A COMPREHENSIVE GEO ATTENDANCE REAL-TIME VEHICLE TRACKING SYSTEM

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Abstract— This software's main objective is to provide specific information about the bus monitoring system. In this application, we offer bus tracking system features like geo-fencing attendance, smart notifications, and real-time bus location. This software's goal is to help university and college students overcome the challenges they face. The main issue that students now encounter is missing the college or school bus by the required amount of time. It will affect the education of the students and make them susceptible to mental stress. Our bus tracking application utilises a client and server architecture. For the client/server application in this application, we use Java and XML. This application's primary goal is to address a significant issue that students will encounter while waiting for a college or school bus. Therefore, the Abstract of our system handles all the information regarding the bus's current location and allows for real-time bus tracking. This information is then provided to the remote user who requests real-time bus information. Students can mark their attendance based on location by using bio-metric mobile finger print.
Index Terms—Client/Server application,Geo Attendance,Real- Time Vehicle Tracker.

I.   INTRODUCTION

A Comprehensive Geo Attendance Real-Time Vehicle Tracking System is a system developed by Android Platform using java programming language. It is built using client-server technology and a database. One Android user who drives a bus updates the server with the bus's location in real time as well as its speed and time. Information about students and drivers is kept in the server's database. The student can be register specific route bus in the administrator. The database can be used by the administrator to store information about buses such as bus numbers, schedules, routes, and driver contacts. Admins also have the authority to manipulate

bus recordings as needed. Student need to login. Student can track the particular bus on the map.

You don't need to wait for the bus because you won't be informed of its whereabouts at regular intervals, so you won't know when it will arrive or depart. The notification residual distance can be adjusted to either 1 km or 2 km by the student. The student will be pin the bus stop in the application that specific allocated bus driver can see the student stop and student name in the map layout. The student can set the pickup drop location. The student application will be have multiple notification settings, When bus arrived at your home, When bus left your home like you will set the notifications. Call options also available in the student application is easy to communicate with driver. Parents also use the student application its for schools and colleges the parent can monitor the school bus. When bus arrived at school, When bus left school all information will be send to parent.The student and driver details all are stored in admin panel. College students can use mobile biometric finger print to record their attendance using the institution's location-based attendance system. In conclusion, our system manages all the information regarding the bus's current location, and it is possible to determine the bus's current location in real time by using the internet. The remote user receives this real-time bus information.

II.   RELATEDWORK
A.   Real-Time Web Based Bus Tracking System
The suggested solution minimizes the amount of waiting time experienced by remote bus riders. Buses can be tracked at any time, anywhere, using the system. Any time and from any location, the bus can be followed. The server stores all of the most recent information, which remote users can access using web-based applications. Although this system is web-based, people now frequently use Android apps instead of web browsers because they are more portable and more widely used.

B.   A smart Bus Tracking System based on location- aware service and QR code
The QR code at the bus stop can be scanned by anyone with a smartphone to view the bus's current location and anticipated arrival time. The fact that the user required to be there in person at the bus stop in order to scan the QR code presented a problem for this project.

C.   Intelligent Bus Monitoring and Management System
Intelligent Bus Monitoring and Management System, The suggested device reduces manual labor in bus management and monitoring systems by utilizing synthetic intelligence with RFID modules. Use RFID to track buses as they pass bus stops. Therefore, Only an approximation of the bus's location based on the bus stop is provided. The project had reached its conclusion because accuracy is so crucial in today's society.

D.   Real Time College Bus Monitoring and Notifications Sys- tem
No one can predict when or at what time the bus will arrive at the bus stop in a traffic situation.The purpose of the research paper is to develop an app that students can use to efficiently manage their time throughout the day, find the bus's location when they need it, and avoid missing it.

E.   Bus Tracking System based on Location-Aware Services

In everyday life, Buses are a common kind of transportation for those who want to get from one area to another. This paper mainly focuses on the bus problem where passengers do not know the exact arrival time of the bus. Bus location and his bus route can be easily tracked on your smartphone. Android based applications are used. This application contains information about all routes and details about the bus.

F.   Application-based bus tracking system

This report is based on a bus tracking system that tracks buses using a GPS tracking programme. The passenger does not know the information about the bus time, thus wasting his hours waiting for the bus on the given route. Here, the bus positions are received from satellites and further processed and sent to the web server with the help of the cellular network. The received coordinate is processed via the Google Maps API.

G.   SMS based Bus Tracking System using Open Source
Technologies

In this paper, a bus tracker application using a GPS transceiver is proposed. The goal of this work is to create a management and control system for transportation that uses a tracking device to send SMS updates on the vehicle's current location schedule using GPS.

H. A Cloud- Based Bus Tracking System based on Internet of Things Technology

Cloud computing and the Internet of Things make it feasible to monitor bus services, which must be recorded, analysed, and assessed. This study suggested a mobile app that largely solves the issue of the student not knowing the precise time of the bus arrival, which is a concern with the buses. A smartphone could be used to track the bus's location and its travel routes. The use of an android-based application that contains all route and bus information is prevalent.

III.   PROPOSED SYSTEM

This project builds and develops a real-time bus tracking system using GPS tracking technology that just requires a smartphone and a real-time server. There are two main concepts in our application. After initially utilising GPS technology to collect real-time position data from the bus, updating the database server's location data. The server-side, client-side, and bus-side modules all offer the functionalities you would expect. The cost of the application as a whole is very low, and bus location tracking is not necessary because it does not require any additional hardware beyond a smart phone, which is accessible to everyone in the world. Users can track the bus using the almost accurate real-time data it provides. We plan to add the following features to the suggested application in the near future.

•   Designing a reliable server with a user friendly API.
•   Distance and time calculation between two places.
•   Bio-metric mobile fingerprint

IV.   METHODOLOGY

Users of the app may view bus locations in real time. In addition to the bus's current position, commuters may also find out how long it should take for the bus to get where it's going. The bus driver's other programme provided the location data to an internet database, which then

received it. It enables you to maintain the bus's identification while showing the bus' position on a map. Client requests for bus information are sent to the client through the server after being retrieved from the database. Drivers submit their coordinates continually to a server that stores the data. A specific bus ID's location is obtained from the server and shown on the map when the user selects that bus ID. Users can really see the current location of the chosen bus since the map's dots move as the coordinates change. The viewer is also shown an approximation of the time it will take for the bus to arrive using Google's Distance Matrix Algorithm. The application was created with Android Studio and has a very straightforward user interface. Its main component, the Google Maps API, is incredibly user-friendly and displays maps using only basic actions like swipes.

A. Driver Module:

V.   MODULES

VI.   SOFTWARE TOOLS

A.   ANDROID STUDIO:-

The module was created with bus drivers. By providing their own access information, authorized bus drivers can use this module. Before starting the driving, location services must be activated. The position of the bus is automatically updated every second from the driver's phone to the server.
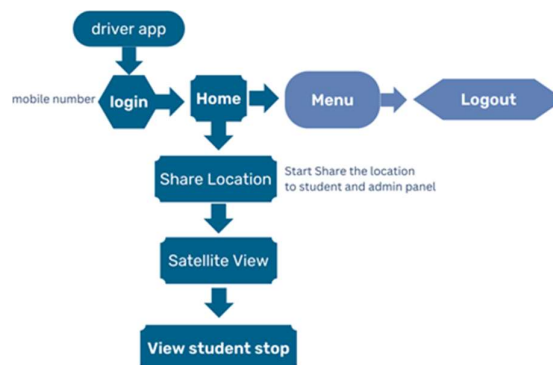

Fig. 1. An image of a driver app flow diagram

B.   Student Module:

This module is the most important one and the basis of the system. For this module, users should select Student Login. You can access all bus information on your smartphone. You can find information about registered buses here. Students can locate buses from any location. The status of location services should be checked by students.
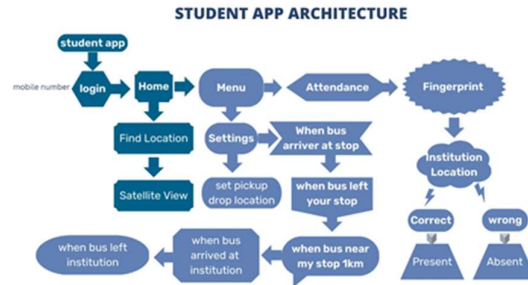
Fig. 2. An image of a student app flow diagram

C.   Admin Module:
The bus administrator can update the information using the module. After authentication and authorization, the admin can access the admin account. The driver, buses, and students may all be added. The student bus attendance is available for download.

We can create apps for Android phones using Android Studio, which offers a unified environment. Making an Android application is incredibly simple. To create the driver application and student application for our proposal system, we can use Android Studio. XML is used for the front end and Java is used for the back end.

B.   VISUAL STUDIO:-
Visual Studio is Microsoft's IDE is used to create a range of software, including computer programmes, websites, mobile apps, and web apps. To simplify the software development process, additional features, compilers, and complementary tools are included. The admin panels for the suggestion system are created in Visual Studio.

C.   XMAPP:-
A website or client can be tested locally using XAMPP before being published to a remote web server. His local computer's XAMPP server software offers good testing environments for MYSQL, PHP, Apache, and Perl projects.

D.   POSTMAN:-
For testing APIs, a computer program is called Postman is used. Any response that a web server provides in response to an API request is returned by Postman. Postman doesn't require any extra setup or work to send and receive requests.

E.   SOCKET.IO:-
A library called Socket.IO enables bidirectional, event-based, low-latency communication between clients and servers. It expands on the WebSocket protocol and offers extra guarantees like HTTP long polling and auto-reconnect fallback.

F.   GOOGLE MAPS APIS:-

The Google Maps Platform is a collection of APIs and SDKs that let programmers incorporate and access Google Maps data in mobile applications and websites. Essentially, Google Maps employs two charting algorithms. The shortest path between factor A (source) and factor B is determined by the Dijkstra and A* algorithms (destination). In essence, a graph data structure is a collection of nodes that are connected by edges and vertices.

G. GEOCODING API:-
A service that supports address geocoding and reverse geocoding is the Geocoding API. The service can also be used as part of the Google Maps JavaScript API client-side or server-side with the Google Maps Services Java, Python, Go, and Node.js clients.

H. MAPS SDK:-
With the Maps SDK for Android, you can integrate maps into your Android app. This category includes Wear OS applications that make use of Google Maps information, map displays, and map gesture reactions. To enhance user engagement and provide more information about the locations displayed on the map, maps can also have markers, polygons, and overlays added to them.

VII. CONCLUSION
In this project we designed and developed , A Compre- hensive Geo Attendance Real-Time Vehicle Tracking System using Android studio. In this project, we aim to help the students save time while also assisting them in having less stressful mornings in preparation for a happy and peaceful day. The only additional hardware required for this programme is a smartphone, which all students have access it. Therefore, tracking the bus's location has a very low overall cost or no cost at all. The user can track the bus using the accurate information it provides about real-time bus tracking.

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