

Wearable sensor fall detection system

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ABSTRACT - Unobserved human falls can be dangerous and can badly affect health. Falls can cause loss of independence and fear among the older people. Sometimes falls may even lead to death. So, many fall detection systems have been developed in the recent past and still efficient fall detection systems are an area of research. This paper presents a study on many of the currently available systems to detect falls which includes fall detection based on many sensors like accelerometer sensor, camera, contrast vision sensor, etc. Also examined the problems with these solutions and identified their main features.

Keywords -Fall Detection, Ageing, Sensors, Accelerometer.

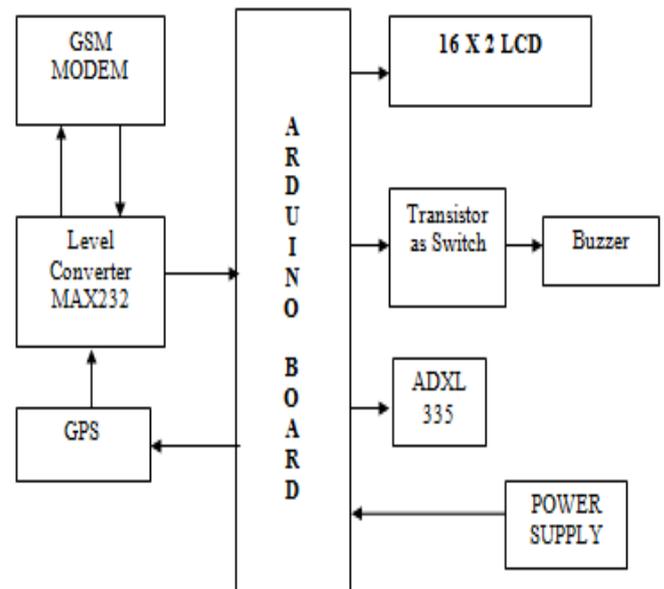
1. INTRODUCTION-

Unintentional falls are a common cause of severe injury in the elderly population. By introducing small, non-invasive sensor nodes in conjunction with a wireless network, the Project aims to provide a path towards more independent living for the elderly. Using a small device worn on the waist and a network of fixed nodes in the home environment, we can detect the occurrence of a fall and the location of the victim. Low-cost and low-power MEMS accelerometers are used to detect the fall while GSM and GPS is used to locate the person. Falling can be a frequent and dangerous event for the elderly population. It is estimated that over a third of adults ages 65 years and older fall each year, making it the leading cause of nonfatal injury for that age group.

2. OBJECTIVES-

The objective of this project was to design and create a fall detection system for the elderly persons.

3. BLOCK DIAGRAM-



3.1 Block diagram description-

3.1.1 Accelerometer-

Accelerometers are available in one, two and three axes. So here we are using three axes accelerometer. and it is common and inexpensive. output range is +1.5g. Accelerometers are useful for sensing vibrations in systems or for orientation applications. That's why we are using ADXL335 sensor. This is one of the main part of our project.

3.1.2 Arduino board-

In our project we are using arduino uno board (ATMEGA328P). The operating voltage is 5 Volt and clock speed is 16 MHz. It has 14 digital input/output pins (of which 6 can be used as PWM outputs) and 6 analog inputs. The Arduino Uno can be powered via USB connection or with an external power supply. Arduino IDE supports Windows, Mac OS X or Linux. In our project we are build up the arduino kit using the IC and mounting with required component.

3.1.3 LCD Display-

In this project we are using 16x2 LCD Display to display the location of the persons and their latitudes and longitudes.

3.1.4 Transistor as a Switch-

Output of micro-controller is not sufficient to drive the buzzer directly. Therefore to drive the buzzer we are using transistor as switch.

3.1.5 Buzzer-

This is output device. When there is accident detected then Buzzer turns ON. Buzzer will take the attraction from other vehicles passing through it.

3.1.6 Power Supply-

This block converts 230 Vac into +5 volt dc and +12 volts dc. +5 volts is required for Arduino board, MAX232 level converter, LCD display, sensors and signal conditioning etc. +12 Volts are required for Buzzer, GSM and GPS Module.

3.1.7 Level Converter-

In our project, RS MAX232 converter are used. The MAX232 translates a TTL logic 0 input to between +3 and +15 V, and changes TTL logic 1 input to between -3 and -15 V, and vice versa for converting from RS-232 to TTL.

3.1.8 GPS Modem-

In our project, GPS modem used for the radio navigation system that will give you the exact position of your vehicles, no matter where they are, what time it is, or what the weather is like. A total of 24 satellites orbit the Earth, monitored continuously by earth stations. GPS satellites broadcast beams in two carrier frequencies; L1 (1,575.42 MHz) and L2 (1,227.60 MHz). The navigation messages are broadcast at a rate of 50 bits per second. Utilizing this collection of data, GPS receiver calculates distance between satellites and the receiver in order to generate position data.

3.1.9 GSM Modem-

In this paper, module SIM900 GSM modem are used. which are used for navigation system. it requires sim card from a wireless carrier in order to operate. and operates over a subscription to a mobile operator, just like a mobile phone. GSM Modem works on Serial communication. it has several advantages such as low cost, reliable, easy to use, and has wide coverage.

4. CONCLUSION

The hardware module can be easily made wearable and can be carried outside also. fall detectors are important to provide a rapid aid to the fall victim in order to avoid serious health problems. the conclusion obtained is that, accelerometer provides more accurate results, the best and efficient way to detect falls are by using accelerometer sensors.

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