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Smart Bus Tracking System

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Abstract— The rapid growth of vehicles implies more fuel is required, resulting in the emission of harmful gases into the environment, causing air pollution. The primary cause of vehicle pollution is the continually growing number of vehicles. An increase in the usage of private cars is not exactly a positive trend. Public transport has become a part of live most people reach from home to workplace or school using public transportation. Waiting for public transport services is one of the most important factors deteriorating public transport customer satisfaction. People spent more time in waiting for the vehicle. The services provided to passengers by transport systems are very important. People have the right to know where the bus is now and how long time it takes has to reach bus stop. People need a service like route, schedule information, fare and current location of the public transport. This can be provided for the needy people in the proposed system by an application to track the location of the buses and to manage the schedule of the buses in every branch location. The passengers can view the schedule of the buses and know whether the bus is On Travel, Arrived, Delayed, or Cancelled trip and they can view where the location of the buses is.

Keywords—GPS, Google map API, KNN algorithm, Notification system.

INTRODUCTION

Smart Bus Tracking System is a system developed on Android Platform using java programming language. It is based on client-server technology along with the use of database. The information provided by the user is stored in the database of the server. And the android users can get the information through the server. The login page is available on the user app for the college administrator. The administrator can keep the record of the bus such as bus number, bus schedule, route information, driver contact, etc. on the database. The administrator also has the permission to manipulate the bus record as per the needs. Passengers need to login the application. Passenger can search for the particular bus on the application based on their location.

Passengers get updated on the bus location at certain time interval so that they don't have to wait for the bus being unknown whether the bus is coming or has gone. So, in summary, our system handles all the data about current location of bus and by using this data the real time tracking of bus can be done and this information is then given to remote user who want to know the real time bus information. For development purpose some technologies like GPS (Global Positioning System) and Google maps are used. The system includes server-client based application, which gives real time location of bus on Google Maps.

GPS technology able to receives the position of an object from space-based satellite navigation system through a GPS receiver. For wireless data transmission, GSM and SMS technology are commonly used. The SMS technology through GSM network and GSM modem provide a user with vehicle location information. Instead of using SMS, the bus tracking system uses the smart phone application to track and monitor a bus location obtained from the in-vehicle tracking device. The bus location is automatically placed on Google maps, which makes it easier for tracking a vehicle and provides users with more accurate bus location information

LITERATURE SURVEY

A vehicle tracking system is very useful for tracking the movement of a vehicle from any location at any time. In this work, real time Google map and GPS based vehicle tracking system is implemented. These are some of the technical literature in engineering and technology where people have tried to implement similar kind of Systems which are mentioned below with their shortcomings with respect to our Application. Authors "ManiniKumbhar,

MeghanaSurvase, Pratibha MAvdhutSalunk" have implemented "Real Time Web Based Bus Tracking System" The proposed system reduces the waiting time of remote users for bus. A system is used to track the bus at any location at any time. All the current information is stored to the server and it is retrieved to remote users via webbased application. This System is a web-based system but nowadays people mostly tends to use Android apps since they are more portable and smart phones are used more widely in today's world. Also, a web-based system is inconvenient for a user to use on a regular basis while waiting for a bus at the bus stop.

Authors "M. A. Hannan, A. M. Mustapha,A.Hussain and H. Basri" have implemented the system "Intelligent Bus Monitoring and Management System" The proposed system uses Artificial intelligence with the help of RFID module which is used in-order to reduce the manual work carried out in the Bus-Management & Monitoring System. In this a RFID is used to track a bus when it crosses the bus stop. Hence the exact location of the bus is not shown, only an approximate location is shown based on the bus stops. In today's world, accuracy is very important and hence this was the limitation of this project.

Authors "Süleyman Eken, Ahmet Sayar" have implemented "have implemented the system "A smart Bus Tracking System based on location- aware service and QR code." In this paper, Bus tracking system, any passenger with Smartphone can scan QR code placed at bus stop to view estimated bus arrival times, current location of the bus. The drawback in this project was that the user had to be physically present at the bus stop to scan the QR code.

Authors "R. Maruthi, C. Jayakumar" implemented the system "SMS based Bus Tracking System using Open Source

Technologies." A bus tracker application to track a bus using GPS transceiver has been proposed in this paper. The objective of this work is to develop a system that manages and controls the transport using a tracking device to know the scheduled vehicle and the current location of the vehicle via SMS using a GPS tracking device.

Author "Yusuf Abdullahi Badamasi" have implemented the system "RFID bus ticketing system" with the help of RFID card which discard the manual or traditional ticketing system (Conductor).

PROPOSED SYSTEM

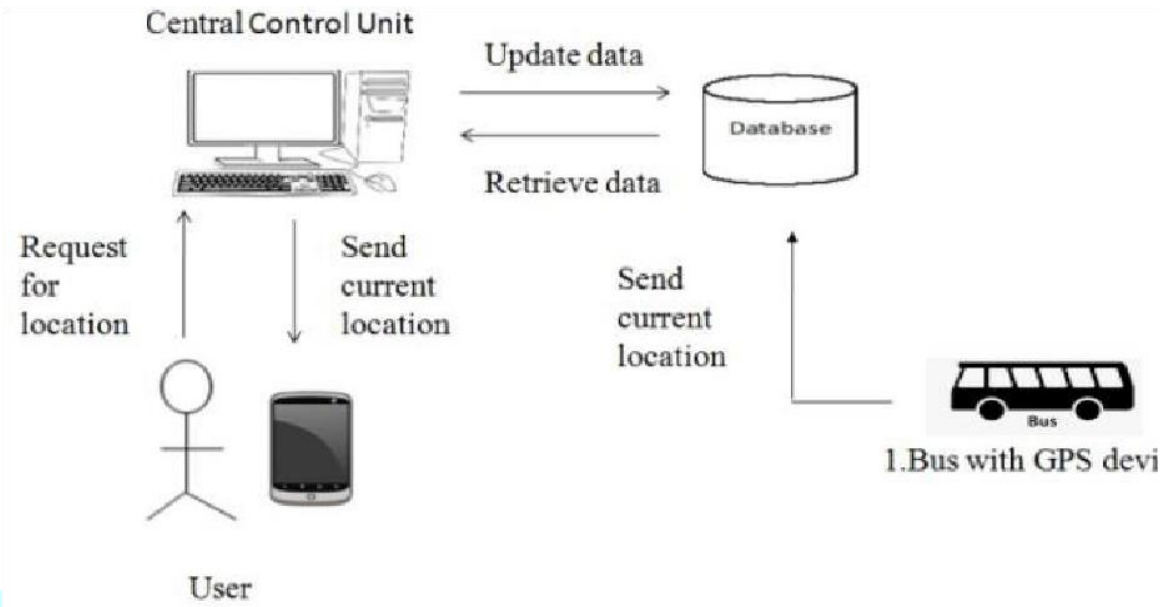
The modern world is guided by the change in the technology day by day. Mostly the relevant changes in technologies are enhancing the modern business techniques. Different technologies have been developed in the world for making people's life easier and better day by day. Android is the latest and a rapid growing technology available for all the users or users in today's market. An enormous increase in the end user acceptance has been experienced in the past few years. The project is based on the latest GPS technology, which enables college management team a better way to keep eye on the activity of the college buses and manage schedule as well as provide real time bus location for the students using bus service. This paper proposes an Android mobile phone application that gives information about buses, bus numbers as well as bus routes/stops online. The proposed system is completely integrated online bus tracking systems using database. It provides the facility of tracking the particular college bus's location in the Google map. They can also view the bus details such as bus schedule and they reach the bus on time.

The project system can be forwarded in other in order to enhance the business activities of the public transport. Some other applications are: fleet operators for fleet management functions such as fleet tracking, routing, dispatch, on-board information and security. A mobile application is used for giving parents/guardians a real-time update on the status of their children. This application is implemented in Android. The application facilitates the tracking the live location of the bus, taking the attendance of the children entering and leaving the bus, sending alerts to authorities and parents in case of emergencies and giving an estimated time of arrival. Real-time location is tracked using Google Maps API on smartphones. For the bus conductor and/or staff, the application is used to take the attendance of the children present on the bus with the help of Bus code. Similarly, the drop status is also recorded using the code scan. The bus conductors have an emergency button on the application, which can be used during extreme emergencies to alert the authorities via the web portal and the parents via the mobile application. GPS tracking is accomplished using the Global GPS System, a digital and to provide the cellular Network and the internet. The GPS system is a network of 24 satellites to be provide circling the earth. These satellites transfer location data back to earth onto continuous basis. The devices are setup to receive this location information. Once received the data is transmitted via a digital cellular network via the internet to our cloud servers where the information can be viewed anywhere in the world. As technical as the GPS tracking system is, the data is delivered to you instantaneously.

Bus track any vehicle, person or asset anytime, in real time. Vehicle with GPS, Tracking Device Real - Time Tracking of GPS Servers your vehicle & Assets The web-based tracking system combination of several modern information and communications technologies. The system comprises of vehicle-mounted tracking devices, a central server system and a web-based application. Through the website, users will have the facility of monitoring the location other similar information of vehicle. This system is designed to serve college student and administrative with an unlimited number of college bus vehicles. The based system enables student to browse location track on map through developed web website that is with Google Map and interact with database server for vehicles tracking information. Using the web-

based system enables users with different operating system platforms to easily reach the demand details by the exact of internet access.

SYSTEM DESIGN



A. GPS Technology GPS [10], also known as a space-based radio navigation system, consists of 24 satellites orbiting this earth under the management of the US government. It was primarily developed for the military purpose and later used to help general people for various applications, e.g., navigation, tracking, timing and positioning services.

B. Android Platform Android is a Linux based open source operating system which was founded by Andy Rubin, et al. There are some important features that make android different from other operating systems. These are as follows:

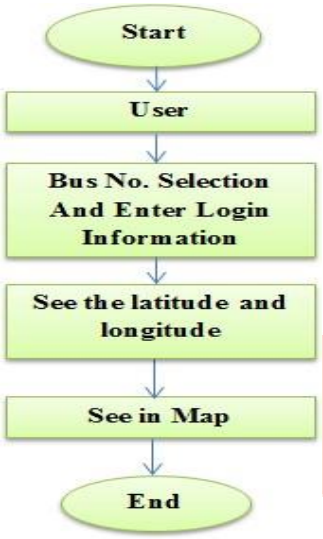
- Open Source
- Easy to customize the Android platform
- Support the multiple inheritance since it uses the concept of Java [18]
- Allow all graphic dimensions, i.e., 3D and 4D • Support the low-level interface for having a Linux operating system
- Support standard libraries like OpenGL, Web Kit and SQLite, etc.
- Appealing look-and-feel features including live Really Simple Syndication (RSS) feeds, weather information, etc.
- Support many more connectivity and messaging services like Bluetooth, GSM, WIFI, MMS, SMS, CDM, etc.

C. Google Map

Google map is a free software that renders 3D graphics of earth using satellite images around the world. It is a version of Google earth that shows the maps and can be embedded into web pages through Google maps API.

MODULE DESCRIPTION

- Login for admin
- User registration
- Bus information
- Bus location register
- Bus location tracking
- GPS integration
- Notification & SMS alert



I. Login for admin

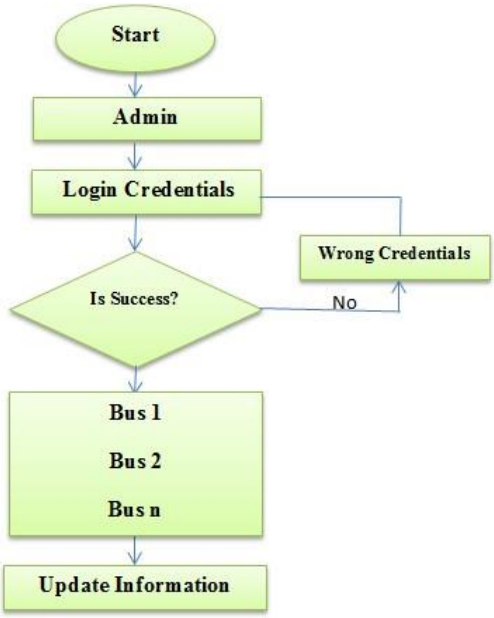
- This module is designed for login that allows the authorized admin to view the files.
- The admin who are registered as the authorized admin.
- The admin can only create, add, update, modify and delete the database about bus information.

II. User Registration

- The user has to register with the proper details.
- This system requires a proper user authentication for accessing the features behind in this system.
- For getting the rights to access the features users have to register their identity to this system.
- Once registered the system will provides the accessibility rights to the users to work in this system

III. Bus Information

- The bus information can contain about the bus numbers, starting points, destination points, timing of arrival and departure Bus route



IV. BUS LOCATION REGISTER

- The buses using GPS technology has become a popular feature in public transportation systems worldwide.
- By providing current location and arrival time of the buses, passengers can plan their journey more efficiently and avoid waiting times.
- GPS devices installed on buses transmit the vehicle's location data to central system.
- It can be accessed by passengers through various mean like mobile apps.

V. BUS LOCATION TRACKING

- Enter the **bus number or name** in the search bar.
- Choose route to track the bus live.
- Tap on any bus stop name to know the live arrival time of the bus on this stop. **VI. GPS**
- The signal contains data that a receiver uses to compute the locations of the satellites and to make other adjustments needed for accurate positioning.
- **GPS** can be integrated with **K-NN algorithm**, which means it does not make any assumption on underlying data.

VII. BUS TRACKING &NOTIFICATION

- The proposed system highlights on the SMS.
- GPS was used to provide the current location of the moving bus, thanks to the Google Map
- The designed system encouraged user participation by relying on them to report any unforeseen accidents, on-road troubles, or GPS disconnections and to send SMS messages to other users with the information.
- A Mobile application was designed with interactive interface as a platform to access all the information. **VIII. Notification SMS Alert**
- If the bus enters to the location notifying bus route through notification, once the user enabling location then easy to trace the bus.
- If **GPS** disconnected or not functioning properly for more than 10 minutes, then the user will receive the notification message (i.e. wait for the bus or further move to another bus).
- If the bus is not available in case of breakdown or any other issues, then the user receives the **notification.**

CONCLUSION & FUTURE ENHANCEMENT

In this research study, we design and develop a real-time bus tracking system using GPS tracking technology which needs only a smartphone and a real-time server. Our application consists of two fundamental concepts: first it collects the realtime location information of buses via GPS technology and secondly updates the location information in the database server. The bus-side, server-side and client-side modules provide all the expected functions. Since this application does not need any external hardware except a smartphone which is available to anyone in the world, the overall cost is very low or no cost needed for tracking the bus location. It provides nearly accurate data in real time that makes possible for the user to track the buses.

In near future, we would like to enrich our proposed application by adding the following features.

Along with this, can create a bus ticketing system where the user can actually buy a digital ticket just like the **UTS app** in the TamilNadu railways in which app take the current location of the user ask for the destination and calculate the fare we will also provide pay option from various third-party app such as **Paytm, PayPal** etc.

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