Intelligent Bus Information System and Blind Assistance

Dennis Dcruz[1], Josna Joseph[2], Jobin Chacko Jacob[3], Delvin C Varghese[4], Adharsh Kumar C[5], Shinto Sebastian[6]

UG Scholar, Department of ECE, Amal Jyothi College of Engineering, Kottayam, Kerala, India[1,2,3,4,5]

Assistant Professor, Department of ECE, Amal Jyothi College of Engineering, Kottayam, Kerala, India[6]

Abstract: Due to the non-availability of prior information about the bus arrival schedule, people have to wait for longer periods at the bus stops, especially during office hours in order to reach on time. Also, bus station follows fixed schedules and routines, and don't make use of intelligent systems for vehicle tracking and control. Administrators deployed at the station prepare the trip sheets containing the schedules and announce it manually which are time consuming, tedious and inaccurate. This Paper is to make transport much convenient for individuals who commute daily using the public bus transport of the city, for effective time management and making it trouble-free, not just for the commuters but the Transport Department to create an efficient public transport system. Our system using GSM and RFID technology provides a cost effective, simple solution and help people in getting the arrival time of the bus. Automatic announcement system in the bus stand announces the name of the bus and destination, while the bus enters the stand. At the same time the arrival time of that bus in the next stand send via GSM and displayed there. A bus detection mechanism for the blind in travelling from one place to another is also incorporated, in order to get their transportation independently. The blind can hear the name and destination using headphone, when the bus comes nearby.

Keywords: GSM, RFID, Announcement system, Bus detection mechanism.

I. INTRODUCTION

Traffic block is a global, day-to-day problem that is affecting Indian road transportation for long. The troubles and difficulties experienced by the general public cannot be expressed in words. Delay to work, school, delay in attending interviews, delay in reaching hospitals in critical cases etc. are very few examples of problems suffered by people due to traffic congestion. One of the results of such traffic congestions are that all the public and private transportation buses will be stuck in the traffic and people will have to wait in the bus terminals for long, without any information about when the bus will reach. We propose a cost effective and simple solution using RFID and GSM technology, in which arrival time of the bus can be displayed and announced at bus terminals.

The system consists of three modules: In-bus module, Bus stand module & Blind assistance module. The In bus module consists of an RFID tag and the Bus stand module consists of an RFID reader, PIC microcontroller, TTS, loudspeaker, GSM module and LCD display. When the bus enters into the bus stand, the RFID reader at the entry gate reads the tag and sends the number to the microcontroller. The Microcontroller on receiving the tag number displays the name and destination of the bus via the LCD display and announces them with the help of TTS module and loudspeaker.

At the same time, it sends the same to the nearby bus stand, where the name and time is displayed using LCD display. This system also eliminates the manual calculation of time by administrators at the station.
With the rise of various support-based organizations, more visually impaired people have been given the opportunity to education and many other means. But still the issues of navigation for the blind are very complex and troublesome especially when they have to navigate to distant places by public transport system. For a blind, reading name boards of buses are not possible, so in this paper we propose a system to serve blind in recognizing the bus. The blind assistance module consisting of RFID reader, TTS and headphone which helps the blind in hearing the destination of the bus, when the bus comes near to him.

II. LITERATURE REVIEW

Since this is a common issue, there are many paper presented work on the bus tracking system. Each paper is unique and special in its design and implementation. Well-known examples of identification technologies include Closed-Circuit Television (CCTV) and Global Positioning System (GPS).

CCTV can be deployed at each entrance gate and image processing techniques can be utilized to identify the arrival of buses, where image recognition was performed to detect the bus in the traffic. This testing has shown poor performance in tracking based detection (~20% precision) [1]. One of the systems by Ganesh K, Sudhakar G, Joy Kuri from Bangalore uses the GPS GPRS technology for permitting localization of the bus and displays the same in bus stands [2]. This method uses a complex ETA algorithm and does not provide actual result.

The work by Shital M Dharrao, Vijay D Choudhary of Maharashtra University summarizes the designing and application of GPS technology clubbed with GSM for Bus stand monitoring and control, of public transportation [3].

The GPS_GSM based tracking system by Abid Khan and Ravi Mishra uses GPS GSM technology is to find the precise location of an object or a person. The latitude and longitude value sent via SMS is not mapped or displayed [4].

In the Punjab province of Pakistan, a system was proposed and implemented for enhancing public transportation management services based on GPS and GSM [5]. GPS receiver communicates with at least 4 satellites before giving the location of the bus. It gives a very good forecasting [1]. However, line of sight between the satellites and the receiver is required otherwise the GPS signal is attenuated, led to error in results.

The main limitation of this technology is especially when it comes to monitor bus traffic inside an underground bus station. Literature review showed that there are many studies made use of Radio Frequency identification (RFID) as a system that transmits the identity of an object using radio waves. This identity is transmitted in a form of serial number that distinguishes each object from others.

The RFID system consists of an RFID reader and an RFID tag. RFID tags are used in various fields, such as for tracking children, tracking vehicles, for toll collection, in super markets etc. This paper proposes a system using RFID and GSM technology, which is cheap and can be easily extended to private as well as public bus transportation. Apart from all the above mentioned system, along with displaying the arrival time, it also announces the name of the bus, when it enters into bus terminal.

So that it will be helpful for the passengers who are anxiously waiting. Blind assistance module [6] is also included, to help visually challenged in getting the destination of the bus, while they wait for bus in bus stop

III. PROPOSED SYSTEM

The proposed system for intelligent bus information system [8] can be mainly divided into two sections bus section and blind assistance section. Bus section consists of two modules- In bus module and Bus stand module. Block diagram of the system is given in Fig. 1.
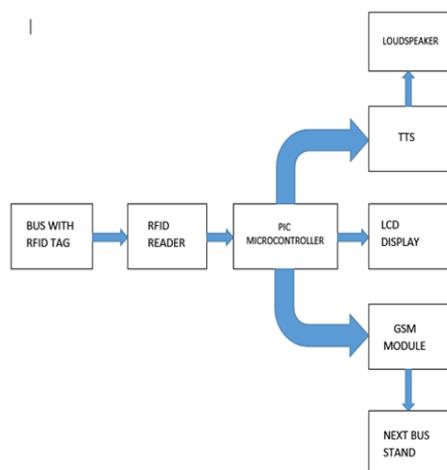
Fig.1. Block Diagram of Proposed System

A. In Bus Module

In bus module consist of a RFID tag with a tag number, unique to each bus. The details such as number, destination, route, delay time etc. of the bus is stored in a database corresponding to each tag number. Data base is created using cloud storage. Cloud is a virtual storage media in which, the data can be stored and retrieved whenever necessary. RFID Tag is shown in the Fig. 2.

Fig.2. RFID Tag

B. Bus Stand Module

Bus stand module at the bus stands consists of RFID reader, GSM, pic microcontroller, LCD display, TTS (Text to Speech converter) and loud speaker. As the bus approaches the bus stand with an RFID reader, the distance between the reader and the tag decreases so that they can interact with each other. RFID reader on reading the tag and selecting the details corresponding to the number from the database display the destination and time on the LCD display and announces it through the loudspeaker. TTS is used to convert the input text data to sound output. The arrival time of the bus to the next station is send through the GSM and displayed on the LCD display as shown in Fig. 2 and Fig. 3.

Fig. 3. Bus Stand Module

Fig.4. LCD Display at the Bus Stand

C. Blind Assistance Module

The second section is the blind assistance module [7], which consists of RFID reader, TTS, microcontroller and headphone. When the tagged bus nears the blind person waiting at the bus stop the RFID reader reads and speaks out the destination of the bus corresponding to tag number

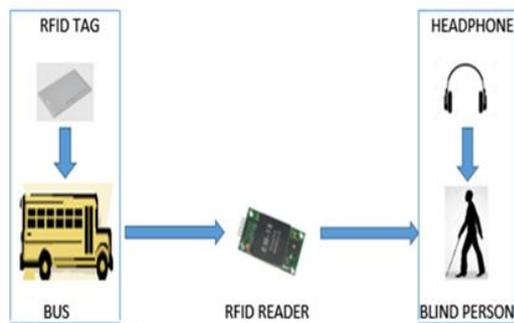from the data base via headphone. The block diagram of proposed blind assistance system is shown in Fig5

Fig. 5 Blind Module

IV. EXPERIMENTAL RESULTS

When the bus enters into the stand, the destination of the bus is announced through loudspeaker and the delay time, name from the database is send via GSM and displayed in the next stand. Small database developed inside the microcontroller is used here, cloud database and management is yet to be done

V. CONCLUSION AND FUTURE ENHANCEMENT

Hence, this paper presents a smart and intelligent bus information system which can provide timings and information of the bus arrivals at the bus terminal. In this way, people can save their valuable time through the updated information passed onto them. Moreover, this system provides an inexpensive and efficient technology providing real time information of buses, hence reducing the waiting time of the passengers and work load of administrators at the bus stand.

The installment cost of the In bus module is very cheap, since it involves RFID tag only. This system will also increase the productivity and system gain of the public and private transport system. In future, the same system can be extended to all bus stops for giving precise information to the public. The above mentioned system along with cloud computing can provide a better and efficient one wherein the information and data are updated and computed within the cloud storage database. A display system can be made inside the bus for displaying the upcoming stop names. App can be developed such that real time information about different buses will be available for the users.

REFERENCES

[1]. Ganeesh K, Thrivikraman M, Hareesh K "Implementation of A Real Time Passenger Information System" International Journal of Innovative Research in Science, Engineering and Technology, 2015.

[2]. Shital M. Dharrao1, Vijay D. Choudhary, Kantilal P. Rane, "Intelligent Bus stand Monitoring and Control Using Combination of GSM, GPS & IR Sensors" International Journal of Engineering Research & Technology (IJERT),2014

[3]. Umar Farooq, TanveeruIHaq, Muhammad Amar, Muhammad UsmanAsad, ,"GPS-GSM Integration for Enhancing Public Transportation Management Services", Second International Conference on Computer Engineering and Applications,2010

[4]. IoanLita, Ion BogdanCioc, Daniel AlexandruVisan, Electronics, Communications and Computers Department, University of Pitesti,"A New Approach of Automobile Localization System Using GPS andGSM_GPRS Transmission".

[5]. Abid khan, Ravi Mishra,M.E,"GPS – GSM Based Tracking System", International Journal of Engineering Trends and Technology- Volume3 lssue2- 2012.

[6]. HU J.,LI G, "Design of city-bus intelligent control system framework", In Proceedings of the2006 IEEE International Conference on Mechatronics and Automation, Henan, China, June 2006, p. 2307-2311.

[7]. Umar Farooq, Tanveer ul Haq, Senior Member IEEE, Muhammad Amar, Muhammad Usman Asad, Asim Iqbal, "GPS-GSM Integration for Enhancing Public Transportation Management Services", 2010 Second International Conference on Computer Engineering and Applications.

[8]. Jack Loomis,M. and Roberta Klatzky,L. (2008), Management Services", Massachusetts Institute of Technology, Vol 7, No.2, pp.193-20.