Smart Bus Tracking and Management System Using IoT

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ABSTRACT

Bus tracking is an application that tracks a bus and gathers the distance to each station along its route. Tracking System involves the installation of an electronic device in a bus, with an installed Android App on any SMART phone to enable the Administrator/User to track the bus location. Based on IoT this project is implemented as android application. There are two applications one for server and the other for the client. Buses carry GPS devices to track their positions. By this positions to server are periodically updated. Client application displays map showing the position of bus. It shows where buses are on a map and provide students and staffs the updated information at different time interval using RTC. The server will monitor location and will store its data in the database. It is a real-time system as this method automatically sends the information on the GPS system to a system/SMART phone. The students/staffs can get flexibility of planning travel using the app, to decide when to catch the bus. Arduino UNO microcontroller is used to programming for software and hardware module. And it is connected to the cloud and following through the android app. The waiting time of the user can be reduced. Simple mode of communication is the key feature of the Bus Tracking system. This application can be easily extended for central tracking system to keep track of all the buses. The different queries and efficient route management can be easily done through central server system.

Keywords: GPS, RTC and Arduino UNO.

1. INTRODUCTION

In our College many students and staffs are not aware of exact timing and location of the college bus. So we have planned to implement a smart bus tracking system for easy transport facility using IoT. The location of the bus is tracked using GPS and sends the collected data to a remotely located server using GSM module. Using application, students or staffs can locate the bus at any time when they need The collected data is retrieved and processed by the server using an application that we installed College bus transport system having many buses and that provides students and staffs for convenient travel from the long distances. But some students/staffs are not aware of timing and directions of the buses. In this case we have planned to do a project for easy transport system. In our project we develop an application on smart phones to monitor a location and timing of the college bus using IoT. It works using GPS and GSM technology designed to continuously monitor a moving buses for doing so a microcontroller is interfaced serially to a GSM Modem and GPS receiver used to send the position (Latitude and Longitude) of the buses from a remote place. IOT places the major role that provides the all details of the buses through the application on the smart phones to the students/staffs for easy transport system. This android application will be helpful to students and staffs for convenient transport system.

2. EXISTING SYSTEM

Due to rapid increase in population, there is need for efficient public transportation system. There is increased burden on public transportation like bus just because of population. Therefore remote user needs a smart system which provides real time information of bus. So we proposed a new system which solves the drawback of current public transportation system. So our system handle all the data like current location of bus, management of buses and its schedule. The real time tracking of bus can be done by our proposed system and this information is then given to remote user who want to know the real time bus information. Some technologies like GPS (Global Positioning System), Google maps and GPRS (General Packet Radio Service) are used for development purpose. Our system provides web based application, which gives real time location of bus on Google maps to remote user.
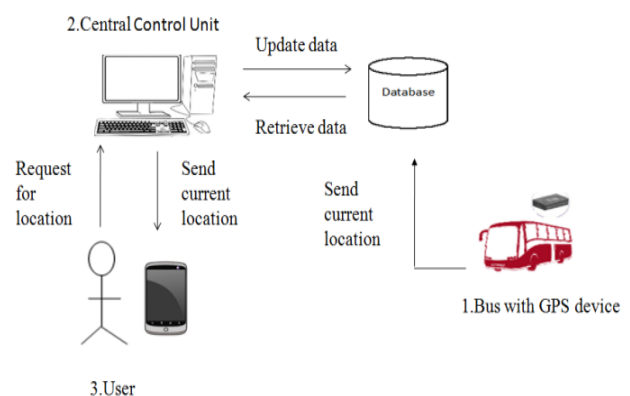

Fig.1. Block diagram of existing system

Drawbacks
- ❖ It is not comfortable for user.
- ❖ Need proper time management system
- ❖ Not use of Internet of things
- ❖ Need speed of data transmission

3. PROPOSED SYSTEM

Our system provides the relevant information regarding all the bus numbers going from users source & destination along with the route details, real time location. Generally our system is operated by GPS which is attached with the bus. Firstly GPS receives the satellite signals and then the position co-ordinates with latitude and longitude are determined by it. The location is determined with the help of GPS and transmission mechanism. After receiving the data the tracking data can be transmitted using any wireless communications systems. A real time clock (RTC) is a computer clock that keeps track of the current time. In this project Arduino UNO is a microcontroller to program with RTC. Based on IoT the students/staffs can access this information of a bus based on users source and destination through the android application. Our proposed system gives the real time location of bus. Smart bus tracking technology is advantageous for tracking and monitoring a college bus.
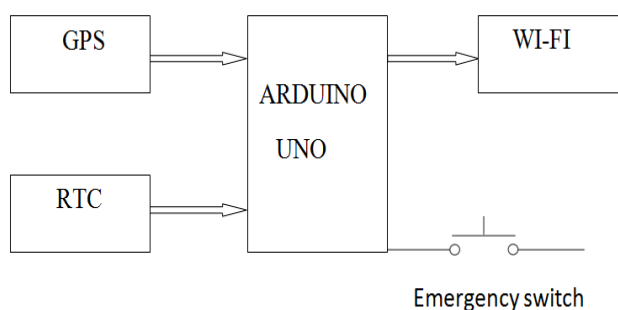

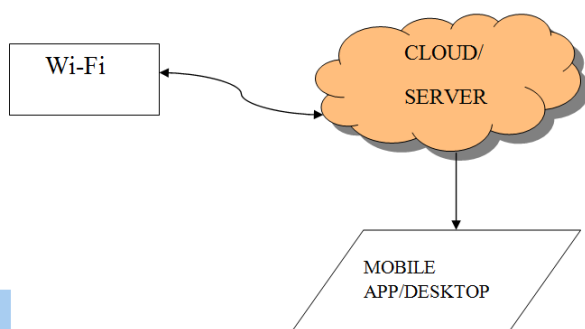Fig.2. Block diagram of transmitter

Fig.3. Block diagram of receiver

4. DESCRIPTION

4.1 GPS (GLOBAL POSITIONING SYSTEM)

The **GPS** is a system for calculating position from signals sent by a network of satellites. To accurately determine the position and it is able to determine the strong signals. GPS tracking system is easy to use, mobile friendly, as intuitive user interface and is designed to communicate with a wide variety of GPS devices. The GPS receivers were much simpler than today, they provided only the latitude and longitude position, the rest was on account of the user who needed to calculate the map.

4.2 RTC

A real time clock is a computer clock that keeps track of the current time. RTC are present in almost any electronic device

which needs to keep accurate time. The term real time clock is used to avoid confusion with ordinary hardware clocks which are only signals that govern digital electronics. The DS3231 is available in commercial and industrial temperature ranges, and is offered in a 16-pin, 300-mil SO package. The RTC maintains seconds, minutes, hours, day, date, month, and year information. The clock operates in either the 24 hour or 12-hour format with an AM/PM indicator.

4.3 WI-FI

Wi-Fi also allows connectivity in peer-to-peer mode, which enables devices to connect directly with each other. Devices that can be use Wi-Fi technology include personal computers, Smart phones and tablet. Wi-Fi compatible devices can connect to the internet via WLAN network and a wireless access point. Wireless communication systems consist of transmitters, antennas and receivers.

4.4 ARDUINO UNO

Arduino/Genuino Uno is a microcontroller board based on the ATmega328P (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started.

4.5 IoT

The Internet of things is the internetworking of physical devices, vehicles, buildings, and other items—embedded with electronics, software, sensors, actuators, and network connectivity that enable these objects to collect and exchange data. Typically, IoT is expected to offer advanced connectivity of devices, systems, and services that goes beyond machine-to-machine (M2M) communications and covers a variety of protocols, domains, and applications.

5. RESULT

The android application gives the information about the college bus for students and staffs. The proposed system is more user friendly than existing system. And it also gives greater performance.

6. CONCLUSION

In this paper we have reviewed a various existing techniques of college bus tracking. By implementing this idea, we can improve the transportation safety and the quality of services to the college buses. The system will have latest technology and optimized algorithms with moderate cost. The system may focus on accurate arrival time and position of the bus.

7. FUTURE SCOPE

To implement a real time application for all other college buses for easy transportation in a smart college bus tracking system.

REFERENCES

[1] Priti Shende, Pratik Bhosale, Shahnawaz Khan, Prashant Patil. "Bus tracking and transportation safety using Internet of

Things" *International Research Journal of Engineering and Technology (IRJET),* Volume: 03 Issue: 02, Feb-2016.

[2] Selvapriya P R, Monica R Mundada, "IOT Based Bus Transport System in Bangalore", *International Journal of Engineering and Technical Research (IJETR)* ISSN: 2321-0869, Volume-3, Issue-2, February 2015.

[3] Manini Kumbhar, Meghana Survase, Pratibha Mastud, Avdhut Salunke, "Real Time Web Based Bus Tracking System", *International Research Journal of Engineering and Technology (IRJET)*, Volume: 03 Issue: 02, Feb-2016.

[4] Savitha S.C, Natya.S, Parinitha.J, "Smart College Bus Tracking Management System and Its Application", *International Journal of Emerging Technologies and Engineering (IJETE),* Volume 1 Issue 5, June 2014, ISSN 2348 – 8050.

[5] Saylee Gharge, Manal Chhaya, Gaurav Chheda, Jitesh Deshpande, "Real time bus monitoring system using GPS," *An International Journal of Engineering Science and Technology,* Vol. 2, Issue 3, June 2012.

[6] Abid Khan, Ravi Mishra, "GPS-GSM based tracking system," *International Journal of Engineering Trends and Technology,* Vol. 3, Issue 2, pp: 161-164, 2012.

[7] S. P. Manikandan, P. Balakrishnan, "An Efficient real time query system for public transportation service using Zigbee and RFID," *International Journal of Research in Communication Engineering,* Vol. 2, No. 2, June 2012.

[8] Swati Chandurkar, Sneha Mugade, Sanjana Sinha, Pooja Borkar, "Implementation of real time bus monitoring and passenger information system," *International Journal of Scientific and Research Publications,* Vol. 3, Issue 5, May 2013.