

NAVIGATION SYSTEM FOR VISUALLY IMPAIRED PEOPLE

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Abstract: Evolution of technology is making our daily life simple. With a fast life everybody today is using the benefits of technology except some people of the society. One of them is the visually impaired people who have to rely on others for travelling and for other activities. This paper aims to provide one such theoretical model which includes the latest technologies to provide efficient and smart aid to the visually impaired people. It uses IR sensors along with ultrasonic range finder circuit for obstacle detection. A simple smart mobile containing Bluetooth module along with GPS technology and an Android application, will provide voice assistance to desired location and in panic situations will send SMS alert to registered mobile number of impaired person. The basic objective of this system is to provide a convenient and easy navigation aid for unsighted person which helps in artificial vision by providing information using this system.

Index Terms: Visually impaired people, GPS, GPRS, Smart stick, Ultrasonic Sensor

I. INTRODUCTION

The main objective of this system is to provide perfect navigation to the visually impaired people using mobile application, along with a smart blind stick which provide assistance to reach desired location avoiding accidents.

Eye is one of the most important senses of human, where most of the information from the environment is gathered via sight. The basic problem which every blind person faces is with regard to navigation in daily life. The basic tools used by the impaired people are walking cane and guide dogs and of fellow commuters. The commonly used tool is still the blind stick. It has some drawbacks like practice, motion all time, less reliability in hurdles and range detection.

This system modifies this cane with sensors and electronic components. Today's technology can help in artificial and accurate navigation. This model uses GPS and GPRS technology along with Bluetooth module which will initiate an android application that will connect to Google maps for navigation. In addition to ultrasonic and IR sensors are used which help in obstacle detection and on recognition the voice message alert is provided to the user. It is a low cost, light weight and accurate model which helps in effortless navigation for the impaired person. At panic situations the device sends longitude and latitude of the location to the preregistered mobile numbers.

II. RELATED WORKS

EXISTING SYSTEM

The system developed in Finland is a GPS based system used for outdoor navigation and public transportation. The main problem with GPS-only based systems is failure to provide guidance in cases where the route details are not clearly updated and at cities with tall buildings. Since it is only based on mobile system the route storage capacity is less and new route details are not available. There are many electronic devices [1] and applications designed for visually impaired people. But they are huge cost which are IOS applications [2].

DIS-ADVANTAGES OF EXISTING SYSTEM

- The main problems with the GPS-only based systems is failure to provide guidance in cases where the route details are not clearly updated.
- User has to update the system frequently for each and every new location to get the route details.

PROPOSED SYSTEM

In the proposed system is a combination of android and cloud technology. An android mobile having GPRS and GPS facilities will connect to cloud server for the updates for route description. Whenever a impaired person wants to go from one place to another place, they have to select the source and destination point and then the system will guide him in a proper way [3][4].

He will be guided to his destination by the updates received via the cloud server; Android application first gives the source (usually current location) & destination location and the date and time. The proposed system is a context aware system which will find the best route based on date and time using context aware concept and guide the user. This system uses the Google Map which gives the co-ordinates of the particular location and vice-versa. This system has a voice play module which will instruct the visually impaired person to move in a proper direction.

ADVANTAGES OF PROPOSED SYSTEM

- Higher performance is expected by the system as it retrieves location information using Google.
- Since cloud servers are used no need to update the route details in android phone, all the route details are available in cloud and the necessary information is extracted as and when required.
- He / She will be guided to his destination by the updates received via the cloud server; Android application first gives the source (usually current location) & destination location and the date and time [5].
- This system uses the Google Map which gives the co-ordinates of the particular location and vice-versa. The voice play module will instruct the user to move in correct direction.
- This system uses Voice Play system which will guide the user clearly without any confusion.
- The Smart blind stick gives voice alert when obstacle is present to avoid accident.

III. METHODOLOGY

Technologies used are:-

Mobile Application:

- Android
- GPS Co-ordinate System
- GPRS

HARDWARE REQUIREMENTS:

A Desktop system with following configuration:

- Hardware : Pentium IV
- Speed : 2.4 GHz
- RAM : 1 GB
- Hard Disk : 250 GB
- Key Board : Standard Windows Keyboard
- Mouse : Two or Three Button Mouse
- Monitor : SVGA

Blind Stick contains:

- Blind Stick
- Ear Phone
- Ultrasonic Sensor

SOFTWARE REQUIREMENTS:

- Android Google Api 1.5 or higher
- Android Development Tool plugin
- Eclipse 3.4 or higher
- Sun JDK 5 or higher
- Web server Apache Tomcat

SERVER SIDE:

- Java Enabled Web Server / App Server(Tomcat)

SYSTEM ARCHITECTURE:

- This system has two applications are followings:
- ✓ J2EE Application, which is running in cloud web server.

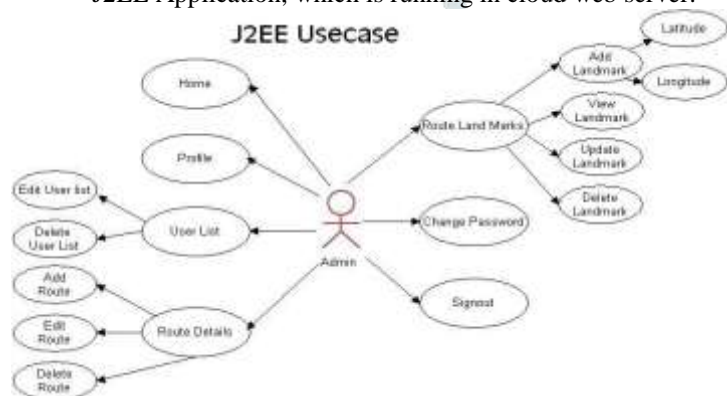


Fig.1 J2EE Usecase

- ✓ Android Application, is installed in the mobile of visually impaired person.

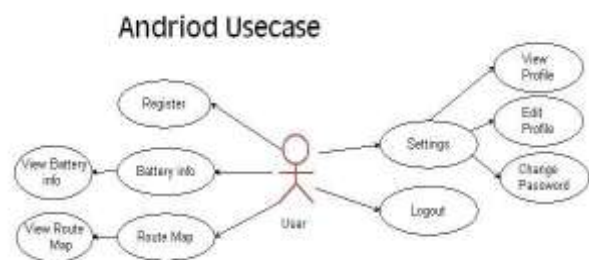
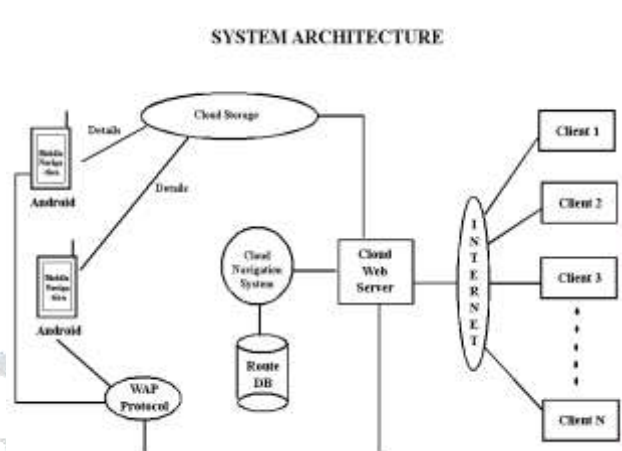


Fig.2 Android Usecase

- Admin user is a main user who accesses the cloud web application. They create route and landmark details and are able to edit the route and landmark details.
- End user that is visually impaired person can register through android application and can login using login id and password.
- Once the visually impaired person logged in the android application, he can able to select a route from the list of route details available in the cloud server.
- As soon as he select the route, android application has to get the GPS coordinates of current mobile location and check

with the routes landmark and inform the impaired person, where they are and how they have to move further.

- Android applications keep on checking the GPS coordinates of mobile, once the next landmark is reached, it will instruct the impaired person, how to move further.
- Once the visually impaired person reached the destination, it will inform through voice, that they have reached the destination.



System Architecture

Fig.3

- This system should have task remainder through which impaired person can be able to set the alert voice message for particular time.
- This system should have battery health monitoring system and inform the user whether recharge the battery or not.
- The Smart stick contain Ultrasonic sensor, the obstacle with 100mtrs away is sensed and gives alert voice to the visually impaired person [6] to avoid collision.



Fig4. View of using this system

IV. CONCLUSION & FUTURE SCOPE

The digital network is growing so huge, and the impaired people are unable to feel the technology. So the needs of the visually impaired people are recognized. The navigation system for visually impaired people is designed to provide a shortest path navigation through voice guidance and the blind stick provides safe journey without causing accidents using Bluetooth and normal smart phone. The proposed system is low cost, which is a significant factor because 90 percent of visually impaired in the world lead their life in low income. This system improves the quality of life and reduces dependency for the social life.

In a future scope, the proposed system must work on Wide Area Network and the visually impaired people must be able to travel

anywhere without restricting the areas. This system must be available to each visually impaired person.

REFERENCES

- [1].<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5375851/>
- [2].<http://www.incobs.de/tests/items/ios-gps-apps.html>
- [3] <https://www.elprocus.com/gps-based-voice-alert-system-for-blind-people/>
- [4].<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5375851/>
- [5].<http://www.afb.org/info/living-with-vision-loss/using-technology/smartphone-gps-navigation-for-people-with-visual-impairments/the-benefits-of-using-a-gps-mobile-navigation-app-designed-for-people-with-visual-impairments/1235>
- [6].<https://www.hindawi.com/journals/abb/2015/479857/>
- [7].http://www.iraj.in/journal/journal_file/journal_pdf/11-296-147564809745-48.pdf
- [8].<https://link.springer.com/article/10.1007/s40595-016-0075-z>
- [9].<http://ijettjournal.org/volume-11/number-6/IJETT-V11P256.pdf>
- [10].<http://www-ist.massey.ac.nz/S2iS/ICST-2014/papers/1569962037.pdf>

