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ANDROID BASED NAVIGATION SYSTEM FOR THE VISUALLY IMPAIRED

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Abstract

Nowadays, technology gets developed day to day. But the idea for helping the visually impaired person is not much developed. The aim of this project is to secure the blind people and also provides immediate help at critical situation. This information system is composed of four basic functions, i.e. system control, locating, routing and graphic/voice guidance. The proposed systems were based on sensors like ultrasonic sensor. The ultrasonic sensor is used to detect the obstacles. If any obstacle comes immediate in front of them and it will alert the blind person using vibrator. This information is useful for the blind to navigate themselves. GPS will make coordinate with the locations and sends the voice commands to the blind person using android application. GSM send the current location of the user to the relatives and friends. Additionally bus unit is added which is used to identify the details of the bus. The details of the bus is transferred from the Radio frequency modulation in the bus unit to the Radio frequency modulation in the blind unit and sends voice commands to the visually impaired person using android application.

Keywords : GPS module, GSM module, Ultrasonic sensor, Bluetooth, PIC16F887, Android application.

1. INTRODUCTION

Artificial Vision is the most important part of human physiology as 83% of information human being gets from the environment is via sight. There are approximately 38 millions of people across the worldwide mainly in developing countries who are blind and visually impaired, over 15 million are from India. The blind people need an assistive device that will allow blind user to navigate freely and this requirement has become crucial. Most of the blind people depend on other individuals, white cane or guide dogs to travel freely. Currently, there are several visual information that helps visually impaired people to move in a right way (e.g. takes a right direction, take left, move forward, move backward and avoid obstacles,) but they all limit the freedom of the user. Our main objective is to make a compact, self-sufficient system that will permit these blind people to travel through an environment .This voice based route navigation system can provide solution to this problem. In our proposed systems, the user can program locations like Home, Office, and Bus stop on stored database user device. The user can select the location they want to go by using the keypad. This information is provided as a voice playback to the user, using android application. Thus the user can independently navigate him using just voice commands and listening to the directions provided by the device. Additionally ultrasonic obstacle detection is used to warn the person of obstacles.

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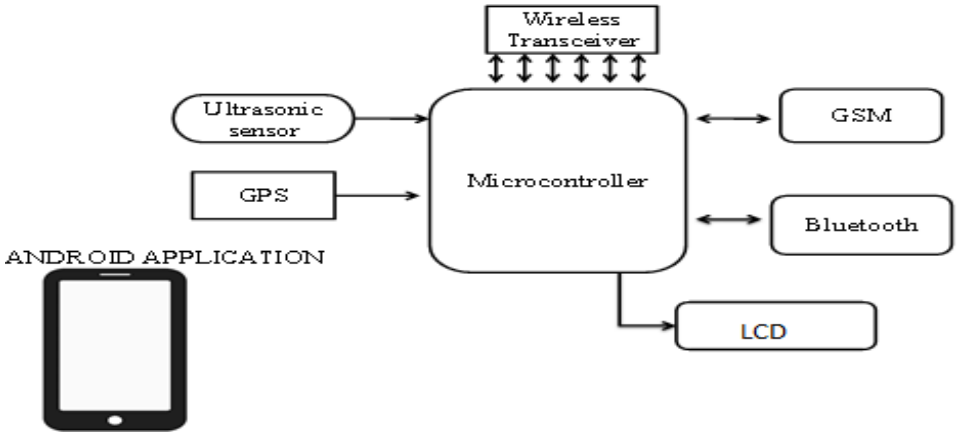

Fig.1.Block diagram of Blind Stick Unit

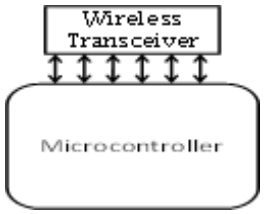

Fig.2.Block diagram of Bus Unit

Further, in bus stop the individual bus will have the wireless transceiver information is transferred using wireless transceiver in blind unit and bus details can be identified. The helper can send message to the user unit to get the location through message.

2. SOFTWARE DETAILS

CCS COMPILER

A compiler is a computer program (or set of programs) that transforms source code written in a programming language (the source language) into another computer language (the target language, often having a binary form known as object code). The most common reason for wanting to transform source code is to create an executable program. This integrated C development environment gives developers the capability to quickly produce very efficient code from an easily maintainable high level language. The compiler includes built-in functions to access the PIC microcontroller hardware such as READ_ADC to read a value from the A/D converter. Discrete I/O is handled by describing the port characteristics in

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The ultra sonic sensor will detects the obstacles in the path and alerts the blind person. The detection of the obstacle will be displayed in the LCD as “obs in your path”.PROGRAM. Functions such as INPUT and OUTPUT_HIGH will properly maintain the tri-state registers. Variables including structures may be directly mapped to memory such as I/O ports to best represent the hardware structure in C.

PROTEUS 7.0 SIMULATION TOOL

Proteus 7.0 is a Virtual System Modeling (VSM) that combines circuit simulation, animated components and microprocessor models to co-simulate the complete microcontroller based designs. This is the perfect tool for engineers to test their microcontroller designs before constructing a physical prototype in real time.

3. HARDWARE DETAILS

- PIC Microcontroller
- Ultrasonic sensor
- GPS
- RPS
- Bluetooth
- GSM
- Wireless transceiver i.e. RFM

4. REUSLTS AND DISCUSSIONS

A. SOFTWARE RESULTS

DETECTION OF THE OBSTACLE

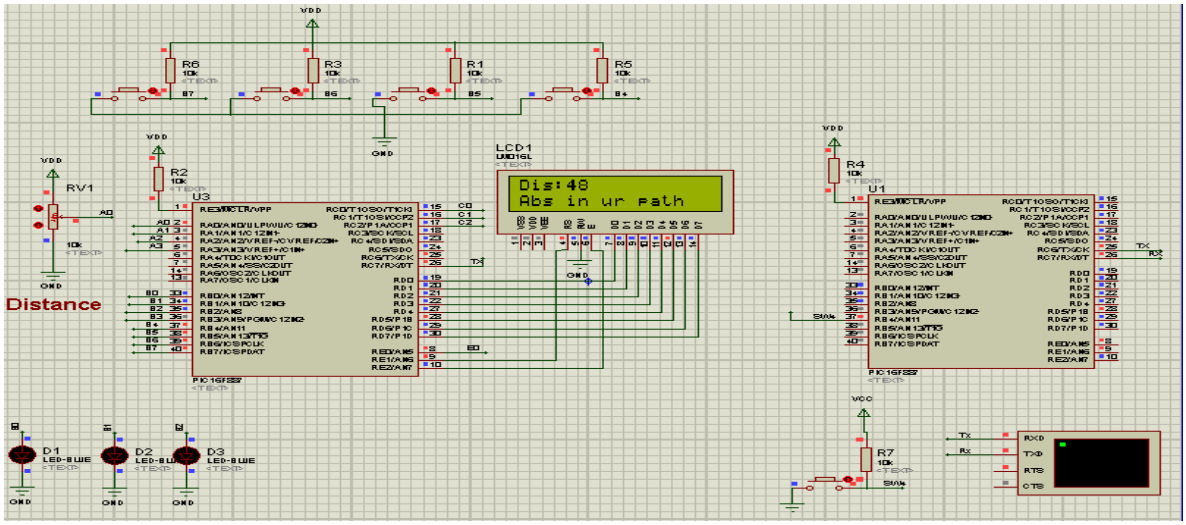

Fig.4.1 Detection of the obstacle

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DIRECTION OF THE LOCATIONS

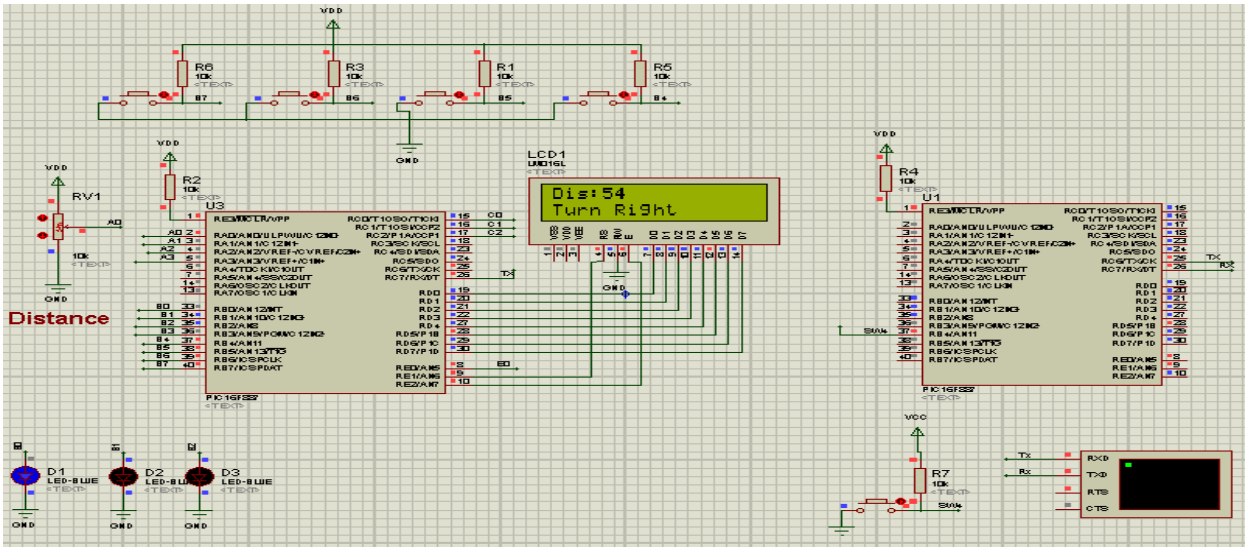

Fig.4.2. Turn right signal

The blind person can set the location where they want to go by using the keypad. The direction of the

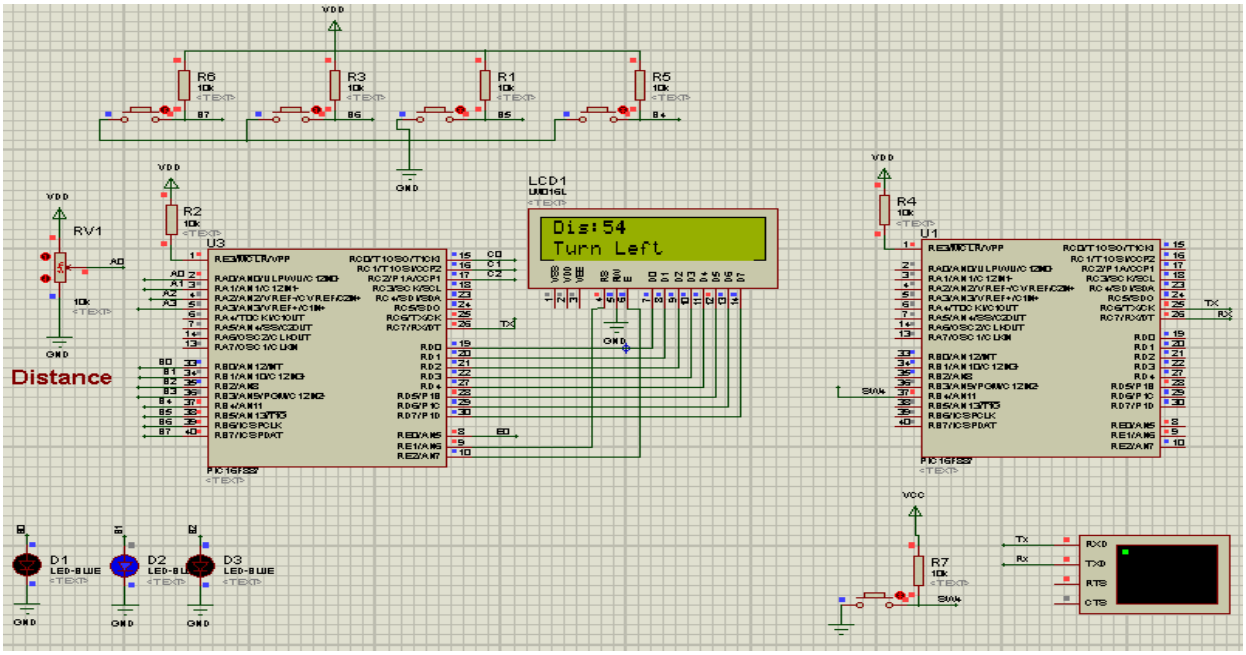

Fig.4.3. Turn left signal

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B. HARDWARE RESULTS

HARDWARE SETUP

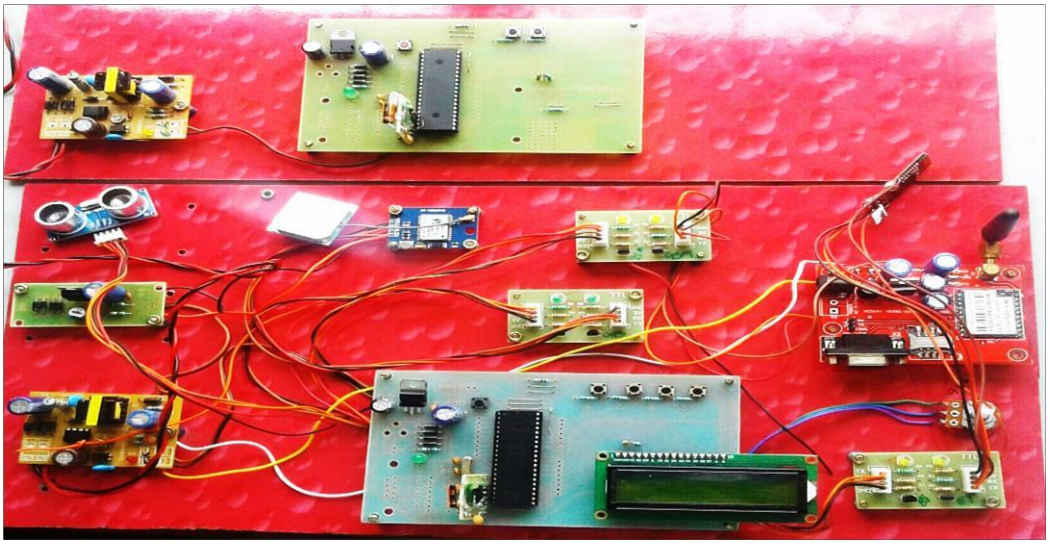

Fig.5.1. Hardware setup

DETECTION OF THE

OBSTACLE

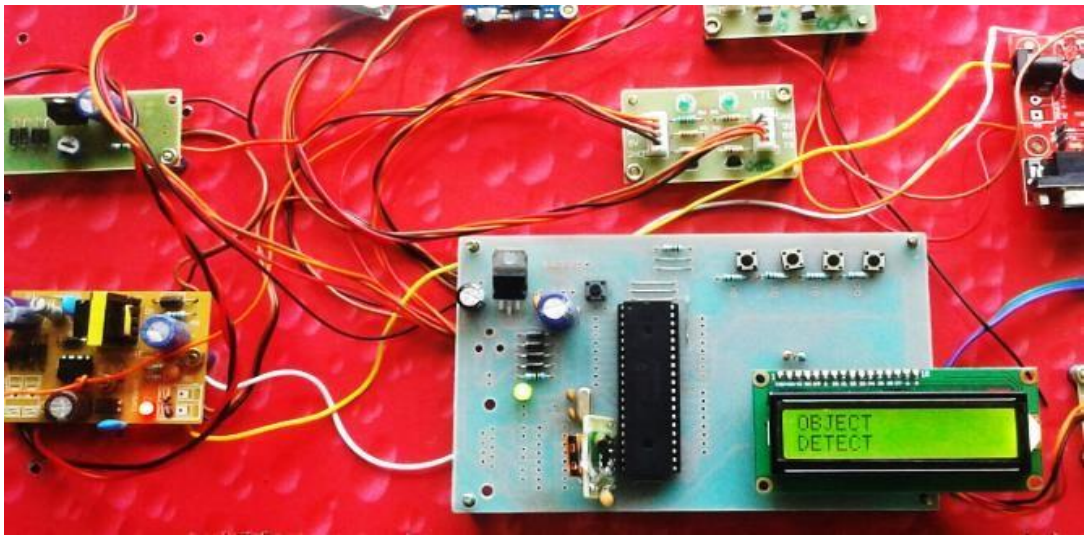

Fig.5.2.Detection of the Obstacle

The ultrasonic sensor will detects the obstacles in the path and alerts the blind person by giving voice commands through Android Application. The detection of the obstacle will be displayed in the LCD as "object detect

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LOCATIONS CO-ORDINATING WITH GPS

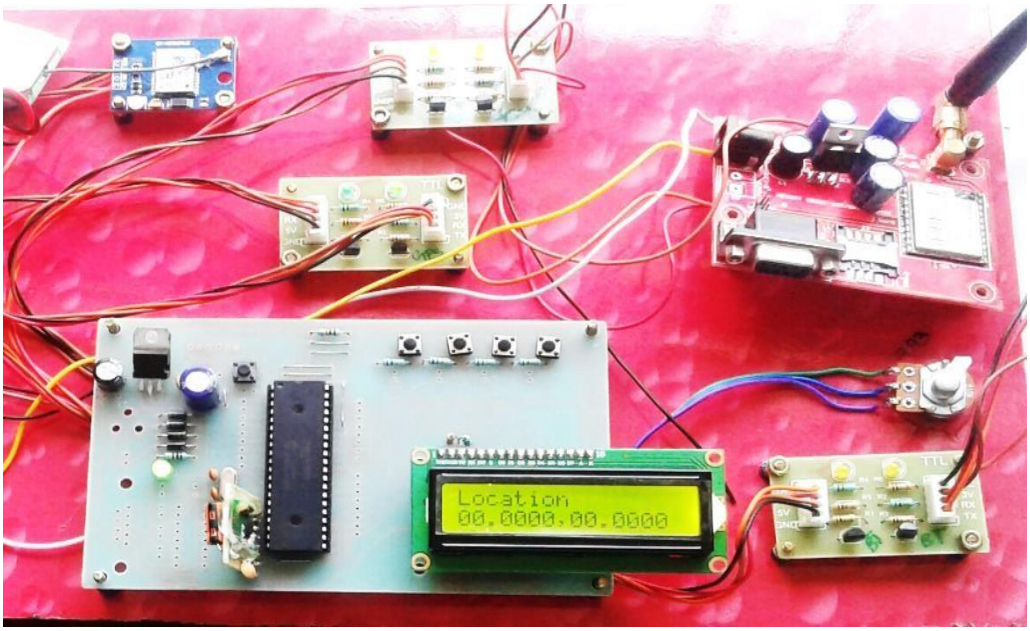

Fig.5.3. Locations co-ordinating with GPS

The GPS will be co-ordinated with the locations programmed in the microcontroller. This is the initial stage of location co-ordination with GPS.

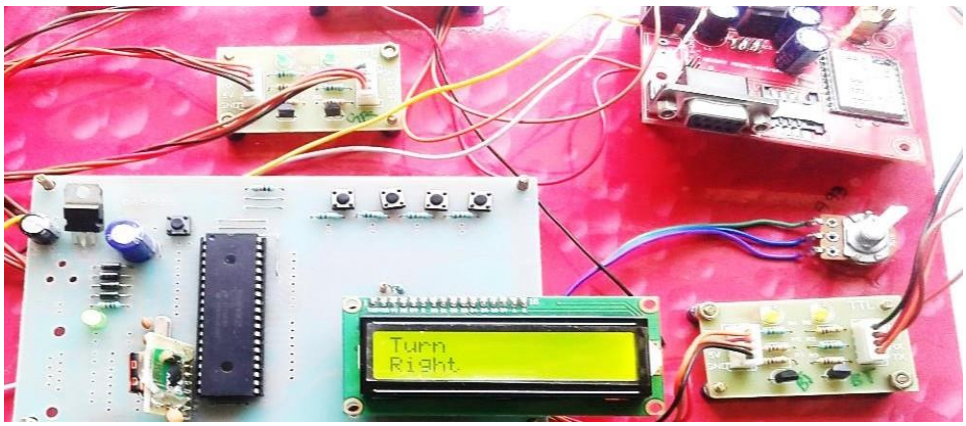

Fig.5.4. Turn right Command

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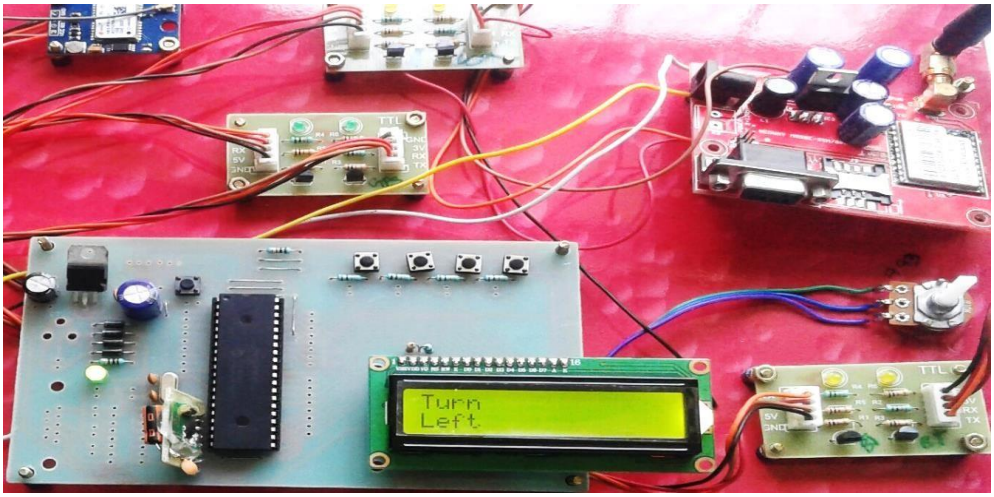

Fig.5.5. Turn left Signal

The direction of the location should be displayed in the LCD as turn left and the android application will giving the voice commands to the visually impaired .

Fig.5.6. Voice command from Android application

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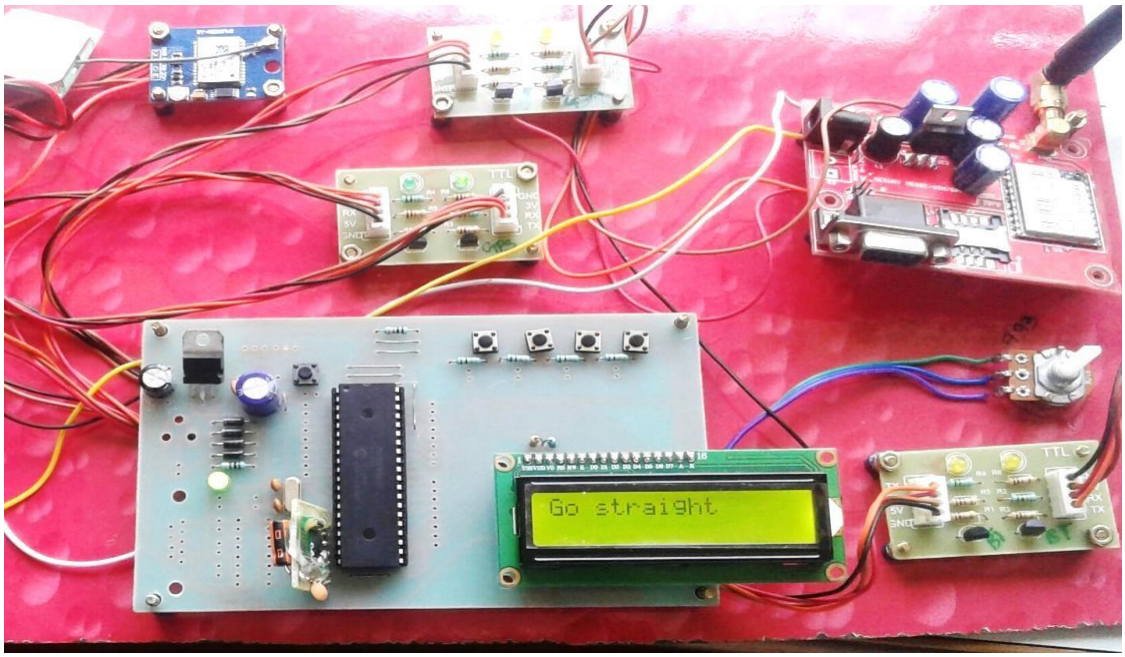

Fig.5.6. Go straight Command

CONCLUSION

Earlier majority of visually impaired people prefer to not use electronic aids, and use only canes or guide dogs. The underlying reasons for this include the relatively high costs and relatively poor levels of user satisfaction associated with existing electronic systems. So we tried to develop a low cost and user friendly system for blind people with greatest possible accuracy. This method offers innovative solutions in order to replace the conventional methods of guiding visually impaired person. Also, it can be easily applied anywhere where it can handle places like mall, airports etc. In this project we have used PIC microcontroller which contains more memory and its operating speed is high. These features not only meet the user's needs but also crucial from an engineering perspective. Those features implemented in the proposed system are the main building blocks to design such a device to provide services for blind people. For future enhancement, the advanced PIC microcontroller can be used to increase the memory and to enhance the operating speed for the same system.

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