Enhancing Fall Detection System for Elderly and Dementia Patients

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Abstract:-Dementia is the most frequent neurodegenerative cognitive disorders, mostly aged people faces this kind of brain related issues. In this paper, the data's of dementia patients are collected and also uses the sensors and send the data's to the server are stored in a database. And hence we have proposed our project to safeguard dementia patients from getting lag in their mental health by boost their memory power by often remainding the patient to do scheduled activities on time. Also our system continuously monitors their physical health and intimate them when they required any medical assistance. Additionally we have adopted accelerometer sensor which will identifies whether the patient is in fall zone and intimates them regarding the environment. In case of any emergency the caregivers or concern persons generate alerts immediately when they face the situations that are indiscernible. The real time IOT, webpage is created and the data's are secured by the security key. AURDINO UNO is used for analysis purpose and results are shown in a better and easy way. Finally we discuss about the wearable technology for the construction of sensor band.

Keywords:- Pressure sensor,Temperature sensor, Mems, Lcd, Gsm, Lcd.

I. INTRODUCTION

The healthcare Internet of things (IOT) based on bio medical devices makes the home based health monitoring for the elderly possible. IOT is the physical device network, used for vehicles, home; it is embedded based electronics device. Main work is to exchange the data. To refer physical objects and IP address for internet connectivity and multi layer technology. It's a smart application for health monitoring. An establishing an IOT-based home cares monitoring system. In the home care monitoring system, the smart home gateway to collects signals from the body sensor and transmits them to the authorized server. The development of home gateway-based health monitoring systems has been through three stages. In the first stage of process, the GSM modem acts as the home gateway, and data was transmitted through the telephone line. This method is successful monitoring system for elderly people. It should be able to detect the desired condition and user's activities. This work like convenient to everyone. And it can be used to educated and uneducated person. This system component used by temperature sensor, pressure sensor, MEMS, GSM, then using simulation software is PROTEUS.

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II. RESEARCH ELABORATION

Power supply

Power supply is an electrical device. It's should be convert to AC voltage to DC voltage. These components are transformer, rectifier, and filter, regulator. The Input voltage of power supply is 240V AC and output regulates voltage is 5V.

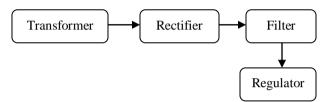


Fig 1:- Power Supply

▶ MEMS

MEMS represented by Micro-Electro-Mechanical Systems; it is defined as miniaturized mechanical and electromechanical device. This is micro fabrication techniques. Its fixed coordinate system, it is also used for health monitoring. It can be measure acceleration in 3axes. To detect whether person fall down or not.

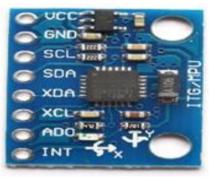


Fig 2:- Mems Sensor

Pressure sensor

A Pressure sensor is a device for health monitoring. These values convert to analog electric signal. This sensor used for to sense the human body pressure. These pressure values send to controller unit.

▶ Temperature sensor

A temperature sensor is a device, to detect the resistance of temperature level. Its act as thermometer or thermocouples, used to determine the human body temperature.LM35 sensor have 3 pins, ground pin, output voltage pin, supply voltage pin.LM35 is a high output voltage, these voltage directly proportional to temperature of Celsius.

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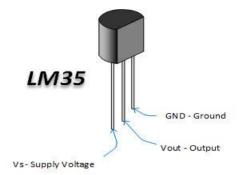


Fig 3:- Temperature Sensor

▶ Arduino

ARDUINO is an open source microcontroller family, serial number is Atmega328, and the operating voltage is 5V.it have 14 digital input and output pins, 6 analog input pins, ARDUINO is to control the all device, and brain of these all components. Input data collect from sensors.



Fig 4:- Arduino

► GSM

GSM is a Global system for mobile communication; it is used for mobile communication system in the world. It is cellular technology used for transmitting mobile data and voice, have operates frequency at the max 1900MHZ. It have time division multiple access technique. To reduce the data, and then send it down through a channel, there are different sizes of cell in a GSM System such as macro, micro, Pico each cell have varies of implementation domain. TDMA techniques have different time slots to each user on the same frequency. The data transmission and voice communication and carry on data rate 64Kbps to 120Mbps.main used GSM in these paper, temperature value and pressure value send to website server, and emergency time send alert SMS to authorized mobile number.



Fig 5:- GSM

> LCD

LCD represented by Liquid Crystal Displays (LCDs). Used for display unit. To control the pixel of different way in LCD screen. To display 16 character in 2 lines. Operating voltage 5V. It has 16 pin packages. Data pin is 8; main purpose of LCD in these projects is to display the body temperature value and pressure value.



III. BLOCK DIAGRAM EXPLANATION

After we are done connecting all the hardware and the Arduino, we can collect data from the sensors through the Arduino. The temperature sensor is a small semi-circle hardware, to measure temperature the host just has to put their finger on the temperature sensor and the sensor will gradually adapt with the hosts temperature and take that data in the Arduino. The data that this sensor collects is in Celsius format so we have to convert it to Fahrenheit format. The pressure sensor will be used to measure the pressure level at sleep duration of the host. The pressure sensor will be kept under the pillow of the host, part of the pressure pad would be connected so a high voltage will be counted on the Arduino and the duration of this high voltage is considered as the duration the host slept. MEMS sensors to analyse the person movements like walking, sleeping & sitting, emergency button can be active emergency situation time, and that time sms send to authorized mobile number. These all collection of data we can find website page. Also our system continously monitors their physical health and intimate them.

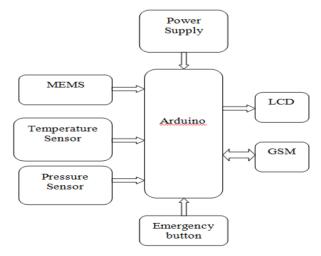


Fig 7:- Block diagram

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IV. SIMULATION RESULTS

The proteus simulation result for Enhancing Fall Detection System For Elderly And Dementia Patients. These process is automatic detection of body temperature and pressure level, the output result given below:

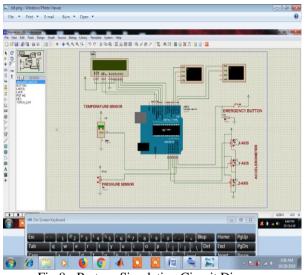


Fig 8:- Proteus Simulation Circuit Diagram

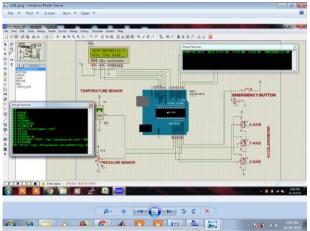


Fig 9:- Output simulation result for Enhancing Fall Detection System for Elderly and Dementia Patients

V. ADVANTAGES OF PAPER

- \succ It is fully automated system
- > Automatic alert system gives intimation to required person
- ➢ It Can be monitor any where using webpage
- ➤ Low cost
- Efficient method

VI. APPLICATION

- This project can be used in home for patients or ill person or old person.
- It can be used in hospital.

VII. CONCLUSION

This paper has proposed wireless sensors based person health monitoring for elder people. The real time IOT, webpage is created and the data's are secured by the security key.

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