Blind Person Bus Travelling and Accident Detection

Rohan Mawal[1], Vijay Purohit[2]

1M.E Electronics and Telecommunication VIT Mumbai, Maharashtra, India
2Associate Professor Electronics and Telecommunication Dept. VIT, Mumbai, Maharashtra, India

ABSTRACT

Travel Bus information is a vital component of many intelligent transportation systems (ITS) applications. In recent years the number of vehicles in India has increased tremendously, leading to serving traffic congestion and pollution in urban areas, particularly during peak periods. A desirable strategy to deal with such issues is to shift more people from personal vehicles to public transport by providing better services like comfort, convenience, and so on. The scope of this project is to use a blind guide system that will be placed in a blind stick system for sensing the obstacle user will get a vibration and announcement using voice module as well as it informs the blind person about the coming bus and bus information using the radiofrequency. The performance of the proposed system is found to be promising and expected to be valuable in the development of the Advanced Public Transportation System (APTS) in India. The main advantage of this device is to provide a bus alerting system for easy navigation i.e. the user gets the voices that pronounce the bus details along with destination alerts. The system also supports another protection feature for the blind, when any sudden accidents occur which is detected using MEMS accelerometer sensor and sends location global positioning system-based alerts to the predefined concerned person in the form of SMS.

Keywords: GPS, Blind navigation, GSM, Wireless Communication.

1. INTRODUCTION

Each visually impaired faces their own daily challenges. In day-to-day life they faced difficulty to sense what happens around them, this compromises a series of activities such as learning, and especially locomotion. If they depend on the goodwill of other people around them to locate public transport vehicle. Most of the time they don't even know they are at Bus Stop. To give more comfort and quality of life for these people to use public transportation, it is necessary to research and develops systems that might help them to localize and use the public transport service independently, like the other normal person. This system is specially designed for blind people, so they can travel easily, safely, and independently. This system is divided into two parts One is the transmitter section and the Other one is the receiver. One part is placed on the blind person's stick and another part is on Bus.

Figure 1

2. BACKGROUND OVERVIEW

A. Existing System

Ordinary solutions that can be used by the person with visual disables are the use of a walking stick, personal guide, and watchdog. The World Health Organization estimates that all crowed with visual disabilities live in low-income conditions. In public transport, only the last 2 solutions help the blind person to get around more safely. However, both have high costs. So, the systems and solutions must be low cost, accessible to all people in this group, with easy operation. Several systems have been proposed over the years.

B. Drawbacks of Existing System

- Less Alert System in emergency
- Not safe for others
- Range does not cover large are
- Monitoring depends on a guide
- Less accuracy
- Operate manually

C. Aim & Objective

Many of them involve electronic systems using depends on the range, it sends a defined number which will be received by the user where the user stick will have a receiver. After receiving the code, it announces the bus number using the APR33A3 voice circuit. When the bus reaches the bus stop the system automatically announces the arrival of the bus along with the bus number details using a voice circuit. The User section also has other protection features like the usage of MEMES accelerometer sensors. There is another mechanism section in this system. This mechanism is specially designed for the safety of blind people. If an accident of a blind person occurred the accelerometer is activated which is placed in the system and GSM 800 Modules, which generate a message which contains the location of the blind person. This message will send to a relative's number of blind persons which is already stored in the system. GPS module provides the particular location of the blind person in an emergency.

Wireless Sensor Networks and/or communication via GPS for localization is the best. The main aim of the project is to design a voice-based alerting system for the blind based on aSpeech recognition system and a voice circuit for voice-based announcements. The system also supports with another protection feature for the blind when any sudden accidents occurred.

D. Proposed System

The proposed system consists of two sections.

(i)   Passenger section
(ii) Bus section

This system which is for passengers or physically disabled people consists of an ATMEGA328 microcontroller which is interfaced with an RF Receiver module, GPS Receiver, GSM modem, APR Voice Circuit, LCD, Buzzer, MEMS accelerometer sensor. When the bus is about to reach, Bus consists of a unique RFID Number which will keep on transmitting at the bus stop before arrival at a distance of 200 too! KM.
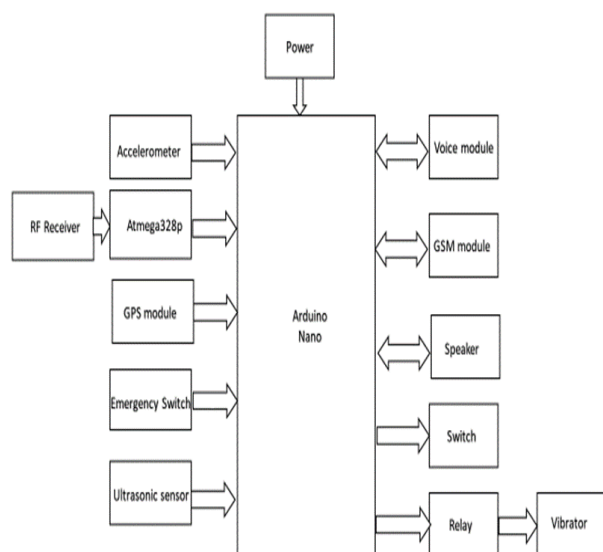
3. BLOCK DIAGRAM

Figure 2

4. THE PROPOSED SYSTEM

A. Introduction

This system is specially designed for blind person, so he/ she can travel easily, safely and independently. This system divided into two parts. One is transmitter and another is receiver. Transmitter side will be placed in the bus and blind person have the receiver side. It's also had accelerometer which gives location of system. As the journey started, system will again be waiting for the transmitter id which matched with destination id. As destination stop arrived the system will again give vibration with the vibration motor and sound with help of Voice IC to alert a blind person that stop arrived, he/she can get down from bus.

There is another mechanism in this system. This mechanism is specially designed for safety of blind person. If accident of blind person is occurred the accelerometer is activated which is placed in system and GSM 800 modules, which generate message which contains the location of blind person. This Message will send to the relative's number of blind person, which is already stored in system. This helps the relatives to find the blind person and it gives more safety to that person.

B. The Working Flow

Let's see how the system will work; as we read in the above paragraph, a Blind person will have a Receiver part. Every bus stop will have its unique id. If a blind person wants to travel from one destination to another by bus, He/she will store the unique id of the destination bus stop, with a help of the keypad provided in the system. After giving destination ID, the receiver will start and continuously search for Id which match destination Id. In transmitter side which placed in buses, its continuously transmit the bus stops id to nearest bus stops. As soon as the transmitter id of bus and systems destination id matches, system will activate the vibrator motor and sound

will generated to give alert for blind person that he/she can board in. As destination stop arrived the system will again give vibration with the vibration motor and sound with help of Voice IC to alert a blind person that stop arrived, he/she can get down from bus.

There is another mechanism in this system. This mechanism is specially designed for safety of blind person. If accident of blind person is ossssccurred the accelerometer is activated which is placed in system and GSM 800 modules, which generate message which contains the location of blind person. This Message will send to the relative's number of blind person, which is already stored in system. This helps the relatives to find the blind person and it gives more safety to that person.

5. ALGORITHM

Step1: Start.

Step2: Create variable to receive the raw data from sensor/LCD display.

Step3: Create two functions for sending SMS.

Step4: Set the input/output pin and set the baud rate for serial.

Step5: Convert the raw data of sensor into Normalize and display the respect values of the LCD display.

Step6: Compare the Normalize value with the condition and display the Alert on the LCD display.

Step7: If the Alert detected (ACCIDENT OR DANGER), send the SMS on the USER number.

Step8: End.

6. RESULT & DISCUSSION

When the person reaches the bus station, he can find the buses that pass through a particular location with the help of a voice recognition system and voice synthesizer. When the bus approaches the bus station, there is an indication in the bus by the voice module that there is a blind person available in the bus station. Finally, when the bus reaches the station the bus number is announced to the blind through a voice module or headphones. There are currently available systems for outdoor navigation but they will not assist in traveling to unfamiliar areas. Some systems use PDA which is not so economic and cannot be afforded by all. In most of the systems, RFID tags are used which are required in 1000s of numbers for tracking of the route. Also, it provides only one way of communication. The system we use is a mobile unit, weightless, and economically feasible.

A. Advantage

- Reliable for blind people.
- Easy to operate.
- Less Power Consumption
- Portable So placed anywhere
- Visual alerts through LCD
- Wireless data transmission using Zigbee.
- User-friendly interaction with the user.
- MEMS-based accident detection
- Live Location-based alerts using GPS receiver module
- User-friendly interaction with the user.
- Sensitive alerts through Voice module
- Reliable for blind physically challenged people.
- SMS based alerting system using GSM in case of emergencies.
- Highly efficient and Low cost of Manufacturing

B. Disadvantages

- Easy to operate.

- Power supply fails system won't work
- Audible alerts through Voice module and also buzzer alarm.
- Failure of device/components may have dire consequences; fatal accidents can occur.

7. CONCLUSION

Primarily, the blind man or woman withinside the bus station is recognized with RF communication. The blind informs the vicinity he desires thru the microphone that's given to the voice reputation device which produces the output of bus numbers withinside the voice synthesizer unit that's heard in headset. Then this vicinity is transmitted to the transceiver withinside the bus. If the names withinside the transceiver withinside the bus healthy with that of the call dispatched through the blind, then there's an alarm withinside the bus unit alerting the presence of blind and a voice to the user's headset that the unique bus has arrived. With the assist of GPS tracker linked with audio output the vacation spot selected with the aid of using the blind is intimated while the bus reaches the precise location. PDA's may be used for GPS monitoring however it isn't always price effective. The accessibility of public delivery for human beings with visible impairment is a difficulty that desires to be pretty debated. Nowadays, the usage of public transportation is developing fast. There is growth of the prevailing networks, ability and the variety of lines. But there are few, or any, techniques aimed for integrating human beings with visible impairments in a way to facilitate their lives. The paintings proposed on this paper seeks to create a low-price solution, low energy intake and a low priced gadget. To attain those characteristics, it makes use of diverse digital gadgets and tremendous technologies, along with smartphone, utility and embedded gadget. This allows to decrease the prices of the gadget, and allows its maintenance. With initial tests, for distances adjusted to actual situation, the gadget confirmed quality results. The communique hyperlink among the modules turned into correctly performed,

in which can be showed thru HyperTerminal. However, the gadget desires to be examined in others situations, like the usage of multiple Module, to analyses the conduct while extra customers are linked to the network. This would require a control of the statistics to wait all of the customers on the proper time.

8. ENHANCEMENTS

A. Future Modifications

- The project can be extended using GPRS module using which the bus details can be monitored directly from predefined web link.
- This approach eliminates the problem of blind pedestrians. We designed an assistive device for the Blind based on adapted GSM, fusion of GPS and vision-based positioning.
- The assistive device improves user positioning, the estimated position would compatible with assisted navigation for the blind positioning.
- The future work enhances autonomous robots or vehicles localization. This project can be extended using GPRS module using which the live tracking of the physically disabled can be plotted in the Google maps.
- The system can be extended by using Android technology for plotting location tracking in Google maps.
- The project can be extended using wireless Wi-Fi network using which the destination can be provide as input using voice application and also touch application from android mobile.
- As future work, the user application for smartphone will be developed. It will contain already all public transport routes, and work with Talkback system.
- The prototypes modules will be developed to small and easy to transport. Final tests will be performed with people with visually impairment, to get feedback about the system and improve it even more.

9. REFERENCES

[1] G.Lavanya ME., Preethy. W1, Shameem.A 1, Sushmitha.R1 (2013) , "Passenger BUS Alert System for Easy Navigation of Blind " , International Conference on Circuits, Power and Computing Technologies IEEE ICCPCT-2013] , 798-202.

[2] Shantanu Agrawal , Anuja Anwane , Prasad Bulankar, Dhiraj K. Thote , (April 2014) , "Bus Recognition System For Visually Impaired Persons (VIPs) Using RF Module " , International Conference on Industrial Automation and Computing (ICIAC- 12-13th April 2014)

[3] G.Raja , D. NaveenKumar ,G.Dhanateja , G.V.Karthik Y, Vijay kumar ,(Apr-2014)

[4] Lamya El alamy, Sara Lhaddad, Soukaina Maalal, Yasmine Taybi,Yassine Salih-Alj ,(2012), "Bus Identification System for Visually Impaired Person " ,IEEE Sixth International Conference on Next Generation Mobile Applications.

[5] Rishabh Gulati (2011), 'GPS Based Voice Alert System for the Blind', International Journal of Scientific and Engineering Research, Volume 2, Issue 1, pp 1-5

[6] Hyn Kwan Lee , Ki Hwan Eom , Min Chul Kim and Trung Pham Quoc, (2010), 'Wireless Sensor Network Apply for the Blind U-bus System', International Journal of u- and eservice, Science and Technology, Vol.3,No.3, pp.l3-24

[7] Brendan D Perry, Sean Morris and Stephanie Carcieri,, (2009), 'RFID Technology to Aid in Navigation and Organization for the Blind and

Partially Sighted', pp. 1-52

[8]   World Health Organization. (2009). 10 facts about blindness and visual impairment Online]. Available: www.who.int/features/factfiles/blindness/blindness_facts/en/index.html

[9]   Advance Data Reports from the National Health Interview Survey (2008). Online]. Available: http://www.cdc.gov/nchs/nhis/nhis_ad.htm

[10]   International   Workshop on Camera-Based Document Analysis and Recognition (CBDAR 2005, 2007, 2009, 2011). Online]. Available: http://www.m.cs.osakafu-u.ac.jp/cbdar2011/

[11]   X. Chen and A. L. Yuille, "Detecting and reading text in natural scenes," in Proc. Comput. Vision

[12]   B. Epshtein, E. Ofek, and Y. Wexler, "Detecting text in natural scenes with stroke width transform," in Proc. Comput. Vision Pattern Recognit., 2010, pp. 2963–2970.

[13]   Y. Freund and R. Schapire, "Experiments with a new boosting algorithm," in Proc. Int. Conf. Machine Learning, 1996, pp. 148–156.

[14]   N. Giudice and G. Legge, "Blind navigation and
the role of technology," in The Engineering Handbook of Smart Technology for Aging, Disability, and Independence, A. A. Helal, M. Mokhtari, and B. Abdulrazak, Eds. Hoboken, NJ,
USA: Wiley, 2008.

[15]   K. Kim, K. Jung, and J. Kim, "Texture-based approach for text detection in images using support vector machines continuously adaptive mean shift algorithm," IEEE Trans. Pattern Anal. Mach. Intell., vol. 25, no. 12,

pp. 1631–1639, Dec. 2003.

[16]   KReader Mobile User Guide, knfb Reading Technology Inc. (2008). Online]. Available: http://www.knfbReading.com

[17]   S. Kumar, R. Gupta, N. Khanna, S. Chaudhury,and S. D. Joshi, "Text extraction and document image segmentation using matched wavelets and MRF model," IEEE Trans Image Process., vol.16, no. 8, pp. 2117–2128, Aug. 2007.

[18]   Joonyoung Jung1 , Kiryong Ha1, Jeonwoo Lee1,Youngsung Kim2 and Daeyoung Kim3. Wireless Body Area Network in a Ubiquitous Healthcare System for Physiological Signal Monitoring   and   Health Consulting

IJSER

IJSER