"Campus Shuttle Tracker System"

A PROJECT REPORT

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF TECHNOLOGY

Submitted to

Dr. Babasaheb Ambedkar Technological University, Lonere.

Submitted By

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Under the Guidance of

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CERTIFICATE

This is to certify that the Project entitled " Campus Shuttle Tracker System" submitted by Mr. Vipul Manilal Patel, Mr. Nishant Nitin Bodare, Mr. Swapnil Shrikant Yadav, Mr. Utkarsh Mohan Yadav is a record of the bonafide work carried out by them, under my guidance, and it is approved for the partial fulfillment of requirement of Dr. Babasaheb Ambedkar Technological University, Lonere for the award of the degree Bachelor of Technology (Computer Science and Engineering) for academic year 2024-2025.

Miss. Shital Waghmare	**Dr. S. V. Balshetwar**	**Dr. Vikram. S. Patil**
Guide	**HOD**	**Principal**
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(External Examiner)

Place:- Satara

Date:-

Declaration by Student(s)

This is to declare that this report has been written by us. No part of the report is plagiarized from other sources. All information included from other sources has been duly acknowledged. We aver that if any part of the report is found to be plagiarized, we shall take full responsibility for it.

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Signature of Students

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Date:-

CONTENTS

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ABSTRACT

The Campus Shuttle Tracker System is an innovative solution designed to enhance the commuting experience for students by providing real-time tracking of college shuttle buses. This system leverages GPS technology to deliver accurate location updates and estimated arrival times, ensuring that students can plan their travel efficiently.

Additionally, the system integrates an attendance management feature, simplifying the process of logging attendance for both students and administration. By linking attendance records with shuttle usage, it provides a seamless and automated approach to tracking student participation.

To support operational efficiency, it monitors fuel consumption and generates digital request forms for refueling, helping to maintain optimal fuel management. It also collects the data for daily running of the bus from start of the day.

Additionally, it includes an integrated online payment gateway for collecting bus fees, generating digital bus passes to promote a paperless and seamless process. The system incorporates RFID technology to automate student attendance during transit, ensuring accurate and tamper-proof records. It would be upcoming feature

With a user-friendly interface and robust backend, the Campus Shuttle Tracker System aims to address common challenges faced in campus transportation while fostering convenience, safety, and time management for students and staff alike.

Keywords: Smart Application for Students, Innovative Solution, Attendance Management, Seat Reservation, Message, Location, User-Friendly, Security, Time Management.

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CHAPTER 1

INTRODUCTION

Chapter 1

Introduction

Efficient transportation is a critical aspect of campus life, influencing both the academic and personal experiences of students. The Campus Shuttle Tracker System is a comprehensive solution designed to address the challenges associated with campus transportation. This system provides students with real-time tracking of college buses, enabling them to monitor their exact locations and estimated arrival times. Such functionality not only minimizes uncertainty but also enhances time management by allowing students to plan their schedules more effectively.

Beyond bus tracking, the system incorporates an attendance management feature, streamlining the process of recording attendance. By integrating transportation data with attendance systems, this app offers a seamless way for both students and administrators to manage records efficiently. The incorporation of RFID technology for automated attendance tracking ensures accountability and accuracy without manual intervention.

Additionally, the system includes a fuel monitoring module to track consumption patterns and generate digital refueling requests, ensuring that shuttles are maintained efficiently and reducing downtime. A secure online payment gateway facilitates easy fee collection and automates the generation of digital bus passes, providing a paperless and convenient experience for users.

Security and convenience are central to this system. By providing real-time updates and organized commuting options, the app contributes to a safer travel environment. In addition, the app's user-friendly interface ensures accessibility and ease of use for all students.

The Campus Shuttle Tracker System is designed to foster a balance of security, time-management, and convenience, making it an essential tool for modern campuses aiming to optimize their transportation services.

CHAPTER 2

Literature Survey

Chapter 2

Literature Survey

The system proposed by G. Kiran et al. offers an innovative solution for real-time bus tracking using an Android application integrated with GPS, Arduino, and GSM modules. Key features include location tracking through GPS, data transmission via GSM, and location display on Google Maps, with updates every 30 seconds. This setup allows users to monitor bus locations conveniently on their mobile devices, improving safety and reliability. The system's hardware unit is designed to send real-time data to a central server, where the information is stored and made accessible to users. However, the system also has several drawbacks. The dependence on GPS for location accuracy may lead to errors in areas with weak signals, and the use of GPRS for data transmission could result in delays due to its slower speeds. Furthermore, the reliance on hardware increases the system's complexity and potential failure points. Additionally, the 30-second refresh rate may not offer the desired real-time tracking experience for fast-moving buses, affecting user satisfaction. [1]

The RFID-Based Intelligent Bus Management and Monitoring System proposed by Komal Satish Agarwal et al. aims to enhance public transportation by addressing issues like underutilization of bus fleets and long waiting times at bus stops. Key features include real-time tracking using RFID technology, optimizing bus schedules, and improving service efficiency. While it offers benefits such as better resource utilization and reduced waiting times, potential drawbacks include the reliance on RFID infrastructure, which may require significant investment, and limited coverage if RFID tags are not widespread. [2].

The Intelligent Bus Monitoring and Management System proposed by M. A. Hannan offers real-time monitoring and valuable data to authorities for effective bus system management. Key features include tracking bus locations, providing status updates, and optimizing routes. The system enhances decision-making and improves operational efficiency. However, potential drawbacks include the need for a reliable communication infrastructure, which may require significant investment, and the challenge of maintaining real-time accuracy in areas with poor connectivity or GPS signal issues. [3].

The GPS and RFID-based Intelligent Bus Tracking and Management System proposed by Anuradha Vishwakarma et al. introduces AISFBRM, an autonomous, flexible, affordable, and accurate bus route mapping service. Its advantages include real-time tracking and

customization. However, it may face challenges in infrastructure implementation and reliability in areas with poor GPS or RFID coverage. [4].

The Intelligent Bus Stand Monitoring and Control System by Shital M. Dharrao et al. combines GSM, GPS, and IR sensors to provide real-time information to both bus stand management and passengers. It offers advantages such as improved efficiency, cost-effectiveness, and commercial viability. The system can optimize bus stand operations and passenger experience. However, its reliance on sensor accuracy, network connectivity, and the proper functioning of communication infrastructure may pose challenges in areas with weak signals, technical malfunctions, or maintenance issues. [5].

The proposed system uses GPS tracking and ReactJS to display student attendance, estimated arrival times, and live video for safety, with updates on routes and places stored in a database. Accessible via web browsers or Android apps, it benefits travel organizations by efficiently tracking vehicle locations. The system includes three modules: the Server module for monitoring and recording bus locations, the Bus Unit module for attendance tracking and data transmission via RFID and GPS, and the End User Application module for interfaces. However, the system may face challenges in maintaining data accuracy, handling connectivity issues, and requiring substantial infrastructure for proper functioning. [6]

The proposed school bus tracking system uses GPS technology to monitor the bus's real-time location, ensuring children's safety during their commute. Developed with Java and Firebase, the system offers features like automatic notifications to parents when their child reaches or passes a stop, enhancing security and peace of mind. Advantages include improved communication, reduced anxiety for parents, and better response in case of emergencies. However, drawbacks include reliance on mobile network coverage and GPS accuracy, which could be affected by technical issues or poor signal areas. Additionally, privacy concerns may arise from tracking children's movements. [7]

CHAPTER 3

System Specification

Chapter 3

System Specification

Software Requirements:

- ➢ Operating system : Windows 10 and above
- ➢ Programming Language : Kotlin / Flutter
- ➢ Database : SQL
- ➢ Tool : Android Studio 2022.3.1
- ➢ Cloud Storage: Google Cloud / Hostinger

Hardware Requirements:

- ➢ Location Tracker Tag
- ➢ Power Supply : battery
- ➢ Ribbon Wires
- ➢ 5 V Adapter
- ➢ Arduino Board

CHAPTER 4

Block Diagram

Chapter 4

Block Diagram

Block Diagram:

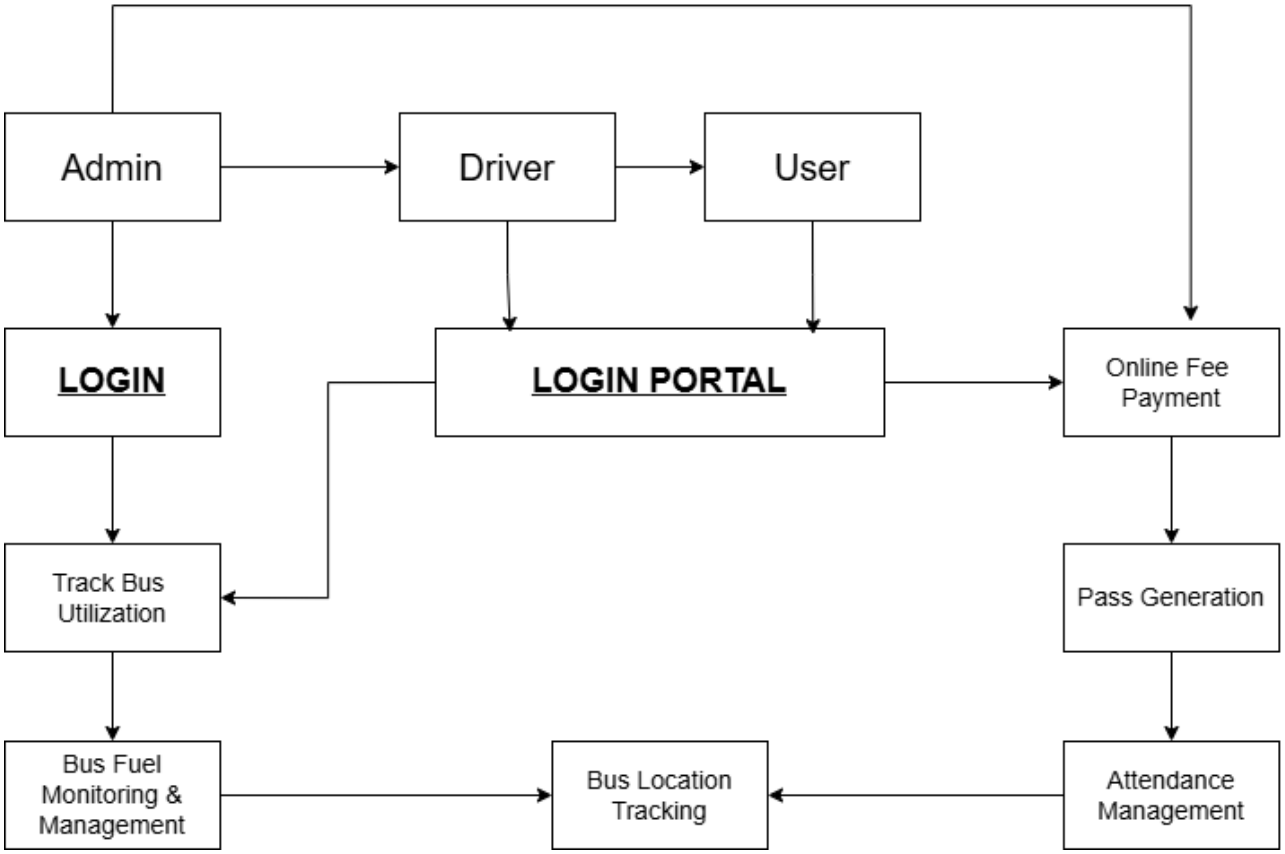

Figure 4.1: Block diagram

CHAPTER 5

System Design

Chapter 5

System Design

DFD:

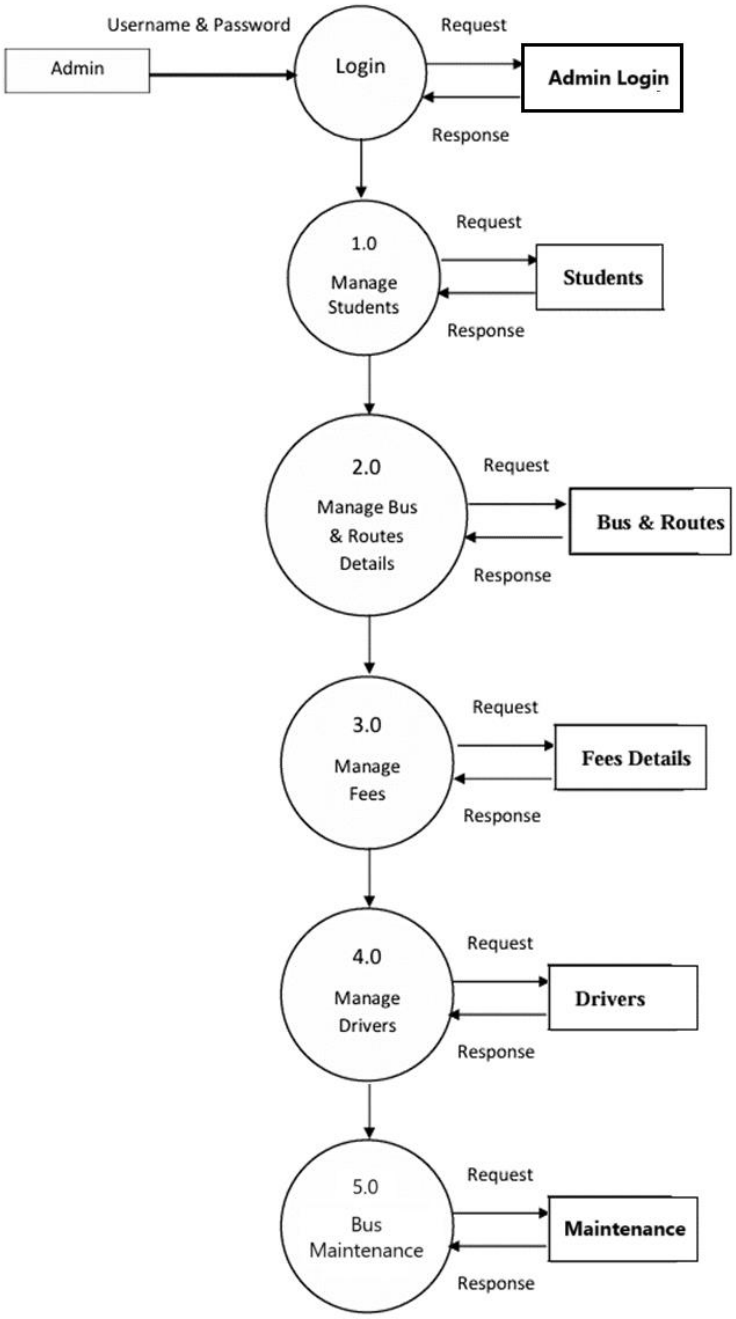

Figure 5.1: Level 0 Data flow diagram

Flow Diagram:

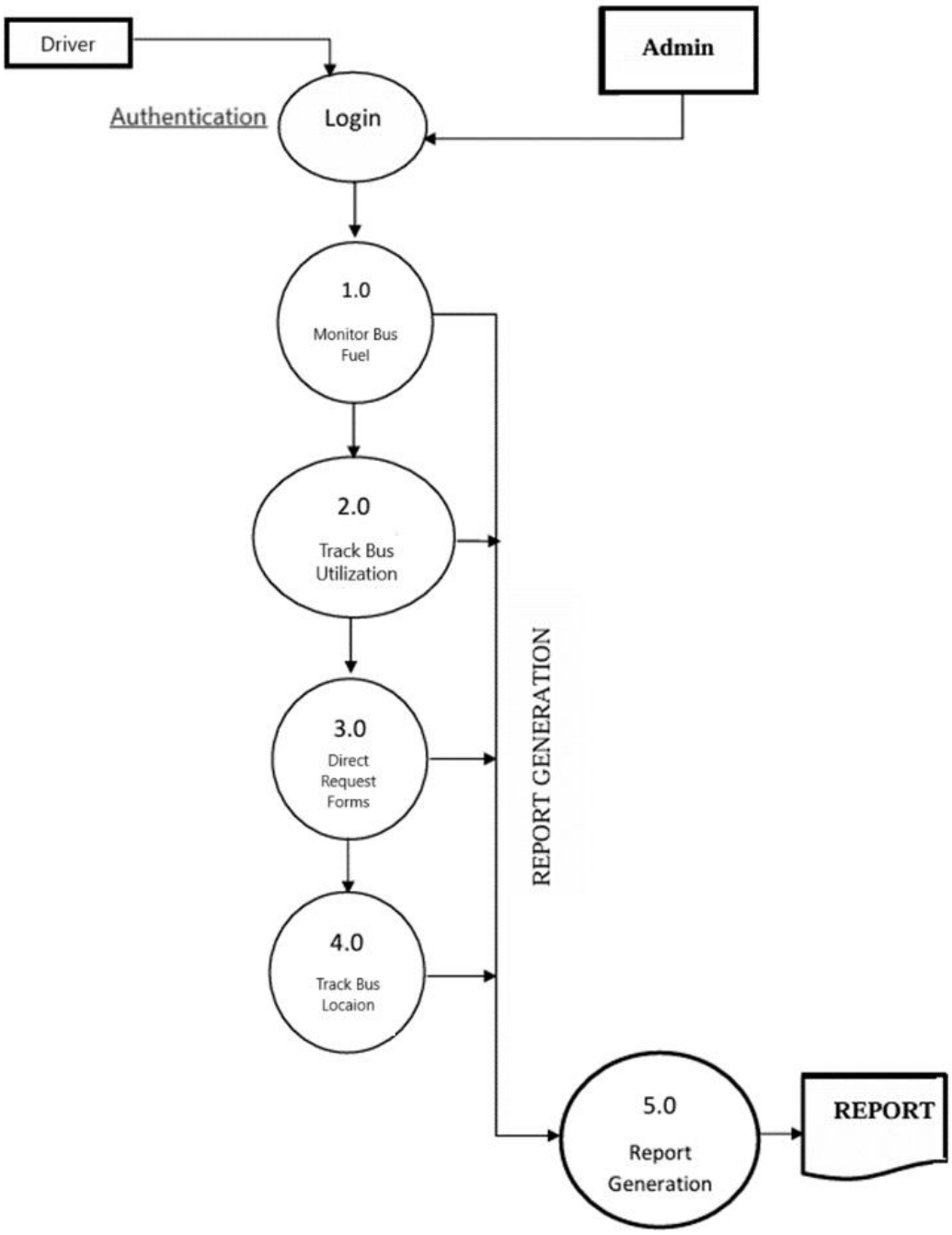

Figure 5.2: Level 1 Data flow diagram - Driver

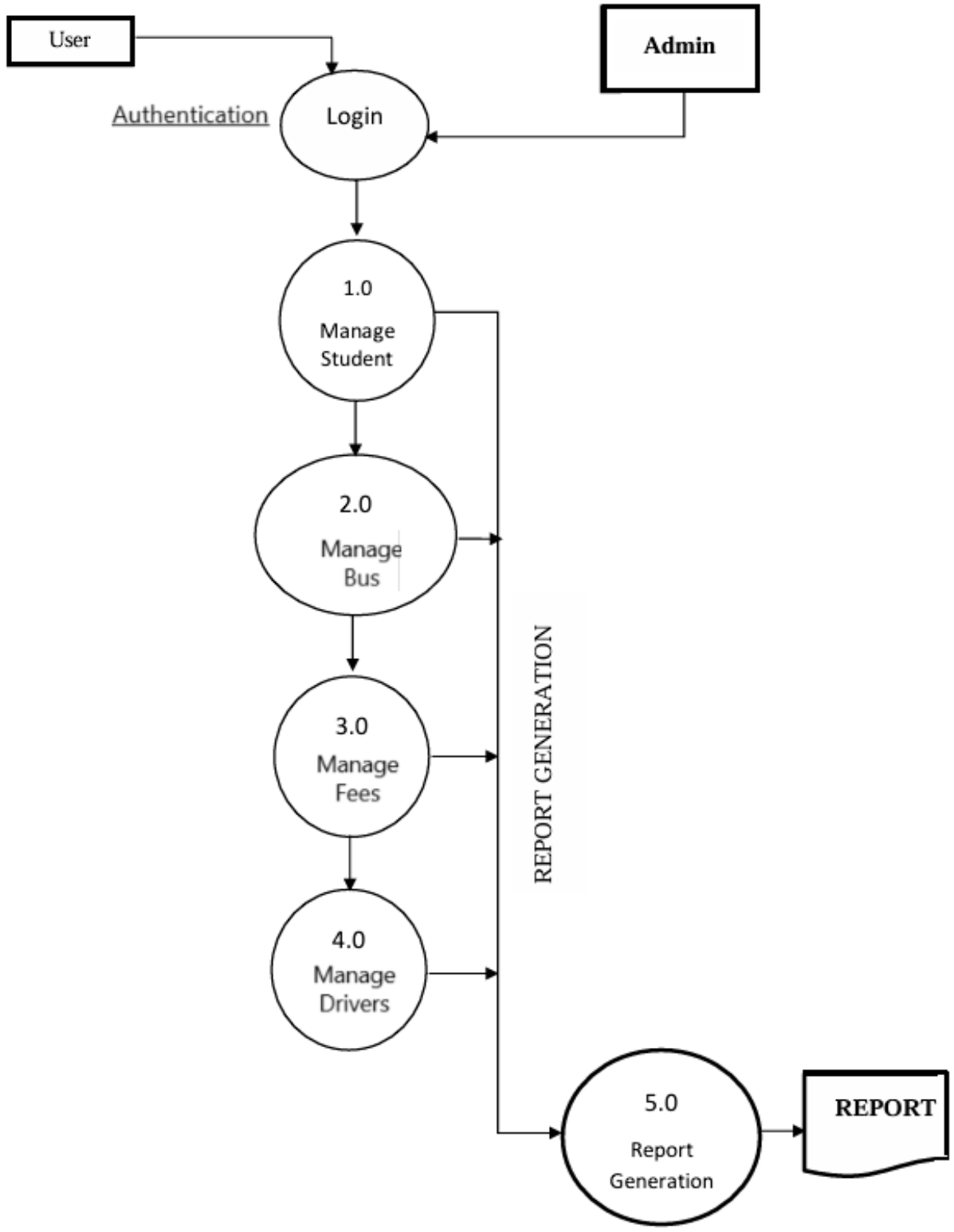

Figure 5.3: Level 1 Data flow diagram - User

UML diagram:

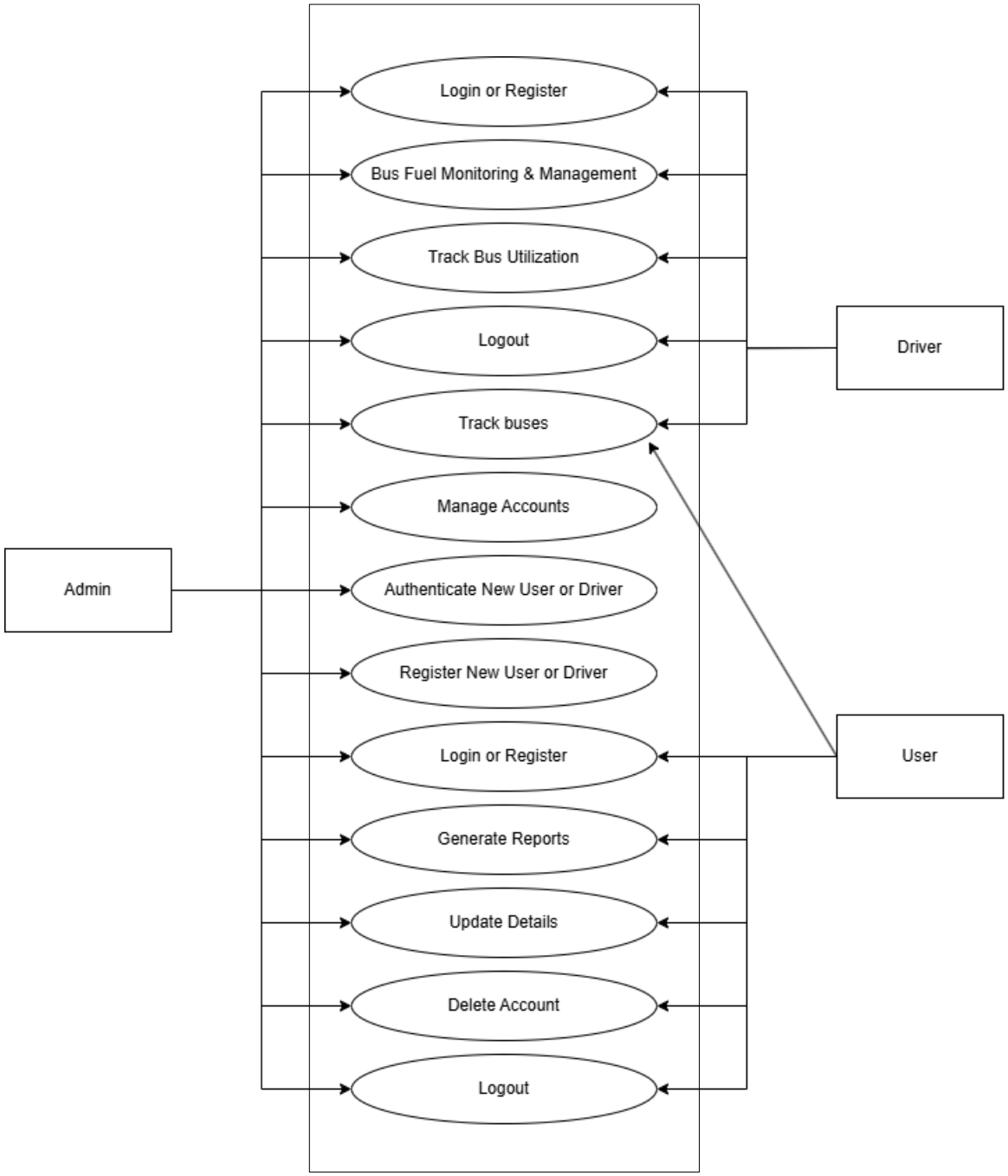

Figure 5.4: UML diagram

CHAPTER 6

Software Development

Chapter 6

Software Development

Problem statement:

The Campus Shuttle Tracker System is a practical solution for student safety and offering a range of features like bus location tracking and preferred seat reservation.

Managing campus transportation efficiently poses challenges such as a lack of real-time bus tracking, cumbersome attendance management processes, lack of digital infrastructure to collect fees and provide e-pass. The absence of a unified solution to address these problems affects the overall commuting experience and campus productivity.

Proposed work**:**

The Campus Shuttle Tracker System is an app that allows users to quickly track the college bus. The App is a revolutionary that utilizes cutting-edge technology to mark users' attendance. The users can pay fees online and generate online pass. The app also monitors fuel efficiency and collect the data of daily running of bus. The Campus Shuttle Tracker System is designed to be user-friendly and easy to use. The app can be useful for girls / ladies who are traveling alone or from isolated areas, as it provides an added layer of protection and security.

Future Scope:

1. Expansion to other campus: The Campus Shuttle Tracker System app can be expanded by selling it to other colleges.
2. Data analytics and user feedback: Analyzing user data and feedback can help improve the app's performance, user experience, and overall effectiveness.

CHAPTER 7

Troubleshooting / Debugging

Chapter 7

Troubleshooting / Debugging

Registration Failure:

Issue: The user is not registered properly.

Debugging Steps:
Ask for the admin to register the user from admin portal.
Ensure that user is not registered twice
Now login on the portal with the credentials

Location Inaccuracy:

Issue: Live location sensor may have not started.

Debugging Steps:

Confirm that the power supply is given to the sensor

Check for the internet connectivity

Test in various location to ensure accuracy.

CHAPTER 8

Conclusion

Chapter 9

Conclusion

We provide this application for students and faculty by which they can use this application to track the college bus by which the are travelling daily. This application provides a friendly interface to track the college bus. This application can be used from any device which is connected to Internet. The application provides various tools like attendance management. The user just needs to log in through their credentials and use the app efficiently. It will help to revolutionize the management and operation of campus transportation systems, providing a seamless, efficient, and technologically advanced solution for both administrators and commuters.

CHAPTER 9

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