Route Finding Application for Blind People

Mrunal Pawar, Minal Pawar, Rohit Najawan

_____

Abstract - **The navigation system aims at building the application which provides guidance for campus navigation and obstacle detection as well for blind people. The main purpose of this project is to guide blind people to reach from source to destination with shortest path. Our application is based on the concept of GPS which helps in navigating the path step by step through voice command. Along with this we are using ultrasonic sensor for obstacle detection. This system gets the information from surrounding area through mounted sensor on the android using the Bluetooth.**

Keywords - **Navigation, obstacle, sensor, GPS, Application, Bluetooth.**

_____

I. INTRODUCTION

The objective of this project is to guide blind people with voice navigated GPS using an android phone. This application is an innovative and cost effective guide system for blind people. For blind and visually impaired people is quite impossible to be autonomous in the contemporary world, in which we are completely surrounded by information, but only visual information. When looking for a product in shops, or ordering at the restaurant, or when they want to listen to the music on a CD, blind person counter the visual barrier of the written language, which only the help of another person can solve. Many industries are using Sensor due to their high level of performance and reliability and which is a great help for human beings. The obstacle avoidance Device is used for detecting obstacles and avoiding the is an autonomous Device Where we are using android device for the information for further Obstacle. The design of obstacle avoidance Program requires the integration of many sensors according to their task. The obstacle detection is primary requirement of this Ultrasonic Sensor and android system. The system gets the information from surrounding area through mounted sensors on the Android using the Bluetooth. Some sensing devices used for obstacle detection like bump sensor, infrared sensor, ultrasonic sensor etc. Ultrasonic sensor is most suitable for obstacle detection and it is of low cost and has high ranging capability.

II. EXISTING SYSTEM

There are many navigation systems for visually impaired people but only few can provide dynamic interactions and adaptability to changes. None of these system work seamlessly both outdoors and indoors. Finding an ROUTE or branch near to us is possible through GIS. A geographic information system is a system designed to capture, store, manipulate, analyze, manage, and present all types of geographically referenced data. The locator to find the services you require simply enter your postcode, town or city and click on 'Search' to see all

ROUTEs in your area. GIS is the merging of cartography, statistical analysis, and database technology. In a general sense, the term describes any information system that integrates stores, edits, analyzes, shares, and displays geographic information for informing decision making. GIS a more complex mapping technology that is connected to a particular database. Because it's generic, it collision. This GIS is a computer program or application that is utilizes to view and handle data about geographic location and spatial correlation among others. Its simply giving the user a framework to obtain information

A. Problems in existing system:
- Merging of cartography, statistical analysis, and database technology.
- Complex mapping technology.
- No wrong Route indication.
- No nearest indication.

III. PROPOSED SYSTEM

Problem Statement

In this project, we are using GPS rather than GIS. First of all, users have to speak out the places from the given list to get source and destination. Proposed system will identify location and navigate you to the nearest place or route. Get turn by turn direction to the destination. This system will provide location and time information in all weather and anywhere. If we enter into wrong route then automatic wrong route indication will be given by voice. The obstacle detecting device is used for sensing the obstacle and thus giving the notification through voice commands

Advantages of Proposed System
1) Space-based satellite navigation system.
2) Provides location and time information in all weather, anywhere on or near the Earth
3) If we enter into wrong root then automatic wrong root indication will give by voice.
4) If we are at near then automatic nearest place indication will give by voice.

Working Principle

The obstacle avoidance uses ultrasonic sensors for its movements and android device and Bluetooth fot notification. A microcontroller of 8051 family is used to achieve the desired operations. The motors are connected through motor driver IC to microcontroller. The ultrasonic sensor is attached to the stick. Whenever the device is going on the desired path the ultrasonic sensor transmits the ultrasonic waves continuously
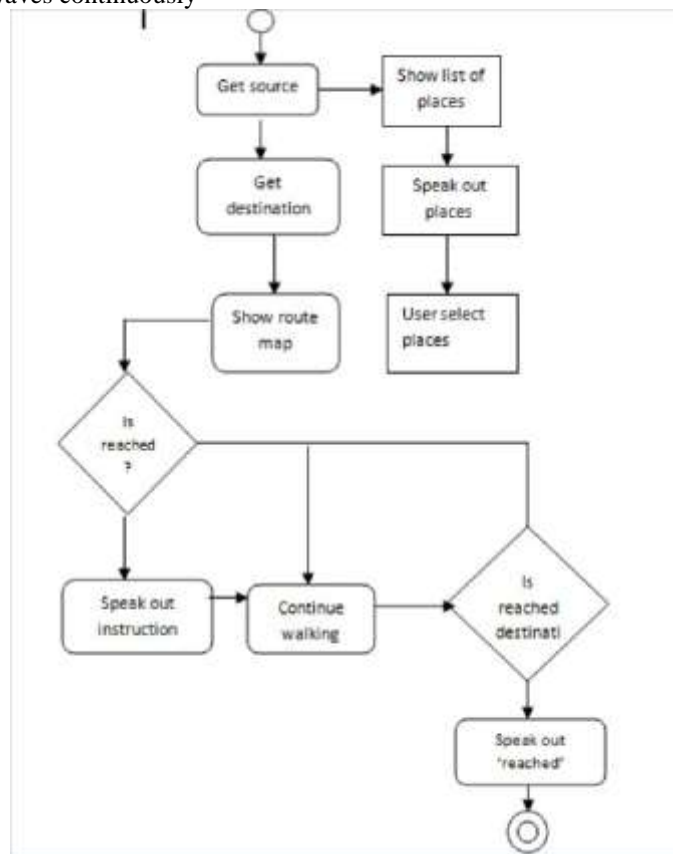
Flow Chart For Navigation

from its sensor head. Whenever an obstacle comes ahead of it the ultrasonic waves are reflected back from an object and that information is passed to the microcontroller. The microcontroller controls the motors legt, right, back and front based on ultrasonic signals. In order to control the speed of each motor pulse width modulation is used (PWM).
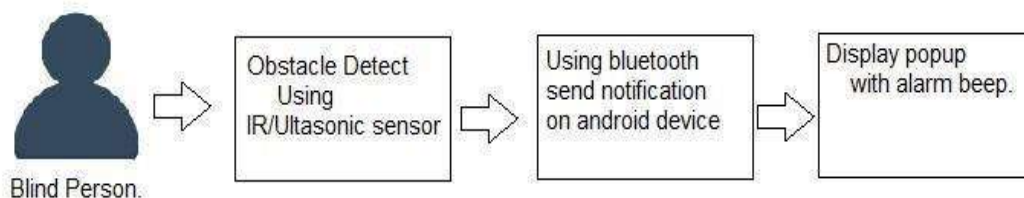
Block Diagram.

Fig. 1. Block diagram for the System

Different Sensors used for obstacle avoidance Robotic vehicle

- Obstacle detection (IR sensor): The IR sensors are used for obstacle detection .The sensor output signal send to the microcontroller. The microcontroller controls the vehicle (forward/back/stop) by using the DC motor which is placed in vehicle. If any obstacle placed in line the IR sensor fails to receive the light rays and gives signals to the microcontroller. The microcontroller will stop the vehicle immediately and siren will on. After one minute the robot will be check the path status, if obstacle is removed the robot move far word else the robot will return back to move starting place. The sensor detects objects by emitting a short ultrasonic burst and then listening for the eco. Under control of a host microcontroller, the sensor emits a short 40 KHz explosion. This explosion ventures or travels through the air, hits an article and after that bounces once again to the sensor. The sensor provides an output pulse to the host that will terminate when the echo is detected; hence the width of one pulse to the next is taken into calculation by a program to provide result in distance of the object.
- Ultrasonic Sensor: The ultrasonic sensor is used for obstacle detection. Ultrasonic sensor transmits the ultrasonic waves from its sensor head and again receives the ultrasonic waves reflected from an object. There are many applications use ultrasonic sensors like instruction alarm systems, automatic door openers etc. The ultrasonic sensor is very compact and has

a very high performance. Where Bluetooth device give us the information about the obstacle and the android device get the message about the obstacle

- Working Principle: The ultrasonic sensor emits the short and high frequency signal. These propagate in the air at the velocity of sound. If they hit any object, then they reflect back echo signal to the sensor. The ultrasonic sensor consists of a multi vibrator, fixed to the base. The multi vibrator is combination of a resonator and vibrator. The resonator delivers ultrasonic wave generated by the vibration. The ultrasonic sensor actually consists of two parts; the emitter which produces a 40 kHz sound wave and detector detects 40 kHz sound wave and sends electrical signal back to the microcontroller.

Applications of Ultrasonic Sensor
- Intruder alarm system
- Back sonar of automobiles

Features of Ultrasonic Sensor
- Compact and light weight
- High sensitivity and high pressure
- High reliability
- Power consumption of 20mA
- Pulse in/out communication
- Narrow acceptance angle
- Provides exact, non-contact separation estimations within 2cm to 3m
- The explosion point LED shows estimations in advancement
- 3-pin header makes it simple to connect utilizing a server development link

Applications of Obstacle Avoidance
- Especially for blind person.

IV. REQUIREMENT ANALYSIS

Hardware requirements
1) System :Pentium IV 2.4 GHz.
2) Hard Disk : 2 GB.
3) Ram : 1 GB.
4) MOBILE: ANDROID
5) Bluetooth Module: Bluetooth is a wireless technology standard for exchanging data over short distances from fixed and mobile devices and building personal area networks. Range is approx. 10 meters. In this system HC-05 module is used. This module is based on the Cambridge Silicon Radio BC417 2.4 GHz Bluetooth radio chip. This chip uses an external 8 Mbit flash memory. HC-05 is more capable module that can be set to be either master or slave. The module has two modes of operation, command mode where we send AT commands to it and Data mode where it transmits and receives data to another Bluetooth module.
6) Ultrasonic Sensor: The ultrasonic sensor is used for obstacle detection. Ultrasonic sensor transmits the ultrasonic waves from its sensor head and again receives the ultrasonic waves reflected from an object. The ultrasonic sensor is very compact and has a very high performance where Bluetooth device gives us the information about the obstacle and the android device get the message about the obstacle.
7) Arduino: An Arduino is an open source microcontroller development board. It is an prototyping platform based on easy-to-use hardware and software. Arduino boards are able to read inputs-light on a sensor, a finger on a button etc. Arduino can run standalone by using a power supply in the bottom left of the board

Software Requirements
- Operating system : Windows XP/7.
- Coding Language : Java 1.7
- Tool Kit : Android 2.3 ABOVE
- IDE : Eclipse
- Android Studio : Developing a mobile application for native platforms gives access to device features like location, communication etc, this access to the primary device features increase the application performance and increases the security aspects of the application. The architecture of the android must be clearly understood before developing any application for android. When building mobile phone application its necessary to test on a real mobile phone device before releasing to the users. Android dev phone is a SIM and hardware unlocked phone used by developers to test their applications.
- GPS A GPS receiver calculates its position by precisely timing the signals sent by the GPS satellites high above the earth. Each satellite continually transmits the messages containing the time message was sent, precise orbit information(the ephemeris orbit path and speed of each satellite), and the general system help, current date and time of all GPS satellites. The receiver measures the transit time of each message and computes the distance to each satellite. A form of triangulation is used to combine these distances with the location of the satellites to determine the receivers location. The position is displayed, perhaps with a moving map display or latitude and longitude; elevation information

maybe included. Many GPS units also show information such as direction and speed, calculated from position changes.

V. CONCLUSION

In this project, we have implemented an android app which is an innovative and cost effective guide system for blind people using an android phone. Also implemented the hardware which helps the blind to avoid the obstacle in their path by giving sound alert. This app will remove the dependency of blind people over others.

VI. ACKNOWLEDGMENT

We are grateful to this institute for having channelized our skills and energy and for encouraging us to work together with cooperation and co-ordination. We are indebted to our inspiring HEAD OF DEPARTMENT Mr.Mahavir Devmane and PRINCIPAL Mr. Rajendra Sawant and also our Internal Guide Mr.Sachin Barahate who have extended all valuable guidance, help and constant encouragement through the various difficult stages in the development of the project.

VII. FUTURE SCOPE

Our navigation application is socially very useful, because it gives the safe and easy use to the impaired people. The user can get vocal Prompts to avoid possible obstacles and step by step walking guidance. The technology used in smart phones is relatively used and makes great steps forward everywhere. A long term perspective, based on more accurate location sensors could offer user better interaction with their environment in the augmented reality view. Whereas in the current version of the prototype users just post comments based on their position, in later releases with an accurate method to determine the orientation of the device indoor, users could post comments directly to walls or other real life objects. Another huge benefit for the application would be to refine the network database for the campus of university.

VIII. REFERENCES

[1] H. Kopka and P. W. Daly, *A Guide to L^{A}TEX*, 3rd ed. Harlow, England: Addison-Wesley, 1999.
[2] Androutsellis-Theotokis, S. and Spinellis, D., "A survey of peer-to-peer content distribution technologies," ACM Computing Surveys, Vol. 36, No. 4, December 2004, pp. 335-371.
[3] R. Shollmeier, I. Gruber and M. Finkenzeller, Routing in Mobile Ad Hoc Networks and Peer-to-Peer Networks, a Comparison, Inter. Workshop on Peer-to-Peer Computing, Pisa, Italy, May 2002.
[4] G. Vasilakis, G. Perantinos, I. Askoxylakis, N. Mechin, V. Spitadakis, A. Traganitis, "Business opportunities and considerations on wireless mesh networks," IEEE WoWMoM, 2009.
[5] B. Schrick and M. Riezemman, "Wireless broadband in a box", IEEE Spectrum Magazine, June 2002, pp. 38- 43.
[6] I. F. Akyildiz, X. Wang, W. Wang, "Wireless mesh networks: a survey", Computer Networks and ISDN Systems, vol. 47 n. 4, March 15, 2005, pp. 445-487.
[7] M.H.Manshei, P.Marbach, and J-P Hubaux. Evolution and market share of wireless community networks. In GameNets, 2009.