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Smart Glove for Blind

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Abstract: ***Blind people's main problem is their loss of vision that cannot be corrected with glasses or contact lenses. They use sticks which will help to know their movement. But here there is a problem with navigation which leads to harm. To get rid of this problem we implemented a smart glove for blind using Ultrasonic sensor, GPS receiver, buzzer, vibrator, microcontroller, colour sensor, fall detector, and battery are all included in this system. Arduino UNO can be used to carry out this project.*** *It* ***can be connected to the sensors listed above. The ultrasonic sensor is useful for detecting impediments and guiding the visually handicapped. If the ultrasonic sensor encounters any difficulties along the road, a buzzer/vibrator is employed to alert the person. A colour sensor can aid in the detection of various coloured objects or items. If the person has an accident or something untoward occurs, the fall detector will notice it and notify their guardian. The device's overall goal is to give a simple and safe way for blind people to overcome their daily challenges.***

Keywords: Ultrasonic sensor, Arduino IDE, GPS antenna, GSM, Fritzing software

I. INTRODUCTION

Canes and guided dogs are the most popular materials or components used by the blind to specify their movement. However, there are issues with this navigation assistance. As a result of the limited preview provided by the cane, the user must be more cautious when walking and go very slowly. The training and maintenance of guided dogs for blind persons is a demanding task. It helps to move with safety and ease through the environment without depending on others. Our problem statement is that around the world, blind people face real problems. Their main problem is their loss of vision that cannot be corrected with glasses or contact lenses. They also face problems with others asking for help, they hesitate or like assistance to them. The objectives of this project are to ensure safety and make navigation easier for blind people. Object detection and ranging is one of the objectives for this ultrasonic sensor that falls into this category. Ultrasonic sensor is used not only for detecting an object but also to measure the distance between the object and sensor. Providing response through vibration and buzzer sound. Sending out the live location to known ones. The glove is fitted with our full system. The method is straightforward: it uses an ultrasonic sensor attached to an Arduino to identify impediments and provide feedback to the user through a vibration motor and a buzzer. And the other objective is Fall detection, in this system use accelerometers (acceleration: rate of change of velocity of an object with respective time), to monitor the movements of the user. It detects when the user has suddenly fallen, by detecting the object changes of body movements.

II. LITERATURE SURVEY

There are different systems that connect to the development of projects for blind people in order to make the system more efficient. These literature reviews assist us in overcoming numerous design and program-related issues. T. Shabana, A. Anam, A. Rafiya, and K. Aisha wrote in “Voice based email system for blinds' ' In this generation communication has become simple because of integration of the internet with the technologies of communication. [2] On the other hand, those who have been exposed to this technology believe that it is difficult to operate because it demands visual insight.Despite the fact that numerous new advancements have been made to assist them in effectively using PCs, no credulous client who has been externally tested can use this innovation as proficiently as an ordinary inexperienced client can. This is not typical for ordinary clients, and they require some training to use the available advances.This type of techniques can also be used by ordinary persons as someone who can know how to read.In the next paper referred, titled as “Smart Cane for blinds' ' . This paper is all about how a blind person can move in an obstacle environment using a smart cane.It is a mobile application which instructs blind persons to move from one place to another. It consists of different modules and control commands which helps the visually impared persons to travel from one place to another without facing any problems.It is a Systematic review of Smart cane uses for blind persons. As a result this aim is organized exploration is to classify the use of smart cane in visually impaired lives. The following parts make up the remainder of the paper : Describing the strategy of navigating and data abstraction process ,describing the research emphasis,smart cane models,sensor-based methods,focusing on the most important findings and also the possible future paths.

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III. PROPOSED METHODOLOGY

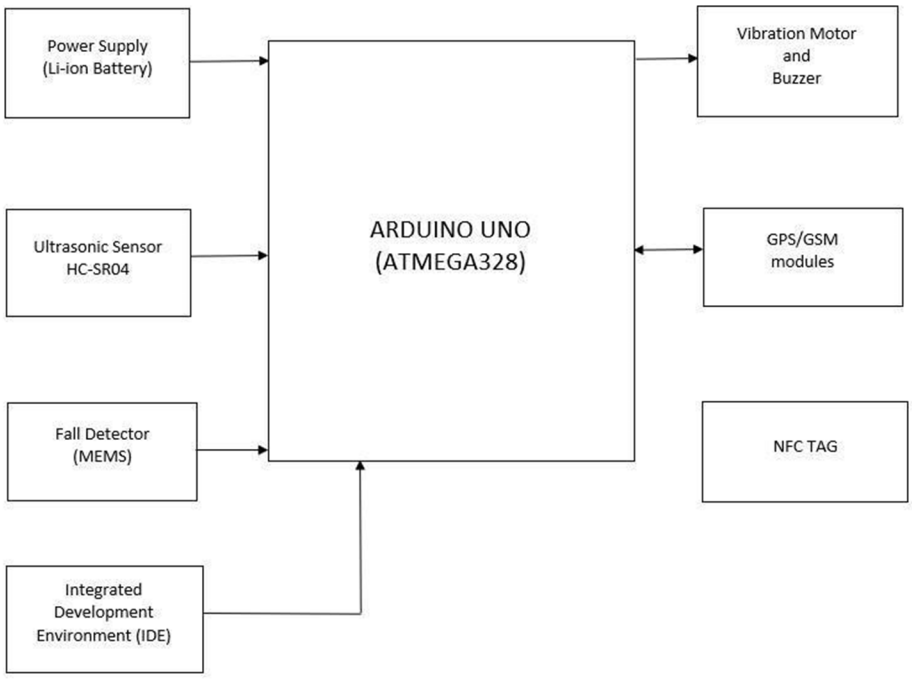


Figure 1:Block Diagram of Smart Glove

Here in our project the hardware components play an important role: the ultrasonic sensor senses the obstacle and sends the signal to arduino. This arduino acts as a microcontroller and it processes the data and sends signals to the buzzer or vibrator1 it'll help them in crisis circumstances just by tapping telephone gloves and relatives are going to be informed by instant messages. During this way, NFC will assist them with covering a wide scope of circumstance taking care of just by tapping the phone to gloves and relatives are going to be informed by instant messages. It'll help them in crisis circumstances just by tapping the telephone to gloves and relatives are going to be informed by instant messages. During this way, NFC will assist them with covering a wide scope of circumstance taking care of just by tapping the phone to gloves.

IV. HARDWARE AND SOFTWARE COMPONENTS

A. Arduino IDE and Arduino Uno

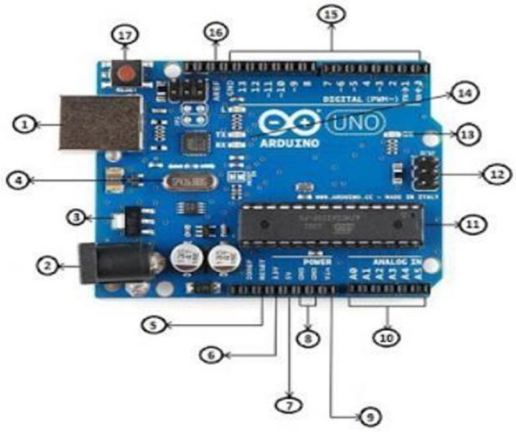


Fig. 2 Arduino Uno

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The software wanted to program Arduino is understood because the Arduino Integrated Development Environment is briefly referred to as the Arduino IDE. It's an open-source software available on the web and may be downloaded and employed by anyone anywhere freed from cost. The software is extremely simple and straightforward to use even for a layman. The IDE is employed to transfer the software code into the Arduino board as machine-level instructions to perform the intended action by the Arduino board after connecting all the specified sensors and devices.The Arduino Ide sends an instruction set to the Arduino board's microcontroller which tells the board to what action to perform. This is often done by the usage of programming language in Arduino. The Arduino IDE supports a good range of languages from basic C programming language to Object oriented languages just like the Java and Python.The Arduino contains a microcontroller mounted on the board, which is liable for completing the instructions in your program. The ATmega328 microcontroller is the brain of the Uno Arduino R3. ATmega 32*8 may be a microcontroller of 8-bit from the AVR family. Its internal registers and data-bus architecture are designed to accommodate eight concurrent data signals.

B. Ultrasonic Sensor

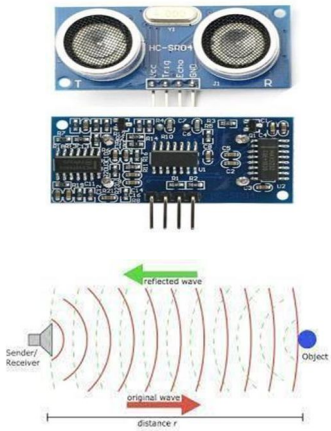


Fig 2.1-Ultrasonic sensor

The sensor is used to detect the objects present before the person. It senses objects about a particular distance. This distance is calculated and sent to the person.This sensor plays an important role in our project .It senses the obstacle in front of the person and indicates to the arduino.

C. GSM Module



Fig. 2.2 GSM Module

A GSM module is a hardware component that is a chip Or circuit that will be used to generate communication between a telephone Or a machine and a GSM. It is connected to a mobile phone that has all gsm capabilities. It consists of two antennas. One of them is formed with wire and the next one is formed with pcb radio wire. Second one is better one it permits us to keep our modules inside a metal sheet.

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D. GPS Antenna

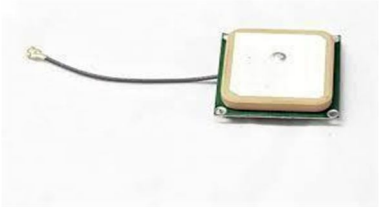


Fig. 2.3 GPS Antenna

This is a GPS Antenna having a frequency of 1575 5 MHz and 28dBi gain. GPS Antenna may be a wireless device to receive and transmit GPS signals, it's been widely utilized in telecommunication to speak . One among the best reasons to use a chip antenna is the reduced overall cost of the radio module.

E. Fall Detection

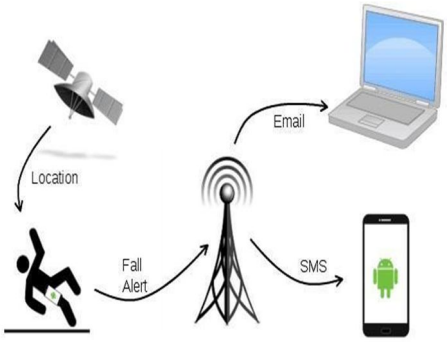


Fig. 2.4 Entire Fall Detection Process

This uses accelerometers,to observe the person. leading edge fall recognition gadgets utilize three pivot accelerometers, almost like people who are utilized inside smartwatches and cell phones. Some fall location gadgets utilize an inherent tri-hub accelerometer with licensed calculations created by Bio Senses. The innovation can assess a particular person's position, actual work, and therefore the perfection of speed increase of developments. In the event that the gadget verifies that these factors are inside the danger zone and a fall went on , it'll naturally initiate a crisis fall caution and call crisis reaction specialists for help. Most regular developments identified with falls are precisely distinguished through programmed fall recognition innovation.

F. Buzzer



Fig. 2.5 Buzzer

Buzzer is the most useful part to highlight our project that provides sound. It is a two pin structure.it is fixed to the arduino.Buzzer contains a ceramic disk when the power is supplied to the buzzer it makes the disk contract or expand. This makes an encompassing disc to produce sound. This is the sound we hear. It can be varied by changing the frequency of the buzzer.

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G. Vibrator Motor



Fig. 2.6 Vibration Motor

There are two basic types of vibration motor.. The most mainstream sort of whimsical turning mass (ERM) engine within purchaser electronic gadgets is the hotcake vibration engine (coin vibration engines). Coin vibration Motor (additionally be called as level vibration engine or flapjack vibration engine) is a sort of ERM Motors. Not quite the same as Cylinder Coreless Motors, the thickness of the Coin Vibration Motor is a lot more modest (the thickness is typically in 2mm-3mm) which makes it appear that it is a coin. Furthermore, that' s the motivation behind why individuals call it a coin vibration engine when all is said and done. Not at all like the barrel shaped engine, the offbeat load of the coin engine is situated in the shell, which essentially decreases the thickness and gives a more grounded conclusion to the engine. That is the reason coin engine is so pervasive in Mobile and Handset fields.

V. RESULTS

The glove is fitted with our full system. The method is straightforward: it uses an ultrasonic sensor attached to an Arduino to identify impediments and provide feedback to the user through a vibration motor and a buzzer. When a fall is detected using the fall detector, GSM and GPS are also connected to the Arduino, which broadcasts the user's location to their known ones.As illustrated in the above diagram, all of the components are attached to the glove, and the glove is outfitted by the user. Ultrasonic sensors are mounted to the glove in such a way that they cover a 180-degree angle in front of the user, allowing them to identify obstructions within the ultrasonic range.The Arduino board, which is the processor that controls all of the components, is mounted below the wrist, together with the RPS and MEMS-based Fall Detector system (Micro Electro Mechanical Systems Sensors). GSM and GPS modules are incorporated on the top of the glove to improve the transmission and reception ranges of the GPS and GSM antennas. Figure 3 depicts the view of the smart glove

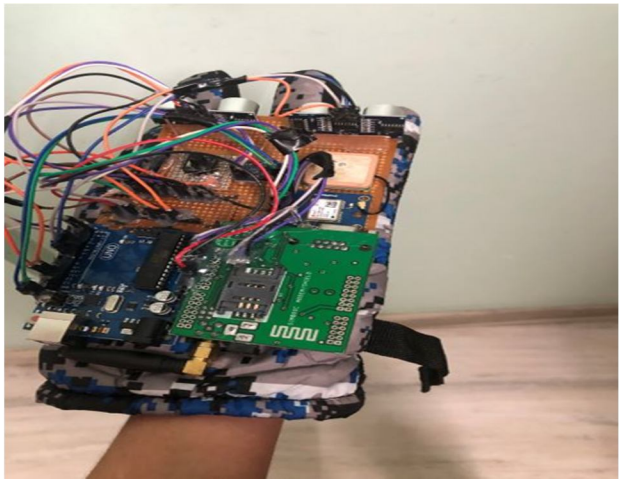


Fig 3-Smart Glove for blind

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A. Emergency Button

The Emergency Button is a tool that assists users who are in emergency situations such as thefts, accidents, or health problems.The client presses the emergency button in the smart glove. When the client squeezes the emergency button, the Arduino detects the reaction and instructs the GSM and GPS modules to relay the position coordinates to their known contacts. So that family members can contact the location and save them in the event of an emergency.

When a user clicks the emergency button, the message "EMERGENCY ALERT" is sent to a family member, along with the user's exact position coordinates as a google maps link.

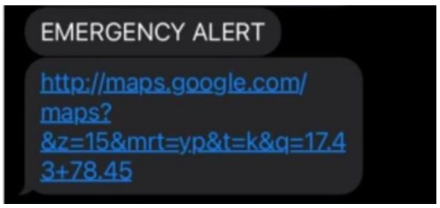


Fig-3.1-Emergency Alert

B. Fall Alert

A gyroscope and a three-axis accelerometer are used in the Fall Alert system to continuously monitor the user's body position. When a user falls down unexpectedly, the fall warning system detects the change in body posture and sends the information to the Arduino, who then triggers the GSM and GPS modules, which send the user's location. The figure 3.2 shows the message which is sent as 'FALL ALERT' and the users exact location coordinates as google maps link are sent to their family member.

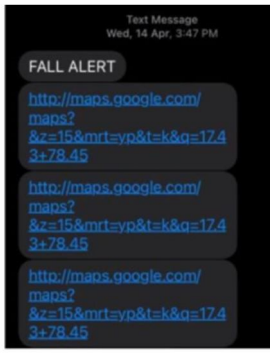


Fig 3.2-Fall Alert

When a user taps on the link, it will take them to Google Maps, which will display them the direction to their exact position, as illustrated in Figure 3.3.

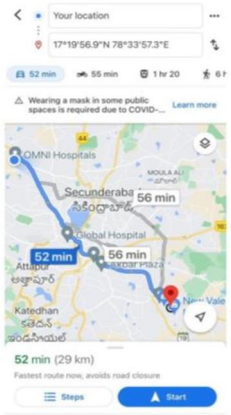


Fig 3.3-Google Maps

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VI. FUTURE SCOPE

The current dazzling glove's future extent manages the outwardly obstructed individual in a productive manner, ensuring the individual's safety. A smartphone app can be created such that the user's family members may follow the user's whereabouts at all times.Family members can also supply real-time directions to the user via speakers using voice commands. Water and fire sensors can be included into the smart glove as an extension of the project. Voice assistants can be embedded into the smart glove, allowing the user to call anyone and activate any of the smart glove's features.By including health monitors such as a heart rate monitor, oximeter, and blood pressure monitor, this smart glove might become a feature-rich device. NFC tags can provide backup service, for example, if the system has run out of battery or if the user has been involved in an accident.

VII. CONCLUSION

The number of visually impaired people of all ages worldwide is estimated to reach 285 million, with 39 million of them blind. People aged 50 and up account for 82 percent of all blind people. For blind people, getting from one place to another has become a huge challenge. They require a blind stick or someone to push them in a wheelchair to travel.Smart Glove uses ultrasonic sensors, GSM, GPS, and a fall detector to tackle real-world challenges experienced by blind people in their daily lives, allowing them to be more independent. It also protects their safety and makes navigating easier for them. Another significant element of the smart glove is the emergency button, which allows the user to notify their loved ones if there is an emergency.The framework's advantage is that it can demonstrate to be a low-cost solution for a huge number of visually impaired people all over the world.

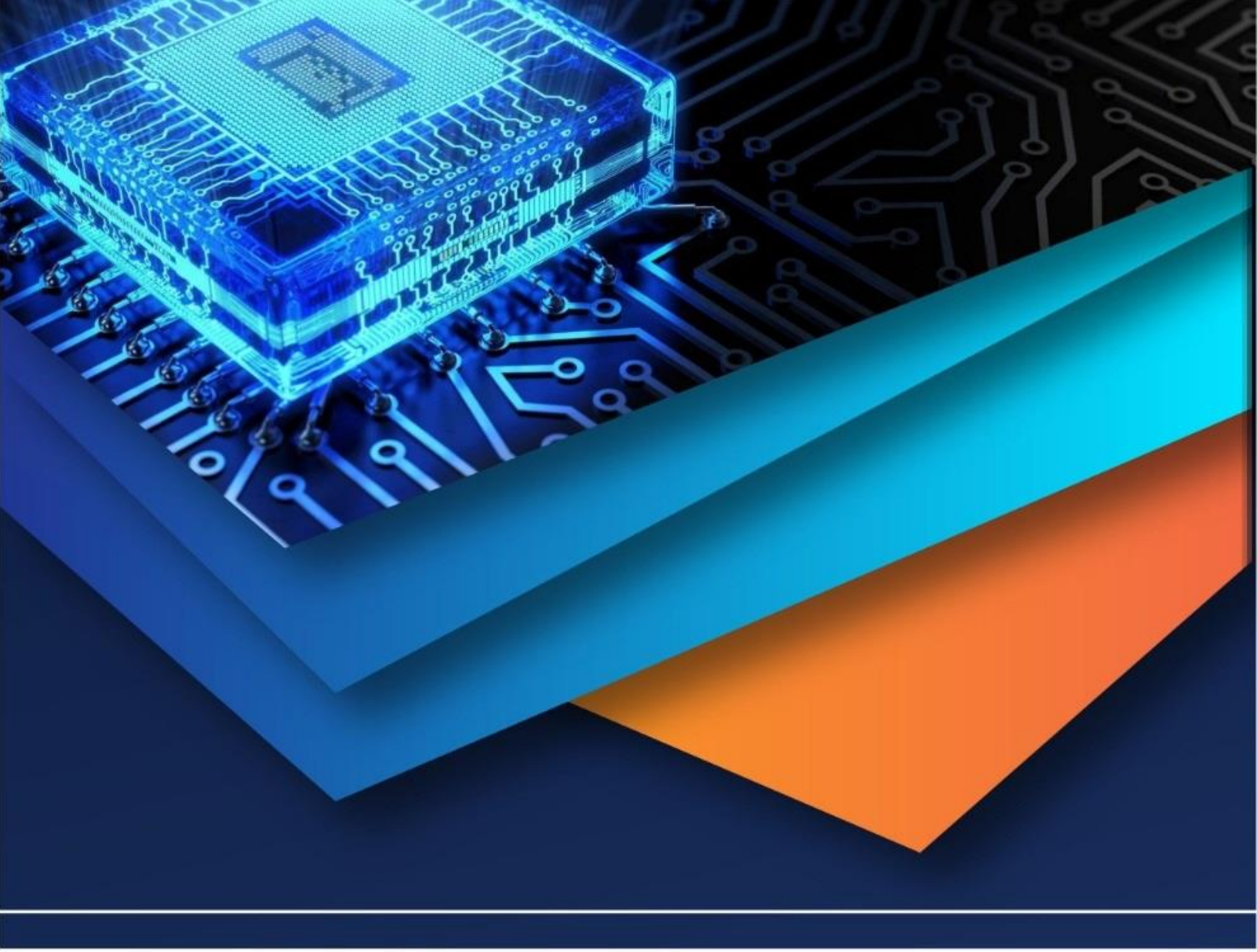
VIII. ACKNOWLEDGEMENT

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