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Compact Walking Aid for Visually Challenged Individuals

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ABSTRACT:

Making a fantastic electronic device to wow others. The device is expected to provide substantial amounts of item discovery and ongoing assistance via GPS. The ultrasonic sensor, GPS Module, GSM Module, and vibratory circuit are all part of the framework (speakers or earphones). Visual challenged is a term that is occasionally used to describe severe visual impairments with or without residual eyesight. The utilization of an ultrasonic extending plan to supply Smart walking aid sticks is a step forward in innovation. The use of a GPS module aids the visually impaired individual in reaching his destination. While the visually impaired person explores, the GPS beneficiary refreshes the location of the person, and the co-ordinates of that location can be used to monitor the visually impaired person for health concerns. Using the GSM module, the visually impaired person can also send crisis messages or make a crisis call to his gatekeeper in the event of danger. As a result, the GSM module will be used to issue warnings when a visually impaired person is in danger. The use of Rf tags Brought much more improvement in the project.

INTRODUCTION:

The primary goal of this project is to advance the current advanced pathfinding device for outwardly debilitated persons to the next level. For the purposes of the main language of this subsection, an eye with a restriction in the fields of vision such that the broadest distance across the visual field subtends a point no more remarkable than 20 degrees will be considered to have a focal visual sharpness of 20/200 or less. Many people with true vision impairments can travel independently, thanks to a variety of devices and methods. Experts who are explicitly prepared to show people with visual impairments how to travel safely, unquestionably, and independently in the home and on the network are known as direction and portability authority. These specialists may also help entice people to work on certain courses that they can use on a regular basis, such knowing the route from one's home to a convenience store. A visually impaired person's ability to explore properly can be greatly aided by being familiar with a scenario or course. There are several papers available about this issue, which is based on GPS, microcontroller GPU, GSM, optical gadget pointer, and other factors. Fake Vision is the most important part of human physiology because 83 percent of information received from the earth is through sight. According to World Health Organization estimates from 2011, there are 285 billion people on the earth with visual impairment, 39 billion people who are visually impaired, and 246 people who have low vision. As a result of the voice transducer/vibrator being implanted, the device becomes increasingly important and has the ability to convey voice commands to the user.

LITERATURE SURVEY

Somnath and Rav from 2012, have worked with the Voice outside of the route structure for outwardly hampered persons since 2012. The device includes an ultrasonic separation sensor, GPS for route control, and a tiny scale SD card for storing multiple area arrangements that are also constrained by discourse signal. The person can arrange the area by voice, and the GPS will direct the user to the required location. This device will also display the speed and remaining distance to the destination. The voice framework will activate the alarm order voices when the ultrasonic sensors legitimately detect any snag. They used an ARM CPU with a large amount of memory, resulting in a fast working pace. As a model-based device, they vigorously advocated for an increase in the precision of the GPS signal. The device they built can work within a 5-meter range.

Professor Shruti from the year 2011 was into the undertaking named Obstacles discovery with fake vision and constant help by means of GPS. The device functions by combining GPS, a phoney vision framework, deterrent recognition, and a voice circuit. A camera is mounted on the person's head, which will be used in conjunction with a calculation to recognize the items in front of them. The device also uses GPS for navigation, and the precision of the false vision unit provides a high level of accuracy to the client. Outside technology was incorporated into this technique for the device's critical use. The innovation includes a heartbeat reverberation system that uses sound alerts to warn the user if he is about to encounter any difficulties. The military frequently employs this approach to locate submarines. They used an ultrasonic beat that ranged from 21 to 50 kHz and hit a hard surface to produce reverberation beats. After computation, the difference between signals send time and sign to determine the time they can foresee the gap between the individual and the snag or device and deterrent.

The assignment Smart Stick for Obstacle Detection and Navigation was revealed with by **Radhika R, Payal G Pai, Rakshitha, Rampur Srinath** in the year 2013. This project makes use of infrared, ultrasonic, water sensors, GPS, and GSM. While the person investigates, the GPS receiver refreshes the area where the person is, and the co-ordinates of that area can be used to monitor the visually impaired person for health concerns. Individuals can also use the GSM module to transmit crisis messages or make emergency calls. Continuous data is collected by the sensors and delivered to the microcontroller. After preparing, the microcontroller sends a Bluetooth headphone message with the appropriate discourse cautioning message. Similarly, when the visually impaired person arrives at his destination via voice, the GPS-based visually impaired device with client input interface alerts him. To produce voice yield, this is combined with a microcontroller module, a GPS unit, and a voice module. As a result, the device saves the information about the current location that it receives from the GPS system. As a result, it compares the information stored with the individual's goal area. As a result, it can draw a line between the goals and provide a warning to warn the client ahead of time.

System components

An ultrasonic sensor is an instrument that detects the obstacle a head by sending the sound waves through transmitter and receives them back via receiver.



Figure 1. Ultrasonic sensor

Infrared sensors are used to sense characteristics in its surroundings by emitting and/or detecting infrared radiation and are capable of measuring the heat being emitted by an object and detecting motion



Figure 2. IR sensor

GPS modules contain tiny processors and antennas that directly receive data sent by satellites through dedicated rf frequencies ,this helps in tracking the location of the person using the walking aid.

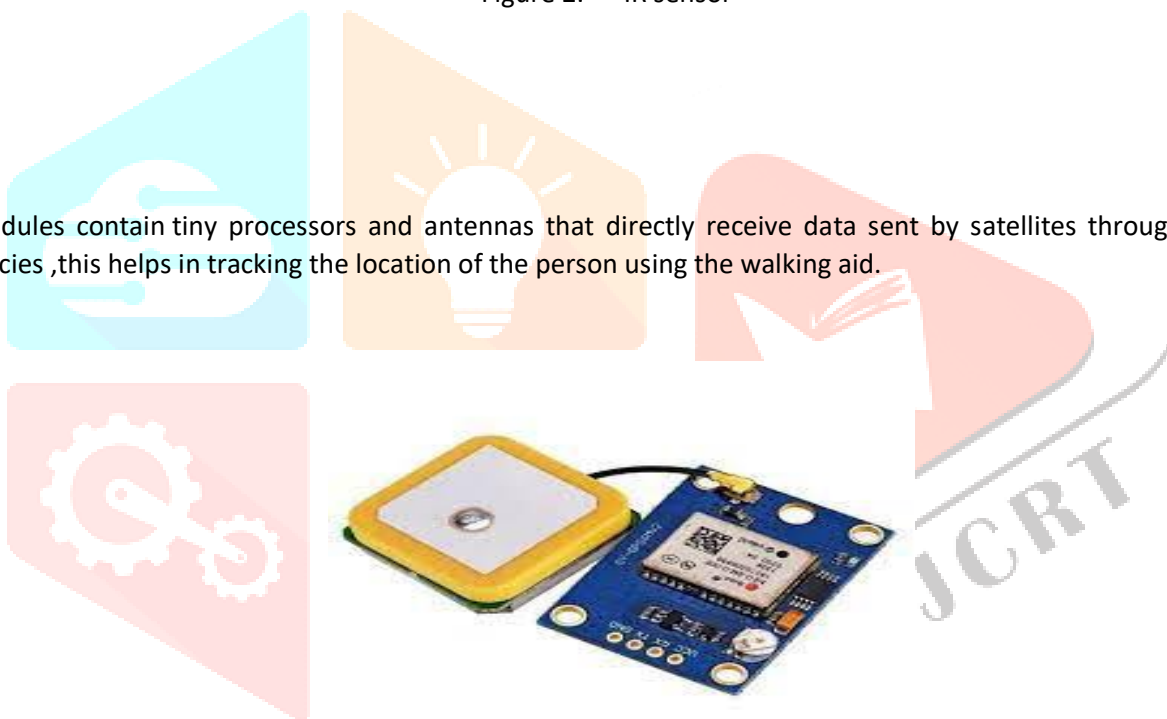


Figure 3 GPS module.

Gsm stands for global system for mobile communication . It is a digital transmitting and receiving device used for open air in cellular mobiles



Figure 4. GSM module

DHT22 it is a kind of sensor which detects the temperature and humidity of the surroundings and the temperature estimating range is from - 40 to +125 degrees celsius with ± 0.5 degrees precision, while. Likewise the dht22 sensor has a superior mugginess estimating range, from 0 to 100% with 2-5% exactness, while the dht11 dampness extend is from 20 to 80% with 5% precision.



Figure 5. DHT22 sensor

Arduino is an open-source advancement stage or improvement board, comprises a microcontroller. With the assistance of Arduino and different sensors one can configuration ventures.

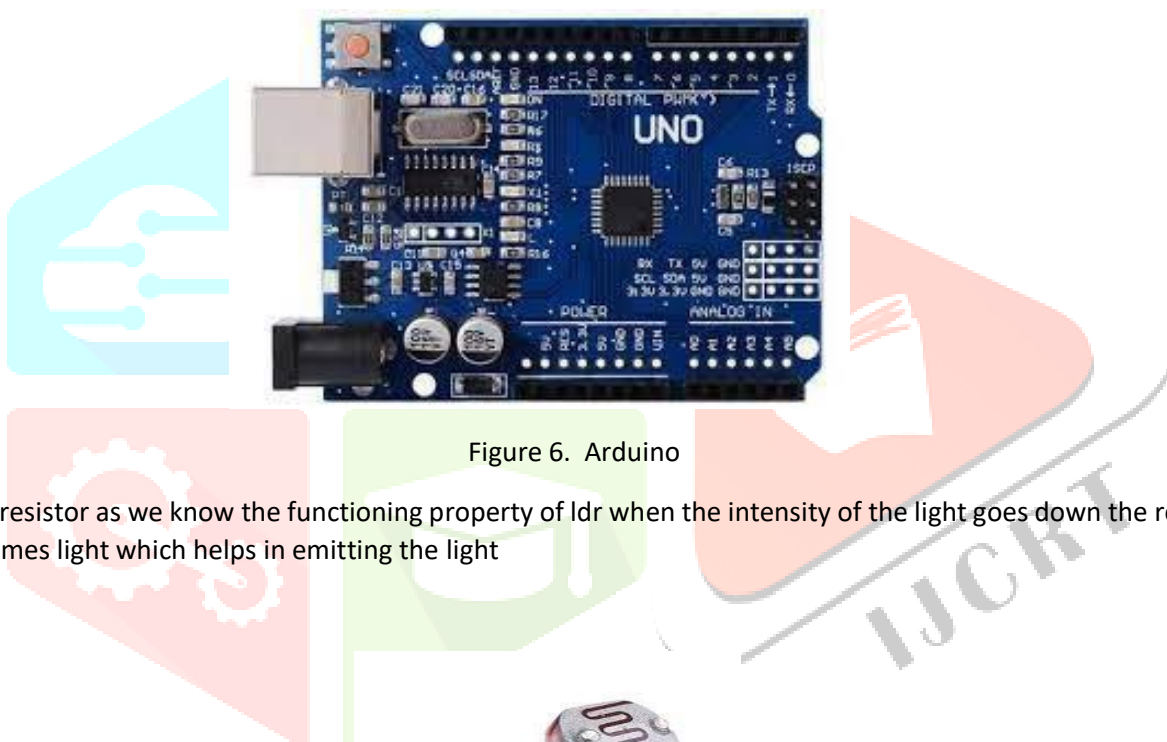


Figure 6. Arduino

A photoresistor as we know the functioning property of ldr when the intensity of the light goes down the resistivity in the ldr becomes light which helps in emitting the light

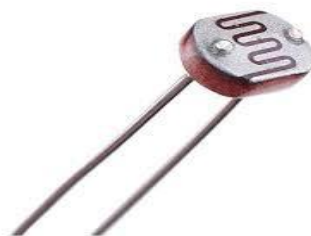


Figure 7. LDR sensor

Our goal is to identify water presence paying little heed to its level. So we utilized a costless other option. three-wire tests fit at the base of the stick to detect snags like water pits, puddles, and water spread.

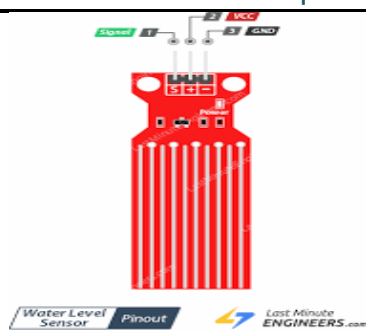


Figure 8 :- Water level sensor

A vibration sensor is used to give the alerts to the person if any obstacle is detected it is placed at the handle of the stick it gives a pluse at eevry obstacle detection.

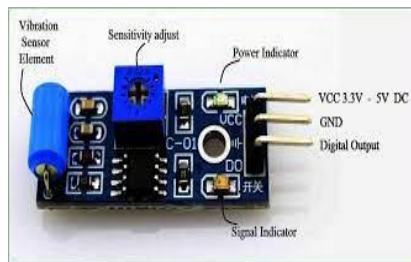


Figure 9. Vibration sensor.

This device is used to give the sound alerts to the person using the stick by mentioning the direction of obstacle



Figure 10. Speaker

An RF module which is shown in Fig. 11 is composed of a transmitter and receiver for RF. A misplaced stick can be found using this module. Similarly, an RF receiver can receive this transmitted data. The transmitter is placed on a simple remote control inside this proposed stick.

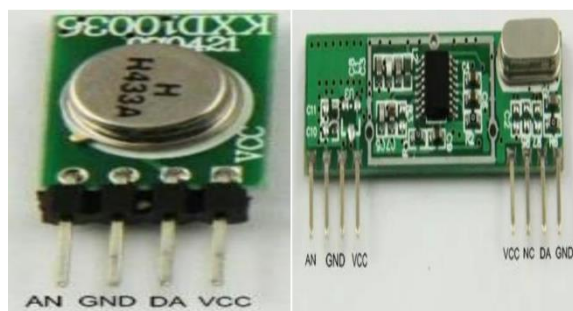


Figure 11. RFID tags

BLOCK DIAGRAM

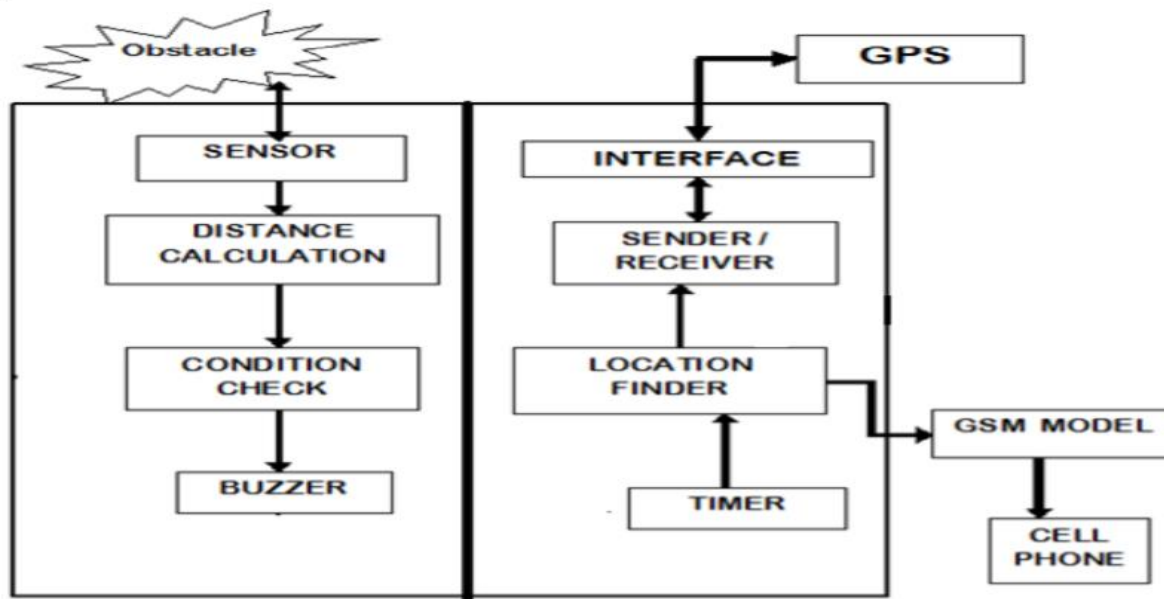


Figure 12. Block diagram

ADVANTAGES

1. Low cost
2. Used for both indoor and outdoor navigation.
3. It enables blind to travel through an unfamiliar environment.
4. Blind person's location can be tracked whenever needed which will ensure additional safety.
5. Detects obstacles and alerts the blind person through vibration alert and speech output.

Previous Technologies

- A few innovations helped helps are accessible to help daze and outwardly impeded individuals play out their everyday exercises. The flow looks into employments best in class innovation to improve the utility of conventional navigational guides to deliver arrangements that are progressively dependable. In such a manner, a white stick is no special case, which is enhanced with the current advancements to plan Electronic Travel Aids (ETAs). Albeit a few survey articles reveal the qualities and confinements of research commitments that broaden customary navigational guides, we discover no audit article that spreads investigate commitments on innovation helped white stick.
- The writers endeavor to fill this writing hole by auditing the most important research articles distributed during 2010–2017 with the normal goal of upgrading the utility of white stick with the current innovation. The discoveries show that the examination pattern is moving towards building up an innovation helped white stick arrangement that is material in both indoor and outside situations to help daze clients in route. In such a manner, abusing cell phones to grow ease and easy to understand route arrangement is among the best research chances to investigate. What's more, the creators contribute a hypothetical assessment system to look at and assess the best in class arrangements, distinguish examine patterns, and future bearings.

The proposed model is divided into 2 Modules:

1. Obstacle Detection Module
2. Data Processing

1. Obstacle Detection Module: In this part the module deals with sensor data the ultrasonic sensor detects the objects and alerts the person using stick ,and the dht22 sensor ,water level sensor does their job in detection of any kind of challenges and ldr used because while evening the person might go out and this ldr helps him giving a sign to the path he is walking in persons can identify that there is a person in front of them.

2. Data processing:- In this part all the sensor data collected is forwarded to give an alert via vibration mode or through speaker by this an alert is raised to intimate the person about the obstacles and the gps data is forwarded to the number which we will be pre registering in the gsm technology this sends an alert to the family members or person whose number is stored in sim by send a link which contains the exact location of the person this helps them in monitoring the persons location at particular time periods.

Results

- The solution proposed in the paper is a Smart Walking aid for individuals who are vision blind. This stick helps them in overcoming that problem and our main motive is to provide this as cost -efficient device.
- The main aim of this Smart Walking aid is to provide a proper navigating system for the visually challenged persons and this might be developed in a far better tech in future.
- Utilizing this Smart walking aid, it would be effortless and easy for the vision-impaired to execute daily activities like traversing or navigating and routing through different routes, GPS Location Tracking, Obstacle Detection, this helps communication with people with much more essential and legitimate.
- Consequently, by preserving the straightforward, easy blueprint of the walking aid currently used by them, a more compelling remedy can be furnished to solve the problems of the vision – impaired individuals.
- Therefore, in this project we are merging the current trending and technologies for developing a project which would be a major use to the blind and hence benefits the society.
- The Rf tags gave an extra benefit to the project by detecting the misplaced, this is also of the one of the concerns to be noted.

CONCLUSION

For daze, use the Advanced Stick. Using GPS is a pre-installed framework that will be used with the goal of reducing the complications faced by visually impaired people. GPS, GSM, Ultrasonic sensor, Wi-Fi module, microcontroller, and all of these features are combined into one device, making it the finest hardware for visually impaired and outwardly handicapped people to get out and about. We use a variety of sensors to detect impediments ahead and alert the visually impaired person to the problem via signal sound. As the individual approaches the snag, the volume of the blaring sound increases, assisting him in clearing the obstruction. We combine the benefits of a GPS module with a GSM/GPRS module, with the GPS module assisting in the tracking of the visually impaired person using the data gathered by it. The RF tags helps in tracking the misplaced stick by sound or vibration. As a result, the framework will be able to address the challenges that the visually impaired face in their daily lives. In addition, the framework takes precautions to ensure their safety. Using solar panels to charge the device is becoming increasingly important as it saves energy.

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