# IOT BASED WHEEL CHAIR FALLDETECTION

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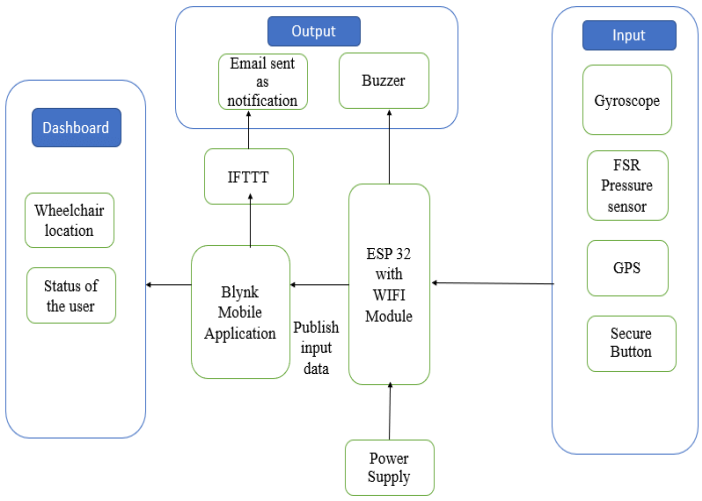
**ABSTRACT: As we know that many of the elderly people, because of the health condition and weakness doctor recommend them to get a wheel chair. As in our busy schedule we cannot monitor them all the day. And there is a chance that the elder people may fall from the wheel chair or they may fall when they are getting off the bed and What if they fall when there were no one around them? So in this mini project we can discuss about monitoring the elder people using the accelerometer sensors and RFID 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 RFID 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.**

**Keywords: Wheelchair, Sensors, Arduino.**

## 1. 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 a dangerous 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.

## 2. BLOCK DIAGRAM




## 3. COMPONENTS REQUIRED

### 3.1. Atmega Microcontroller

Atmega microcontrollers are based on Harvard architecture, i.e. separate data memory and program memory. The Program memory also known as Program or Code Memory is the Flash Random Access Memory (ROM). The size of program memory ranges from 8K to 128K Bytes.

The data memory is divided to three parts – 32 General Purpose Registers, Input/output memory and Internal Static Random Access Memory (SRAM). while the size of General Purpose Registers is fixed, the I/O Memory and internal SRAM size varies from chip to chip.

**3.2 Buzzer**

A buzzer or beeper is a sound flagging device, which might be mechanical, electromechanical, or piezoelectric (piezo for short). Common employments of bells and beepers incorporate caution gadgets, clocks, and affirmation of client info, for example, a mouse snap or keystroke.

Fig.3.2 buzzer

The two most normal advancements utilized in ringer plans are attractive and piezo. Numerous applications utilize either an attractive or a piezo ringer, yet the choice in regards to which of the two advances to utilize depends on various imperatives. Attractive bells work at lower voltages and higher flows (1.5~12 V, > 20 mA) contrasted with piezo signals (12~220 V, < 20 mA), while piezo ringers frequently have more prominent greatest sound pressing factor level (SPL) ability than attractive ringers. Notwithstanding, it ought to be noticed that the more prominent SPL accessible from piezo signals requires bigger impressions. In an attractive signal, a current is passed through a loop of wire which delivers an attractive field. An adaptable ferromagnetic circle is drawn to the curl when the current is available and gets back to a "rest" position when the current isn't coursing through the loop. The sound from an attractive signal is created by the development of the ferromagnetic circle likewise to how the cone in a speaker produces sound. An attractive bell is a current driven gadget, however the force source is regularly a voltage. The current through the loop is dictated by the applied voltage and the impedanceof the curl.

**3.3 Accelerometer & Gyroscope Sensor**

3.3.1 Accelerometer:

Accelerometer are electronic device that measures the acceleration, the rate of change in the velocity of the object. In other words, it's devices used to respond to any vibrations associated with movement.Accelerometers can be based on other operating principles, such as the microchip-packaged mems accelerometers. Mems accelerometers are designed for easy integration with Arduino or other microcontrollers these days, with common ones being the ADXL sensor series (popular ones being ADXL345, ADXL335). With its miniaturized sensors, Mems accelerometers are applicable for IoT usages, low-power, industrial and automotive applications, healthcare, etc.

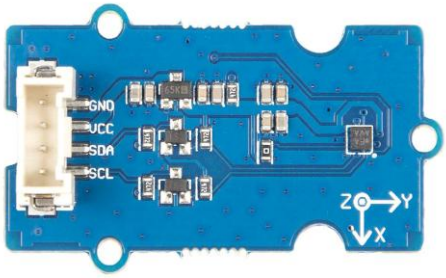



Fig.3.3.1 Accelerometer Sensor

3.3.2 Gyroscope:

A typical gyroscope contains a rotor that's suspended inside three rings called the gimbals.It works through the precision effect, allowing gyroscopes to defy gravity when the spin-axis is rotated. This means that instead of falling over from the force of gravity, it automatically adjusts itself sideways.MEMS Gyroscopes are small miniaturized sensors designed possible through integrating MEMS (Micro-Electro-Mechanical-System) technology into it. This allows for the functionality of gyroscopes to be utilized in a smaller package. Similarly to MEMS accelerometers, with such technology, it allows for a lower cost, lower power, and applicability with your Arduino, Raspberry Pi, and more!


Fig. 3.3.2 Gyroscope sensor

Besides sensing the angular velocity, Gyroscope sensors can also measure the motion of the object. For more robust and accurate motion sensing, in consumer electronics Gyroscope sensors are combined with Accelerometer sensors. Depending on the direction there are three types of angular rate measurements. Yaw- the horizontal rotation on a flat surface when seen the object from above, Pitch- Vertical rotation as seen the object from front, Roll- the horizontal rotation when seen the object from front. The concept of Coriolis force is used in Gyroscope sensors. In this sensor to measure the angular rate, the rotation rate of the sensor is converted into an electrical signal. Working principle of Gyroscope sensor can be understood by observing the working of Vibration Gyroscope sensor.

## 4. WORKING PRINCIPLE

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!

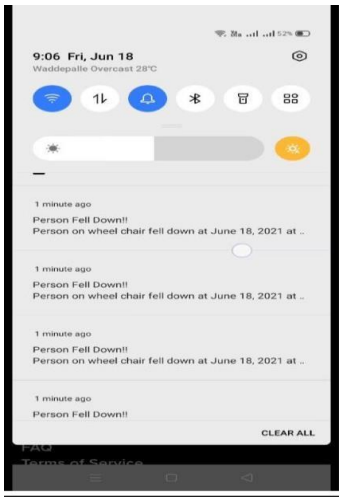



Fig 4.1 image showing notification

As we can see we can receive a notification to our phone showing that the people had fell down.

## 5. 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).

## 6. 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

## 7. REFERENCE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