SAFETY GUARD FOR BLIND USING 8051

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Abstract- People with serious visual impairments can travel independently, using a wide range of tools and techniques. They are taught how to travel safely, confidently, and independently in the home and the community. Use of cane has many disadvantages such as limited perception and lack of depth assessment. In this paper, we have proposed a system that overcomes the difficulties faced by the cane by using ultrasonic sensor, GPS and GSM.

Index Terms- Microcontroller 8051, Speech IC, Ultrasonic sensor, GPS, GSM.

I. INTRODUCTION

Human eye is probably the most important sense organ as it gives the sense of sight, allowing people to observe things around them and thus learn more about the surrounding world. Looking at the figures over the last 20 years we see that there has been significant progress in preventing and curing visual impairment in many countries. . Traffic safety is one of the fields where the consideration of problems faced by blind people is inevitable. In our project we are detecting an object/obstacle based on its distance from the person concerned using a GPS, sound alarm from a buzzer will alert the user about the object and the person can avoid the object safely without hitting the object. Thus we design a cost effective and low power dissipation device that helps in proper locomotion of blind people by detecting problematic or erroneous outputs in critical conditions. Also we make use of GSM to communicate with the guardian.

II. REVIEW OF EXISTING DEVICES

The most commonly used and famous travel aid for blind is the Walking cane. It can detect obstacles like potholes, stones, uneven surfaces etc. There have been many new technologies being introduced to serve the blind. They are as follows:

III. CONVENTIONAL ELECTRONIC AID FOR BLIND

The existing electronic aid for blind in the past three decades is:
The C-5 Laser Cane – can detect objects within 1.5m-3.5m range and can recognize the objects fallen in front of the user. This cane was introduced by Benjamin et al.
The Nottingham Obstacle Detector (NOD) –is a sonar device that provides an audio feedback, with 8 different musical tones for 8 different distances.
The Sonicguide– comes in the form of a pair of spectacle frames, with one ultrasonic wide-beam transmitter mounted between the spectacle lenses and one receiver on each side of the transmitter.

The drawbacks occurring in these devices are:
1. The user has to have a fair idea about the environment by detecting the obstacles in front of them which consumes a lot of time.
2. One problem with all electronic aids based on auditory feedback is the interference with the blind person's ability to pick up surrounding cues through hearing.

IV. THE NAVBELT

The NavBelt produced a 120 degree-wide view of the obstacles ahead of the user. The image is then translated into a series of directional (stereophonic) audio cues through which the user could determine which directions were blocked by obstacles and which directions were free for travel. The problem with this method lay in the fact that a considerable conscious effort was required to comprehend the audio cues. Because of the resulting slow response time our test subjects could not travel faster than roughly 0.3 m/sec (1 foot/sec). And even this marginal level of performance required hundreds of hours of training time.

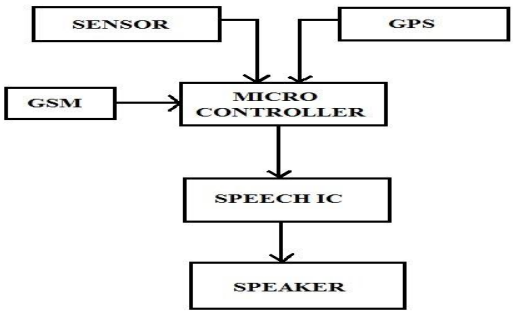
1.3 Rahul Chowdry.D and Bhanu Prakash.k (2010) proposed a walking stick that has IR distance sensor which can detect the object in front of the user. The drawbacks of this project is that
1. The walking stick won't detect obstacles around the user.
2. The buzzer in the upper part of the walking stick.

V. PROPOSED DEVICE

This project is focusing on the detection of object that is in front of the user within the specific distance range which is depending on the type of distance sensor used. In this project, an ultrasonic distance sensor is going to be used. As the object is closer to the sensor, the signal produced is increased as well.

The signaling mean of the walking stick is a buzzer which produces sound when the object is detected. The strength of the sound is increasing as the object is getting closer to the user making the application easy to install. GPS is one of the important features of our project which directs the user to the required destination.

VI. BLOCK DIAGRAM



VII. METHODOLOGY

Walking stick for visually challenged using ultrasonic sensors, microcontroller, GPS, speech ic, speakers and vibrators is integrated in a long stick. The first step is to detect the distance and speed of an obstacle from the user and is done by using ultra sonic sensors.

An **ultrasonic sensor-** is a converter that measures a physical quantity and converts it into a signal which can be read by an observer or by an (today mostly electronic) instrument. It measures the difference of the transmitted and the received signals and sends the information to the microcontroller.
An another input to the microcontroller is from GPS which provides latitude and longitude.

A **microcontroller** (sometimes abbreviated **µC**, **uC** or **MCU**)- is a small computer on a single integrated circuit containing a processor core, memory, and programmable input/output peripherals.
The Microcontroller receives the input value from the Sensor and GPS, and according to these values, it informs the user through the speech IC and consequently the speaker. The main function of the Microcontroller is to compare the Set Point values with the detected values and send signals to the respective devices if the value exceeds the Set Point values. The Microcontroller is programmed in such a way that it will vary the output of the system if there is any change in the input quantity.
The coding has been done and the components interfaced with the microcontroller.
In **Apr33a3 speech IC,** we can record 8 voice signals and it is played based on the distance being detected by the microcontroller.

A **GSM SIM 300** module (modem) is made use of to communicate with the Guardian who is at some distance from the user. It is interfaced with the 8051 microcontroller via RS 232 communication path.
Output: Messages sent and calls made to the specified phone number successfully.
A **speaker** is an electro-acoustic transducer that produces sound in response to an electrical audio signal input. The speaker used in the project will be worn by the user on their ear such that when they are near the obstacle, the speaker gives a message about the distance.
The **GPS** collects the latitude and longitude of user's location, sends it to the microcontroller that accordingly sends this information to the Guardian via the GSM.
Output: The latitude and longitude of the user has been determined

CONCLUSION

In this paper we have analyzed the various approaches and devices that helps for navigation of blinds. The use of ultrasonic sensor, GPS and GSM will help us to overcome the drawbacks by providing better accuracy.

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REFERENCES

[1] Rahul chowdary.D,Banu Prakash k."EL Electronic guard for blind". 2010.

[2] J. Borenstein, I. Ulrich (1997). "The Guide Cane- A Computerized Travel Aid for the Active Guidance of Blind Pedestrians", IEEE

[3] International Conference on Robotics and Automation, Albuquerque, NM, Apr. 21-27, pp 1283-1288.

[4] Blasch, B. B., Long, R. G., and Griffin-Shirley,N., 1989, "National Evaluation of Electronic Travel Aids for Blind and Visually Impaired Individuals: Implications for Design." RESNA 12th Annual Conference, New Orleans, Louisiana, pp. 133-134.

[5] Shoval, S., Borenstein, J., and Koren, Y., 1994f,"Mobile Robot Obstacle Avoidance in a Computerized Travel Aid for the Blind." Proceedings of the 1994 IEEE International Conference on Robotics and Automation,San Diego, CA, May 8-13, pp. 2023-2029.

[6] Kay, L., 1974, "A Sonar Aid to Enhance Spatial Perception of the Blind: Engineering Design and evaluation." Radio and Electronic Engineer, Vol. 44, No. 11, pp. 605-627.

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