IoT based Blind Person’s Stick

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ABSTRACT
This research paper emphasizes on the blind persons of our society. We built our paper with prototyping the features and also real life application. We mainly focus IoT in our research. Enriching our research with variety of sensors. We embellish our project with (i) GSM, the core of IoT this can detect the location of the blind person and makes necessary messages based on the values of different sensors which are transmitted to relatives of the user (ii) Utilizing multiple sensors our stick have ability to make command that can be compared as eyes of blind person (iii) also Using some indicator to prove that user is blind. This stick can find out any type of obstacles around the blind person like left, Right, Up and Down. Controlling system is very facile. Thus, any blind can have ability to operate it.

Keywords  
GSM, Sensor, Arduino, intellectual stick, LDR, Ultrasonic sensor, Speaker.

1. INTRODUCTION
In accordance of recent statistics, 263 million people spent their life with visual disability and 36 million of them are blinds. This is a matter of regret for those peoples who can’t visualize this beautiful world. Even they can’t go anywhere without the help of others. Often we see in the daily newspaper about blind person accident while crossing road. Their members are very concern about their visual deprivation.

This paper focuses on the solution of this problems. We build a prototype where the existing sensor can read the obstacle and produced the appropriate message to the blind person. This stick can also detect the hole on the street, having ability to detect water, tracking the location the location of the blind person and also produce message while occurred an accident to the blind person. The blind person take a response of the sensors from the speaker in their mother tongue.

2. WORKING PRINCIPLES
Basically we divide our project in four significant part. Every part of this this project is connected to each other. At the items required in this research must place in a small box on the stick. Visual disable person can fold it as their wishes.

2.1 Detecting Obstacles
Firstly, as blind can’t see the obstacle while walking, so the most significant part of this project is to detect the obstacle around the user. We use three ultrasonic sensor around the stick LEFT, RIGHT and FRONT. This sensor can measure the distances of the obstacle by performing echo. Maximum range of detection is 4m and Minimum, detection 2cm.

I. If this sensor detect an obstacle within 30cm towards the FRONT of the stick, it sends data to the arduino and the speaker produce a sound same as the user’s mother tongue like “Obstacle in the front”

II. If this sensor detect an obstacle within 30cm towards the LEFT of the stick, it sends data to the arduino and the speaker produce a sound same as the user’s mother tongue like “Obstacle in the LEFT”.

III. If this sensor detect an obstacle within 30cm towards the RIGHT of the stick, it sends data to the arduino and the speaker produce a sound same as the user’s mother tongue like “Obstacle in the RIGHT”.

2.2 Hole detection in street
Secondly, our stick can detect any type of hole in the street while walking. In our developed model, we placed a minimum distance from stick’s sensor to the street. When, the distance level is larger than the minimum distance, it automatically knock the user and alarm about the detection in the street.

Fig 1: Working procedures for detecting obstacles
2.3 Location Tracking
Thirdly, our stick can track the location of the disable person using GSM. We placed a button in the stick. If the blind person face any trouble or accident, by pressing the button he/she can send a SMS through the GPRS module to their relatives. So, the relatives of the user can easily find them. Thus they can be out of concerned.

3. BLOCK DIAGRAM
This section emphasizes the architecture of our developed project. As previously discussed, our developed system is divided into three interconnected features. In Fig 3, There is an additional feature called light detection. Basically, this portion is not for the blind person. The feature is only for the persons whose are capable of visualize this world. In this feature, placed an LDR sensor to control some LED automatically. When a blind person wants to walk at in the street, this LED will alarm other people that someone is walking in the street. Thus they can help the blind person.

4. SENSOR DATA IN GRAPH
Ultrasonic sensor provides 2cm-4m non traffic measurement criteria. This module has four part VCC, GND, Trig and Echo. This module measures distance by performing math operation based on Sound echo. Measuring distance equation is given below:

\[ \text{Test distance} = \frac{(T \times V)}{2} \]

Where,
\( T = \text{High level time} \)
\( V = \text{Velocity of the sound} \)

Using this mathematical equation we present the graphical representation of data. Fig 4, Shows the graphical data of ultrasonic sensor.
5. ADVANTAGES
- This stick is eligible for both inside and outside of the house.
- This project is very cost effective. Thus, every people can afford it.
- This project can also controlled via Android application
- Obstacle detection is very effective
- As we use the mother tongue, so every user can identify the messages.
- We can easily track the blind person.

6. FUTURE SCOPE
All about our research we take care about one problem that is visual disability. To make a solution we did this low cost project. We believe that this project will spread all around society and convert disable to able. This is our hope, to consider this stick as smart eye for the visual impairments.

7. CONCLUSION
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8. REFERENCES