LIVE MONITORING SYSTEM OF BUS

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Abstract - Nowadays many cities face severe problems of road congestion and associated issues of commuters, which include delays in the arrival of buses at bus stops, lack of information about different bus routes and stops and time. College students/staffs will miss their bus by a fraction of second. This will lead to many problems like being late for the classes and sometimes late for the exams also. To overcome this, we have implemented a Smart Bus Tracking System. The proposed system uses a Smartphone application. Buses carry Global Positioning System (GPS) devices to track their positions and Google Maps API is used to display the vehicle on the map in the Smartphone application. It shows where exactly the bus is there on the map and provides updated information to the user at different time intervals. This also displays the estimated arrival time, which helps the user to know when exactly the bus is going to reach his/her stop. The user can get flexibility of planning travel using the app, to decide when to catch the bus. The proposed system is user friendly and ensures safety and surveillance at low maintenance cost.

1. INTRODUCTION

Vehicle tracking systems were first implemented for the shipping industry because people wanted to know where each vehicle was at any given time. These days, however, with technology growing at a fast pace, automated vehicle tracking system is being used in a variety of ways to track and display vehicle locations in real-time. However, bus transportation service has very poor transportation information system nowadays. Bus users do not know the exact arrival time for a bus, but only know the scheduled approximate arrival time. Bus transportation service does not have a proper system to track all buses position and the actual arrival time in every bus stop. These problems occur because current bus service system did not apply real time tracking technology to track on each bus on the road and also lack of a platform to update latest bus traffic information to bus users. The system consists of modern hardware and software components enabling one to track their vehicle online or offline. Any vehicle tracking system consists of mainly three parts mobile vehicle unit, fixed based station and, database and software system.

1.1 VEHICLE UNIT: It is the hardware component attached to the vehicle having a GPS/GSM modem. The unit is configure around a primary modem that functions with the tracking software by receiving signals from GPS satellites or radio station points with the help of antenna. The controller modem converts the data and sends the vehicle location data to the server.Fixed Based Station: It consists of a wireless network to receive and forward the data to the data center. Base stations are equipped with tracking software and geographic map useful for determining the vehicle location. Maps of every city and landmarks are available in the based station that has an in-built Web Server.Database and Software: The position information or the coordinates of each visiting points are stored in a database, which later can be viewed in a display screen using digital maps.

1.2 GPS TRACKING: A GPS tracking unit is a device, normally carried by a moving vehicle or person, that uses the Global Positioning System to determine and track its precise location, and hence that of its carrier, at intervals. The recorded location data can be stored within the tracking unit, or it may be transmitted to a central location data base, or Internet-connected computer, using a cellular (GPRS or SMS), radio, or satellite modem embedded in the unit. This allows the asset's location to be displayed against a map backdrop either in real time or when analyzing the track later, using GPS tracking software. Data tracking software is available for smartphones with GPS capability. GPS originally designed for military and intelligence application that come from the idea of the Sputnik satellite that launched by Russian in 1957, surprising the world. Then the very first GPS system was developed in the 1960s to allow the ships in the US Navy to navigate the oceans more accurately.

GPS is a network of orbiting satellites that send the details of their position in space back to earth. Then the GPS receiver knows what their exact location now is. Besides that, it can be used to calculate speed and time at the vehicle location at real time. This is very useful when navigate the route of the vehicle especially for students. By using this technology, students can know which bus will pass through their dormitory route and help them know how long the time to arrive at their destination.GPS system can help driver to save their money when spending on fuel and that is the main reason why people want GPS system in the vehicle. The accurate driving directions also help to save time when travels. It is also benefit for fisherman or sailor. GPS system work as a life saver when they get lost in the middle of the sea. Furthermore, GPS system can also have the ability to function as a hand – free device for smartphone and it can help to avoid traffic. The GPS will update in real

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time when caught in traffic, and can automatically change to other directions with the same destination as quickly as possible. For company like trucking companies and other delivery services can view the locations of all the trucks in a time. It is used to track other employee's vehicle throughout the day, ensuring that employees are focused on their work and do not take advantages of company assets.

The main objective of the project is to design and develop a bus tracker mobile application which enables time estimation of the bus arrival at certain location within UTM's vicinity. The requirements of the proposed system are elicited by analyzing the problems faced by UTM students in transportation. Once the system has been developed, the system was validated and tested on the functionality of the developed system to meet the user requirement.

2 PROPOSED SYSTEM

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. There are two applications one for server and the other for the client. Buses carry GPS devices to track their positions. By this position 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 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 standard desktop web interface is designed to loosely mimic the interface of the main Google Maps website that many users are already familiar with. Specifically, the primary view is a Google map view, with a search field at the top and a search results panel on the left. Users can browse the map directly to see transit stops at a particular location, additionally, users can search by route to display the map of that route and stops along the route. One important interface detail is that I calculate the direction of travel for routes serving a particular stop and show a directional arrow for the stop on the map. This direction of- travel arrow is particularly useful to riders when they are attempting to disambiguate between two transit stops that are right across the street from each other, but serve routes headed in opposite directions.

In this Smartphone application, Buses carry Global Positioning System (GPS) devices to track their positions and Google Maps API is used to display the vehicle on the map in the Smartphone application. It shows where exactly the bus is there on the map and provides updated information to the user at different time intervals. This also displays the estimated arrival time, which helps the user to know when exactly the bus is going to reach his/her stop. It provides the alternate routes for the driver if there is any congestion in his route. The next major advantage is, if the bus is in any emergency situation it sends an alert message to the transport in charge. The user can get flexibility of planning travel using the app, to decide when to catch the bus. The proposed system is user friendly and ensures safety and surveillance at low maintenance cost. This proposed system is designed with aimed to track the vehicles using Real Time Operating System programming. The location of the vehicle is indicated using GPS technology. Exact location of the target vehicle is received with the help of a GPS receiver. GPS will give the information of parameters like longitude, latitude, by which we can easily identify the location of the vehicle and map it on Google map. First the communication takes place between GPS receiver and GPS satellite. GPS satellite continuously tracks the target vehicle and the position of the vehicle is send to the controller from GPS receiver. Vehicle is ready with the GPRS connectivity which sends the continuous information about the position of the vehicle to the server unit.
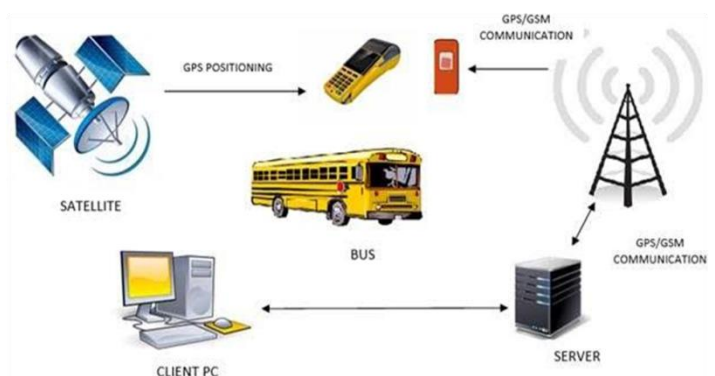

Fig 1. Proposed system Architecture

2.1 ADVANTAGES:

- Real time tracking of the bus.
- Time delay can be checked.
- The user specificity with the proposed method has increased.
- The GPS extracts the exact location of the system.

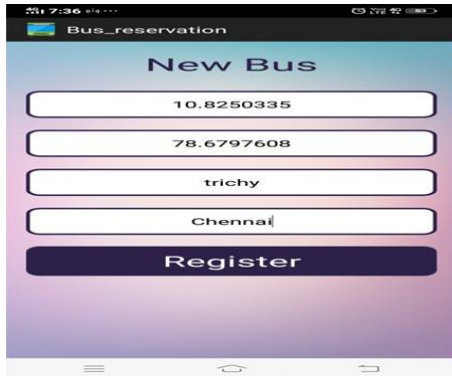## 3. EXECUTION RESULTS

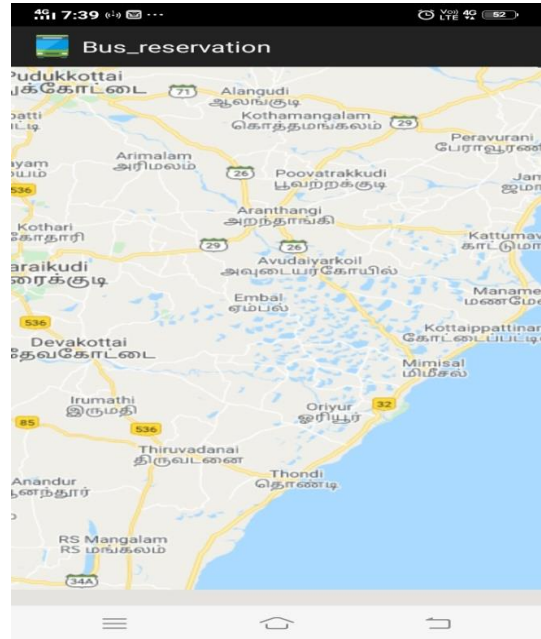### 3.1 New Bus addition page

Fig.2 Add New bus with Location

3.2 Bus location extraction

Fig. 3 Location Retrieval Of the bus

3.3 Geo Location Extraction system

Fig.4 Tracking of Bus location with API

3.4 QR based Booking availability
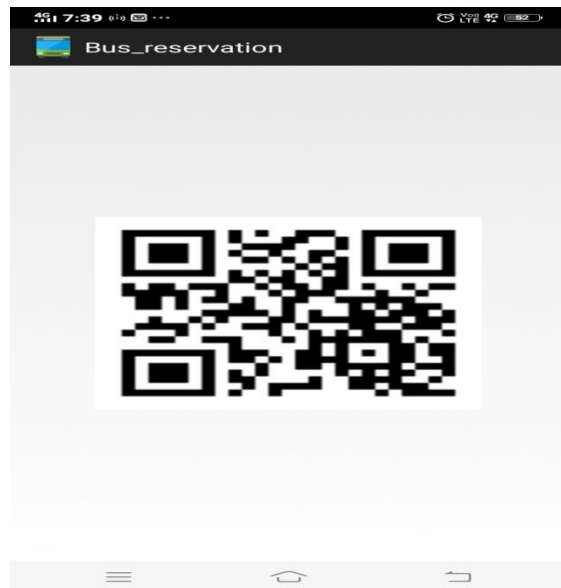
Fig.5 Bus booking QR code Generation

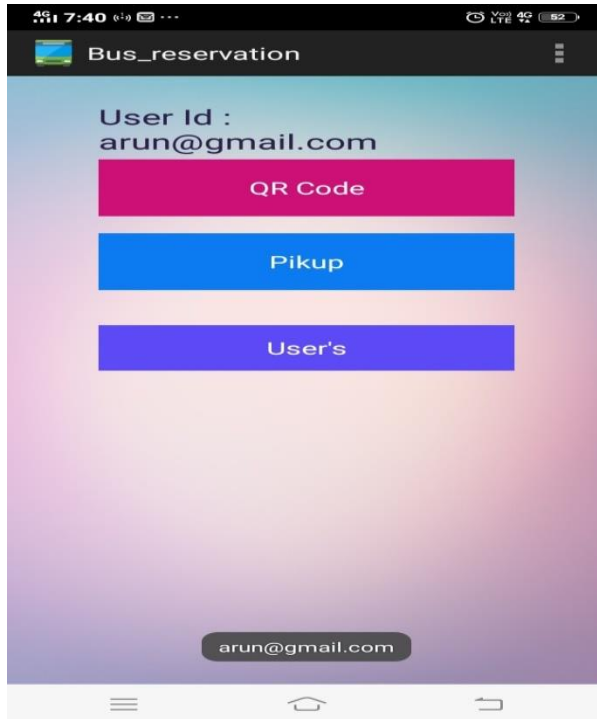## 4 CONCLUSION

3.5 Booked details with Pick up

Fig.6 User Home page
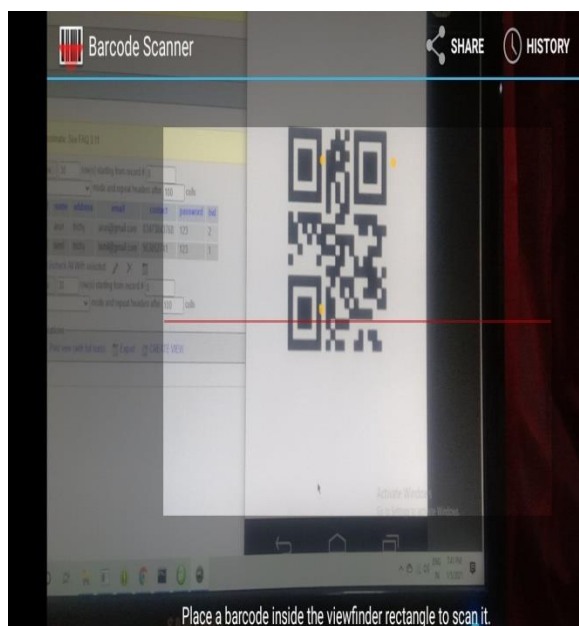
3.6 QR access Generation

Fig.7 QR access for pass

This project tracks the location of the bus using GPS and displays it on Google map. By fixing GPS enabled Android device in every bus, we can track each bus from their current location. This application consists of both transmitter and receiver inbuilt in android mobile phones. The transmitter is used to transmit the location and bus status information to the server. The receiver is the user who can view the details regarding the bus location using his smart phone via Google map. Considering the features of project such as bus locator, updating the location of bus on Google map, notifications are provided if there is any in the daily bus routine. Bus tracking ticketing system is very useful and important mainly in cities. This system has many advantages like easy to use, wide area range, easy to implement in vehicles, more effective, huge capacity etc. This system is made of a tracking module containing GPS model to access dynamic vehicle location and send it to server. Then people can access this information from their android mobile phones. GPS UTM bus tracker system has delivered the objective of this project which are student can plan their time more effectively without having worry about missing the bus. They able to monitor the bus location and save their time for other preparations instead of wasting their time waiting for bus.

FUTURE ENHANCEMENT

Our tracking system is not secured because it can be accessed by any unauthorized persons also. It doesn't work if the GPS is not turned on in the user's phone. Only the transport officer receives the bus break down details. The delay of the bus is not informed for the commuter in early stage. The student or staff will not get any alarm notification regarding the crossing of buses from each stop.

This system can be further extended for multiple applications as follows

- Anti-theft system for cars and bikes.
- Managing public transports likes buses and trains.
- Tracking of valuable assets.
- As a vehicle management software for transport companies.

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