

# GPS Navigation System with Voice Alert For Blind People with User Recordable Locations & Messages Using ARM ATSAM3X8E Aurdino DUE-ARM quarter M3

Vidya Bhoge<sup>1</sup>, R.J.Magar<sup>2</sup>M.E. Student, Department of E&TC, Shreeyash College of Engg. & Tech, Dr. BAMU University,  
Aurangabad (MS), India<sup>1</sup>Asst. Professor, Department of E&TC, Shreeyash College of Engg. & Tech, Dr. BAMU University,  
Aurangabad (MS), India<sup>2</sup>

**ABSTRACT:** Visually Impaired Person (VIP) or Blind People, it is difficult to find the way and hence it is need to implementation of the system that helps the visually impaired person or blind person to navigate automatically. In this project we have purposed the design of the voice based navigation system for blind using voice recognition module and GPS module implemented on arduino board using ARM ATSAM3X8E DUE-arm quartex M3. Using voice recognition module the blind person will give the destination's name and GPS module compares destination's latitude and longitude with the current location latitude and longitude of user. In this way the proposed system helps the blind person to navigate.

**KEYWORDS:** Arduino, GPS, Navigation, Voice Recognition, latitude, longitude

## I. INTRODUCTION

In the world near about or across 37 million people are blind and India is now home to the world's largest number of blind people near about 15 millions. Most of the Blind People or Visually Impaired Person (VIP) uses traditional systems like canes or Guide dogs for obstacle detection and avoidance, but these systems have some limitation. This needs to develop the new systems for the Blind People or Visually Impaired Person (VIP). For the blind people technologies rapidly changes. Using some technologies like voice recognition, wireless communication, GIS and GPS etc. It is possible to develop the smart system or aid for impaired people.

Most of the modern systems are based on commands, like visually impaired person issues the command and receives the direction response using audio signals. The GPS receiver continuously receives the latitude and longitude values of user or visually impaired person compare with the final destination given and directions are given to the user with the help of audio signals to the visually impaired person [1].

The paper organization is as follows, Section II provides a general overview of the GPS Navigation System with voice alert for blind people. Section III gives a detailed discussion on architecture of the proposed system with detailed discussion on the various building blocks. The Section IV concludes the paper.

## II. RELATED WORK

Harsha Gawari and Prof. Meeta Bakuli [1], presents the architecture and implementation of a system that will help in the navigation of the visually impaired people, in which GPS and voice recognition along with obstacle avoidance for

# International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: [www.ijirset.com](http://www.ijirset.com)

Vol. 7, Issue 1, January 2018

the purpose of guiding visually impaired. This system guides the visually impaired person by issues the command and the same time the latitude and longitude values of the user are received continuously from the GPS receiver and the directions are continuously given to the user with the help of audio signals. The proposed system contains the hardware like MICROCONTROLLER (ARM LPC2148 which is based on 32/16 bit ARM7TDMI-S CPU with real-time emulation and embedded trace support), GPS RECEIVER (GPS receivers, to provide three dimensional location latitude, longitude, and altitude), VOICE RECOGNITION (Different operations are performed at different levels on the input signal such as Pre-emphasis, Framing, Windowing, Mel Cepstrum analysis and Recognition), IC HM2007 and the softwares like Embedded C, Keil IDE and Uc-Flash.

Mrunal Pawar et al. [2] present the navigation system which provides guidance for campus navigation and obstacle detection as well for blind people. This proposed system guides blind people to reach from source to destination with shortest path and based on the concept of GPS. Ultrasonic sensors are used obstacle avoidance for its movements and android device and Bluetooth for notification, microcontroller of 8051 family is used to achieve the desired operations. The ultrasonic sensor is attached to the stick of blind person, transmits the ultrasonic waves continuously whenever the device is going on the desired path the ultrasonic sensor. When obstacle comes ahead of it the ultrasonic waves are reflected back from an object and that information is passed to the microcontroller and microcontroller controls the motors left, right, back and front based on ultrasonic signals.

K. Ramarethinam, Mrs. K. Thenkumari and P. Kalaiselvan [3] present portable system with self-contained feature that allows the blind people to travel through familiar and unfamiliar environment. The proposed system consists of hardware like GPS receiver (PD321 GPS module is used to get 10 satellite signals for more accurate), ARM Cortex-M3 processor (32-bit processor for highly deterministic real time applications), Sonar sensor (SRF02 a single transducer ultrasonic rangefinder in a small footprint PCB), Temperature sensor (MCP9800 is a digital temperature sensor capable of reading temperatures), An analog-to-digital converter (abbreviated ADC, A/D or A to D), and software's like LPCXpresso is a new, low-cost development platform available from NXP.

### III. ARCHITECTURE OF THE PROPOSED SYSTEM

Figure 1 shows the block diagram of the proposed system, used hardware as well as software, in which GPS and GSM module is used to get satellite signals for more accurate and full duplex voice telephony respectively. Arduino DUE which improves all the standard Arduino functionalities and adds many new features and Arduino software (a single-board microcontroller intended to make the application of interactive objects or environments more accessible). All the modules used in the proposed system are explained below in details one by one.

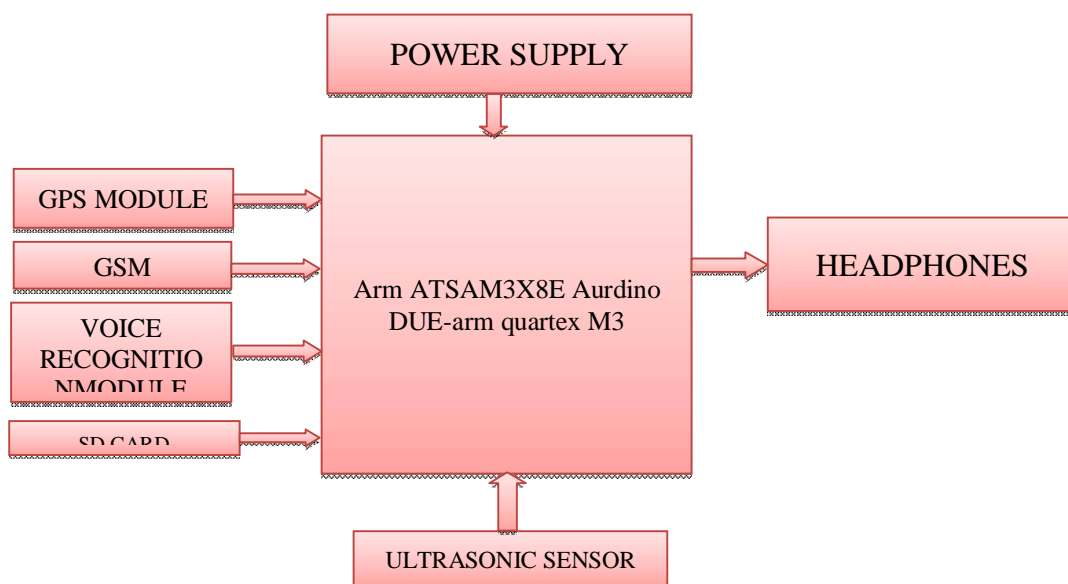


Figure 1 Block Diagram of Proposed System

# International Journal of Innovative Research in Science, Engineering and Technology

*(A High Impact Factor, Monthly, Peer Reviewed Journal)*

Visit: [www.ijirset.com](http://www.ijirset.com)

Vol. 7, Issue 1, January 2018

## 3.1 Hardware Description

### a. Arduino DUE

Arduino Due is first board based on a 32 bit processor (Atmel SAM3X8AER M Cortex-M3 MCU); it offers 54 digital input/output pins out of which 16 can be used as PWM outputs with selectable resolution, 12 analog inputs, UART (hardware serial ports) two DAC (digital to analog converter). Figure 2 shows the Arduino DUE

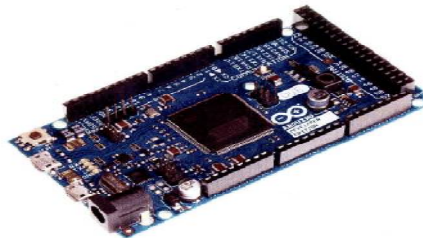


Figure 2 Arduino DUE

### b. GSM Module

Originally GSM (Global System for Mobile Communications) is a Group of Special Mobile, developed by the European Telecommunications Standards Institute (ETSI). It is used to describe protocols for second generation (2G) digital cellular networks. Figure 3 shows the GSM Module.



Figure 3 GSM Module

### c. GPS MODULE

The Global Positioning System is a space-based satellite navigation system. GPS provides location and time of object in information in all weather conditions. It is a network of 30 satellites orbiting the earth at an altitude of 20,000km whenever you are on the planet. The GPS (Global Positioning system) receiver continuously receives the latitude and longitude values for every position of the object or system [4].

# International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: [www.ijirset.com](http://www.ijirset.com)

Vol. 7, Issue 1, January 2018

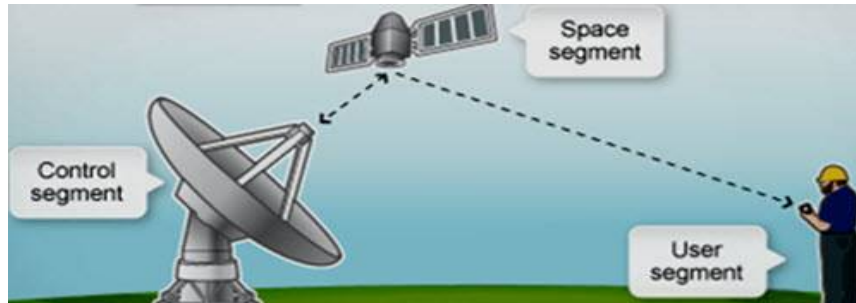


Figure 4 GPS System

## d. Ultrasonic Sensor

Ultrasonic sensor is used for detecting the obstacles, and in this system this sensor is used for detecting the obstacles on the way for the blind persons. According to the ultrasonic burst or on the output pulse and the input pulse distance target is easily detected and measured. Figure 5 shows the Ultrasonic Sensor.



Figure 5 Ultrasonic Sensor

## e. SD Card module

SD card is used read and write and easily interfaced as a peripheral to your arduino sensor shield module. This module is shown in figure 6. This SD card module interface with arduino with different SPI Pins like MOSI, SCK, MISO and CS, for further connection Input Voltage: 3.3V/5V. The navigation directions are stored in audio format in the SD in the form of MP3.



Figure 6 SD Card module

## f. Voice Recognition Module

Voice Recognition Module V3 is used to gives destination's name as the input to the voice recognition module by a user and system compares the destination with the stored locations in the database.

## International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: [www.ijirset.com](http://www.ijirset.com)

Vol. 7, Issue 1, January 2018



Figure 7 Voice Recognition Module

### 3.2 Software Description

#### a. Arduino Software

The Arduino IDE uses the GNU tool chain and AVR Lab to compile programs, and uses argued to upload programs to the board. As the Arduino platform uses Atmel microcontrollers, Atmel's development environment, AVR Studio or the newer Atmel Studio, may also be used to develop software for the Arduino.

#### b. Proteus Software

Proteus 8 Software provides directly make PCB design with it so it could be an all in one package for students. Also provides to test programs and embedded designs for electronics circuit.

## IV. CONCLUSION

This system provides navigation system to the blind and visually impaired people. This project we have purposed the design of the voice based navigation system for blind using voice recognition module and GPS module implemented on arduino board using ARM ATSAM3X8EDUE-arm quartex M3. Section 3 provides the implementation of the proposed system.

## REFERENCES

- [1] Harsha Gawari and Prof. Meeta Bakuli, "Voice and GPS Based Navigation System for Visually Impaired", International Journal of Engineering Trends and Technology (IJETT), Volume 11, Number 6, May 2014, pp.296-299.
- [2] Mrunal Pawar, Minal Pawar and Rohit Najawan, "Route Finding Application for Blind People", International Journal of Engineering Development and Research (IJEDR), Volume 4, Issue 2, 2016, pp. 144-147.
- [3] K. Ramarethinam, Mrs K. Thenkumari and P.Kalaiselvan, "Navigation System for Blind People Using GPS & GSM Techniques", International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering (IJREIE), Vol. 3, Special Issue 2, April 2014, pp. 398-405.
- [4] Anushree Harsur and Chitra.M, "Voice Based Navigation System for Blind People Using Ultrasonic Sensor", International Journal on Recent and Innovation Trends in Computing and Communication (IJRITCC), Volume: 3 Issue: 6, June 2015, pp. 4117 – 4122.