SMART TELEMEDICINE SYSTEM FOR COMA PATIENTS

Mrs. E. STEPHENA [1], [2] D.SANTHOSH , [3] V.SASI KUMAR, A.SRIRAM [4]
[1]Assistant professor, Electronics and Communication Engineering, Loyola Institute of Technology
[2] Student, Electronics and Communication Engineering, Loyola Institute Of Technology [3]Student, Electronics and Communication Engineering, Loyola Institute Of Technology [4]Student, Electronics and Communication Engineering, Loyola Institute Of Technology

ABSTRACT:

Detection of changes due to movement in a real time video is very important tool. Patient movement system is a system that is used to detect movement changes in patient.Those changes may be either abnormal behaviour or unusual changes made by the patient in the absence of doctor. This paper presents the method of patient movement monitoring system for those patients that are taking medical treatment in both local and foreign Hospital with the help of frames comparison approach.

This system is maintain and monitor thehistory of the patients using smart IOT ESP8266. It Observe patient's temperature, movement and wet sensing using of LM35 and MQ135 sensors. And log the data's intoCloud for further use.In this Project FLEX sensors is used on the hand muscles in orderto measure tiny movement of the patient.

GLASS SETUP with EYE BALL sensor areused to monitorthe motion of the eyeballs.

Keywords- Arduino, Flex Sensor, Eyeball sensor, Limit switch sensor, Temperature Sensor, Wet Sensor, ESP8266 01s Module.

1. INTRODUCTION:

The Internet of Things (IoT) is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction. A thing, in the Internet of Things, can be a person with a heart monitorimplant, a farm animal with a biochip transponder, an automobile that has built-in sensors to alert the driver when tire pressure is low -- or any other natural or man-made object that can be assigned an IP address andprovided with the ability to transfer data over a network. IoT has evolved from the convergence of wireless technologies, microelectromechanical systems (MEMS), micro services and the internet. The convergence has helped tear down the silo walls between operational technology (OT) and information technology (IT), allowing unstructured machine-generated data to be analyzed forinsights that will drive improvements.

Today computers -- and, therefore, the internet -- are almost wholly dependent on human beings for information. Nearly all of the roughly 50 petabytes (a petabyte is1,024terabytes) of data available on the internet were first captured and created by human beings by typing, pressing a record button, taking a digital picture or scanning a bar code. The problem is, people have limited time, attention and accuracy -- all of which means they are not very good at capturing data about things in the real world. Ifwe hadcomputers that knew everything there was toknow about things -- using data they gathered without any help from us -- we would be able to track and count everything and greatly reduce waste, loss and cost. We would know when things needed replacing, repairing or recalling and whether they werefresh or past their best.

OBJECTIVE:

To Monitor and maintain the history of the patients. To observe patient's temperature, movement and wet sensing. Tolog the data's into cloud Think speak for further use.

LITERATURE SURVEY

2.1 INTRODUCTION

This chapter deals with review on smart and pervasive health care system in IOT. There are many software tools and techniques that are used for monitoring the health condition of the patient. Analysis of this method is also described. Certain algorithms were used.

2.2 REVIEW ON SMART AND PERVASIVE HEALTH CARE IN IOT

"Smart and pervasive ICU based-IoT for improving ICU" [Arnaud S. R. M.Ahouandjinou and Cina Motamed , 2015] has described Information and Communication Technologies solutions for modern healthcare systems continuously grow worldwide. Recent years have seen a rising interest in wearable sensors and today several devices are commercially available for personal health care, fitness, and activity awareness. In addition to current smart medical devices, researchers have also considered applications of such technologies in clinical applications in remote health monitoring systems for long term recording, management and clinical access to patient's physiological information. Based on current technological trends, one can readily imagine a time in the near future when your routine physical examination is preceded by a two-three days period of continuous physiological monitoring using inexpensive wearable sensors.

"Real time patient monitoring system based on Internet of Things" [Mohammad Salah Uddin and Suraiya Banu, 2017] has described the similar name of Intensive Care Unit (ICU) is Critical Care Unit (CCU). It is also familiar with some others name such as intensive treatment unit. ICU is a distinct sector of a clinic/hospital that delivers rigorous treatment. Not all the patients need intensive care. Medical scientist categorized them (patients) who needs special treatment "Real-Time Signal Quality-Aware ECG Telemetry System for IoT-Based Health Care Monitoring" Internet of Things (IoT)- driven health and wellness monitoring systems enable remote and continuous monitoring of individuals, with applications chronic conditions, such as obesity, hypertension, diabetes, hyperlipidemia, heart failure, asthma, depression, elderly care support, preventive care, and wellness [1]–[11]. The IoT paradigms can play a significant role in improving the health and wellness of subjects by increasing the availability and quality of care, and dramatically lowering the treatment costs and frequent travel.

The IoT driven healthcare system employs networked biosensors to simultaneously collect multiple physiological signals and wireless connectivity to share/transmit gathered signals directly to the cloud diagnostic server and the caregivers for further analysis and clinical review. "Real time health monitoring of patients from a remote place"[Arundhati Sen and T.K. Rana] has explained Care of critically ill patient requires prompt & accurate decisions so that life-protecting and lifesaving therapy can be properly applied.
Because of these requirements, ICUs have become widely established in hospitals.
Difficulty found in most hospitals is that expert has to frequently visit the patient and checks condition of the patient by measuring different parameters.

This paper presents a reliable, energy efficient patient continuous monitoring system from a local as well as from a remote place. It is able to send through GSM based technology, patient's health parameters like temperature, heart condition, and respiratory function in real time enabling the doctors or the family members to take measures.

Emergency online activated services have also been provided from remote GSM devices. "Wi-Fi based passive human motion sensing for in-home healthcare applications"[Bo Tan and Robert Piechocki,2016] This paper introduces a Wi-Fi signal based passive wireless sensing system that has the capability to detect diverse indoor human movements, from whole body motions to limb movements and breathing movements of the chest. The real time signal processing is used for human body motion sensing, and software defined radio demo system are described and verified in practical experiments scenarios, which include detection of through-wall human body movement, hand gesture or tremor, and even respiration. The experiment results offer potential for promising

healthcare applications
using Wi-Fi passive sensing in the home to monitor daily activities, to gather health data and detect emergency situations.

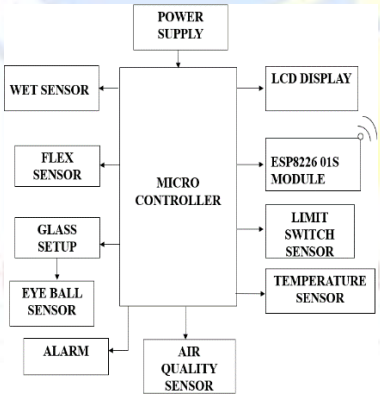
HARDWARE REQUIREMENTS :

1. Arduino Micro Controller
2. ESP 01S ESP 8266 Module
3. Temperature sensor
4. Flex sensor
5. Limit switch sensor
6. Eye blink Sensor
7. Wet Sensor
8. Buzzer
9. Air Quality sensor
10. 16x LCD Display

PROPOSED SYSTEM :

This chapter deals with Hardware and software architecture. Components are briefly explained with pin configuration. Arduino is one of the most renowned controller is very convenient to use, the coding or programming of this controller is also easier. The processed data is displaye in the LED display. Arduino is an open source computer hardware and software company, project, and user community that designs and manufactures single-board microcontrollers and microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical world. Power supply is given to all the components. The processed data is sent to ESP8266 (WI-FI module).

Block Diagram :



ARDUINO UNO :

Arduino is an open source computer hardware and software company, project, and user community that designs and manufactures single-board microcontrollers and microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical world. The project's products are distributed as open-source hardware and software, which are licensed under the GNU Lesser General Public License (LGPL) or the GNU General Public License (GPL), permitting the manufacture of Arduino boards and software distribution by anyone. Arduino boards are available commercially in preassembled form, or as do-it-yourself (DIY) kits. Arduino microcontrollers are pre-programmed with a boot loader that simplifies uploading of programs to the on- chip flash memory.

Fig.2 Arduino uno

ESP 01S ESP 8266 Module :

The ESP 01S WIFI Module is a self-contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your WIFI network. The ESP8266 is a capable of either hosting an application or offloading all WIFI networking functions from another application processor each ESP 01S Module comes pre-programmed with an AT command set firmware, meaning you can simply hook this up to your Arduino device and get about as much WIFI shield offers (and that's just out of the box)! The ESP 01S Module is an extremely cost effective board with a huge and ever-growing community.

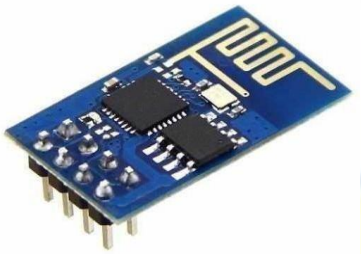


Fig.2.1 ESP01S ESP 8266 MODULE

TEMPERATURE SENSOR :

LM35 is a precision IC temperature sensor with its output proportional to the temperature. The sensor circuitry is sealed and therefore it is not subjected to oxidation and other processes. With LM35, temperature can be measured more accurately than with a thermistor. It also possess low self heating and does not cause more than 0.1oC temperature rise in still air. The operating temperature range is from - 55°C to 150°C. The output voltage varies by 10mV in response to every oC rise/fall in ambient temperature, i.e., its scale factor is 0.01V/oC.

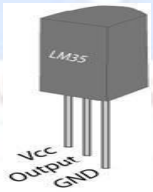


Fig.3.1LM 35 TEMPERTURE SENSOR

FLEX SENSOR :

Flex sensors are usually available in twosizes. One is 2.2 inch and another is 4.5 inch. Although the sizes are different the basic function remains the same. They are also divided based on resistance. There are LOW resistance, MEDIUM resistance and HIGH resistance types. Its terminal resistance changes when it is bent.

Fig. 4.1 FLEX SENSOR

LIMIT SWITCH SENSOR :

Detecting the presence or absence of anobject using a contact or noncontact detecting device is possible using a simpleswitch. Once the object is detected then these devices will generate an electrical signal that is used to control different types of equipment and also processes in differentindustries. One such is a limit switch. The controlling of this switch can be done by different factors like temperature, position, and pressure. This switch is mainly designedto operate only once a fixed limit is achieved, and it is generally activated through contact by using an object like a cam.

Fig.5.1 LIMIT SWITCH SENSOR

EYE BLINK SENSOR :

The eye blink using IR sensor and IR transmitter is used to transmit. The infrared rays in our eye. The IR receiver is used to receive the reflected infrared rays of eye. If the eye is closed means the output of IR receiver is high otherwise the IR receiver output is low. This to know the eye is closing or opening position. This output is given to logic circuit to indicate the alarm, gsm and LCD. This circuit is mainly used tofor counting application, intruder detector etc.

Fig.6.1 EYE BLINK SENSOR

WET SENSOR :

It is a self designed sensor it detects the patients wet condition and intimates to the nurse via the buzzer. It display the conditionof the patient via the LCD i.e wet detected or not so that the patient could be helped out.

BUZZER :

A buzzer or beeper is a signaling device, usually electronic, typically used in automobiles, household appliances such as a microwave oven, or game shows. It most commonly consists of a number of switch or sensors connected to a control unit that determines if and which button was pushedor a preset time has lapsed, and usually illuminates a light on the appropriate buttonor control panel, and sounds a warning in the form of a continuous or intermittent buzzing or beeping sound. Initially this device was based on an electromechanical system which was identical to an electric bell without the metal gong (which makes the ringing noise).

Fig.7.1 BUZZER

AIR QUALITY SENSOR :

The MQ-135 sensor can detect gases like Ammonia (NH3), sulfur (S), Benzene (C6H6), CO2, and other harmful gases and smoke. Silmilar to other MQ series gas sensor, this sensor also has a digital and analog output pin. When the level of these gases go beyond a threshold limit in the air the digital pin goes high. This threshold value can be set by using the on-board potentiometer. The analog output pin, outputs an analog voltage which can be usedto approximate the level of these gases in the atmosphere

Fig.8.1 AIR QUALITY SENSOR

LIQUID CRYSTAL DISPLAY (LCD) :

Either an active matrix display grid or a passive display grid makes up the LCD. Although the majority of smartphones with LCD panels employ active matrix displays, some older devices continue to use passive display grid designs. For their displays, the majority of electronic gadgets rely primarilyon liquid crystal display technology. The liquid has the distinct benefit of using less power than an LED or cathode ray tube.

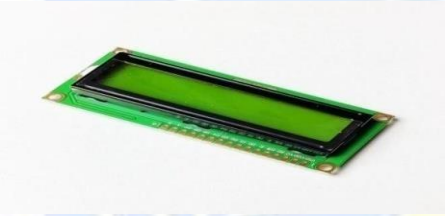


Fig.9.1 LIQUID CRYSTAL DISPLAY

CONCLUSION :

In designed to improve the standard living in home. The remote control function by pic16f877a provides help and assistance especially to disabled and elderly. In order to provide safety protection to the user, a low voltage activating switches is replaced current electrical switches. Moreover, implementation of wireless connection in control board allows the system installation in more simple way. The control board is directly installed beside the electrical switches thereby the switching connection is controlled by relay. Furthermore, flexible types of connections are designed as backupconnections to the system

REFERENCES :

1.Arnaud S.R.M. Ahouandjinou and CinaMotamed, on “Smart and Pervasive ICU based IOT for improving intensive health care”IEEE internet of things journals,jan.2017.

2.Mohammad Salah Uddin and Suraiya Banu, on “Real time patient monitoring system based on Internet of Things”IEEE internet of things journals, jan. 2017.

3.Barathram Ramkumarand M. Sabarimalai Manikandan on “RealTime Signal QualityAware ECG Telemetry System for IoT-
Based Health Care Monitoring”IEEEinternet of things journals, jan.2017.

4.Debeshi Dutta and Kunal Pal on “Finger movement based attender calling system for ICU patient management” IEEE internet of thingsjournals, jan.2015.

5.Deepika Agarwal and Punit Gupta on“IoT based smart healthcarekit” IEEEinternet of things journals, jan.2016.

6. IkhwanKim andYajie Qin on “Towards an IoTbased upper limbrehabilitation assessment system”IEEE internet of things journals, jan.2015.

7. Limin Son and Yuan Zhang on“Ubiquitous WSN for Healthcare: Recent Advances and Future Prospects”IEEE internet of thingsjournals, jan.2014.

8. Amir M.Rahmani and Geng Yang on“IoT-based Remote Pain Monitoring System: from Device to Cloud Platform”IEEE internet of things journals, jan.2017.