

# ELECTRONIC MOBILITY AID FOR BLIND

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**Abstract**—Many people with visual destruction travel independently using a wide range of tools and techniques. Blind people are faced with many problems such as independent and graceful travel. The walking stick is to protect against obstacles such as automobiles collisions and accident that leads to great loss of human lives and can have disastrous results. Technology used for this purpose worked by detecting the other automobiles, obstacles, water on floor and bystanders. This project is designed for blind people to avoid obstacles. Here, an IR sensor is used to detect any obstruction and it in turn signals the microcontroller. Whenever the obstacle comes near the stick the sensor senses the obstacle and signals to the microcontroller which in turn will announce using the voice module. Similarly, the stick is built with copper electrodes at the bottom to sense the wet (water) floor that provides a logic signal to controller which in turn will announce the information through the same voice module.

**Index Terms**—Sensors, Transducers, Ultrasonic, IR, Electrode

## I. INTRODUCTION

Blind people run the risk of colliding with an obstacle only when they are in movement relatively to their environment. This helps in locating the static object in their path, thereby helping the blind user to travel themselves. This project cannot detect hanging objects as the sensors are mounted on the walking stick which can detect objects at ground level. User can be alerted of close obstacles in range while traveling in their environment. The system we propose, detects the nearest obstacle via an ultrasonic sensor system and pits using IR sensors. This system aims at increasing the mobility of visually impaired people by offering new sensing abilities. Blind individuals find traveling difficult and hazardous because they cannot easily determine "where" things are, a process otherwise known as "spatial sensing." Thus the problem of mobility can be reframed as a problem in spatial sensing. For the blind it is difficult to step out without someone's help. To make their life simpler, our electronic safety guard system will alert them of any obstacle in their path. We used electronic safety guard system that alerts them of any obstacle, pit or wet surface in their path and also transmits their location to the authorized mobile, when emergency button is pressed. It has

two important units; they are object detecting sensors unit and microcontroller alarm unit through voice chip along with GPS and GSM modules.

## II. FUNCTIONAL DESCRIPTION

Nowadays there is a drastic development in the technology the things have been moved very high in every field. And in each field there is a tremendous advancement in day-to-day life. In this project we have contributed to help the blind through this particular project of artificial vision system. The block and circuit diagrams are shown in the next chapter. For better understanding the total project is divided into several sections and each section is explained below:

**IR SENSING CIRCUIT** : The main block in the project is the Obstacle (Pit) Sensing circuit Designed with IR Sensors.

The obstacle-sensing block is designed with LM567 IC, this is a tone decoder IC, and also it generates tone frequency. For identifying the obstacles, a set of sensors are used with a 567 IC.

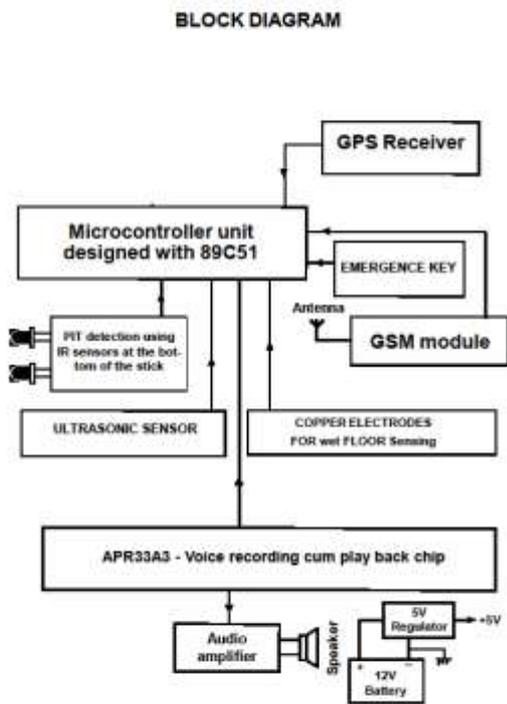
**ULTRASONIC SENSOR** : Ultrasonic sensors work on a principle similar to radar or sonar which evaluates attributes of a target by interpreting the echoes from radio or sound waves respectively. Ultrasonic sensors generate high frequency sound waves and evaluate the echo which is received back by the sensor. Sensors calculate the time interval between sending the signal and receiving the echo to determine the distance to an object.

**WATER (WET FLOOR) SENSING** : To find the wetness an electronic circuit is designed, which takes care of the monitoring of water (wet floor) continuously. For this, two electrodes are used. One electrode is fed with +5V DC and the other electrode is used for indicating the sensitivity of the floor to the micro controller. When the floor is completely dry, the electrode will be in open circuit condition. Since water is a conductor of electricity, whenever the floor becomes wet, conduction makes continuity between the conductors (electrodes) and a logic high signal will be received by the controller if water is detected and a message will be played through the voice chip.

**EMERGENCY KEY**: By pressing the emergency button in the blind stick, the location data will be sent to the concern mobile through the GSM. GPS receives the data and GSM transmits and receives the data. So the GPS system will receive the

Longitude and Latitude values corresponding blind person position through the satellites to respected care taker.

### III. BLOCK DIAGRAM



### IV. HARDWARE DETAILS

The IC's and other important components used in this project work, procured from the Hyderabad Electronics Market. The details or data sheets of the IC's are downloaded from the Internet. The following are the web sites that can be browsed for collecting the data sheets:

1. www. TexasInstruments.com
2. www. National semiconductors.com
3. www. Fairchild semiconductors.com

The following are the IC's and other important components used in this project work

1. ATME1 89S52 MICROCONTROLLER CHIP
2. LM 567 Tone Decoder
3. Ultrasonic Sensor
4. APR 33A3 VOICE RECORD CUM PLAYBACK IC
5. GPS and GSM Modules
6. 7805 VOLTAGE REGULATOR
7. BC 547 TRANSISTOR

The required PCB'S (Printed Circuit boards) for the project work fabricated by SUN RISE CIRCUITS, Kushaiguda Industrial Estate, Hyderabad. Kushaiguda Industrial Estate is very famous for fabricating the Industrial grade PCB's.

### V. SOFTWARE DETAILS

In our project we used software that is Keil micro vision for the simulation of the program.

#### KEIL Software

KEIL development tools for the 8051 Microcontroller Architecture support every level of software developer from the professional applications engineer to the student just learning about embedded software.

The industry-standard Keil C Compilers, Macro Assemblers, Debuggers, Real-time Kernels, Single-board Computers, and Emulators support all 8051 derivatives and help you get your projects completed on schedule.

### VII. CONCLUSION

The project work "Walking stick using Sensors, GPS and GSM with Voice Announcement" is designed & developed successfully and for the demonstration purpose a prototype module is constructed and results are found to be satisfactory.

Electronic Blind Mobility Aid is composed of a pair of transducers, one transmitter that transmits echo locating signal and a receiver mounted on the walking stick. Inaudible ultrasound echoes captured at the receivers are converted into audible sound induced by the user during his movement from a static object in a range of 1.5 feet. The resulting audible signal is conveyed to the user through stereophonic earphones. Whenever an obstacle is found, a pre-recorded voice message gets activated and the message is conveyed through the earphones. This Aid can be helpful to blind people in spatial sensing by supplying information during his movement if any obstacle is found. This is less complicated, simple, portable as it is mounted on the stick and there is lesser time lag between the signal transmitted and reception. This also has disadvantages like interference with the external ultrasonic sources, which leads to the false information.

A white cane is used by many people who are blind or visually impaired, both as a mobility tool and as a courtesy to others.

The major and critical task is preparing the software for performing the tasks depending on the inputs. The performance of the module purely depends on the software (code) we define in the controller. The technology utilized here is for developing the prototype module only; it has to be enhanced to develop it into a real working system.

Most of blind people use white cane stick to find the obstacles in their path, but those cannot help the blind people to sense the obstacle the object and provide any precautions therefore this system is able to detect almost all obstacles such as furniture's, metallic objects, water on floor, etc, thereby preventing them from colliding and falling with such objects at a range of 1.5 feet. For this project to be successful, the system must be a worthwhile investment for blind users in terms of cost of equipment and time invested in learning to use it. In addition the pits can also be identified and can be indicated to the blind through the speaker by auto announcing with some of the modifications in the same project work which is the future extension of the project.

### VIII. REFERENCE

The following are the references made during design, development and fabrication of the project work:

Books:

- 1.LINEAR INTERGRATED CIRCUITS – By: D. Roy Choudhury, Shail Jain.
- 2.<http://google.about.com/od/mapsanddirections/fr/mapsrev.html>
3. Digital and Analog communication systems - By: K. Sam Shanmugam
- 4.Electronic Devices & Circuits – ALLEN MOTTERSHEAD
- 5.Electronic Instrumentation and Measurement Techniques By: William David Cooper
6. Loren values - Latitude and Longitude conversion - [http://www.cosports.com/tools/gps\\_coords.html](http://www.cosports.com/tools/gps_coords.html)
7. Practical transistor circuit design and analysis By: GERALD E. WILLIAMS
8. The 8051 Micro-controller Architecture, programming & Applications - By: Kenneth J. Ayala

Catalogs:

- (1) TEXAS - LINEAR IC's manual
- (2) SIGNETICS - DIGITAL IC's manual

Journals:

- (1) Electronic Design
- (2) Electronics for you
- (3) Electronics Text.
- (4) Practical Electronics

