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Smart Glove for Blind

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Abstract: To assist visually impaired individuals, a study that helps those individuals to walk additional with confidence is planned. The study hypothesizes a sensible walking glove that alerts visually-impaired individuals over obstacles, pits therefore this device might facilitate them in walking with less accident. It outlines a far better guidance tool for the visually impaired. It consists of straightforward walking equipped with sensors to provide data concerning the environment. GPS technology is integrated with a microcontroller which can facilitate their favorite ones to stay an eye on them. during this system, supersonic sensing elements, GPS receiver, buzzer, vibrator, microcontroller, fall detector, NFC communication, and battery are used. This project will be enforced by victimization Arduino UNO. It will be interfaced with higher than mentioned sensors. The ultrasonic sensing element helps distinguish obstacles and guide the impaired in their manner. If an ultrasonic detector finds any inconvenience in their manner, then Buzzer/Vibrator is employed to send the acknowledgment to the person. All of the unexpected, if the person met with an associate accident or any excess factor happen then fall detector senses that and it'll send the acknowledgment to their guardian. additionally, to all or any of these options, NFC will be used as a backup choice. the device aims to supply a convenient and safe technique for the blind to beat their difficulties in lifestyle.
Keywords: GPS, GSM, NFC Communication, Arduino UNO, supersonic sensing element.

I. INTRODUCTION

Vision is that the most significant part of human physiology as eighty-three of knowledge a person gets from the atmosphere is via sight. The 2011 statistics by the World Health Organization (WHO) estimates that there are 285 million people within the world with visual defects, thirty-nine million of that are blind, and the remaining 246 million with low vision. Presently, blind folks use a white stick as a tool for guiding them after they move or walk. Here, we tend to develop a tool that might function as a sensible glove being additional economical and useful than the traditional one. this may assist the blind persons throughout the walk associated provides an alarm if any hurdle is detected among the set range. Nowadays, technology and human life can't be separated because it has become the development of the globe. however, the technology will facilitate people that visually impaired? Blind individuals sometimes will estimate the obstacle ahead of them while not knowing the particular distance of the obstacle from them. quality for the blind folks will be outlined as quality to maneuver with safety and ease through the atmosphere while not suppose different. most ordinarily quality aid utilized by the blind cane and guide dogs to facilitate their movement. However, there are issues with these navigation supports. they will give a restricted preview for the user and as a result, a user needs to be additional careful to run and mobile very slowly. As for the guide dogs, coaching and coordinating the dogs with blind folks are tough tasks and also the result is minimal. To beat this drawback, analysis on the assistant devices for the blind has been done by {many people to assist cut back the restricted ability of blind people. The helpful glove for the blind could be a device that will facilitate the visually impaired to facilitate movement and to perform daily activities while not relying an excessive amount on others. The glove with the combination of ultrasonic sensor HC-SR04, Arduino UNO microcontroller can help blind to facilitate movement and provides alert to the user if there are obstacle ahead of them within the range of a pair of cm to three hundred cm.

II. LITERATURE REVIEW

To make the System additional economical there is a varied system that relates to the event for projects associated with blind persons. This literature survey facilitates us to beat various style and program-related enhancements. In “Voice-based email system for blinds” by T. Shabana1, A. Anam, A. Rafiya, K. Aisha. says “In today’s world communication has become very easy thanks to the integration of communication technologies with the web.[2] but, the unsighted due to notice it because of tough to utilize this technology owing to the very fact that victimization they need visual perception”. even if several new advancements are enforced to assist them to use the computers with efficiency no unexperienced user World Health Organization is visually challenged can use this technology as with efficiency as the unexperienced user will do this is not like normal users, they need some practice for using the obtainable technologies.

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This paper aims at developing an associate email system that may facilitate even an inexperienced visually impaired person to use the services for communication while not previous coaching. The system won't let the user create use of keyboard instead can work solely on mouse operation and speech conversion to text. Also, this method will be utilized by any traditional person added as an example the one World Health Organization isn't ready to scan. The system is supported interactive voice response which can create it user-friendly and economical to use.

Navigation System for Visually Impaired individuals by Chaitali Kishor Lakde and Dr. Prakash S. Prasad says Navigation help for visually impaired (NA VI) refers to systems that are ready to assist or guide people with vision loss, starting from partly clear-sighted to wholly blind, by means that of sound commands.[3] several researchers are operating to help visually impaired individuals in numerous ways in which like voice-based help, ultrasonic based mostly help, camera-based assistance, and in some advanced manner researchers are attempting to provide transplantation of real eyes with robotic eyes which might capable enough to plot the important image over patient retina using some medical specialty technologies. There are some limitations in the system like obstacle detection that couldn't see the thing however detection the thing and camera-based system cannot work properly in numerous light-weight level therefore the planned system could be a fusion of Color sensing detector and also the obstacle sensing element alongside the voice-based assist system.

III. PROPOSED DESIGN

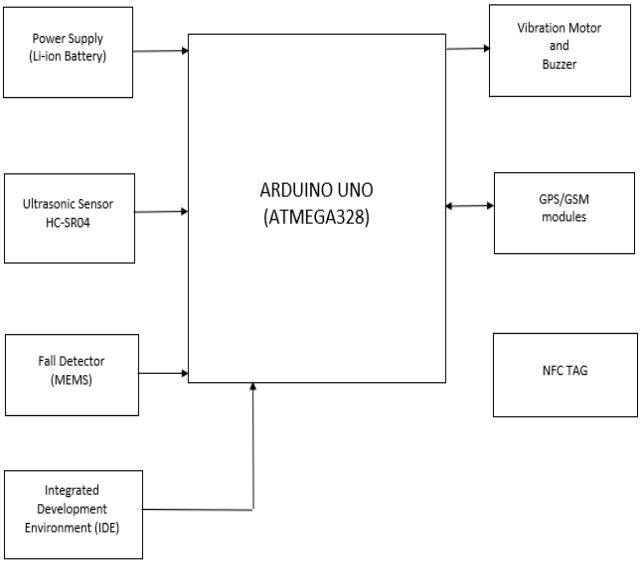

Fig. 1. Block diagram of Smart Glove

The proposed system uses Arduino UNO as the core of the system to which different sensors and modules are interfaced to get different results in different cases.

IV. WORKING OF SMART GLOVE

To achieve the objectives, the scope of this project is determined. For the hardware, ultrasonic detectors are used as a sensor to find obstacles at the front and it'll send the signal to Arduino UNO that acts as a microcontroller. The microcontroller can then process information and send the signal to Buzzer/Vibrator Motor which can guide through its moving feedback. For the software package, the planning of the circuit is completed using Fritzing software package and therefore the program is done using the Arduino software package by installing through the Arduino library. To assist blinds in emergency things, are square measure using the GPS/Near Field Communication Technology that is wide called 'NFC'. simply faucet the smartphone with gloves and you're able to go. it'll facilitate them in emergency things by simply sound smartphone to gloves and members of the family are notified by text messages. Thus, NFC can facilitate them to hide a wide selection of scenario handling by simply tapping the phone to gloves.

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V. RESULTS

In this project, all the components are attached to the glove and the glove is equipped by the user as shown in the above figure. The ultrasonic sensor is attached to the glove such that the sensors cover the 180 degrees angle in front of the user so that the sensors can detect the obstacles within the ultrasonic range.

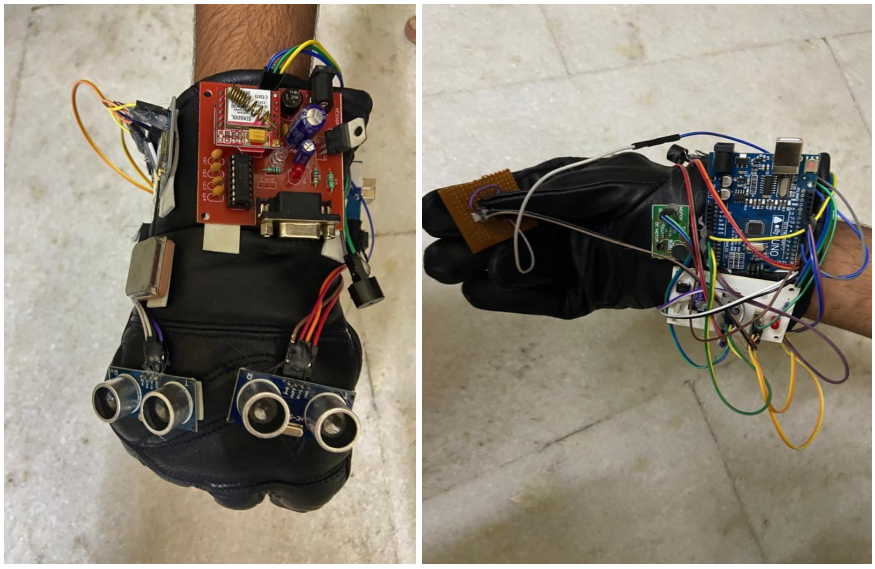

Fig 5.1 Rear and Front Views of Smart Glove

Arduino board which is the processor which controls all the units is attached below the wrist along with the RPS and Fall Detector system which is integrated by MEMS (Micro-Electro-Mechanical Systems Sensors). GSM and GPS modules are integrated on the top of the glove so that the GPS and GSM antennas can have better transmission and reception ranges.

A. Fall Alert

The Fall alert system consists of a gyroscope and 3 axis accelerometer which continuously monitors the user's body position. Whenever the user fell abruptly then the fall alert system detects the change in body position of the user and sends the information to the Arduino, eventually Arduino triggers the GSM and GPS modules which further sends the user's location.

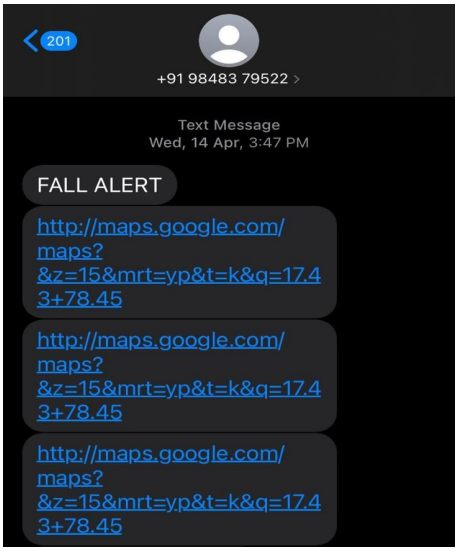

Fig 5.2 Fall Alert

The above figure shows the message which is sent as ‘FALL ALERT’ and the user's exact location coordinates as google maps link are sent to their family member.

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B. Emergency Button

Emergency Button is the rescue feature that helps the user who feels that he is in emergency situations such as the thefts, accidents, health issues etc.

Emergency Button →

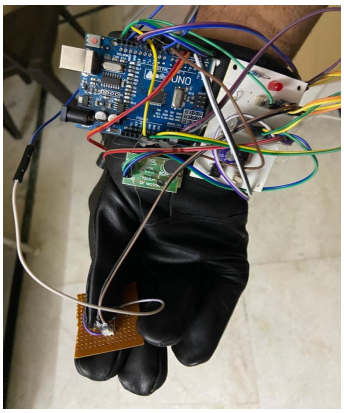

Fig 5.3 Emergency Button

This figure shows that how the emergency button is pressed by the user. When a user presses this button, the Arduino recognizes the response from the emergency button and triggers the GSM and GPS module to send the location coordinates to their known ones. So that the family members can reach out to the location and save them from any emergency situations as mentioned.

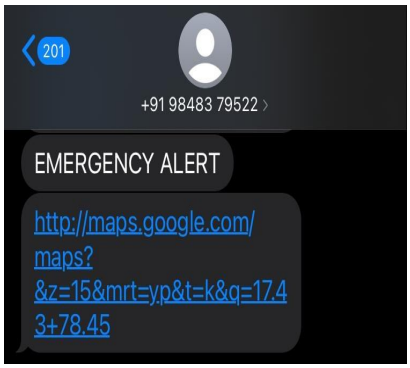

Fig 5.4 Emergency alert result

As soon as the user presses the emergency button, then the message as 'EMERGENCY ALERT' and the user's exact location coordinates as google maps link are sent to their family member.

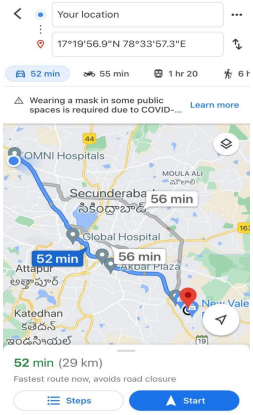

Fig 5.5. Location of the user

Whenever the person taps on the link it will redirect to google maps showing the direction towards the user's exact location.

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VI. CONCLUSION

Globally the number of people of all ages visually impaired is estimated to be 285 million, of whom 39 million are blind. People 50 years and older are 82% of all blind. Nowadays it has been a major problem for blind people to navigate from one place to another. To navigate they need a blind stick or a person who carries them in a wheelchair. To mitigate above-mentioned problems, we came up with a unique system named "Smart Glove". Smart Glove aims to solve real-world problems faced by blind people in their daily life an makes them independent and it also ensures the safety and make navigation easier for Blind people by using ultrasonic sensors, GSM, GPS, and Fall detector. Another important feature in smart glove is the emergency button which provides an option to the user to inform to their know ones if there exist any emergency situations. The advantage of the system lies in the fact that it can prove to very low-cost solution to millions of blind people worldwide.

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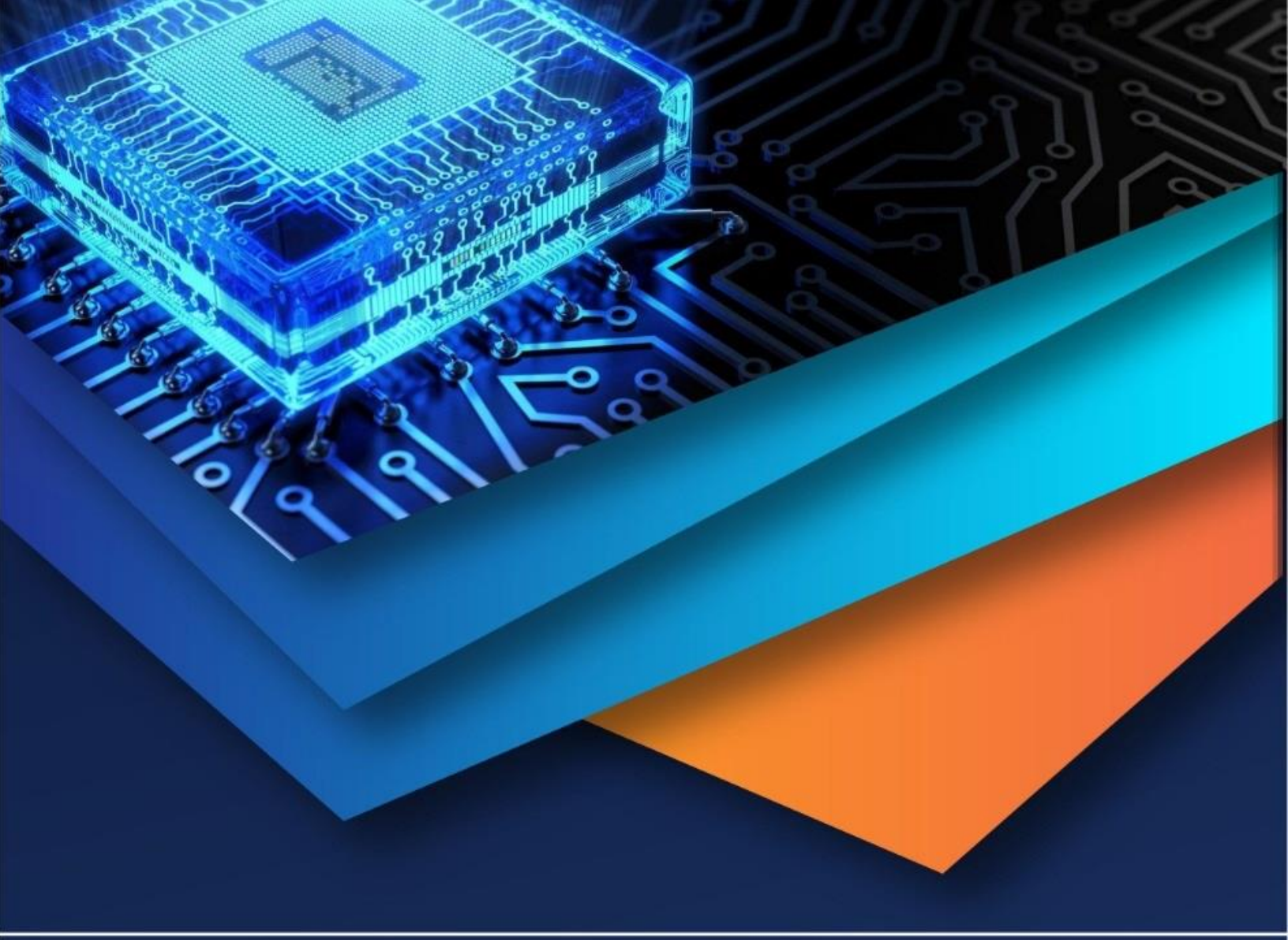

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