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AUTOMATED MOBILITY FOR VISUALLY IMPAIRED PEOPLE

Prof. Mrs. V.K.Patil[1] , Siddhant Aher[2] ,Aparna Kshirsagar[3]

1 Guide ,Professor, Electronics and Telecommunication Department, AISSM'S, Institute Of Information and Technology, Pune, India

2.3 Students, Electronics and Telecommunication Department, AISSM'S,Institute Of Information and Technology, Pune, India

ABSTRACT: *This paper presents automated mobility for visually impaired people which focuses on independent mobility of visually impaired or blind people who suffer in an unknown environment without any manual assistance. This system employs Radio Frequency Identification (RFID) to achieve an objective of identifying certain paths for the user navigation as well as provide certain features such as object recognition, log records of all users' tag access. This proposed system on the user side include a mobile RFID reader module with an integrated microcontroller. In path identification technique, RFID passive tag network is employed on the path and for object recognition required tools and other objects in the house or building will be embedded with passive RFID tags. A text data unique to each object and path location, resides on the server. The reader reads the tags and transmits the data wirelessly to the mobile which in turn scans for the received Tag ID in the database and respond to the user with its related text data which is played at the user side .The mobile application helps to trace the exact location of the person in the building. As an overall this system will help visually or mentally impaired person to gain the feelings of visualization as well as it will also help us by giving the location of impaired person.*

Keywords: *Visually or mentally Impaired, Navigation, Recognition, RFID, IR sensors.*

1.INTRODUCTION

In a pervasive computing world, location information is very precious. Several new emerging applications is based on location information. For example, location information can be used to help users find what they need and where it is from the current location of the users. A tracking system can be used to prevent lost kids in a shopping mall by attaching location devices to them to locate their current location. Similarly, a navigation system is used to guide users to a certain location. For example, a car navigator is used to guide a driver to a destination based on the current location of the vehicle in real-time or turn-by-turn. The location given to the navigator is typically calculated by Global Position System (GPS) receiver that receives reference radio signals from GPS satellites. Thus, the GPS-based navigation does not work for indoor navigation. An indoor navigation is important for some applications. For example, people can utilize an indoor navigation system to locate devices throughout a building, tourists can use it as a tour guide in a museum, or fire fighters can use it to find an emergency exit in the smoky environments where it is difficult to see the way. Several techniques have been proposed for indoor navigation system. For example, a fingerprinting technique is used with Wireless Local Area Network (WLAN) to calculate a current location of a device.A Radio Frequency Identification (RFID) tag is used to store its location as a reference point to an RFID reader[2].The work of RFID-based on-foot navigation for outdoor and indoor environments.An active RFID-based navigation system is proposed to use radio signal strength of the active RFID signal, and the result shows little accuracy improvement [2]. In this paper, we proposed an RFID based navigation system for in-building navigation for blind people. Our proposed system helps blind people to find a shortest path from his current location to a destination. It also helps to them when they get lost by automatically detecting the lost and recalculate a new route to the same destination. Our proposed system embeds RFID tags into a footpath that can be read by an RFID reader with a cane antenna. Our proposed work can also be used as a tourist guide system for a museum or a navigation system for a rescue in hazardous environments where it is difficult to find an emergency exit. For the rest of this paper, we discuss some related work in Section II, and discuss our proposed work in Section III. The experiment and results are explained in Section IV. We conclude our work and suggest for future work in Section V.

2.SYSTEM DESIGN

The main encouraging factor for the application of technology for visually impaired people is the policy measures adopted by the western countries for social inclusiveness.In the year 2003, international conference dedicated to the theme of application of technology for all aspects of sight loss showcased many such devices [5].

The system design of our project is explained with the help of figure 1.The main component of the project is microcontroller.We are going to use ARM7 microntroller.The RFID tad is interfaced with LPC2138. Each RFID tag is attached a location in a building as a location information reference. The RFID reader is attached to a door and an inertial sensor system. When a visually impaired man moves, the IR is activated and it will be used as obractledetection.If the obstracle is detected by the IR sensors,the buzzer will sound,which is interfaced to the microcontroller. cterecords the movement and estimates the location of the firefighter. The location of the man is adjusted when he passes through the point of location reference which is the location of RFID tags.Our proposed system is similar to that proposed in [5] except that our system is for indoor environment that utilizes only RFID system for location information retrieval. In addition, our proposed system adds a routing system that is used to help users to navigate to a destination with a shortest path. The routing system is also used to help lost people. The ID string and navigation data are processed and then an output is sent through a Bluetooth channel to the headsets which finally produce the audio output that is used by the visually impaired person.The system is suited for both indoor and outdoor use as the RFID tags used arevery resilient to environmental stress.

3. BLOCK DIAGRAM OF PROPOSED SYSTEM

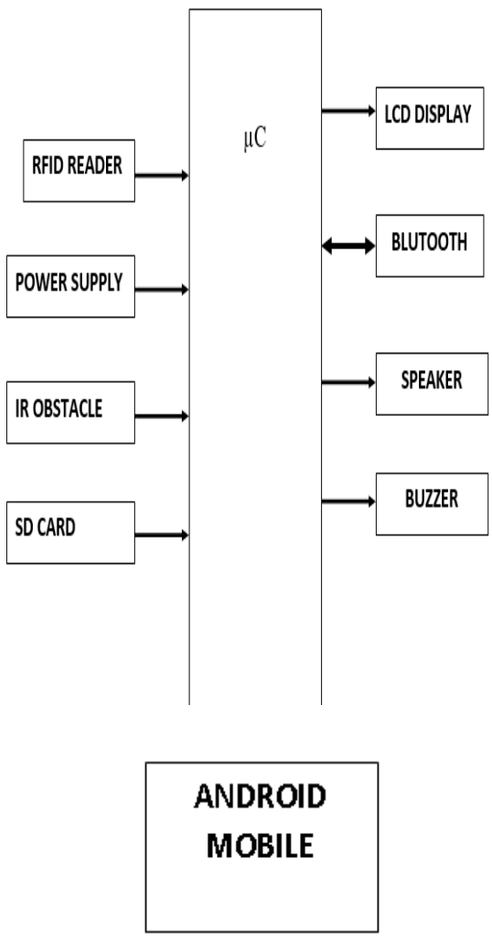
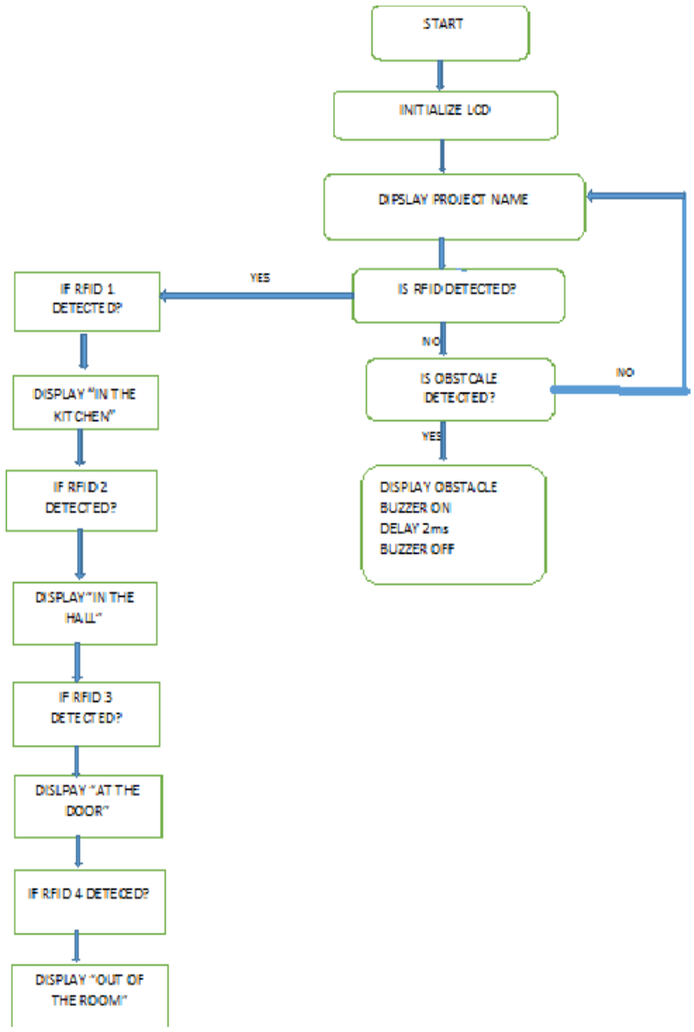


Figure-1

4.WORKING

In this design, the RFID reader, microcontroller, interface, and power system is contained in a stick for a Seeing Eye dog. Passive RFID tags are placed on the ground and at various elevations. Testing is conducted to determine the actual read range of the system at each elevation. When a tag is read, the information is sent to the microcontroller that will send the information to the user through buzzer. An ultrasonic sensor is mounted on the cane. The effective obstacle detection range of the sensor is measured with the sensor mounted at various points on the cane. When an obstacle is detected, a signal is sent to the microcontroller which then informs the user by sending a signal to a speaker that is mounted on the stick. Now this information is transferred to mobile through Bluetooth which helps us in tracing the exact location of the person.

3.Flow chart for the proposed system-



4. EXPERIMENTS AND RESULTS

In this section, actual system prototype is explained and results discussion of Visually Impaired Assistive System is done on the basis of experimental execution conducted with the help of walkthrough sessions. We have built a system prototype including tags to form paths. Each tag contains Tag ID and its location. All locations of the tags are used to identify the location of the user.This location of user we received through the Bluetooth model in the android phone.

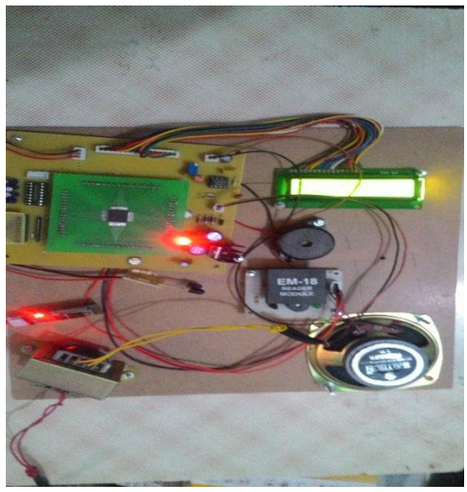


Fig: Working model our project

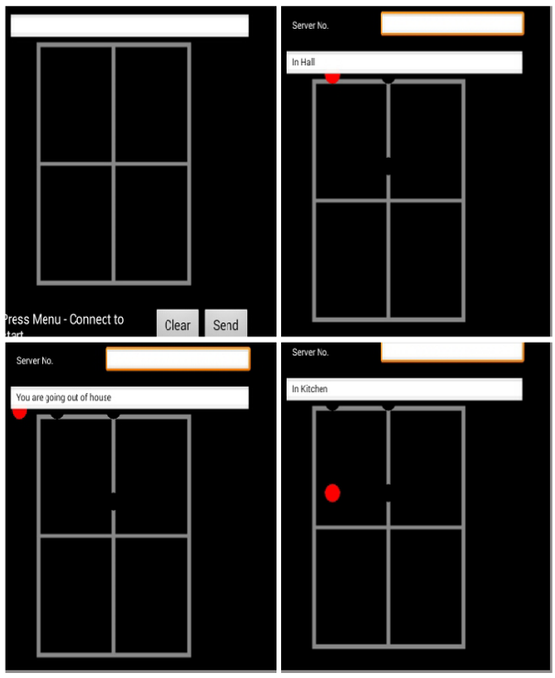


Fig (a) Tracking application on moblie (b) shows the location of person in hall (c)shows that the person is going out of the house (d) shows that the person is in the kitchen

5.CONCLUSION

The portable device is described to provide help to people who are visually impaired in the search for objects at short distances using RFID technology. The device is compact and can easily be placed inside of a glove.The device is able to provide to the blind the information stored in the scanned tags and also the alert when obstracle is detected.This function can be used by the blind to reach an object, to which an SD card was applied, by means of definig path. Through a variable defined path in the SD card, the blind person is able to reach the desired location.Thissysem can also be useful for the people who are mentally impaired.As there is any person in the house who is mentally impaired, we can get the location of the user on the android phone by installing the application based on our system.

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