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Route Finding Application for Blind People Using GPS

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ABSTRACT: Most of the blind people in the world use white canes to go from one place to another. Due to their blindness they are not able to perceive their surroundings. So the mobility of the visually impaired people is limited. Therefore the purpose of this project is to build a navigation system that will be able to guide a visually impaired person safely and with ease, in an indoor and outdoor environment. This goal has been realized through the use of an ultrasonic sensor to determine the range of obstacles and also a microcontroller to act accordingly. The system includes a warning system through voice rendering and through the generation of vibration. Talking signs, control stick, echolocations are generally helpful in exploring the visually impaired people to arrive at their goal, but this can't be used for longer distance of travelling in the traffic. it is not easy for blind people to independently move. In this paper, it constructs and materializes the navigation system for blind people in order to provide precise location information, using Android base Smart Phone. The navigation system uses TTS(Text-to-Speech) for blindness in order to provide a navigation service through voice. Also, it uses Google Map API to apply map information.

KEYWORDS:Detection; Vibration; Voice feedback. Navigation System, obstacle, sensor.

I. INTRODUCTION

India is now home to the world's largest number of blind people. Of the 37 million people across the globe who are blind, over 15 million are from India [1], [2]. Most of these people are from families with very poor economic condition and they rely on other people to help them or use white canes, to roam around. The project proposes a navigation system that includes a white cane capable of detecting obstacles and providing feedback. The World Health Organization (WHO) estimates that 285 million people are visually impaired worldwide. 39 million of them are blind. About 246 million people suffer from severe reduction of vision. People who suffer from a severe reduction of vision that cannot be corrected with conventional means like glasses are blind. A blind person cannot see any obstacle and thus cannot move without any help of other means. Moreover, these blind people use a white cane as a tool for direction when they walk or move. As electronic technologies have improved, a research about Electrical Aided: EA for blind people has started. With a current product, Human Tech of Japan developed Navigation for blind people, using GPS and cell phone. This system is consisted of cell phone of the user (blind people), a subminiature of GPS receiver, a magnetic direction sensor, a control unit and a speech synthesis equipment with PC of base station.

II. RELATED WORK

[1]   This work presents a navigation system for visually impaired using sound navigation and ranging. Here, ultrasonic sensor and Infra Red (IR) proximity sensor have been used for real time obstacle detection. Real time image processing is used to generate idea about the size and distance of the obstacle from the blind person, thus creating safe path for navigation towards destination. Voice recognition is used for controlling the device. A method of finding the device in case it is lost is also provided in the work. The goal is to create a cost effective, light weight, portable system for the blind people enabling their movement without assistance.

[2] The paper represents the architecture and implementation of a system that will help to navigate the visually impaired people. The system designed uses GPS and voice recognition along with obstacle avoidance for the purpose of guiding visually impaired. The visuallyimpaired person issues the command and receives the direction response using audio signals.The latitude and longitude values are received continuously from the GPS receiver. TheDirections are given to the user with the help of audio signals. An obstacle detect or is used toHelp the user to avoid obstacles by sending an audio message. GPS receivers use NMEAStandard. With the advancement in voice recognition regarding direction to the visually impaired.

[3] In this paper we have presented the design voice based navigation systemfor blind using voice recognition module and GPS module implemented on arduino board. This system helps the blind person to navigate. The blind person will give the destination's name as the input to voice recognition module.GPS module continuously receives the latitude and longitude of the current location. GPS compares it with the destination's latitude and longitude. The blind person receives the pronounced directions which he needs to follow to reach his destination.

[4] 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.

III. PROPOSED SYSTEM

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

GPS(Global Positioning System) GPS is a radio navigation system using satellites and it is developed by USA Department of Defense for military use navigation but it can be used by citizens with a limited range. It predicts radio coverage from satellites to a receiver, then it shows the exact 3D location, speed and time. This system can be universally used for 24 hours, and many people can use it. This GPS system can be dived into 3 different segments; SS (Space Segment), CS (Control Segment), and US (User Segment). SS (Space Segment) represents the location of 24 satellites that rotate around the Earth every 12 hours. As of April, 2007, there is a total of 36 GPS satellites with 30 of them are active and 6 of them are preparatory satellites in case of malfunction. CS (Control Segment) represents a general observation post that manages and tracks GPS satellites. US (User Segment) represents GPS users and GPS receiver .
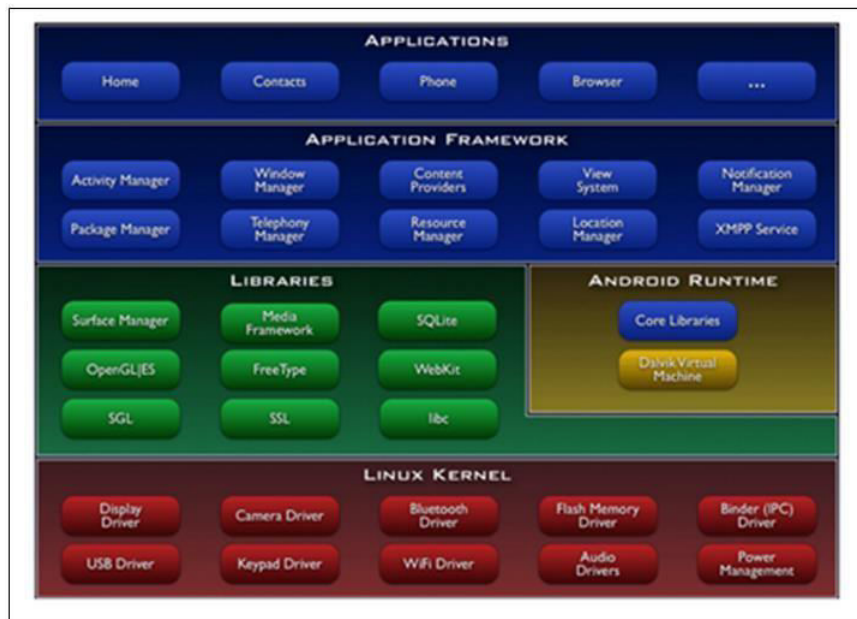
Positioning Technology: Service provider can predict any location using GPS chip within wireless device.In this case, the positioning technology directly manages a calculation of location using received signal from satellite. Once the calculation is done, a variety of information can be received through mobile communication network. Depending on Mobile communication network or location information service, the system sometimes uses a single base station based information, rather than multiple base stations. Since mobile communication network, characteristically, constantly manages the mobility of cell phones, this positioning technology method can be a method of providing LBS without any additional position technology and any calculation from requests of location. The accuracy of location estimation is at the maximum when the location was estimated using GPS and the matching satellite based location prediction method. On the other hand, a base station method has the lowest accuracy of predicting location since it only allows predicting a certain part of region rather than a coordinate. LBL service can be materialized using, other methods other than what are currently shown. Within current mobile communication network, there exists a variety of end terminals that have different method of predicting location. Therefore, normal mobile communication companies combines GPS, A-GPS and a base station based method to provide LBS

Location application: This application represents a service that provides already processed contents based on locations of individual user or an object through communicating with lay-administered platform or that can manage collected location information. Within mobile communication network, this application can be separated into LocationApplication server and Location contents server. Location Application Server is nicknamed as 'LBs Platform' and it is a facility of mobile communication network that Simultaneously provides extra service based on basic location and a gateway for the outer contents service.Typical contents service or areas of solution are telematics, WAP service based on location, emergent Safety call service, map combined withGIS and aregion service.
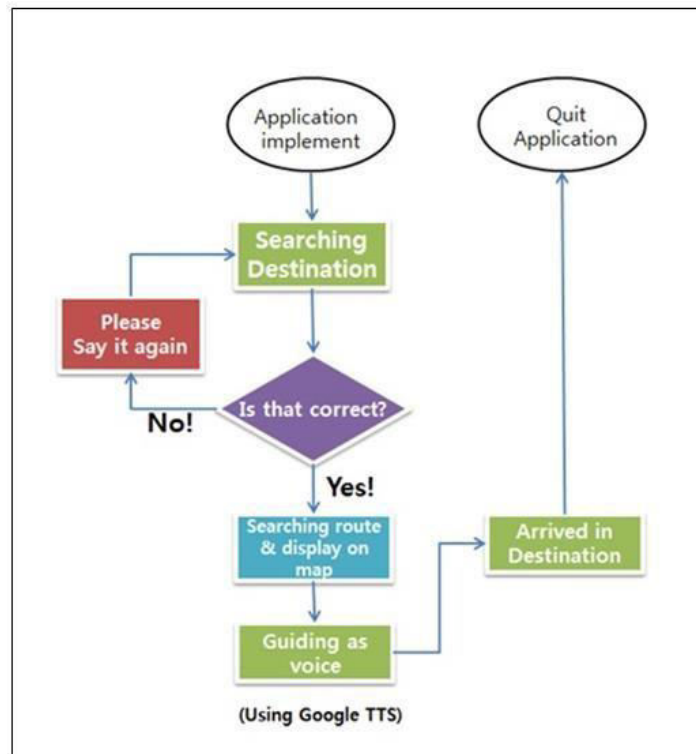
Emergency Help While roaming outdoor or indoor the blind person may face difficulties that s/he can't escape on her/his own, i.e. the person may get sick or hurt. We are providing a method so that the blind person can ask for an emergency help when needed. If the person somehow moves out from the route to an unknown place where it's very hard to find the location or the person is hurt or feeling sick, with just a help of pressing a button s/he can send the present location and ask for help from her/his friends and family.

Voice Recognition Voice recognition method is being used by various systems nowadays. We have seen the Siri in Apple products, The Google assistant in Android systems, Cortana in Windows. These apps work as artificial intelligence systems. The user can give order or ask for anything and the assistant executes it within its level of intelligence. Unfortunately, till now to use a smart phone is very tough for a blind person and can be high maintenance. So we are trying to provide a voice recognition system along with some buttons which are easy to maintain. When pressed the system will take input from the person through the microphone and will execute the task.

Route Information Without knowing where to go, a blind person can't move in an unknown environment. Basically the blind person makes an imaginary route or navigation system of her/his own considering the environment where s/he is moving daily. Sometimes s/he sort of memorizes the touch, sound, footsteps, directions etc. everything in her/his mind to make a map of her/his own. Without that s/he is very helpless. When a blind person moves outdoor, the total environment can be known, unknown or can be modified from her/his past experience. So walking independently outdoor is almost impossible or can be very hard. This makes the blind person frustrated and dependent on help of the pedestrians. That's why we are trying to introduce the route information to them. With the help of the proposed system s/he'll get the route information, i.e. where to go, how to go, how much is the distance from the source to the destination etc.
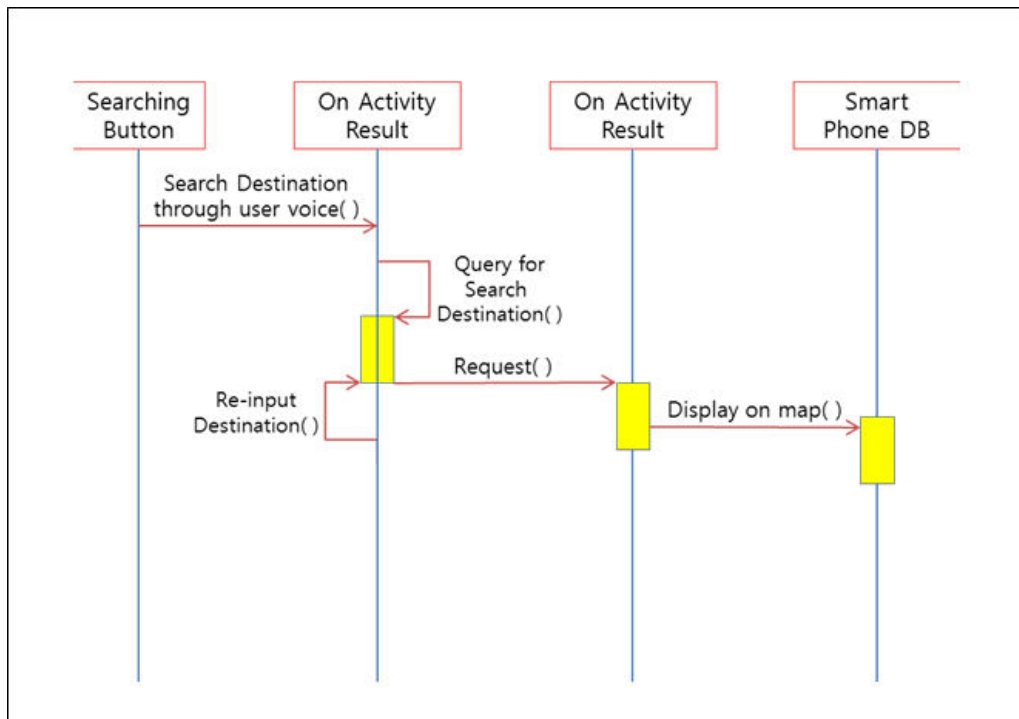
SOFTWAREREQUIREMENTS:
- Operating system : Windows7andabove.
- Coding Language : Java1.8
- Toolkit : Android2.3andabove
- IDE : Android Studio
- Database :SQLite,MySQ

IV. RESULTS

Voice Recognition We are here trying to provide a voice recognition system along with some buttons which are easy to maintain. When pressed the system will take input from the person through the microphone and will execute it. So at first we took several inputs to test whether the voice recognition system can take the input or not. After several tests we found some errors. When there is a lot of sound pollution the input was not taken well by the processor. Moreover the processor is a bit slow to handle these types of instructions too. But overall performance was good. At least, from the results we got we can say that it can be provided with the system.

Route Information To take the input of the destination from the blind person we provided two different ways- button input and voice input. When the system is online we can easily use the voice recognition system to take the input. But the button system also works just fine and faster than the voice recognition system. Several destination buttons were placed to take the input from the blind person. S/he can even know about the present condition also. When a destination button is pressed or voice input is taken for a destination, thesystem will create the path, tell the person about the distance between her/him and the destination.

Sending SMS: one can see that the system is sending sms when it gets an instruction including current location information

V. CONCLUSION

This project proposes a system to assist blind users in their navigation. With the proposed design and architecture the blind people will able to move easily from one place to another without help from other people . Our paper analysed the existing electronic aids for the blind people. The proposed system is more useful and efficient than the conventional ones. As far as the localization is concerned, it will be able to provide accurate details of the location of the blind

person with the help of the GPS if in case s/he gets lost or faces any danger. The proposed system is able to provide information about the surrounding environment. It can be further improved to have more decision making capabilities by employing varied types of sensors, which are not used in current work.

FUTURE SCOPE

In future, we will access the map from google for deep location as we are doing this as a student level.

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