Smart Backing Cane For Visually Impaired

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ABSTRACT: *Currently, visually impaired people use a traditional cane as a tool for directing them when they move from one place to another. Although, the traditional cane is the most widespread means that is used today by the visually impaired people, it could not help them to detect dangers from all levels of obstacles. In this context, we propose a new intelligent system for guiding individuals who are visually impaired or partially sighted. The system is used to enable visually impaired people to move with the same ease and confidence as a sighted people. Also the system helps in detecting the potholes. The Arduino integrated system keeps the person informed about the obstacles lying ahead. Such aid gives user more knowledge about the environment and enables them to make decisions much more quickly, thus allowing them to move around more confidently and effectively. The cane may be used in the nearby environment may be in a park, at work, at home, and while a long journey. The designed assisted device helps a visionless person to anticipate the surrounding using the sensor and vibrations. Moreover, it provides the direction information as well as information to avoid obstacles based on ultrasonic sensors. A buzzer and vibrator motor are also added to the system. The whole system is designed to be small, light and is used in conjunction with the white cane.*

I. INTRODUCTION

Independence is a building methodology in bringing about goals and objectives in life. Visually Impaired person find it challenging to go out independently. There are over 284 million people who are visually impaired and there are over 39 million people who are totally blind. They are always in need of helping hands. Engineering and technology is all about using the power of science to make a better life for the people. Blind people have problem when they walk on the streets or stairs ordinary white cane. The smart cane will help the visually impaired by providing more convenient means of life. The main goal of the paper is to contribute the people of blind and disable society. The lack of visual capabilities has limited these individuals from completely perceiving their immediate surroundings which has potential safety concerns and also lowers their quality of life since they must rely on some sort of aid to get around. Currently, in order for visually impaired individuals to get around, they rely on walking canes, guide dogs, and/or personal human aids for assistance. These aids lack the intelligence to provide directions to unvisited locations and cannot completely warn individuals of obstruent objects in their vicinity. A human aid provides this intelligence but makes the visually impaired individual very dependent on the human aid. A good solution will be a device that is portable and is able to alert the user of obstacles in their path when the user is walking. For the purpose of this project, we streamlined the problem defined above to assisting blind individuals with getting around outdoors. We believe a project like this will create the case for further investment in creating smarter electronic devices to assist visually impaired individuals with getting around.

II. EXISTING SYSTEM

Safe mobility is one of the greatest challenges faced by the visually challenged in day to day life. The normal white cane which they use for mobility has the following shortcomings.

- The white cane is able to detect up to knee level only. Hence the user is not able to detect the raised obstacles like windows that are protruding, scaffoldings and ladders and frequently collides with them.
- The cane can only detect obstacles in less distance, which gives the user a very little time to take any preventive actions.
- Additionally, obstacles like moving vehicles cannot be detected until being close to the person.

This Smart stick will have an **Ultrasonic sensor to sense distance from any obstacles**. The existing system has only ultrasonic sensing.

The blind stick is integrated with ultrasonic sensor to detect obstacles ahead using ultrasonic waves. On sensing obstacles the sensor passes this data to the Arduino Uno. The arduino Uno then processes this data and calculates if the obstacle is close enough. If the obstacle is not that close the circuit does nothing. If the obstacle is close the arduino Uno sends a beep sound through buzzer and it vibrates through vibrating motor. The stick also includes the vibrator. If the obstacle is close the arduinouno sends a warning through vibration.

III. PROPOSED SYSTEM

"*Humans are not disabled. A person can never be broken. Our built environment, our technologies, is broken and disabled. We the people need not*

*accept our limitations, but can transfer disability through technological Innovation***. said by Herr.

These were not just words but he lived his life to them, today he uses Prosthetic legs and claims to live to normal life. So yes, technology can indeed neutralize human disability; with this in mind let us use the power of **Arduino Uno and sensor to build a walking stick** that could perform more than just a stick for visually impaired persons.

To ameliorate the problem faced by the visually impaired people, a smart cane would be the right replacement for the white cane. Features of our smart cane are as follows:

[1] Moisture detection and intimation:

The smart cane would detect the water spills or pit in the way of walking and intimate the user by vibration. The cane is also capable of intimating through voice message. The power of vibration depends upon the level of water spill detected.

[2] Obstacle sensing:

For sensing the obstacle and intimation will be given to the user. The coding is written and processed with the help of arduino.

[3] Upper and lower surface detection:

This module also helps in detecting the upper and lower surface (i.e. Stairs).

[4] Location detection:

This module helps to share the location of the visually impaired when they are in danger and when they are in need of help.

This location sharing facility helps the guardian of the visually impaired to find their location.
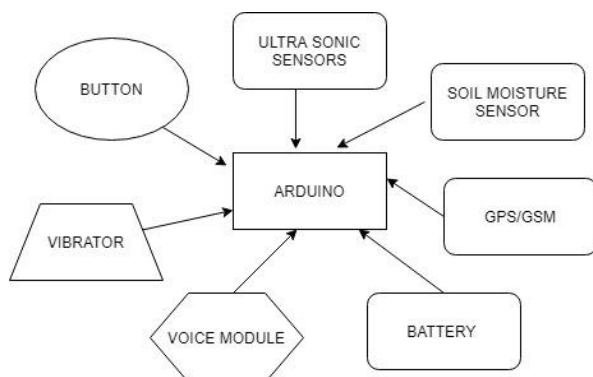
IV. ARCHITECTURE DIAGRAM

Figure 1. Architecture diagram
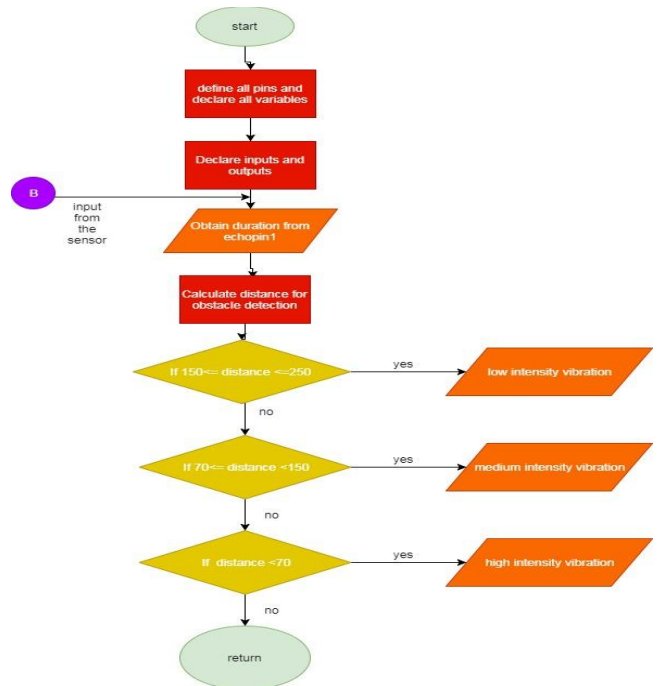
V. DATA FLOW DIAGRAM

Figure 2. Data flow diagram.

VI. MODULE DESCRIPTION

The main component used for this device is the ultrasonic sensor. The ultrasonic sensor transmits a high frequency sound pulse and then calculates the time to receive the signal of the sound echo to reflect back. The sensor has 2 circles. One of them acts as the transmitter and transmits the ultrasonic waves. The other one acts as a receiver (mostly a small microphone) and receives the echoed sound signal. The sensor is calibrated according to the speed of the sound in air. With this calibrated input, the time difference between the transmission and reception of sound pulse is determined to calculate the distance of the object. When the object is sensed by the ultrasonic sensor when it is with in the reach of100 cm and it sends signal to the arduino and arduino activates the buzzer. SPST switch is used for switching purpose. This circuit is powered by a 9-volt battery through a switch.

Ultrasonic sensors are sensors that uses sound waves to detect objects. In the product it is used for detecting obstacles. It works on similar principle of radar or sonar which generates high free sensor. To determine the distance of the object, the sensor calculates the interval between the signal sent and the echo received. The smart cane is very helpful for the visually impaired. When the user is using it, if any obstacle is nearing, the sensor senses it and immediately intimates to the user through voice message and vibration. The power of vibration depends upon how close the obstacle is.

This will help them to prevent themselves from colliding. At the bottom of the cane a moisture sensor will be attached which will help the user to get rid of the water pit in the roads. The moisture sensor will sense the user through vibration.

There are two ultrasonic sensors – one for detecting upper surface and the other one for the lower surface. This helps the visually impaired to easily use stair case.

GPS/GSM module used gets activated when the person press the emergency red button is being pressed. This sends the latitudinal and longitudinal coordinates to the registered mobile number. This helps to find them when they go missing.

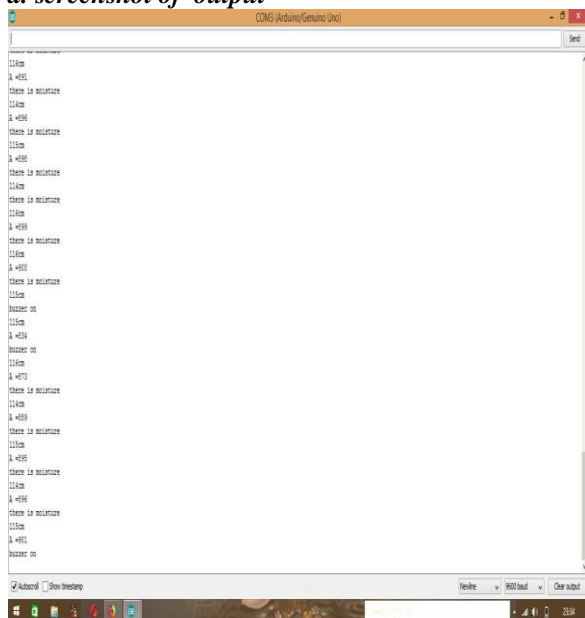## VII. RESULT ANALYSIS

a. screenshot of output

Figure 3.

b. Working of ultrasonic sensor
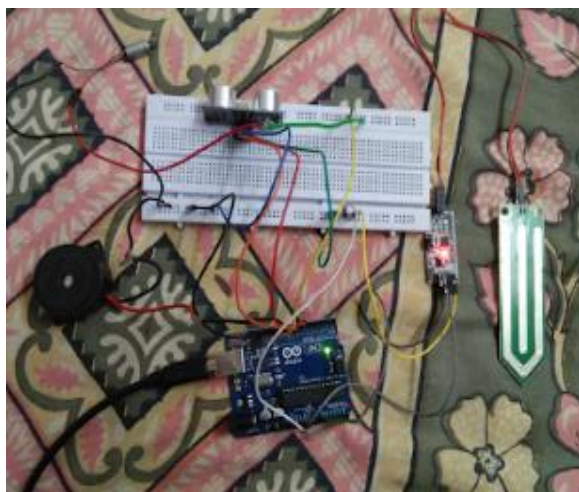

Figure 4.

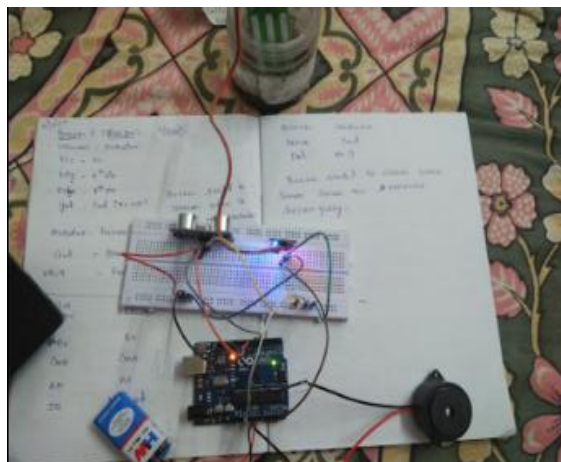### c. Working of soil moisture sensor

Figure 5.

d. Smart cane for visually impaired

Figure 6.

VIII. CONCLUSION

Vulnerability is the birth place of innovation, creativity, and courage" said Bren A Brown in his TED talk. Ultimate aim of this project is to devise an affordable obstacle detecting Smart cane for the visually impaired to improve the independent mobility. The system reduces dependence on sighted assistance, improves independent mobility and paves the way for affordable electronic travel aids for the visually challenged particularly in developing countries. This paper presents the implementation of a smart stick that assists a visually impaired person to his destination safe and secure. We make use of ultrasonic sensors to detect the obstacles ahead and warn the blind person about the obstacle through beep sound.

Internet of Things is a trending concept which can increase the benefits of the smart stick by allowing one stick to communicate with another

smart stick (or mobile , PCs) nearby to utilize the functionality of the other stick when one stick's functionality breaks down.

IX. REFERENCES

[1] Paul R., Garg A., Singh V., Mehra D., Balakrishnan M., Paul K., Manocha D.. "*Smart Cane for the Visually Impaired: Technological Solutions for Detecting Knee-above Obstacles and Accessing Public Buses*", Proc. of 11th International conference on Mobility and Transport for Elderly and Disabled Persons (TRANSED 2007), Montreal, Canada, June 2007

[2] Balakrishnan M., Paul K., Garg A., Paul R., Mehra D., Singh V., Rao P., Chatterjee D.. "*Cane Mounted Knee-above Obstacle Detection and Warning System for the Visually Impaired*", Proc. of ASME 2007 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, Las Vegas, Nevada, USA

[3] http://assistech.iitd.ernet.in/doc/Transed2010_Smart_Cane.pdf

[4] https://www.researchgate.net/publication/282686024_An_electronic_walking_stick_for_blinds