Bus Tracking System and Li-Fi System

Malathi.R[1], RaveenaRagavi.G[2], Gopal.K[3], Dhanasekar.J[4]

Students of Sri Eshwar College of Engineering[1,2,3]

Assistant Professor Department of ECE, Sri Eshwar College of Engineering[4]

Abstract: In this project we proposed a new technology called LIFI (light fidelity). Li-Fi technology provides transmission of data through illumination by sending data through an LED light bulb that varies in intensity faster than the human eye can follow. This paper focuses on developing a Li-Fi based system and analyzes its performance with respect to existing technology. Wi-Fi is great for general wireless coverage within buildings, whereas Li-Fi is ideal for high density wireless data coverage in confined area and for relieving radio interference issues. Li-Fi provides better bandwidth, efficiency, availability and security than Wi-Fi and has already achieved blisteringly high speed in the lab. And in this project an RFID card is used and using this RFID card only a passage can enter into the bus. By using GSM message is send to the person's relative. And by using GPS, if a bus starts from a particular stop the next stop will be identified before the bus arrives that stop. This can be done by LED.

Keywords: GPS, GSM, Tracking System.

1) INTRODUCTION

Public transport has become a part of live. Most peoplereach from homes to workplace or school using publictransportation. People can lose time in transportation becauseof unwanted waiting. Also, people have the right to knowwhere the bus is now and how long time it takes bus to reachbus stop. The services provided to passengers by transportsystems are very important. There are two modules in this project. One is using RFID card. And the other is using LI-FI technology. In the first module, if a passenger wants to enter into the bus he wants to use the RFID card (i.e.) RFID card must be starched to enter into the bus. After this process a message can be send to the passenger's home using GSM technology. This message contains the details of the time that the passenger enters into the bus and the place where he enters into the bus. The second module with the help of LIFI location of the town bus intimated to the passengers who are all standing in the bus stop through LED board and we can also track the bus location through GPS. This GPS could be used in many applications and it is possible to follow routes and locations driven a vehicle by means of GPS. They develop a web based system presenting vehicles' locations to the user.

2) LITERATURE SURVEY

When it comes to taking the public transportation,time and patience are of essence. In other words, many peopleusing public transport buses have experienced time loss because of waiting at the bus stops. In this paper, we proposed smart bustracking system that any passenger with a smart phone or mobiledevice with the QR (Quick Response) code reader can scan QRcodes placed at bus stops to view estimated bus arrival times,buses' current locations, and bus routes on a map. Anyone canaccess these maps and have the option to sign up to receive freealerts about expected bus arrival times for the interested busesand related routes via SMS and e-mails. We used C4.5 (astatistical classifier) algorithm for the estimation of bus

arrival times to minimize the passengers waiting time. GPS (GlobalPositioning System) and Google Maps are used for navigationand display services, respectively [1].Around the world, the number of vehicles theftcases has been increasing at a rapid rate whereas the rate ofrecovery of the stolen vehicles is still minimal. Furthermore, many service provider companies lack proper fleetmanagement system which causes low efficiency of servicesand reduced profit as the company could not monitortransportation operations. A real-time remote vehicle trackingsystem is one of the possible solutions to overcome these issues.This paper presents the development of the remote vehicletracking system which integrates the Global System forMobile Communications (GSM) Modem and Google Map. TheGSM modem at the control centre will receive the coordinatesthrough Short Message Service (SMS) and updates the maindatabase. The information then will be accessed by the websiteand the position of the vehicle will be displayed through theGoogle Maps application. A website has been developed to aidthe user to track and view the vehicles' location and can beaccess anytime and anywhere as long as Internet connection is available. The three working functions are the latest trackedvehicle location, route history and route planner. The developed remote vehicle tracking system demonstrates thefeasibility of real-time tracking of vehicles, which can be usedfor many applications including vehicle security and fleetmanagement.[2].Initially the GPS continuously takes input data from the satellite and stores the latitude and longitude values in AT89s52 microcontroller's buffer. If we have to track the vehicle, we need to send a message to GSM device, by which it gets activated. It also gets activated by detecting accident on the IR sensor, by detecting fire on the temperature sensor, by detecting theft connected to vehicle. Parallely deactivates GPS with the help of relay .Once GSM gets activated it takes the last received latitude and longitude positions values from the

buffer and sends a message to the particular number or laptop which is predefined in the program. Once message has been sent to the predefined device the GSM gets deactivated and GPS gets activated.[3].GPS is one of the technologies that are used in a huge number of applications today. One of theapplications is tracking your vehicle and keeps regular monitoring on them. This tracking system caninform you the location and route travelled by vehicle, and that information can be observed from anyother remote location. It also includes the web application that provides you exact location of target. Thissystem enables us to track target in any weather conditions. This system uses GPS and GSM technologies.The paper includes the hardware part which comprises of GPS, GSM, Atmega microcontroller MAX 232,16x2 LCD and software part is used for interfacing all the required modules and a web application is alsodeveloped at the client side. Main objective is to design a system that can be easily installed and to provideplatform for further enhancement.[4].The Real Time Bus Monitoring and Passenger Information bus tracking device is a standalone system designed to display the real-time location(s) of the buses in Mumbai city.

This system will enable the tracking device to obtain GPS data of the bus locations, which it will then transfer it to centralized control unit and depict it by activating LEDs in the approximate geographic positions of the buses on the route map. Specific softwares will be used to interface the data received to the map.[5].Thebus tracking system isa costeffective and efficient system. Using this system four application will be developed. First application isestablishing communication between college server and bussystem which iscapable of providing real-time dataregarding the current location of buses.Secondapplication is sending agroup messages i.e. alertmessagesto the students waiting at the next stop,changes in current route, bus number, etc., hence it savesthe time of students.Third application is generation of e-bus pass system as there is no need of generation of plastic bus passes.Last application is developing an emergency handling system which college, police and ambulance in case of accidents.[6]

3) PROPOSED BUS TRACKING SYSTEM AND LIFI SYSTEM

Transmitter:

Fig 3.1 shows the transmitter block for the bus tracking system. We are using PIC 16F877A microcontroller.PIC stands for Acorn RISC machine is a family of instruction set architectures for computer processors based on a reduced instruction set computing (RISC) architecture. And in simple word PIC is "Processor Architecture ".Here some of the blocks are connected to the PIC kit. They are LCD display, power supply, LED, photo diode, ZIGBEE, vibration sensor. ZigBee is a mesh network specification for low-power wireless local area networks (WLANs) that cover a large area. Zigbee based network architecture is able to provide information about the vehicle accurately.
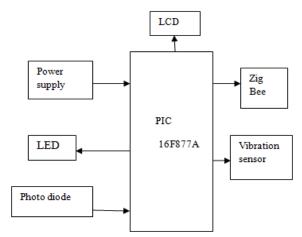

Fig.3.1 Transmitter block

The vehicle and the passenger will be having a unique RFID tag (Radio Frequency Identification). The RFID reader is placed in particular places. For the beneficial features of RFID, we integrate RFID readers into the Vehicle tracking Information System. This RFID reader can check or collect the data and the information is given to the control station through the Zigbee protocol. The Zigbee protocol is used for the messaging service between the control station and the vehicle. Here the message will be send to the person's family.LED will glow when a person enters into the bus. Photo diodeis a semiconductor device that converts light into current. Vibrating sensor will be used in an emergency situation. LCD display is used to display some messages like place, time etc…
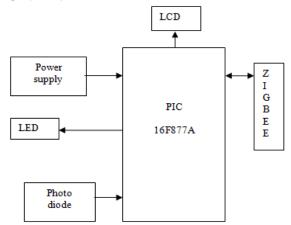
RECEVIER:

Fig 3.2 Receiver block diagram

Fig3.2 shows the block diagram of the receiver for the bus tracking system. All the components used here are same as the transmitter. This kit is used in the bus stop. Here LIFI technology is used.With the help of LIFI location of the town bus intimated to the passengers who are all standing in the bus stop through LCD and we can also track the bus location through GPS.

4) RESULTS AND DISCUSSION

In our project we have made 2 modules with 3 kits. On the first module we are using only one kit which is in the bus. It uses RFID card system. On the second module we are

using 2 kits. First kit is in the bus and the second kit is in the bus stop. This is used to know that what bus is arriving in that particular bus stop. We first planned to use AVR board to display a voice message of the coming bus. But do to our cost, now we made this kit with LCD display.
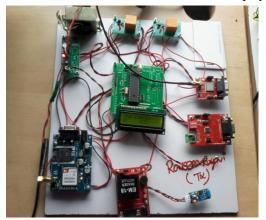

Fig.4.1 Transmitter kit

Fig 4.1 shows the block diagram for the whole transmitter kit of bus tracking system and Li-Fi system with the output shown in the LCD.
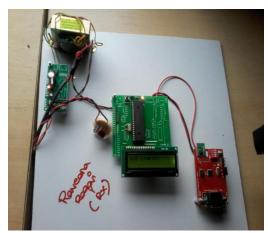

Fig.4.2 Receiver kit

Fig 4.2 shows the block diagram for the whole receiver kit of bus tracking system and Li-Fi system with the output shown in the LCD.
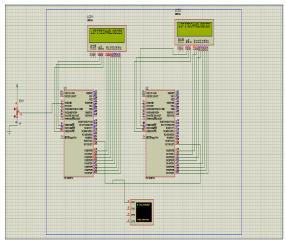

Fig.4.3 Output of LCD display

Fig 4.3 shows the output of LCD display for the bus tracking system and the Li-Fi system.

5) FUTURE SCOPE

Time is really precious these days. Everything we use on a daily basis has been simplified by a technology, so that we can save our time and do our work in more efficient way. For ex. Invention of a TV remote; in earlier days we used to operate TV by the controls attached to it. Now, with the help of a remote we can save the time and operate the TV from a distance. Public Transport System lags in using the technology. We want them to use our application that will ease their work and will take public transport system to the next level in the future. In the future this project can be done with AVR BOARD. By using this board it will be helpful to the blind, and dumb people. And also this can be done for all the stopping. For example: if a bus starts from a bus stand each and every stop can be displayed where the particular bus is now.

REFERENCES

[1] W. El-Medany, A. Al-Omary, R. Al"A Cost Effective Real-Time Tracking System Prototype UsingIntegrated GPS/GPRS Module", Sixth International Conference onWireless and Mobile CommunicationValencia, 2010

[2] F.M. Franczyk, J.D. Vanstone, "Vehicle warning system", Patentnumber: 7362239, Issue date: 22 April 2008.

[3] J. Gong, M. Liu, S. Zhang, "Hybrid dynamic prediction model of busarrival time based on weighted of historical and real2013 25th Chinese Control and Decision Conference (CCDC), pp. 972976, 2013

[4] X. Guo, E. Huang, B. Hung, L. Juras, Design a Smart Bus System, Dept.Electrical and Computer Engineering, Uni2012.

[5] T. Le-Tien, V. Phung-The, "Routing and Tracking System for MobileVehicles in Large Area", Fifth IEEE International Symposium onElectronic Design, Test & Applications, pp. 297-300, 2010.

[6] Oberli, C et al (2010). "Performance Evaluation of UHF RFID Technologies for Real Time passenger Recognition in Intelligent Public transportation Systems", IEEE Transactions on Intelligent Transport Systems, Vol.11(3), pp.748-753.

[7] S. Pooja, "Vehicle Tracking System Using GPS", International Journalof Science and Research (IJSR), vol. 2, no. 9, pp. 128

[8] P. Verma, J.S.Bhatia, "Design and DevelopTracking System with Google Map based Monitoring", InternationalJournal of Computer Science, Engineering and Applications (IJCSEA),vol. 3, no. 3, pp. 33-40, 2013\

[9] The Official Website of The Massachusetts Department of Transportation, Enhance Public Information on Existing RTAInformation and Potential Improvements,http://www.massdot.state.ma.us/, (accessed 19 January 2014).