

College Bus Tracking System

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Abstract: *The modern world is driven by technological change day by day. Especially appropriate technological changes improve modern business strategies. Various technologies have been developed in the world to make people's lives easier and better day by day. Android is the latest and fastest technology available to all users or users in today's market. A significant increase in user acceptance has been seen in the last few years. The project is based on the latest GPS technology that allows the college management team the best way to monitor college bus activity and schedule and provide real-time bus location for students using the bus service. This paper proposes an Android mobile app that provides information about buses, bus numbers and bus routes / bus-stops online. The proposed system is fully integrated with online bus tracking systems using an android app. They can also view bus details as a bus schedule and arrive at the bus on time. It is a real-time system as the current bus location is constantly updated with latitude and longitude is obtained by the user at his request with the help of Google Map API.*

Keywords: Bus Tracking, Mobile GPS, Google Maps, Android Studio

I. INTRODUCTION

The mobile phone industry is one of the fastest and most flexible business sectors today. The need for effective and instant communication remains a constant need. Cell phones are now equipped with navigation systems such as GPS or Global Position Satellite to help travelers, tourists and sailors get the most accurate view of their current location.

In today's world, time is essence to students. Being a high-tech product, mobile phones are widely and increasingly used famous. The vehicle tracking system is widely used for vehicle tracking application. Due to traffic congestion and road work, most buses are delayed. People have to wait for their bus at the bus stop for a long time without knowing when the bus will arrive. Thus, the timing of the bus arrival cannot be guaranteed.

GPS means it is handled to track real-time bus location and send information to the server which is why it was previously used by the app to support their travel locations and features. The main purpose of this app is to track the bus location and transfer it to users through the Android app on Google Maps. Therefore, this helps the user to prepare and save his/her time properly in the morning and catch the college bus on time.

II. LITERATURE SURVEY

A vehicle tracking system is very useful for tracking the movement of a vehicle from any location at any time. These are some of the technical literatures 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.

[1] Sridevi, K., Jeevitha, A., Kavitha, K., Sathya, K. and Narmada, K., 2017. Smart bus tracking and management system using IoT. Asian Journal of Applied Science and Technology (AJAST) Volume, 1.

In this paper the Bus tracking application is used that tracks a bus and gathers the distance to each station along its route. Based on IoT this project is implemented as Android application. It uses RTC to show where buses are on a map and provide students and staffs the updated information at different time interval. Simple mode of communication is the key feature of the proposed system.

[2] Jemilda, G., Krishnan, R.B., Johnson, B. and Sangeeth, G.L., 2015. Mobile application for college bus tracking. International journal of computer science and mobile computing, 4(3), pp.500-507.

This paper proposes an Android mobile phone application that gives information about buses, bus numbers as well as bus routes both online and offline. It uses GPS and Client-Server Technology to give the precise location of the bus as well as the estimate remaining time for the bus to reach the destination. In this system Two Android applications are designed one for the driver to update the location to the server and one for the user.

[3] Gull, H., Aljohar, D., Alutaibi, R., Alqahtani, D., Alarfaj, M. and Alqahtani, R., 2021, June. Smart School Bus Tracking: Requirements and Design of an IoT based School Bus Tracking System. In 2021 5th International Conference on Trends in Electronics and Informatics (ICOEI) (pp. 388-394). IEEE. 2 This paper proposes a system that will track the vehicle location using driver's mobile phone. It introduces a tracking website and an android application for the school admin, drivers of the bus and the parents. Also provide the admin with the charge of adding new bus driver and new student to the driver list. The application will also generate a fixed QR code for each student that will be placed on a card that contain the student personal information.

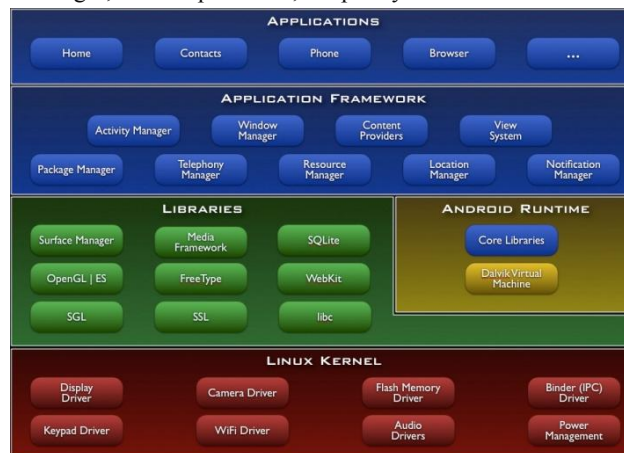
[4] Raj, J.T. and Sankar, J., 2017, December. IoT based smart school bus monitoring and notification system. In 2017 IEEE Region 10 Humanitarian Technology Conference (R10-HTC) (pp. 89-92). IEEE.

In the proposed system RFID and GPS technologies are connected to a remote server over WIFI using an ESP8266 microcontroller to give the real time information about various parameters of the vehicle like the location, the route, the speed, the list of passengers, the commitments of drivers to the schedule. An Ublox 6M GPS module is used to find the geographic coordinates also the MFRC522 RFID reader identifies each student as they board. This system uses ESP8266 microcontroller to upload the information, which can be accessed by the parents through a mobile application and this helps them track their wards effectively.

III. ANDROID

Android is a free operating system, with open-source mobile devices. It is an open-source development platform for creating mobile apps. Devices, especially mobile phones, run the Android operating system and apps are designed for it. Specifically, Android is made up of a few essential and dependable components, which include the following:

- Linux operating system kernel that provides low-level interface with hardware, memory management, and process control.
- Libraries have open-source software development tools, including SQLite, Web Kit, OpenGL and media manager.
- Software development kit used to create applications, including tools, plug-ins, and documents.
- An application framework that anonymously exposes system services in the application layer, including window manager and location manager, content providers, telephony and sensors.



IV. PROPOSED SYSTEM

The proposed system provides a direct bus destination students from their respective areas. In line with this, it and provides the following features:

- Information such as bus number, driver's contact number, bus Route, Stops etc.
- Authentication of Administrator, Driver, Registered College Students.
- Both Student and Driver has facility to inform admin about any Emergency.
- Student can also give feedback about Bus and Bus Driver and all the stuff related to Bus.

V. SYSTEM DESCRIPTION

5.1 System Architecture

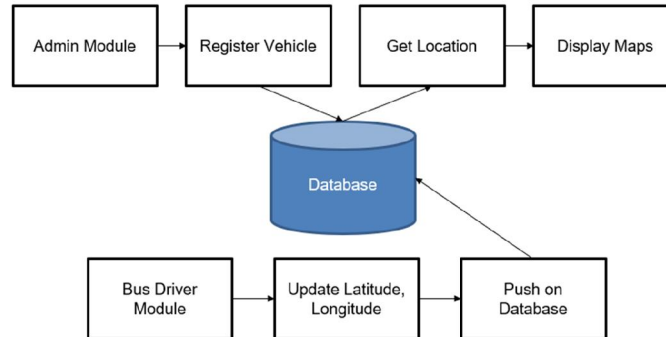


Figure 1: System Architecture Design

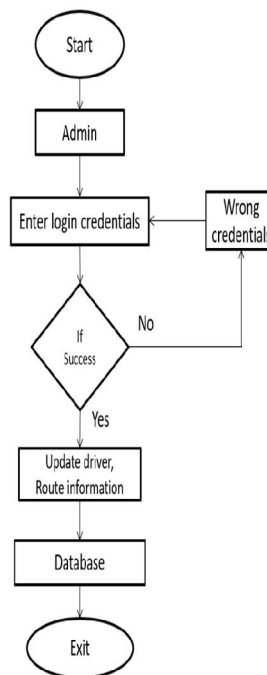
5.2 Module Description

There are three modules in our application:

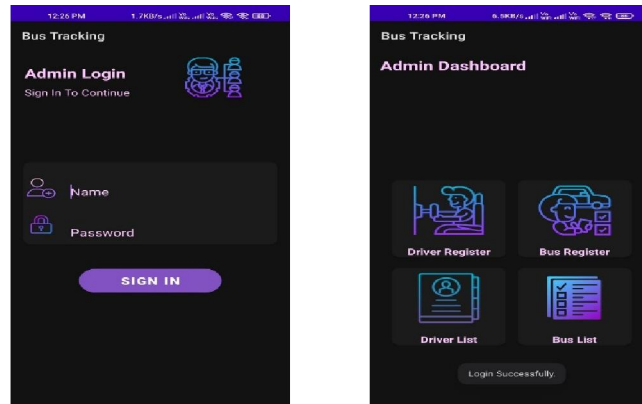
1. Admin
2. Driver
3. Student

A. Admin

Admin can login to the Account after authentication and authorization. Admin has the option to Add or Remove the route details. Admin can add new route details and can select a route from the route list and display the corresponding stops. Admin has also option of driver registration in which he updates Driver name, Drivers Contact number etc. Below fig shows flow of admin module.



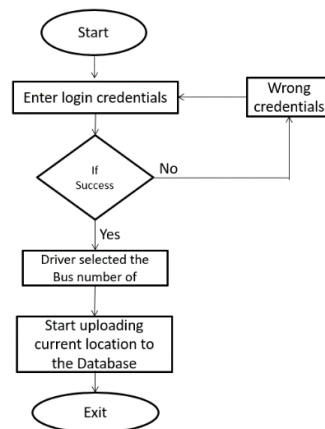
When Admin enters into the admin module, following screen will be provided for him to enter the login credentials.



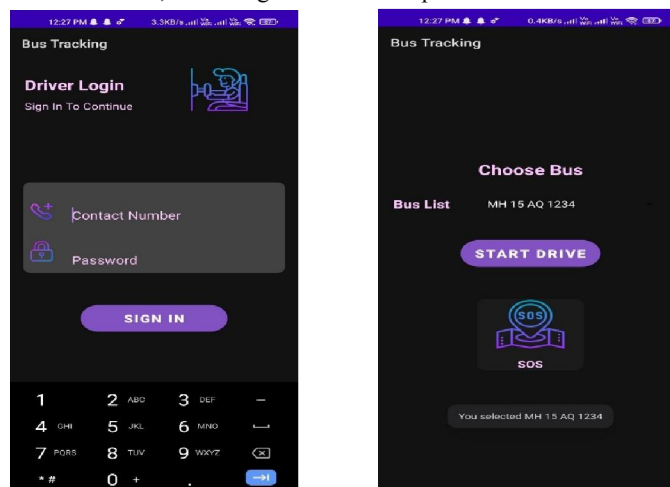
B. Driver

This module is for uploading the location of bus. The authorized bus driver has to login to the driver module using the credentials provided by admin. After login he have to select the bus number from dropdown menu. After selecting bus number, he has to start the location uploading before start of driving. The current location of the bus will be updated from organizational mobile to the firebase database every moment in the form of latitude and longitude.

Below fig shows flow of Driver module.



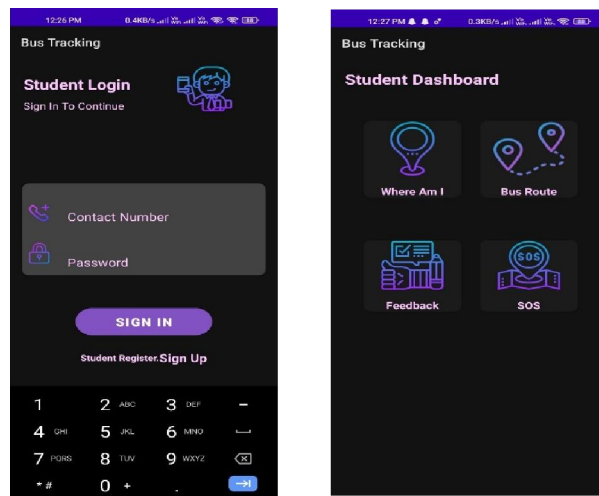
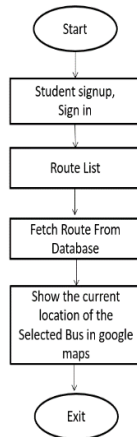
When Driver enters into the Driver module, following screen will be provided for him to enter the login credentials



C. Student

This Module is for student. Student has to sign up first in the system and after using credentials he login to the system. He/she get access of all the buses details of their college through their cell phones

When student sign in into the system the home-activity has the option of bus routes where route list is fetched from database for student to select and track the location current location of bus. Student has also the option of feedback related to bus and bus driver. Below fig shows flow of Student module.



VI. FUTURE ENHANCEMENT

This project has a wide range. The use of the video camera in this system will take this system to the next level in the security sector. This will help beware of modern-day crimes that are witnessed by ordinary people on a daily basis. This will prove to be a major achievement in reducing crime; with the use of moving sensors the speed of the bus can be calculated. Also, by using RFID tags we can use the E-bus ticketing system and the eco-friendly E-bus system as there is no need to produce paper tickets for buses. Also, in application can be useful in medical field for tracking the Ambulance Bus and to manage the drivers. In case of any emergency fire outbreak after advancing the project, we can track the firetruck to give emergency call and rescue the mission

VIII. CONCLUSION

This proposed work is successfully designed, implemented and tested. Our system reduces the waiting time of remote users for bus. With the mobile application we can track the location of bus at any point of time. All the current information is stored to the cloud and it is retrieved to remote users via mobile application. This system is more user friendly for users

to get information visually shown on Google Map. User can freely get this mobile application for real-time tracking of bus which provide interactive interface environment. So, by using this application remote user can just wait or they may reschedule their journey according to the availability of bus. So, this, paper presents a system which provides high practical value in the modern fast era.

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