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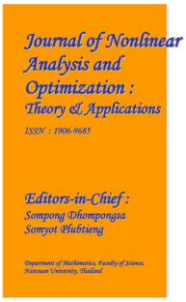

IOT BASED WHEEL CHAIR FALL DETECTION

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ABSTRACT:

As we know that many of the elderly people, because of the health condition and weakness doctor recommend them to get a wheel chair. As in our busy schedule we cannot monitor them all the day. And there is a chance that the elder people may fall from the wheel chair or they may fall when they are getting off the bed and What if they fall when there were no one around them? So in this project we can discuss about monitoring the elder people using the accelerometer sensors and wifi technology (radio frequency identification)operating through indoor and outdoor tracking using the embedded system with the thresholds. The falls can be detected of the elder people who are living alone in the home and the person who is handicapped can have certain incidents like falling so to monitor the elder people activities this paper presents the accelerometer sensor and the wifi technology using this technology the activities of the elder people can be identified and if they fall then we will get an alert message to our phone so that we may get them on time. Here DHT11 sensor used for to measure the temperature of person

INTRODUCTION

As we can see there are many elder people using a wheel chair because of their health condition and also there is a problem that many of the people cannot monitor them every minute because of their busy schedule. so, what if the elder people fell down from the wheel chair and being in a situation where he cannot seek any help from the near by people and also unable to shout louder and in the consideration many of the cases of the elder people are getting in adangerous situation without knowing their actual situation. So, in this mini project we can rectify the problem by monitoring them with technology by using the Gyroscope sensors. By this instrument we can monitor them and even we can detect if there is a fall. The Gyroscope sensor can detect the fall and sends an alert message to our phone saying that they areseeking for some help and by this we can save them.

Objective: This project aims to develop a wheelchair fall detection system using IoT which involves,if a person falls from the wheelchair,it will turn ON buzzer and alert people around that place,and the fall detection will be updated in the cloud. Here we are using IoT Gecko web to connect with the wifi network which shows the fall detection online. For detecting the fall detection we are using accelerometer and gyroscope sensors. If the sensor values exceeds the particular threshold value , it will detected as fall, the buzzer will ON. The users can get the alert in IoT gecko website or in app . Mainly When it comes to old age, it becomes necessary to monitor our old ones for their health and safety. Due to weakness and weak joints they have a great risk of falling

down. Now it is important to know if an old age person has fallen so that he/she can be helped on time. Also people on wheelchair need to be checked for fall detection. For this purpose we propose a smart fall detection system.

LITERATURE SURVEY

Background Research Independent-living seniors and people with disabilities have a high likelihood of falling and getting injured. Because no one is aware that the person is falling and becoming unconscious, the faller may sustain more serious injuries. If a falling incident occurs, it is crucial for a response and rescue time. Several technologies are available to assist in detecting falls in elderly people. Another of the systems that detected falls used a webcam to watch elderly people's activities and detect falls. However, only indoor environments can use it because of the high cost of installation and operation. Then, since detecting falls is rather expensive for all tiers of society, improvements must be made to lower that cost rate. Most of the time, commercially available fall detection systems require the user to wear a wireless emergency transmitter, such as a pendant, necklace, or wristband. Wearable technology has limitations, such as the tendency of elderly people to forget to wear them or their inability to use them after falling asleep. A device that can detect falls and automatically call for assistance without the user having to press a button is thus necessary. Although there are various existing studies which focus on fall detection with individual sensors, such as wearable ones and depth cameras, the performance of these systems are still not satisfying as they suffer mostly from high false alarms. Literature shows that fusing the signals of different sensors could result in higher accuracy and lower false alarms, while improving the robustness of such systems. We approach this survey from different perspectives, including data collection, data transmission, sensor fusion, data analysis, security, and privacy. We also review the benchmark data sets available that have been used to quantify the performance of the proposed methods. The survey is meant to provide researchers in the field of elderly fall detection using sensor networks with a summary of progress achieved up to date and to identify areas where further effort would be beneficial [5]. 5 1.3 Problem Statement Independent-living seniors and people with disabilities have a high likelihood of falling and getting injured. Because no one is aware that the person is falling and becoming unconscious, the faller may sustain more serious injuries. If a falling incident occurs, it is crucial for a response and rescue time. Several technologies are available to assist in detecting falls in elderly people. Another of the systems that detected falls used a webcam to watch elderly people's activities and detect falls. However, only indoor environments can use it because of the high cost of installation and operation. Then, since detecting falls is rather expensive for all tiers of society, improvements must be made to lower that cost rate. Most of the time, commercially available fall detection systems require the user to wear a wireless emergency transmitter, such as a pendant, necklace, or wristband. Wearable technology has limitations, such as the tendency of elderly people to forget to wear them or their inability to use them after falling asleep. A device that can detect falls and automatically call for assistance without the user having to press a button is thus necessary. As illustrated in Figure 1.3, Google Trends2 shows that fall detection has drawn increasing attention from both academia and industry, especially in the last couple of years, where a sudden increase can be observed. Moreover, on the same line, the topic of fall-likelihood prediction is very significant too, which is coupled with some applications focused on prevention and protection. [6]

DESIGN OF HARDWARE

ARDUINO UNO

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, 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 a AC-to-DC adapter or battery to get started.

The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converter. Uno board has a resistor pulling the 8U2 HWB line to ground, making it easier to put into DFU mode.

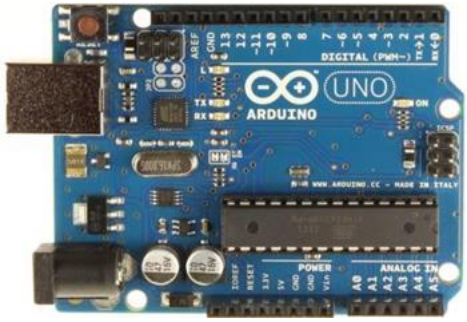
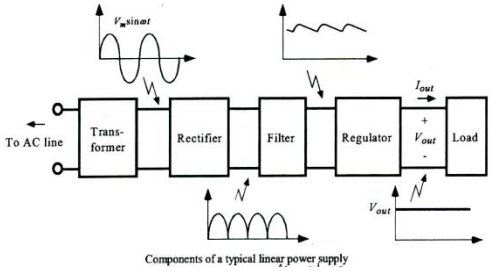


Fig: ARDUINO UNO

4.2. POWER SUPPLY

The power supplies are designed to convert high voltage AC mains electricity to a suitable low voltage supply for electronic circuits and other devices. A power supply can by broken down into a series of blocks, each of which performs a particular function. A d.c power supply which maintains the output voltage constant irrespective of a.c mains fluctuations or load variations is known as "Regulated D.C Power Supply".

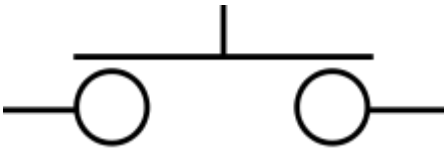


Components of a typical linear power supply

4.3. PUSH ON-SWITCH

A push button is a momentary or non-latching switch which causes a temporary change in the state of an electrical circuit only while the switch is physically actuated. An automatic mechanism (i.e. a spring) returns the switch to its default position immediately afterwards, restoring the initial circuit condition. There are two types:

- A push to make switch allows electricity to flow between its two contacts when held in. When the button is released, the circuit is broken. This type of switch is also known as a Normally Open (NO) Switch. (Examples: doorbell, computer case power switch, calculator buttons, individual keys on a keyboard).



- A push to break switch does the opposite, i.e. when the button is not pressed, electricity can flow, but when it is pressed the circuit is broken. This type of switch is also known as a Normally Closed (NC) Switch. (Examples: Fridge Light Switch, Alarm Switches in Fail-Safe circuits).

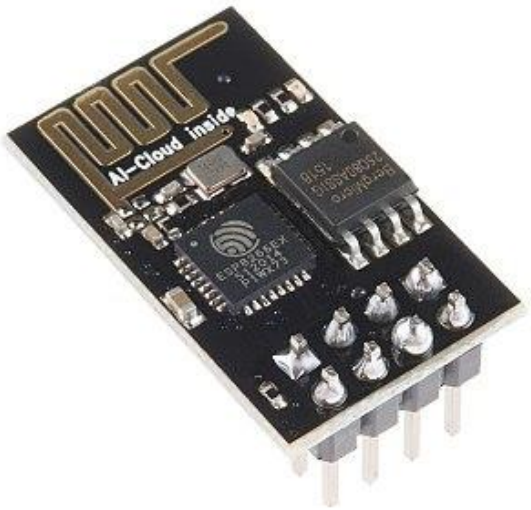
Many Push switches are designed to function as both push to make and push to break switches. For these switches, the wiring of the switch determines whether the switch functions as a push to make or as a push to break switch.

ESP8266 WIFI

The **ESP8266** is a low-cost Wi-Fi microchip with full TCP/IP stack and microcontroller capability produced by Shanghai-based Chinese manufacturer, Espressif Systems.[1]

The chip first came to the attention of western makers in August 2014 with the **ESP-01** module, made by a third-party manufacturer, Ai-Thinker. This small module allows microcontrollers to connect to a Wi-Fi network and make simple TCP/IP connections using Hayes-style commands. However, at the time there was almost no English-language documentation on the chip and the commands it accepted.[2] The very low price and the fact that there were very few external components on the module which suggested that it could eventually be very inexpensive in volume, attracted many hackers to explore the module, chip, and the software on it, as well as to translate the Chinese documentation.[3]

The **ESP8285** is an ESP8266 with 1 MiB of built-in flash, allowing for single-chip devices capable of connecting to Wi-Fi.[4]



4.7. LCD DISPLAY

A model described here is for its low price and great possibilities most frequently used in practice. It is based on the HD44780 microcontroller (Hitachi) and can display messages in two lines with 16 characters each. It displays all the alphabets, Greek letters, punctuation marks, mathematical symbols etc. In addition, it is possible to display symbols that user makes up on its own. Automatic shifting message on display (shift left and right), appearance of the pointer, backlight etc. are considered as useful characteristics.

Fig: 4.10. LCD

THEORY OF DC MOTOR

The speed of a DC motor is directly proportional to the supply voltage, so if we reduce the supply voltage from 12 Volts to 6 Volts, the motor will run at half the speed. How can this be achieved when the battery is fixed at 12 Volts? The speed controller works by varying the average voltage sent to the motor. It could do this by simply adjusting the voltage sent to the motor, but this is quite inefficient to do. A better way is to switch the motor's supply on and off very quickly. If the switching is fast enough, the motor doesn't notice it, it only notices the average effect.

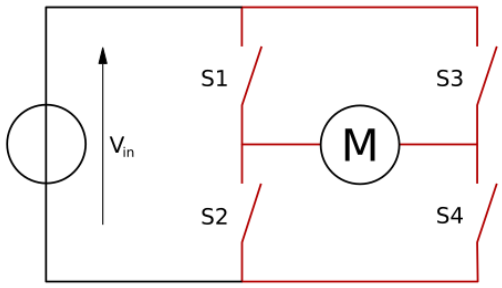
When you watch a film in the cinema, or the television, what you are actually seeing is a series of fixed pictures, which change rapidly enough that your eyes just see the average effect - movement. Your brain fills in the gaps to give an average effect.

Now imagine a light bulb with a switch. When you close the switch, the bulb goes on and is at full brightness, say 100 Watts. When you open the switch it goes off (0 Watts). Now if you close the switch for a fraction of a second, then open it for the same amount of time, the filament won't have time to cool down and heat up, and you will just get an average glow of 50 Watts.

This is how lamp dimmers work, and the same principle is used by speed controllers to drive a motor. When the switch is closed, the motor sees 12 Volts, and when it is open it sees 0 Volts. If the switch is open for the same amount of time as it is closed, the motor will see an average of 6 Volts, and will run more slowly accordingly. The graph below shows the speed of a motor that is being turned on and off

H-BRIDGE:

An H-bridge is an electronic circuit which enables DC electric motors to be run forwards or backwards. These circuits are often used in robotics. H-bridges are available as integrated circuits, or can be built from discrete components.



TEMPERATURE SENSOR (LM35):

in order to monitor the temperature continuously and compare this with the set temperature preprogrammed in the microcontroller, initially this temperature value has to be read and fed to the microcontroller. This temperature value has to be sensed. Thus a sensor has to be used and the sensor used in this project is LM35. It converts temperature value into electrical signals.

LM35 series sensors are precision integrated-circuit temperature sensors whose output voltage is linearly proportional to the Celsius temperature. The LM35 requires no external calibration since it is internally calibrated. . The LM35 does not require any external calibration or trimming to provide typical accuracies of ±1⁄4°C at room temperature and ±3⁄4°C over a full −55 to +150°C temperature range.

The LM35's low output impedance, linear output, and precise inherent calibration make interfacing to readout or control circuitry especially easy. It can be used with single power supplies, or with plus and minus supplies. As it draws only 60 μA from its supply, it has very low self-heating, less than 0.1°C in still air.

MEMS:

MEMS are a process technology used to create tiny integrated devices or systems that combine mechanical and electrical components. They are fabricated using integrated circuit (IC) batch processing techniques and can range in size from a few micrometers to milli metres. These
devices (or systems) have the ability to sense, control and actuate on the micro scale, and generate effects on the macro scale.

The interdisciplinary nature of MEMS utilizes design, engineering and manufacturing expertise from a wide and diverse range of technical areas including integrated circuitfabrication technology, mechanical engineering, materials science, electrical engineering,chemistry and chemical engineering, as well as fluid engineering, optics, instrumentation andpackaging. The complexity of MEMS is also shown in the extensive range of markets andapplications that incorporate MEMS devices. MEMS can be found in systems ranging acrossautomotive, medical, electronic, communication and defence applications. Current MEMSdevices include accelerometers for airbag sensors, inkjet printer heads, computer disk driveread/write heads, projection display chips, blood pressure sensors, optical switches,microvalves, biosensors and many other products that are all manufactured and shipped inhigh commercial volumes.

MEMS has been identified as one of the most promising technologies for the 21st

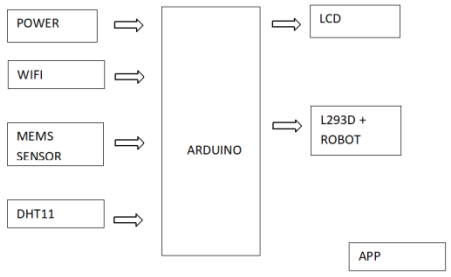
Century and has the potential to revolutionize both industrial and consumer products by combining siliconbased microelectronics with micromachining technology. Its techniques and microsystembased devices have the potential to dramatically affect of all of our lives and the way we live.

If semiconductor microfabrication was seen to be the first micromanufacturing revolution, MEMS is the second revolution.This report introduces the field of MEMS and is divided into four main sections. In the firstsection, the reader is introduced to MEMS, its definitions, history, current and potentialapplications, as well as the state of the MEMS market and issues concerning miniaturization.

The second section deals with the fundamental fabrication methods of MEMS including
photolithography, bulk micromachining, surface micromachining and high-aspect-ratio micromachining; assembly, system integration and packaging of MEMS devices is also described here. The third section reviews the range of MEMS sensors and actuators, the phenomena that can be sensed or acted upon with MEMS devices, and a brief description of the basic sensing and actuation mechanisms. The final section illustrates the challenges facing the MEMS industry for the commercialisation and success of MEMS.

6. PROJECT DESCRIPTION

BLOCK DIAGRAM:



As we can see the working principle we can say that the Gyroscope sensor can detect the fall of the person. If the elder people goes far away from the gyroscope sensor or if the elder people fall down from the wheel chair i.e goes away form the gyroscope sensor then the buzzer starts to make noise and we have to off the manually or we can turn it by our phone. The sensor is connected to the atmega microcontroller and these both the devices are connected to the power supply. Now by using the Arduino IDE (Integrated Development Environment) the software code is added into the atmega. When the fall is is detected the Gyroscope sensor gives a value 0 as the sensor is an active low which makes the buzzer high. The value of the sensor is displayed in the serial monitor of the Arduino IDE. This value will be sent to the Adafruit IO server with a message displaying Sent!

CONCLUSION

This work depends on the execution of distinguishing the fall of the septuagenarian who needs the prompt assistance of the someone else. This work have to make the locator on arduino based gadget for the advanced age individuals who falls down. This framework assists the septuagenarian with guaranteeing their security who is living alone in home, and if any disparity happens this framework alert the entitled individual through SMS. This assists the entitled individual with being unwind in their works without agonizing over the septuagenarian (ELDER PEOPLE).

FUTURE SCOPE

In our work the finder depends on IOT based sensor gadget which remains focused the progressions moving of the individual and furthermore saves the data. The gadget is very much convenient than contrasted with existing frameworks which assists with fixing in any space like wheel seat, bed, and the old age individual can likewise fix it with their wearable contraptions. This has been consider as

exceptional component of this work when contrasted with the current works. The significant benefit of this work is that this sensor gadget sends the SMS caution to the entitled individual which is particularly helpful for the individual to realize that the septuagenarian has felt down with the goal that they can take the quick activities to save them. What's more, if the individual has not gets the SMS ready, the gadget naturally settles on decision to the entitled individual

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