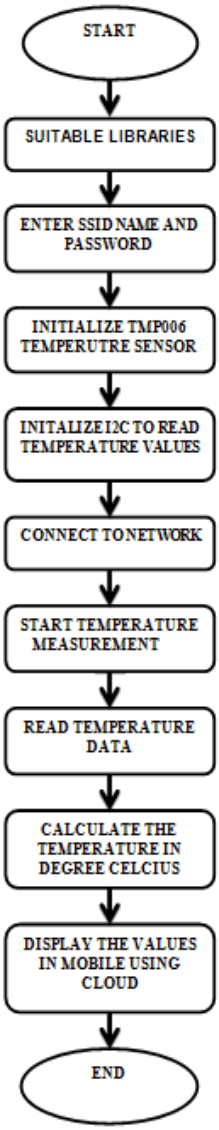


Fig. 2 Flow chart of patient monitoring system.

3 HARDWARE DESCRIPTION

3.1 CC3200 Launch Pad

CC3200 is also known as Tiva-C Launch pad with single board ARM Cortex M4F microcontroller with inbuilt Wi-Fi designed by Texas Instruments. This is a network processor. It has a 32 bit CPU devices or communication modules and USB port. It also include ground pins and power(3.3 V) operating at 80 to 120 MHz The input pins are in the range of 40 to 80 based on the versions that is can be used as both input pins and output pins like digital input and output using push buttons, analog input and output pins. There are multiple functions also by interfacing seriel ports for communication with external) pin. The clock is 80 MHz. The device include peripherals like SPI, UART, I2C, I2S, SD/MMC, ADC (4 channels) and parallel interface. It will support for WPA2 and WPS security and also function as both station and client. This will also support for many internet protocals like SSL stack, TCP/IP stack. It has a memory of 1024 KB of flash memory for non-volatile storage and 256 KB of RAM for data storage and 256-Kbytes of flash memory for non-volatile code storage. It also includes in-built sensors of temperature sensor, accelerometer and LED's of red, green, blue. This launch pad is used in many IoT applications for developing many projects based on embedded system. In CC3200 jumpers are used for selecting power source of ICDI USB and USB Device.

3.2 Temperature Sensor(TMP006)

A sensor converts from physical quantity to any other form of energy or it sense the environment without any physical touch. The TMP006 is a single chip Infrared (IR) temperature sensor. The TMP006 thermopile sensors have a power consumption of 90%. Here in-built temperature sensor is used for monitoring patient's body temperature which is non-contact. Therefore it uses I2C communication for sending data. Thermopile sensor Integrated MEMS, ADC, local temperature reference and signal conditioning. Power design are low current 240 micro ampere, low voltage 2.2 V. The Digital output: local temperature -40ºC to +125ºC.

3.3 Software Description

3.3.1 Energia Software

Energia is an open source & integrated development environment. It was launched to bring framework to the Texas Instruments. It uses mspgcc compiler and it is based on wiring and Arduino framework. It is a portable framework. Together with Energia, Launch pad can be used to develop innovative projects. Energia works on Mac OS X, Linux and Wi-Fi. The fig 3.3.1 shows the Energia software's window in which the coding is developed. Simple and easy-to use code editor and compiler with built-in Serial Monitor. Support various TI embedded devices (MSP430, TMC4, CC3200, C2000, etc.) and open source. It is hosted in GitHub.

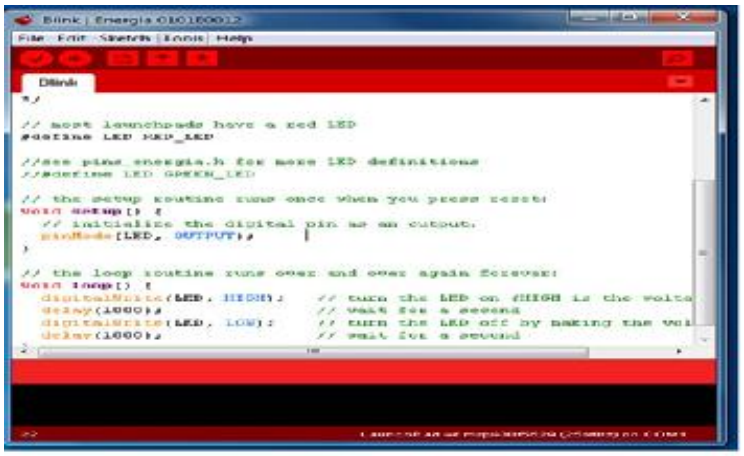


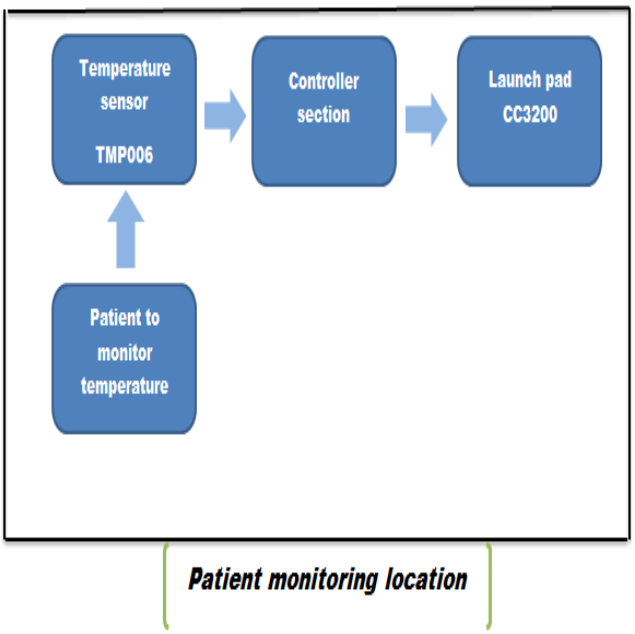
Fig. 3.3.1 Energia software window.

4 BLOCK DIAGRAM

Fig. 4 Working block diagram.

4.1 Description

The working block diagram of the patient monitoring system is shown in the fig 4.1. The temperature of the patient is sensed using TMP006 temperature sensor, which is connected to the launch pad CC3200 microcontroller uses cloud technology. Connect the launch pad to the power supply. And connect the launch pad with the laptop using USB cable. Using the Energia software upload the temperature sensing program to the launch pad. Then, the temperature of the patient is sensed using the temperature sensor TMP006. Since the temperature sensor is a non-contact sensor, there may be some approximation in the values obtained, that can be calibrated in the program. Then to transfer the obtained value in the cloud, the launch pad is connected with the local Wi-Fi. Then connect the laptop with the Launch pad Wi-Fi. Using Energia software upload the Wi-Fi program in the launch pad. Open the serial monitor, the IP address of the launch pad obtained is displayed on the serial monitor. Using the mobile phone, open the Google search engine and type the obtained IP address in the search engine. The patient temperature that is sensed using the temperature sensor is displayed on the screen.



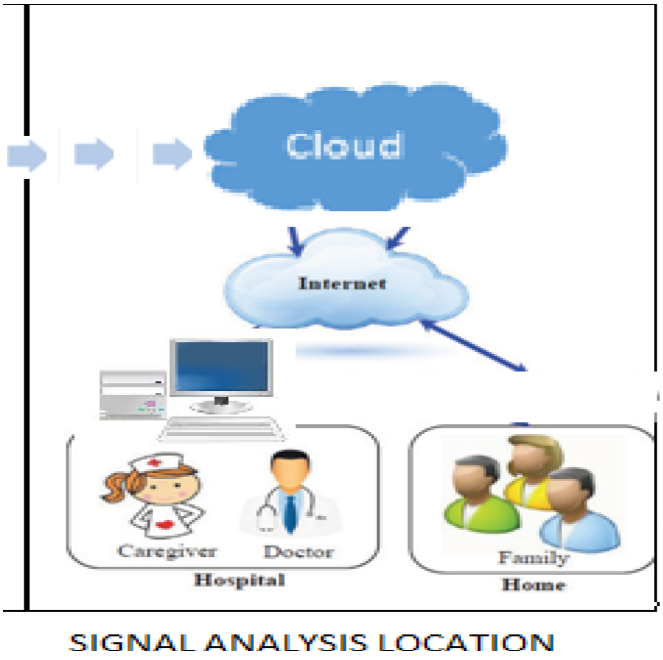


Fig. 4.1 *Working of patient monitoring system.*

5 RESULT

5.1 Launch Pad Output

The launch pad output is shown in the fig 5.1. It includes SSID name and IP address.

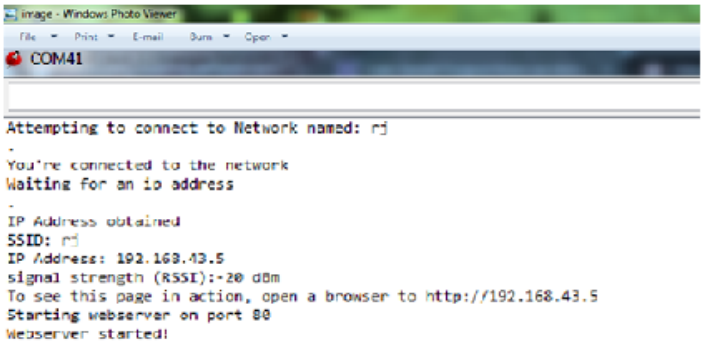


Fig 5.1 Launch pad output from the Energia software.

5.2 Mobile Phone Output

The temperature value is displayed in webpage through mobile. Therefore, output is in degree Celsius shown in fig 5.2.

Fig 5.2 Mobile output.

6 CONCLUSION

This project provides better and efficient health care by implementing a wireless monitoring using cloud network. This helps the doctors to make use of the data provide by the cloud. The solution provided by this very efficient. It also can be used with mobile app and can be monitored in daily basis. In case of emergency the mail and messages are sent to the mobile phones of relatives.

7 FUTURE SCOPE

The plan of future work is to use web service API which enables interoperability. A variety of devices independent of their platform and language can communicate with web service through HTTP request response messaging for retrieving data. This architecture will not affect the users in case of future extensions or modifications. The changes will be made to the web service alone. The users will remain unaffected. Emergency Decision Support systems can be built based on these IoT architectures.

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