

Bus Tracking System using Geofencing

Amrutkar Namrata Ravindra¹, Nikam Jayashri², Rumane Mohini³, Patil Mohini⁴

^{1,2,3,4}Student, Department of Computer Engineering, MCERC, Nashik, India

Abstract: The bus tracking system will serve as a usable notification system that will effectively assist passengers in making the decision of whether to wait for the bus or not. This system is a standalone system designed to display the real-time location(s) of the buses with the use of GSM module technology. The system will consist of Geo-fencing (geofencing) Geo-fencing is a feature in a software program that uses the global positioning system (GPS) or radio frequency identification (RFID) to define geographical boundaries. Geofencing allow an administrator to set up triggers so when a device enters (or exits) the boundaries defined by the administrator, an alert is issued.

Keywords: GPS/RFID, Geo-fencing, smoke/alcohol detection systems, Mobile applications.

1. Introduction

A vehicle tracking system combines the use of automatic vehicle location in individual vehicles with software that collects these fleet data for a comprehensive picture of vehicle locations. Modern vehicle tracking systems commonly use GPS or GLONASS technology for locating the vehicle, but other types of automatic vehicle location technology can also be used. Vehicle information can be viewed on electronic maps via the Internet or specialized software. Urban public transit authorities are an increasingly common user of vehicle tracking systems, particularly in large cities. Moreover, vehicle and fleet tracking systems presents a challenging system and have raised a great interest to many companies and developers. This interest is based on the need for such a system but it is also based on the complexity and the challenge for making such a useful and

necessary system. The main problem is about cost. Having in mind that there are many technologies incorporated, then easily can be understood that the cost can often be very high. Unusual and unexpected conditions on the roads affect the smooth operation of the bus system and the movement of vehicles. Also, everyday problems such as traffic congestion, unexpected delays, randomness in passenger demand, irregular vehicle dispatching times take place and as a result of which the schedule of the passengers are affected and they inevitably have to wait for the arrival of their respective bus. This passenger inconvenience can be avoided by introducing a system which provides real time information about the location and estimated time of arrival of the buses. The basic idea behind this approach is to make a system that serves as a vehicle tracking system and is based on Geo-fencing and GPS services. This system tends to be more cost effective than previous one discussed above. Many geo-fencing applications incorporate Google Earth, allowing administrators to define boundaries on top of a satellite view of a specific geographical area. Other applications define boundaries by longitude and latitude or through user-created and Web-based maps. Interesting thing about this approach is that it uses mobile phones based on Android platform.

2. Literature survey

The Bus tracking project required extensive research into similar systems. By reviewing we used this insight to develop our system. To this end, research papers from various quad rotor groups we reused as guides in the early development of

Table 1
Literature survey

S. No	Title of the Papers	Technology/ Method	Remarks	Drawbacks
1.	Smart bus: A tracking system for school buses	RFID and GSM	Increase child Safety	May be GSM module or network failure occurs
2.	Real-Time Vehicle Tracking System Using GPS/GSM/GPRS Technology Kosovo Government Vehicles Case	GPS/GSM/GPRS, Kosovo, real-time system	1.External sensors connection capability 2. Sleep mode and deep sleep mode	Sometimes sensor issue may occur.
3.	GPS Based Bus Tracking System	Android, GPS, GSM, Location Based Services, Clustering, Artificial neural network	1. A bus tracking system are reduced wait time, ease of use. 2. The Application is User Friendly.	Users needs to be continued internet connection.
4.	Real Time Bus Monitoring System	Real time tracking, GPS, GIS	1. To provide accurate location to the passengers with the accurate estimated time of arrival. 2. Low power consumption	May be GSM module or network failure occurs.

the dynamics and control theory. Literature survey is mainly used to identify information relevant to the project work and know impact of it within the project area.

3. Methodology

This section introduces us architecture of the system and Modules of the system. It also contains the input to the module processing and required output to the system.

A. System architecture

The system architecture shows the block schematic of the system. It shows the various levels of the system and their individual functionality. The system architecture is an efficient way of representing the working of a system.

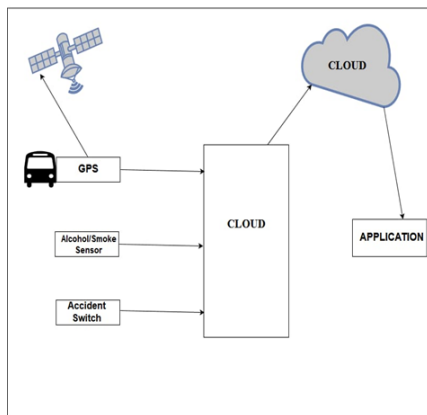


Fig. 1. System architecture of bus tracking system using geofencing.

B. Prototype model

1) Geo-fence

A geo-fence is a virtual perimeter for a real-world geographic area. A geo-fence could be dynamically generated as in a radius around a point location, or a geo-fence can be a predefined set of boundaries (such as school zones or neighborhood boundaries).

4. GPS

The GPS (Global Positioning System) does not require the user to transmit any data, and it operates independently of any internet or telephonic reception, though these technologies can increase the usefulness of the GPS positioning information. The GPS provides many capabilities like critical positioning capabilities to military, civil, airplane and commercial users around the world.

5. GSM

GSM (Global System for Mobile communication) is a globally accepted standard for digital cellular communications. GSM that uses a fluctuation of time division multiple access (TDMA) and is the most widely used of the three digital wireless telephony technologies like as TDMA, GSM and code-division multiple access (CDMA). TDMA is text-based services over mobile phone networks through this we send

messages. GSM digitizes and compresses data, then sends it down a channel with two other streams of user data, each in its own time.

A. System features

Tracking is one of the most problematic issues that governments or large enterprises have to deal with. Manipulation with kilometers, fuel and other issues are not rare. This paper treats real-time vehicle tracking system.

- Real Time Tracking Most GPS tracking devices are enabled with real-time monitoring. Location of the vehicles is tracked on the map as it moves from point to point. The GPS location of your vehicle is displayed on a map along with vehicle speed if the vehicle is moving. The current state of the vehicle like moving, parked since or idle is shown using map markers. Multiple vehicles can be grouped and managed simultaneously using simple to use interface.
- Geo Fencing this is the most important and beneficial feature of the system to be implemented fencing takes alert customization to the next level. You can create geographical boundaries called Geo fences on the map around a landmark. An alert is sent out every time the vehicle enters or exits the Geo fence. This opens up immense possibilities in different ways of using the monitoring information that can translate into increased operational efficiency, workforce optimization and elevated security and safety levels for the user.
- Alerts using vehicle tracking system features like over speeding alert, start of day alert, route deviation alert and excessive stoppage alert, one can analyze driver behavior and optimize fuel usage and optimizing workforce. Depending on your need there are several alerts that can be configured: Idling Alert, Stoppage Alert, Tampering Alert, Over-speeding Alert etc. For consumers looking for vehicle tracking system for personal use features like maintenance alerts and fuel pilferage alerts prove to be useful.
- Anytime Anywhere Access In todays connected world where any and every information is available at your fingertips, it is imperative invest in a vehicle tracking system that is accessible on web and on smart phone. This is especially useful when the car tracking device is used by discerning parents to track school bus or chauffeur driven cars carrying children.
- Easy to use, user friendly interface a simple and intuitive user interface provides powerful features like group-wise access without the need for multiple accounts, bird's eye view of entire fleet and the ability to report historical and real-time data. A simple yet well-developed intuitive user interface allows easy access to the right information to make informed decisions.

6. Conclusion

The proposed system plays an important role in real time tracking and monitoring of buses. With the implementation of the project a complete track of the buses can be kept around the city through the web application. The application can be hosted on the android platform through which local public can download it free of cost and it will be more user friendly to use. The application will also protect the integrity of the location data of the busses as the servers will be accessible only through the private domains network. Accurate bus timings and tracking will make the life of local public easier. And also, this project implementation will be a step towards a smart Nashik city.

References

- [1] Y. H .Pan, "Development Trend of Wireless Mobile Communication, Communication Technologies," vol. 4, no. 2, pp. 55-57, 2006.
- [2] Oching, W. Y., and Sauer, K, "Urban road transport navigation: Performance of the Global Positioning System after selective availability," Transportation Research Part C, 10, 171-187, 2002.
- [3] Madoka Nakajima and Shinichiro Haruyama, "New indoor navigation system for visually impaired people using visible light communication," EURASIP Journal on Wireless Communications and Networking 2013, 2013, 37.
- [4] Motorola, Inc., "Overview of 2G LCS Technologies and Standards", 3GPP TSG SA2 LCS Workshop, London, UK, 11 - 12 January 2001.