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A Review on Ultrasonic Obstacle Detection and Location Tracker

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ABSTRACT: The paper main objective is to provide the information to the blind people. Information which contains the exact location of the blind person, where he is standing or any obstacle is nearby of him. We are going to develop an intelligent system that works efficiently in both indoor and outdoor environment. When a person walks, he must be able to know that, is there any obstacle is present in front of him or not. The current device works for the visually impaired person, which can be able to move freely without any restrictions.

It can provide an alarm to the person if the visually impaired person gets an obstacle in front of him.

KEYWORDS: Ultrasonic, Global positioning system, Obstacle, GSM.

I. INTRODUCTION

As the world is growing faster people will always try to improve the technology that can be used for the needful. In today's era each and every person has the ability to walk anywhere he wants to go, but the persons with lack of visual ability faces different problems to move from one location to another.

As the problem is in their blindness, we must use some technique so that he can be able to walk anywhere without any restrictions. Our technique is used for that person, in which a blind person can be able to know whether he is facing any obstacle in front of him or not. If any obstacle will be present in front of him an alarm rings, with that he will be able to know that something is coming in front of him and he can stop there or change its direction.

If in case a blind person lost himself in any market or in any place, that blind person can be able to send his location to their family members. So that they can come and take him home.

II. LITERATURE SURVEY

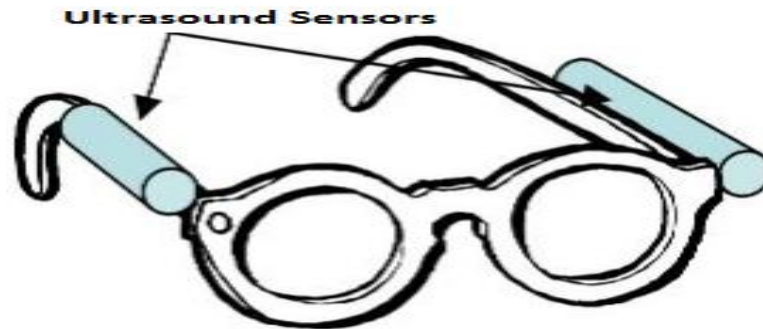
As the need increases there is an enormous work going in this field. Since a blind person face various problems like daily activity, walking on road. There must be technique which will be helpful to them, so that they can work properly in the world.

Now a day there are some of the techniques available for the blind persons which can help them for mobile activities.

Some of the techniques which include:

A. Ultrasonic Spectacles and Waist-belt:

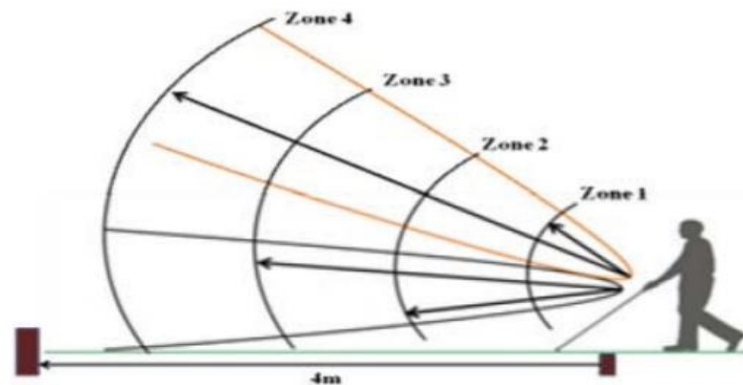
The ultrasonic spectacles and waist-belt technique is used for Ultrasonic sensors for obstacle detection and calculation of its adaptive distance from the visually impaired person. Ultrasonic sensors are used in pair as transceivers [9]. One device which emits sound waves is called as transmitter and other who receives echo is known as receiver. These sensors work on a principle similar to radar or sonar which detects the object with the help of echoes from sound waves.



Ultrasonic sensors are used for obstacle detection and calculation of its adaptive distance from the visually impaired person. Ultrasonic sensors are used in pair as transceivers. One device which emits sound waves is called as transmitter and other who receives echo is known as receiver [9]. These sensors work on a principle similar to radar or sonar which detects the object with the help of echoes from sound waves. An algorithm is implemented in C-language on AT89S52 microcontroller.

B. Ultrasonic Smart Stick:

This technique provides a natural way of carrying that facilitate its use. The components integrate are: two sonar sensors, a microcontroller, and two vibrators [4]. The sensors are fixed on the shoulders to increase the field of sensing and side determination.



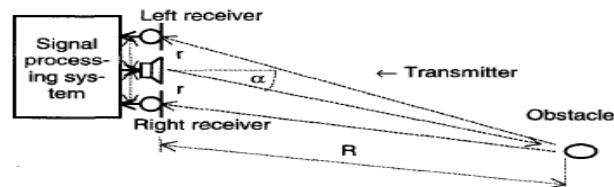
On sensing obstacles the sensor passes this data to the microcontroller. The microcontroller then processes this data and calculates if the obstacle is close enough [2]. If the obstacle is not that close the circuit does nothing. If the obstacle is close the microcontroller sends a signal to sound a buzzer.

In addition to that, when the GSM modem receive a message it will be sent to the microcontroller which will get the location of the stick from the GPS modem and transmit the location to the GSM modem in response to the sender [2]. In the areas with low signals cameras can be use, this system works by fitting a camera on the persons head, it will use certain algorithm to identify the highs and obstacles in front the blind person. In case of an emergency, the user of the stick will press the emergency button and the signal from the button will go to the microcontroller which will get the location from the GPS modem and transmit the location to the GSM modem which will send a SMS messages to the all saved numbers in the system [3].

C. DSP-based Ultrasonic Navigation:

This system contains a DSP based system is able to determine the distance and the horizontal position of the obstacles in front of the user and to indicate the location of the nearest (most dangerous) one by stereo sound through earphones [6]. The DSP is equipped with suitable interface circuits connected to one ultrasound transmitter and two receivers, which can be mounted on the hat of the blind person. To simplify the discussion some assumptions have been made:

- 1). There is only one obstacle.
- 2). The size of the obstacle is relatively small.
- 3). The surface of the object to be detected is ideally reflecting.



Though this simple method is sensitive to noise, it should be mentioned that it could work without envelope demodulation of the received signal, so it can provide the basis of more sophisticated methods like distance varying or adaptive threshold methods.

III. PROPOSED SOLUTION

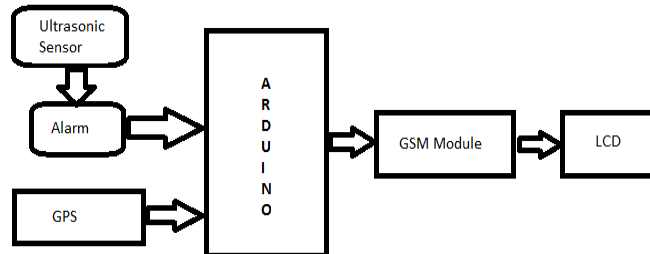
As the survey suggest that the blind person can be able to see their surroundings using the ultrasonic sensor. The ultrasound transmits the signal and when transmitted signal strikes the obstacle it will be reflected back to its transmitter [2]. Since all these techniques contain the solution for the blind person to keep on moving, but what will happen if the will lost while walking. For that purpose we need to get the position of that person to their family members [7]. We are using a GPS system to get correct location of the person. Using location obtained from GPS it can be send towards the family member using GSM technique.

A. Algorithm

- First the ultrasonic sensor transmits the signal.
- The transmitted signal will be reflected from the obstacle.
- The reflected signal gives the input to the alarm.
- The alarm rings and gives indication to blind person to stop.
- The ringing alarm gets the location of that person using GPS.
- The data of GPS will be send signal to Arduino.
- The arduino sends the location using GSM to any other location.

B. Block Diagram

The block diagram shows how to implement the process of detection and making aware to blind person.



The proposed block diagram shows the interfacing between arduino and the various modules, which contains an alarm, ultrasonic sensor, GPS, GSM module and the LCD to display the position of the system. GPS (Global positioning system) is used to get the position of the person at a real time. Since the number of components required to make the system is very less, it is very much portable for the person to take it with him and walk around.

Using the position the family can find out the persons position and reach to them very easily. Since the technique is very easy to understand it can be utilized by any person. This technique can be used in the condition when a visually impaired person will get lost or will be alone.

IV. METHODOLOGY

Since the application of the technique will be very useful for the person. We can have very much in the future. As it can be used to locate the position of the person and avoid it from getting hurt by different obstacles while walking on the road.

The following can be seen as a future in the system:

- Implementing a vision camera for blind people.
- Use of speech processing to check the path for the blind person.

As per the survey, some systems are their which had done these techniques but as per the future we can increase the position of the system, which will not only tell the position but also the mental and physical condition of the blind person.

V. CONCLUSION

As per the literature survey of the system we can conclude that there are various systems which are present in the world but all the techniques are having some kind of limitations to it. Based on the limitations in existing aids, this paper proposes an enhanced assisting electronic aid using latest technology like Ultrasonic waves, GPS, GSM for the visually impaired people [3]. We need to overcome these limitations in order to get a highly accurate and useful system for the persons who are having vision problems. So they can walk and move easily and also they are under the eyes of their family.

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