PATIENT MONITORING SYSTEM USING IOT

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***Abstract*—*Telemedicine is a rapidly developing application of clinic medicine where medical information is transferred through the phone or internet or other networks for the purpose of consulting and performing remote medical procedures or examinations. This project elaborates the experience; a methodology adopted and highlights various design aspects to be considered for making telemedicine in patient monitoring system effective. In this method, the patient's vital signs like, blood pressure and temperature sensor are capturing and the values are entered into the database. It is then uploaded into the web based server and sent to the doctor's phone using ANDROID technology. It also enables the doctors to instantly send back their feedback to the nurse station. In its broadest application, telemedicine can be defined as the use of telecommunication technologies to provide medical information and services. The key aspect of telemedicine is the use of electronic signals to transfer information from one site to another.*

Keywords- Internet of things, telemedicine,android.

I. INTRODUCTION

Mobile healthcare applications receive more and more attention due to the ability to reshape healthcare delivery, for example, enabling self-management of patients while they pursue their daily activity .Mobile healthcare web services using Android can provide advantages to patients, enabling them to query their Symptoms and get the expert response from the Expert System in the form of identification of the disease and medications to cure the illness. Patients can access medical information and Expert system independent of their current place and time and content can be dynamically adjusted to the current context and terminal type. Healthcare Services Using Android Devices involves the use of a mobile client-server model employing web services in order to transfer the currently available web-based system onto an Android platform. The server is dedicated to provide an interpretive report of the obtained test results, whereas the client acts as a convenient user front-end. Communication between the client and the server is based on web services

Now with the growing social pressure and the life more and more quick steps, most people are facing with health problems, especially a lot of high-level personnel who are insub-health. And modern social accidents occur frequently. It is more important to design a health security system for people.. As mobile phones play more and more important role for people, it is the best choice that the system will be deployed on mobile phones.Normally, a healthcare emergency alarm system is deployed on an independent device, wired or wirelessly linked to a gateway, and then connected to the hospital or emergency center, such as and But the disadvantage of such systems is obvious: once getting out of the coverage of the gateway, the system won't work anymore. A healthcare management system has two main functions. The one is life reminder system. The other is On-Line medical. However the life reminder function is useful and helpful for the senior people and chronic patients to give a friendly reminder for medicine and so on.

II. PROPOSED MODEL

This paper presents the implementation of an Mobile app towards the IoT connected healthcare applications. It consists of 3 major parts: 1) a arduino board with voltage regulator circuit, 2) temperature and pulse sensor, 3) a smart phone application acting as the IoT gateway for sensor data visualization.

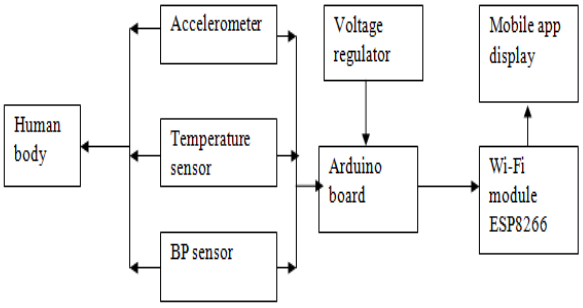

Fig:1 Block diagram.

1.ARDUINO BOARD

Arduino Uno is a microcontroller board based on the ATmega328P (datasheet). It has 14 digital input/output pins (of

which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started.

Fig : 2 Arduino uno board

A. POWER

The Arduino Uno can be powered via the USB connection or with an external power supply. The power source is selected automatically. External (non-USB) power can come either from an AC-to-DC adapter (wall-wart) or battery. The adapter can be connected by plugging a 2.1mm centre-positive plug into the board's power jack. Leads from a battery can be inserted in the Gnd and Vin pin headers of the POWER connector. The board can operate on an external supply of 6 to 20 volts.

B. MEMORY

The ATmega328 has 32 KB (with 0.5 KB used for the boot loader). It also has 2 KB of SRAM and 1 KB of EEPROM (which can be read and written with the EEPROM library). Each of the 14 digital pins on the Uno can be used as an input or output, using pin Mode(), digital Write(), and digital Read()functions.

C.*PROGRAMMING*

The Arduino Uno can be programmed with the Arduino software (download). Select "Arduino Uno fromthe Tools > Board menu (according to the microcontroller on your board). The ATmega328 on the Arduino Uno comes preburned with a bootloader that allows you to upload newcode to it without the use of an external hardware programmer. It communicates using the originalSTK500 protocol(reference, C header files).You can also bypass the bootloader and program the microcontroller through the ICSP (In-CircuitSerial Programming) header.

2. ESP8266 WIFI MODULE

ESP8266EX implements TCP/IP, the full 802.11 b/g/n WLAN MAC protocol and Wi-Fi direct specification. It supports not only basic service set (BSS) operations under the distributed control function (DCF) but also P2P group operation compliant with the latest Wi-Fi P2P protocol. Low level protocol functions are handled automatically by ESP8266EX.

A.*SPECIFICATION OF ESP 8266*

The circuit diagram of the WIFI module is shown in Figure 4.8 that possess the following specifications:

Certification Wi-Fi Alliance

Protocols 802.11 b/g/n

Frequency Range 2.4G ~ 2.5G (2400M ~ 2483.5M)

Tx Power:

802.11 b: +20 dBm

802.11 g: +17 dBm

802.11 n: +14 dBm

Rx Sensitivity:

802.11 b: –91 dbm (11 Mbps)

802.11 g: –75 dbm (54 Mbps)

802.11 n: –72 dbm (MCS7)

Antenna PCB Trace, External, IPEX Connector, Ceramic Chip, Hardware CPU Tensilica L106 32-bit processor

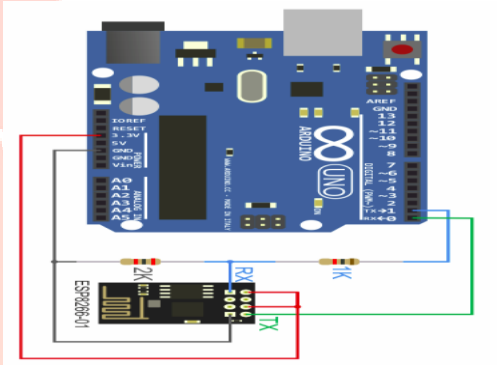

Fig:3 Connection ofArduino UNO with ESP 8266 WIFI Module

3.VOLTAGE REGULATOR

7805 is a voltage regulator integrated circuit. It is a member of 78xx series of fixed linear voltage regulator ICs. The voltage source in a circuit may have fluctuations and would not give the fixed voltage output. The voltage regulator IC maintains the output voltage at a constant value. The xx in 78xx indicates the fixed output voltage it is designed to provide. 7805 provides +5V regulated power supply. Capacitors of suitable values can be connected at input and output pins depending upon the respective voltage levels.

4. POWER SUPPLY

The power supply used in this model is 12v, 500mA step down transformer which transforms 220v AC to 12v that provides a maximum of 500mA current. It is easy and flexible to be used as a regulated power supply.

5. ARDUINO IDE SOFTWARE

Arduino consists of both physical programmable circuit board and a piece of software, or IDE that runs on the computer, used to write and upload computer code to the physical board. It can be extended through the use of libraries to provide extra functionality to the sketches which is described in Figure 4.5.

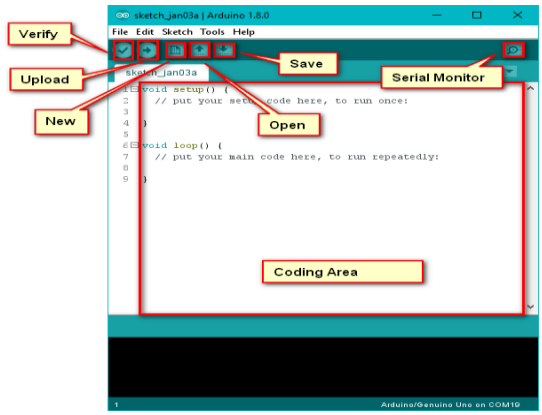

Fig:4 Arduino IDE –Sketch Illustration

Arduino IDE contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus which is shown in Figure 5.2. It connects to the Arduino /Genuino hardware to upload program and communicate with the

6. SENSORS

A.*THERMISTOR*

A thermistor is a temperature sensor constructed of semiconductor material that exhibits a large modification in resistance in proportion to a tiny low modification in temperature. Thermistors are inexpensive, rugged, reliable and responds quickly. Because of these qualities thermistors are used to measure simple temperature measurements, but not for high temperatures. Thermistor is easy to use, cheap, durable and respond predictably to a change in temperature.

B.IR *SENSOR*

An infrared sensor is an electronic device,that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion. These types of sensors measures only infrared radiation, rather than emitting it that is called as a passive IR sensor. Usually in the infrared spectrum, all the objects radiate some form of thermal radiations. These types of radiations are invisible to our eyes, that can be detected by an infrared sensor. The emitter is simply an IR LED (Light Emitting Diode) and the detector is simply an IR photodiode which is sensitive to IR light of the same wavelength as that emitted by the IR LED. When IR light falls on the photodiode, The resistances and these output voltages, change in proportion to the magnitude of the IR light received.

III.MOBILE APPLICATION

App programming is done by app inventor tool by opening a browser to *ai2.appinventor.mit.edu*. The App Inventor programming environment has three key parts:
The *Component Designer*-. You use it to select components for your app and specify their properties.
The *Blocks Editor*-. You use it to specify how the components will behave (e.g., what happens when a user clicks a button).
An Android device with which you can actually run and test your app as you are developing it. If you don't have an Android device handy, you can test the apps you build by using the Android emulator that comes with the system.

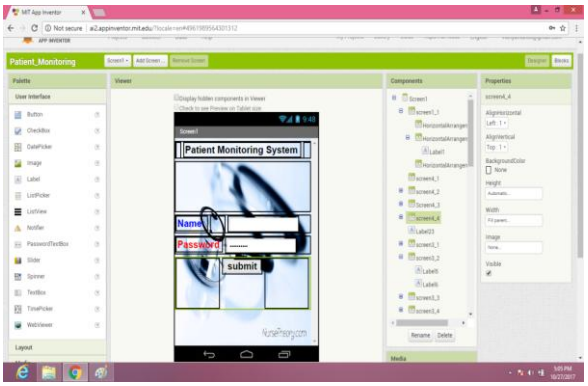

Fig:5 Component designer

Fig: 6 Blocks editor

Using this tool a mobile app is built and the patients information is monitored.

IV.EXPERIMENTAL RESULTS

A.*HARDWARE*

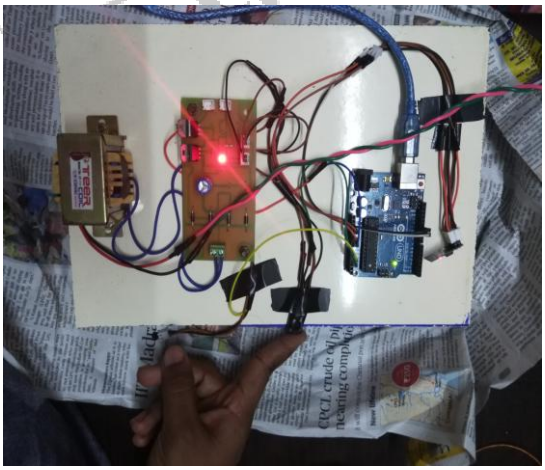

Fig :7 HARDWARE MODEL

B.*SOFTWARE*

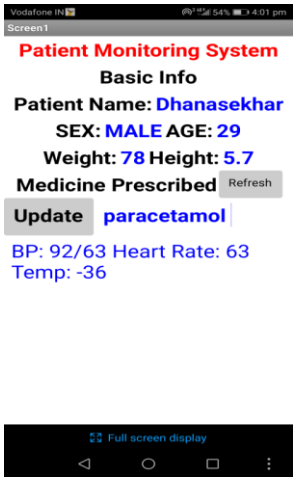

Fig 8 MOBILE APPLICATION

V.CONCLUSION

The paper describes the steps involved in designing and implementing a mobile app and hardware for patient monitoring using different sensors. The app monitors the patient states by using only sensors with an accuracy of 78%. The mobile app is easy to use and completely non-invasive, not requiring any external sensors or devices. It should be noted that value is stored only in temporary buffers and that only the detected states are stored. This will impose processing and time resources penalties, but will assure the fact that the detected patient states correspond to the targeted user. This is a necessary step that will increase the reliability of the system. The server application allows for the mobile app to be used for telemonitoring in different scenarios like: monitoring the state of people that need assistance in their daily lives, to detect the activities that are patients for them; monitoring patients by a psychiatrist, to allow the psychiatrist to have a better view of the mental states of his patient; monitoring the employs in different working areas to be able to better allocate human resources; etc.

VI.REFERENCES

[1] G. Fortino and P. Trunfio, "Internet of things based on smart objects: technology, middleware and applications," Cham, Switzerland: Springer, 2014.

[2] I. Lee and K. Lee, "The internet of things (iot): Applications, investments, and challenges for enterprises," Business Horizons, vol. 58, no. 4, pp. 431–440, 2015.

[3] F. Cicirelli, G. Fortino, A. Giordano, A. Guerrieri, G. Spezzano, and A. Vinci, "On the design of smart homes: A framework for activity recognition in home environment," Journal of medical systems, vol. 40, no. 9, pp. 1–17, 2016.

[4] P. Gope and T. Hwang, "Bsn-care: a secure iot-based modern healthcare system using body sensor network," IEEE Sensors Journal, vol. 16, no. 5, pp. 1368–1376, 2016.

[5] E. U.Iniyan, L.Padmanaban,"Fusion of Medical Images using Wavelet Transform and Second generation curvelet Transfor",International Journal of Creative Research and Thoughts,Vol 6,Issue 1,pp 437-442,2018.

[6] R. Gravina, P. Alinia, H. Ghasemzadeh, and G. Fortino, "Multi-sensor fusion in body sensor networks: State-of-the-art and research challenges," Information Fusion, vol. 35, pp. 68–80, 2017.

[7] C. C. Poon, B. P. Lo, M. R. Yuce, A. Alomainy, and Y. Hao, "Body sensor networks: In the era of big data and beyond," IEEE reviews in biomedical engineering, vol. 8, pp. 4–16, 2015.

[8] M. R. Yuce, "Implementation of wireless body area networks for healthcare systems," Sensors and Actuators A: Physical, vol. 162, no. 1, pp. 116–129, 2010.

[9] Ms. M. D. Dafny Lydia Ms. V. Savitha M.E. , Mr. E. U. Iniyan M.E.," Small Data Dissipation Using Se-Drip –An Enhanced Version of Drip," International Journal of Engineering Trends and Technology,Vol 18, pp.276-278,2014.

[10] KS Sunitha, E U Iniyan, M Moorthi, "Reversible Encrypted Data Concealment in Encrypted Images by Reserving Room approach for Data Protection System," International Journal of Research in Engineering & Advanced Technology,Vol 1, pp:1-5,2013.

[11] G. Fortino, G. Di Fatta, M. Pathan, and A. V. Vasilakos, "Cloud-assisted body area networks: state-of-the-art and future challenges," Wireless Networks, vol. 20, no. 7, pp. 1925–1938, 2014.

[12] G. Aloi, G. Caliciuri, G. Fortino, R. Gravina, P. Pace, W. Russo, and C. Savaglio, "Enabling iot interoperability through opportunistic smartphone-based mobile gateways," Journal of Network and Computer Applications, vol. 81, pp. 74–84, 2017.