iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 14 **Issue:** I **Month of publication:** January 2026

DOI: https://doi.org/10.22214/ijraset.2026.76950

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 14 Issue I Jan 2026- Available at www.ijraset.com

A Web-Based College Bus Tracking Application for Real-Time Transportation and Monitoring

Thelukuntla Nishanth[1], K. Nithin Reddy[2], S. Laxman[3], J. Ravi Teja[4], Dr. Revathi Durgam[5]
[1, 2, 3, 4] *Department of CSE (Data Science), AVN Institute of Engineering and Technology*
[5]*Associate Professor, Department of CSE(Data Science), AVN Institute of Engineering and Technology*

Abstract: ***Efficient management of college transportation systems is essential to ensure student safety, punctuality, and convenience. Traditional college bus services operate on fixed schedules and lack real-time visibility, leading to uncertainty in bus arrival times and inconvenience for students. This paper proposes a Web-Based College Bus Tracking Application that enables real-time monitoring of college buses without requiring dedicated GPS hardware installation. The system utilizes location data shared through the driver's mobile device and a centralized web server to provide live bus location updates. A web-based interface allows students, drivers, and administrators to securely access bus routes, current status, and estimated arrival times. The proposed system reduces waiting time, improves transportation transparency, enhances safety, and offers a cost-effective and scalable solution for educational institution***

Index Terms: College Bus Tracking, Web Application, Real-Time Monitoring, Transportation Management System, Vehicle Tracking Smart Campus

I. INTRODUCTION

Transportation management in educational institutions plays a vital role in ensuring smooth daily operations and student safety. College buses are widely used for commuting; however, students often face difficulties due to the lack of real-time information regarding bus location, delays, or route changes. This results in increased waiting time, missed buses, and inconvenience.

Traditional college transportation systems rely on predefined schedules and manual coordination, which fail to adapt to real-world traffic conditions. Administrators also face challenges in monitoring bus movement and ensuring punctuality due to the absence of a centralized tracking mechanism.

With the advancement of web technologies and mobile-based location services, real-time vehicle tracking can be achieved without additional hardware costs. Web-based systems offer platform independence, ease of access, and scalability, making them suitable for academic environments.

This paper presents a Web-Based College Bus Tracking Application that enables real-time tracking using driver-provided location data through mobile devices. The system provides secure access for students, drivers, and administrators, improving transparency, reducing uncertainty, and enhancing overall transportation efficiency.

II. LITERATURE SURVEY

Several studies have addressed vehicle tracking and public transportation monitoring to improve commuter convenience and operational efficiency. Early systems relied on static timetables and manual reporting, which lacked accuracy and real-time updates.

Subsequent research introduced GPS-based tracking systems integrated with mobile or web applications. While these systems improved tracking accuracy, they often required dedicated hardware installation, increasing cost and maintenance complexity. Some solutions used mobile applications but were limited by platform dependency and lack of centralized administrative control.

Recent studies have explored web-based transportation systems using mobile location services, offering cost-effective and scalable solutions. However, many existing implementations lack robust authentication mechanisms and are not specifically designed for educational institutions. The review highlights the need for a secure, web-based, and low-cost college bus tracking system that provides real-time updates without relying on additional hardware. The proposed system addresses these gaps by using driver mobile-based location sharing and a centralized web platform tailored for academic transportation needs.

III. PROPOSED SYSTEM

The proposed Web-Based College Bus Tracking Application is designed to monitor and manage college bus movement using real-time location data shared through the driver's mobile device.

©IJRASET: All Rights are Reserved

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 14 Issue I Jan 2026- Available at www.ijraset.com

A. System Overview

The system consists of a driver location update interface, centralized web server, database, and a web-based user interface. The bus driver shares location data using a mobile-enabled web interface. This information is transmitted to the server, processed, and displayed in real time. Authorized users such as students and administrators can access bus location, route details, and estimated arrival times through secure login credentials.

B. Module Description

1) Driver Location Update Module: This module allows the driver to share real-time location data using a mobile device. The location information is periodically sent to the server during the trip.

2) Data Processing Module: The server processes incoming location data to determine the current bus position, route progress, and estimated arrival time. All processed information is stored in a centralized database.

3) Web Application Module: This module provides a user-friendly interface for all users. Students can track buses in real time, drivers can manage trip status, and administrators can control buses, routes, and user accounts.

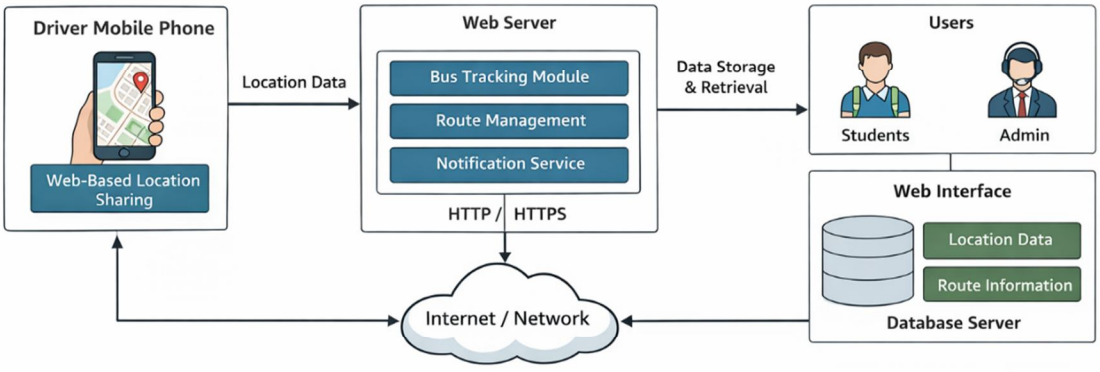
4) Authentication and Authorization Module: This module ensures secure access through role-based authentication. Different privileges are assigned to students, drivers, and administrators to protect system data.

5) Information Display Module: The display module presents real-time bus information, route details, and arrival estimates in an intuitive format, enabling users to plan their commute effectively.

6) Output Module: The output module is responsible for presenting the processed bus tracking information to the end users. It displays real-time bus location, route details, current status, and estimated arrival time through the web interface. This module ensures clear and accurate visualization of information, enabling students and administrators to monitor bus movement effectively and make informed travel decisions.

IV. FIGURES

Figure 1- System Architecture



System Architecture of Web-Based College Bus Tracking Application Using Driver Mobile Location

©IJRASET: All Rights are Reserved

Figure 2- Use Case Diagram

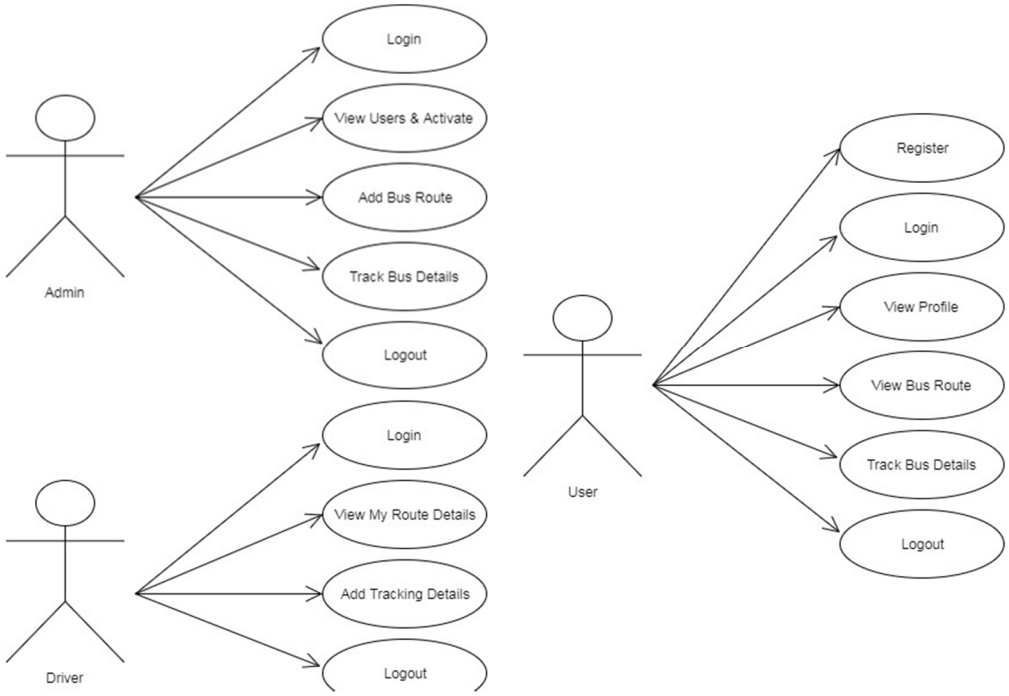


Figure 3- Sequence Diagram

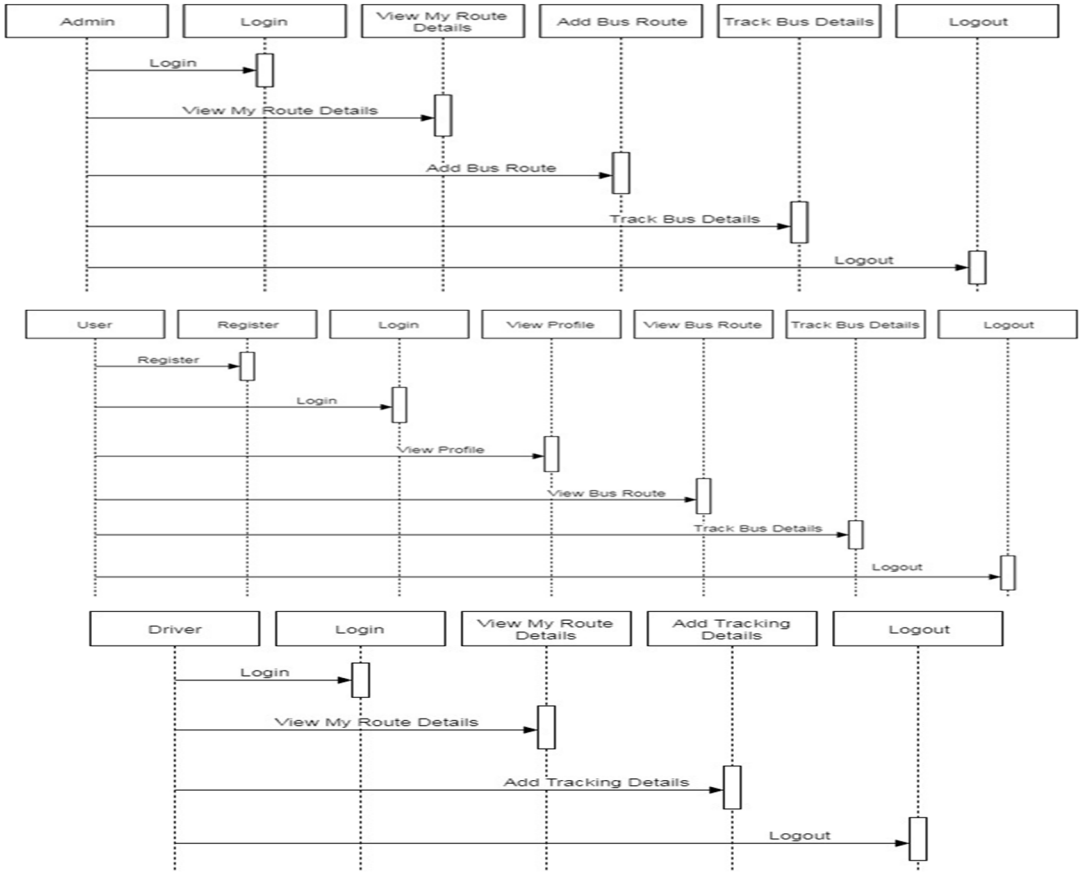


Figure 4- Activity Diagram

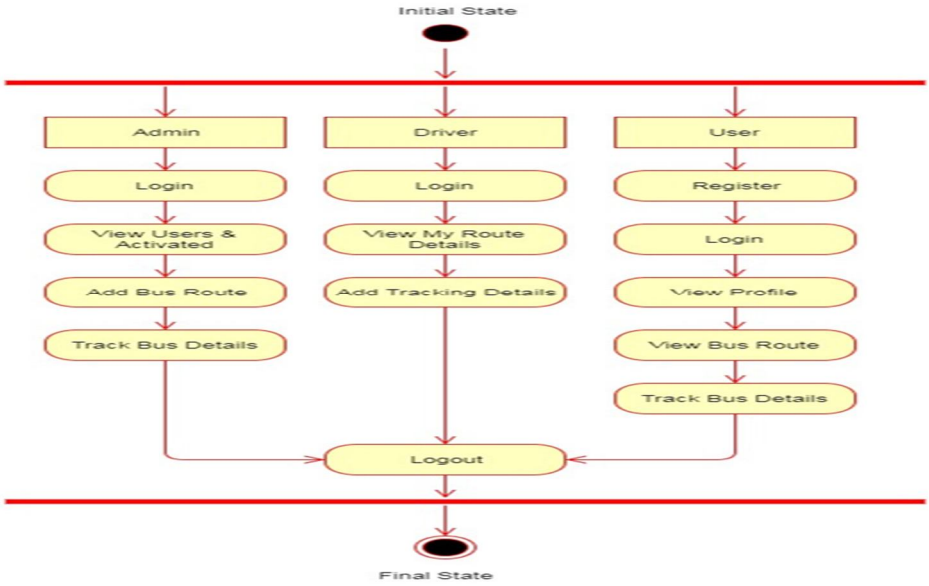
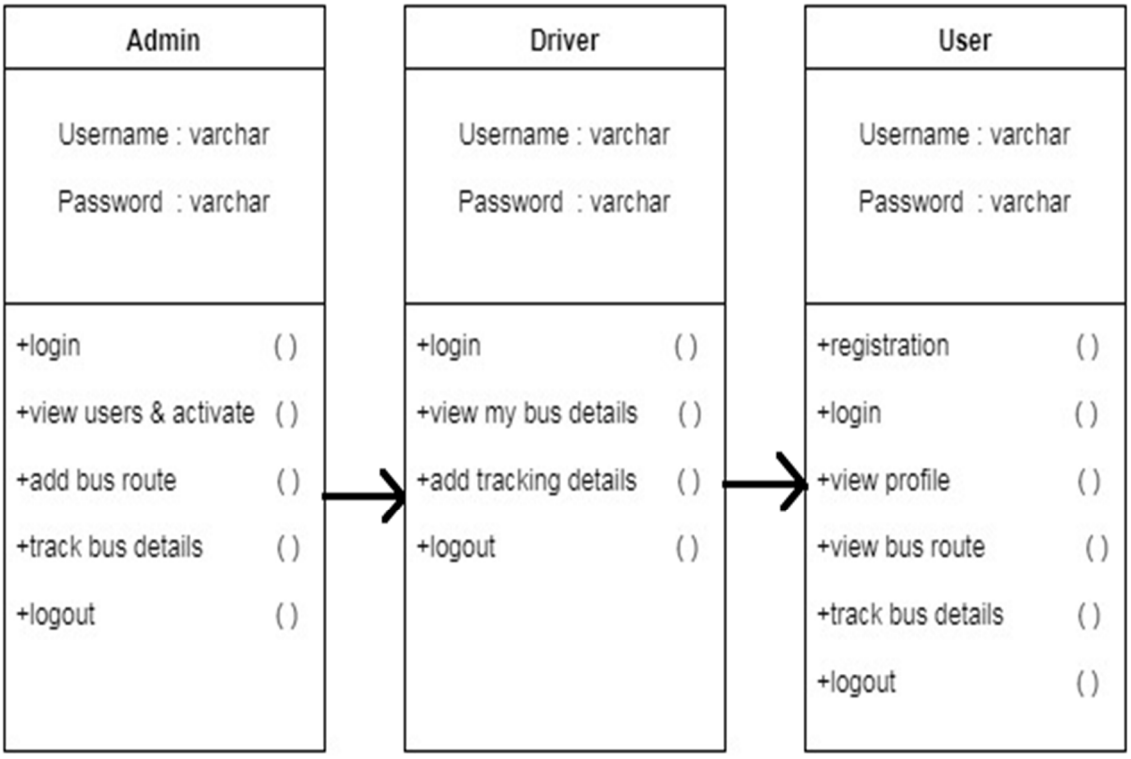


Figure 5- Class Diagram



V. OUTPUTS

The system was evaluated using a web-based development and testing environment to assess its functional performance. The results indicate reliable real-time updating of bus location and route information with minimal processing and communication delay. The system demonstrates consistent responsiveness to driver-provided location updates, ensuring smooth and continuous tracking through the web interface. Route information is displayed accurately and updated dynamically as the bus progresses along its path. Overall, the application shows stable performance, effective information delivery, and improved transparency in college transportation monitoring without requiring additional hardware.

VI. CONCLUSION AND FUTURE WORK

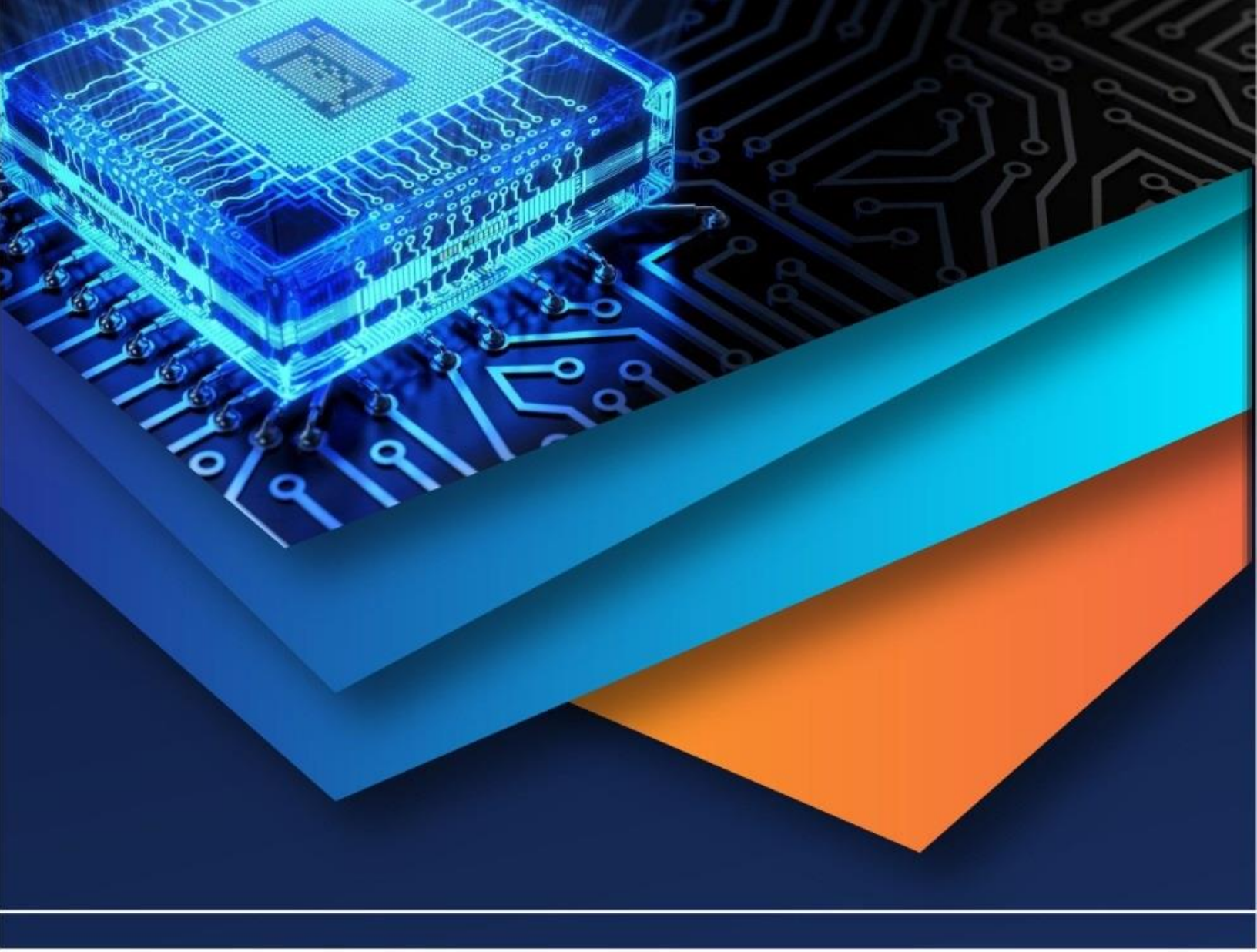
The Web-Based College Bus Tracking Application successfully improves transportation transparency by providing real-time bus location and route information through a centralized web platform. The system reduces uncertainty for students, simplifies transportation monitoring, and enhances overall operational efficiency without requiring additional hardware installation. Its cost-effective and scalable design makes it suitable for deployment in educational institutions.

Future enhancements may include automated location updates, mobile application integration, push notifications for bus arrival alerts, and traffic-aware route optimization. The incorporation of data analytics and predictive arrival estimation can further improve system accuracy and support intelligent transportation management.

REFERENCES

[1] R. Want, "An Introduction to RFID Technology," IEEE Pervasive Computing, vol. 5, no. 1, pp. 25–33, 2006.
[2] M. A. Khan and S. Jain, "Web-Based Vehicle Tracking System for Smart Transportation," International Journal of Computer Applications, vol. 179, no. 7, pp. 20–25, 2018.
[3] S. Sharma, A. Verma, and R. Singh, "Real-Time Vehicle Tracking System Using Web Technologies," International Journal of Engineering Research and Technology (IJERT), vol. 6, no. 4, pp. 45–49, 2017.
[4] T. H. Cormen et al., Introduction to Algorithms, 3rd ed. Cambridge, MA, USA: MIT Press, 2009
[5] W3C, "Geolocation API Specification," World Wide Web Consortium, 2022. [Online]. Available https://www.w3.org/TR/geolocation-API/
[6] P. Bellavista, A. Corradi, and C. Stefanelli, "Mobile Agent-Based Monitoring for Transportation Systems," IEEE Transactions on Vehicular Technology, vol. 57, no. 2, pp. 1026–1040, 2008.
[7] N. Patel and R. Mehta, "Design and Development of Web-Based Transportation Management Systems," International Journal of Advanced Research in Computer Science, vol. 9, no. 3, pp. 312–316, 2018.

Figure 2. Use Case Diagram of the College Bus Tracking System
(Adapted from: https://1000projects.org/...)
Similarly:
Figure 3. Sequence Diagram of the College Bus Tracking System
(Source :1000projects.org)
Figure 4. Activity Diagram of the College Bus Tracking System
(Source: 1000projects.org)
Figure 5. Class Diagram of the College Bus Tracking System
(Source: 1000projects.org)



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)