

Bus Tracking System Using Arduino

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ABSTRACT

Bus tracking system using Arduino is an application that tracks a bus and collects the distance to each station. In this the bus stop reminder using RFID so that the users don't get delayed or don't get down at a different stop. The main goal of this project is to remind the bus number before the stop has come. Bus routes travel through a number of bus stops. Many times buses change routes and need to be configured in system. We use Arduino based circuit along with RF receiver based circuit to be placed in buses. Also we use a android app in smart phones to display number of bus as they arrive. We use RF transmitter based circuits which will be placed on bus stops. This tracking system involves the installation of an electronic device in a bus, with an installed Android App on any smart phone to enable a user to track the bus location. Each bus stop system constantly transmits a unique bus number code. When the bus comes in range of a bus stop the code is picked up by bus system and it automatically feeds it to controller and the controller process this information to find out the arrival of corresponding bus. GPS connected to zigbee which gives real time location by sending longitude and latitude values. The waiting time of the user can be reduced by using this application. User gets the information about buses, bus numbers, bus route, bus arrival and bus delay timing information etc. Hence we can detect the arrival of particular bus at the bus stop.

INTRODUCTION

ABOUT THE PAPER:

There are buses available for passengers travelling to different locations, but not many passengers have complete information about these buses. Complete information namely the number of buses that go to the required destination, bus numbers, bus timings, the routes through which the bus would pass, time taken for the vehicle to reach its destination location would assist the passengers with various routes, track the current location of the bus and give the correct time for the bus to reach its bus stop. The proposed system deals with overcoming the problems stated above. The system is an Android application that gives necessary information about all the buses travelling in Mumbai. The platform chosen for this kind of system is android, reason being Android Operating System has come up on a very large scale and is owned by almost every second person. As more and more applications of android operating system is developed day by day on large scale ever since it is advent. Android is an open source mobile software environment. There are various problems that require solution such as „the zone in which the bus is“ and „the recorded time that each bus passed through each zone“. The limitation of this algorithm is that it is not suitable for large cities where both travel time and dwell time could be subject to large variations. Generally speaking, these models are reliable only when the traffic pattern in the area of interest is relatively stable.

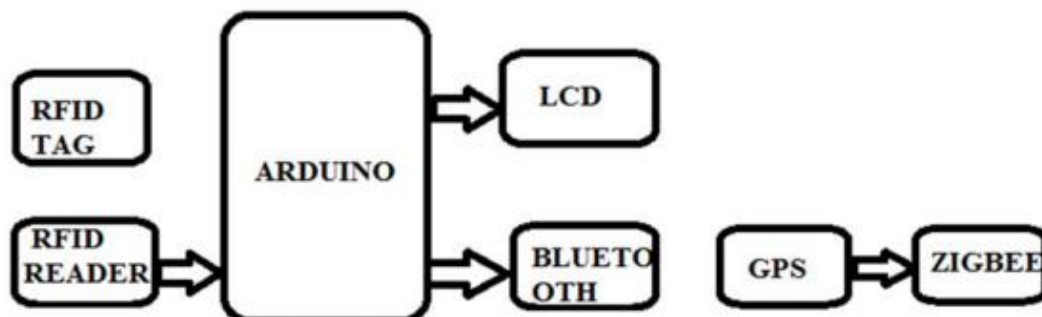
PROBLEM TO BE STUDIED:

Public transport business has been facing quite a few serious challenges. Indeed, public transport operators need to be more heedful of the changing mobility needs and passengers' perceptions regarding the delivery of bus transport services in order to keep it profitable. With the prevailing conditions of city buses, as they are, bus transport may not suit the needs of most passengers. The disputes and agreements between passengers were critically examined to obtain a final rating of service quality attributes. The results revealed that users are very disappointed with the

punctuality of bus service and inability of the operators to provide a tentative timetable for the operation schedules. Passengers of public transport were satisfied with the number of days of operation and the available bus facilities. The study also indicated that the reliability provided by the operators is quite different from what passengers expect. So to solve the issue real time bus tracking is implemented using Arduino and GPS.

OBJECTIVE OF THE PROJECT: T

he main objectives of the project are: 1. To design and develop an efficient data information and enquiry system. 2. To design a bus tracking system with low installation and maintenance cost.

BLOCK DIAGRAM**DESCRIPTION:**

RFID is Radio Frequency Identification. An RFID reader is used to read RFID tags (which contain certain unique data stored in a chip). An RFID reader and an RFID tag, both have a coil surrounding them. When an RFID tag is shown near an RFID Reader, it collects the unique tag data (a combination of digits and characters) from the RFID tag. You will be wondering how the chip inside RFID tag gets power ? This is made possible via Electromagnetic Induction. I told you, both RFID reader and RFID tag comes with a coil in them.

We power the RFID reader from power supply for reading purpose. Now when an RFID tag is shown near the reader, electromagnetic induction will take place between the coils and this

powers the chip inside tag. This chip will send data electromagnetically to the reader. The reader will receive this electromagnetically transferred data and outputs it serially. Every RFID reader comes with Serial output pins. We can collect the read data through these serial pins using arduino or any other micro controller.

Power supply requirement of RFID Readers vary from product to product. The RFID reader I used in this tutorial is a 12 Volts one. There are 5 Volts and 9 Volts versions available in the market. There are two possible outputs from an RFID Reader. One is RS232 compatible output and other one is TTL compatible output. A TTL compatible output pin can be connected directly to Arduino. Whereas an RS232 compatible output must be converted to TTL using an RS232 to TTL converter (You can design this yourself using MAX232 IC). The GPS module continuously produces a set of data regarding the position of the earth surface where it is situated which includes the current position with respect to the equator of the earth in terms of Latitude and Longitude.

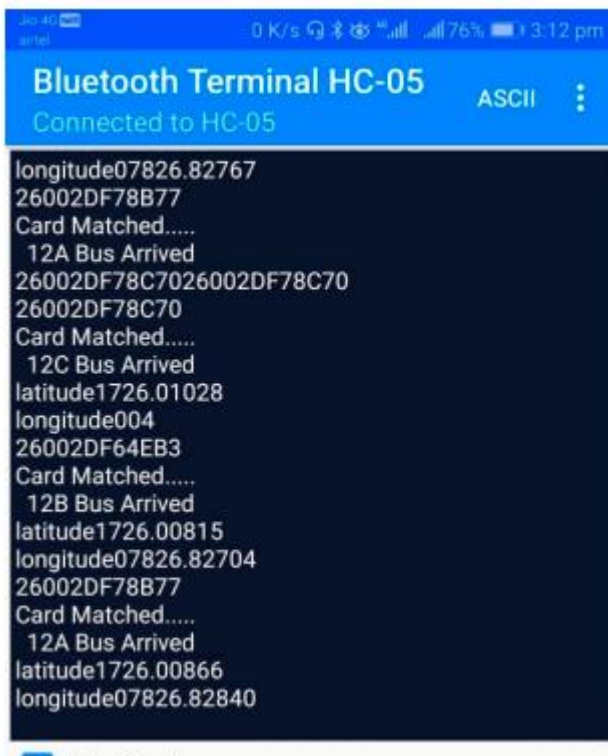
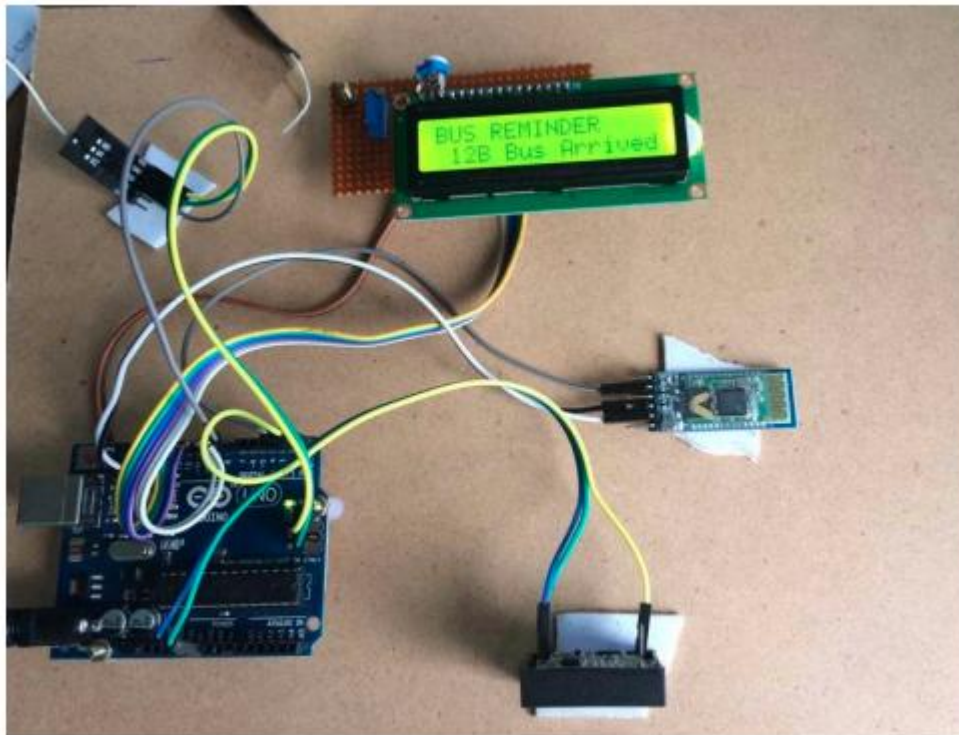
This data can be decoded and printed into the readable format with the help of a microcontroller. In this project the data regarding the geographical coordinate is extracted from the GPS output with the help of the Arduino and send it to a remote PC with the help of Xbee transceiver The Xbee is the brand name a wireless transceiver device which works on the ZigBee protocol. The Zigbee is the name of a wireless protocol maintained by the IEEE 802.15 standard. This is a protocol specified for wireless Personal Area Network (PAN) using low powered wireless transceivers. They can be used for simple point to point communication systems also.

They have an approximate range of 10 to 100 meters and are used in industries, scientific fields, medical fields etc. The Xbee module even though uses complex packet data based Zigbee protocol for communicating with each other, they can communicate with other devices using simplest serial communication protocol and hence they are widely used in microcontroller base boards. Since the arduino pro-mini board has no circuitry for interfacing it with the serial port or the USB port of the PC, an external USB to TTL converter board is required to connect it with the PC. This hardware helps in programming the arduino board and also helps in the serial communication with the USB port of the PC.

The code written for this paper on Arduino reads the serial data from the GPS module and writes the GPS data to the Xbee for transmission with the help of serial communication functions provided by the Arduino library.

The functions like `Serial.begin()` which helps to initialize the serial port with a given baud rate, `Serial.write()` to send a data to the serial port, `Serial.available()` and `Serial.read()` functions to read data from the serial port are used in this project and they are already As soon as the board is powered up the Xbee in the Arduino board automatically establishes communication with another Xbee which is connected to the serial port of a PC. The second Xbeeboard can be connected to the PC using the same USB to TTL converter board which has been used to program the Arduino board. The geographical coordinates can be then be read using any serial monitoring software or using the Arduino IDE's serial monitoring softwa

RESULT



ADVANTAGES:

1. We can track bus easily without internet.
2. Shows the route with bus number and as well shows the registered bus number.
3. It is user friendly.

4. No longer waiting for buses.

DISADVANTAGES:

1. Initial cost is high.
2. Device won't send any messages if circuit break downs.
3. Require continuous power supply.

APPLICATIONS:

1. Car navigation
2. Fleet management/Tracking
3. Location based services enabled devices
4. Palmtop, Laptops and Handheld

FUTURE SCOPE:—

For future enhancement, we may develop a vehicle tracking and monitoring system using GPS, GSM/GPRS with high speed processor. The system will have latest technology and optimized algorithm with moderate cost. The systematic focus on accurate arrival time prediction and real time position of vehicle. The system can be installed in buses, cars and trucks. We can use EEPROM to store the previous navigating positions up to 256 locations and we can navigate up to N number of locations by increasing its memory. We can use our kit for detection of bomb by connecting to the bomb sensor. With the help of high sensitivity vibration sensors we can detect the accident.

CONCLUSION:

Vehicle tracking both in case of personal as well as business purpose improves safety and security, communication medium, performance monitoring and increases productivity. So in the coming year, it is going to play a major role in our day-to-day living. By using this system, we can monitor the traffic in real-time.

REFERENCES:

- [1] R.S Gaonkar, "Microprocessor Architecture Programming and Application", Wiley Eastern Ltd, New Delhi.
- [2] Krishna Kant, "Microprocessor and microcontroller", Eastern Company Edition , New Delhi 2007. [2] Daniel. W. Lewis, "Fundamental of embedded software", prentice hall of India, 2004.

[3] William Stallings, “Wireless Communication and Networks”, 2nd edition, prentice hall of India, 2005.

[4] Chen, H., Chiang, Y. Chang, F. H. Wang, Toward Real-Time Precise PointPositioning: Differential GPS Based on IGS Ultra Rapid Product, SICEAnnual Conference, The Grand Hotel, Taipei, Taiwan August 18- 21,(2010).

[5] KunalMaurya , Mandeep Singh, Neelu Jain, “Real Time Vehicle Tracking System using GSM and GPS Technology- An Anti-theft Tracking System”, International Journal of Electronics and Computer Science Engineering, ISSN 2277-1956/V1N3-1103-1107 .

[6] Vikram Kulkarni &ViswaprakashBabu, “embedded smart car security system on face detection”, special issue of IJCCT, ISSN(Online) : 2231-0371, ISSN(Print):0975-7449,volume-3, issue-1