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# SmartCab: An AI-Enabled Web-Based Employee Cab Booking Using ASP.NET Core and React

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**Abstract:** *Corporate organizations face challenges in managing employee transportation due to increasing workforce size and complex schedules. Traditional cab booking methods based on manual coordination are inefficient, error-prone, and lack real-time visibility. This paper presents SmartCab, a web-based employee cab booking system developed using ASP.NET Core Web API, React, and Microsoft SQL Server.*

*The system provides a real-time booking interface, driver allocation, schedule management, and email notifications, along with an admin approval workflow. Additionally, an AI-powered chat support module is integrated to assist users with booking queries, slot availability, and system guidance in real time.*

*Results show improved booking efficiency, reduced manual effort, enhanced user satisfaction, and better user support, making SmartCab a scalable and intelligent solution for corporate transportation management.*

**Keywords:** Cab Booking System, Ride Management, AI-powered chat support, ASP.NET Core, React, SQL Server, Entity Framework Core, Web Application

## I. INTRODUCTION

In modern organizations, managing employee transportation is challenging due to increasing workforce size and complex scheduling. Traditional cab booking methods rely on manual processes, leading to scheduling conflicts, lack of transparency, and inefficient approvals, which reduce productivity and increase workload.

This paper presents Cab Booking Services, a web-based system that simplifies the booking and approval process. Employees can book cab slots, select pickup times, and manage travel details, while an admin approval workflow ensures proper coordination.

The system provides real-time management, automated notifications, and improved data accuracy. It enhances operational efficiency, reduces errors, and improves user satisfaction, making it a scalable and effective transportation management solution.

SmartCab: An Intelligent Web-Based was developed to address these specific gaps. The project was completed during the 2025–26 academic year at Sant Gajanan Maharaj College of Engineering (SGMCOE), Mahagaon, under the guidance of Asst. Prof. Mayuri S. Rane and with industry support from Codexlabz Technologies Four MCA final-year students each took responsibility.

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## II. RELATED WORK

Previous research in transportation systems highlights the importance of automation and real-time tracking in improving service efficiency. Many existing systems provide basic booking functionality but lack proper backend architecture and scalability.

Modern ride-sharing applications demonstrate the benefits of digital transformation, including reduced waiting times and improved customer satisfaction. However, simpler systems still face challenges such as inefficient database management, lack of automation, and limited real-time features.

SmartCab addresses these limitations by integrating a robust backend using ASP.NET Core Web API and a responsive frontend using React, ensuring better performance and scalability.

## III. PROBLEM STATEMENT

In modern organizations, managing employee transportation has become a challenging task due to the growing number of employees and complex work schedules. Many companies still rely on manual or semi-automated systems, which are inefficient and prone to errors. Handling multiple shifts, route planning, and vehicle allocation becomes difficult without proper automation. Traffic conditions and last-minute changes further increase the complexity of transportation management.

Inefficient planning often leads to delays, higher fuel costs, and poor vehicle utilization. Additionally, ensuring employee safety, especially during night shifts, is a major concern for organizations. Lack of real-time tracking and communication makes it difficult to monitor vehicles and respond to emergencies.

Moreover, coordination between drivers, employees, and administrators becomes complicated without a centralized system. This results in mismanagement and reduced employee satisfaction. Therefore, there is a need for an efficient, automated transportation management system to improve planning, safety, and overall operational efficiency.

## IV. PROPOSED SYSTEM OVERVIEW

The SmartCab platform provides a structured workflow for managing cab services:

Step 1: User Registration and Authentication
Step 2: Cab Search and Availability Check
Step 3: Ride Booking with Pickup and Drop Details
Step 4: Automated Fare Calculation
Step 5: Driver Allocation
Step 6: Real-Time Ride Tracking
Step 7: Email Notification and Trip Completion

The system ensures smooth coordination between all stakeholders and eliminates manual intervention.

## V. SYSTEM ARCHITECTURE

The SmartCab system is structured into three layers:

| Tier | Layer | Technology |
|---|---|---|
| 1 | Presentation | React, HTML5, CSS3, JavaScript |
| 2 | Application | ASP.NET Core Web API |
| 3 | Database | Microsoft SQL Server, Entity Framework Core |

This architecture ensures efficient communication between frontend and backend while maintaining scalability and security.

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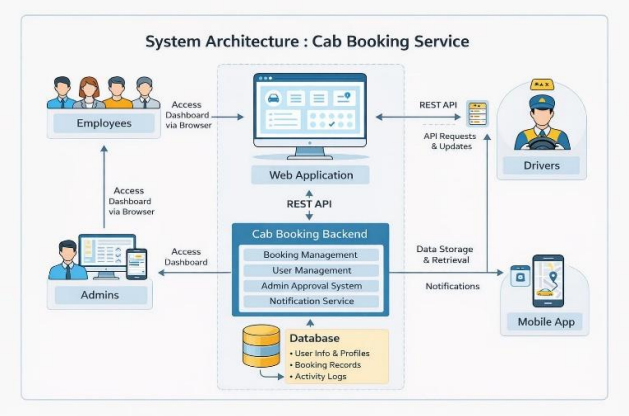


Fig No: 1.1 System Architecture

## VI. MODULES DESCRIPTION

**1.Employee Registration & Authenticaon**

This module manages the registration and login process for employees and administrators. Employees can create accounts by providing their personal and contact details, which are stored securely in the system. The system verifies user credentials during login and provides access based on user roles. Employees can access booking features, while administrators can manage booking approvals and system settings. This module ensures secure user authentication and maintains employee information in a centralized database.

**2.Cab Booking and Time Slot Management**

This module allows employees to book cab services for their weekly office commute. Employees can select available time slots from Monday to Friday based on predefined schedules. The system displays available slots and nodal points, allowing users to choose convenient pickup locations and timings. Once selected, the booking request is recorded and stored in the system for further processing.

**3.Booking Modification and Profile Management**

This module enables employees to update their personal details and modify existing cab bookings whenever required. Users can change their time slots, pickup points, or cancel bookings before the approval stage. The system ensures that updated information is recorded correctly and reflected in the booking records. This module provides flexibility for employees to manage their transportation preferences efficiently.

**4. Admin Approval and Booking Management**

This module allows administrators to review and manage cab booking requests submitted by employees. The administrator verifies booking details, approves or rejects requests, and ensures that cab allocations follow company transportation policies. The system also helps administrators monitor employee bookings, manage nodal points, and maintain an organized transportation schedule.

**5. Notification and Booking Status Management**

This module keeps employees informed about important updates related to their accounts and cab bookings. The system sends notifications regarding registration confirmation, booking approvals, rejections, or modifications. Employees can also view the current status of their bookings through the system. This module ensures transparency and effective communication between employees and administrators.

**6. AI Chat Support System**

This module introduces an AI-powered chatbot integrated into the SmartCab platform to assist employees and administrators in real time. The chatbot provides instant responses to user queries related to cab booking, time slot availability, and system navigation.

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The AI chat support reduces dependency on manual help or admin intervention by offering 24/7 assistance.

## VII. IMPLEMENTATION

### A. Architecture and Stack

The SmartCab system follows a modern full-stack architecture:
Frontend: React for dynamic UI
Backend: ASP.NET Core Web API
Database: SQL Server with Entity Framework Core
The system is developed using Visual Studio 2022 and tested using Swagger and Postman.

### B. Hardware and Software Requirements

| Category | Requirement Type | Details |
|---|---|---|
| Hardware | Processor | Intel i3 or higher |
| Hardware | RAM | 8 GB minimum (16 GB recommended) |
| Hardware | Storage | 256 GB SSD or higher |
| Hardware | Internet | Required |
| Software | Operating System | Windows / Linux / macOS |
| Software | Backend | ASP.NET Core Web API |
| Software | Language | C# |
| Software | Frontend | React, HTML, CSS, JavaScript |
| Software | Database | SQL Server |
| Software | Tools | Visual Studio, VS Code, SSMS |

Table II. Hardware and Software Specifications

## VIII. SYSTEM ANALYSIS

**REAL TIME CAB BOOKING EFFICINCY**

The system significantly improves booking efficiency by allowing users to make reservations instantly through an online platform. Unlike traditional manual methods, it reduces waiting time and minimizes delays. Real-time processing ensures quick confirmation of bookings, improving overall user experience and operational speed.

**Accurate Fare Calculation :**

The system provides automated fare calculation based on distance, time, and predefined pricing rules. This eliminates the chances of human errors and ensures transparency in pricing. Users can view the exact fare before confirming their booking, which increases trust and reliability.

**Secure System Access:**

The system uses role-based authentication to ensure secure access for different types of users such as administrators, drivers, and customers. Each user has controlled permissions, preventing unauthorized access to sensitive data. This enhances data privacy and overall system security.

**Scalability:**

The system is designed with a modular architecture, making it easy to scale as the organization grows. New features, users, or services can be added without affecting existing functionality. This flexibility ensures long-term usability and adaptability to future requirements.

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**AI-Based User Assistance:**

The integration of AI chat support enhances user interaction by providing instant responses to queries. It helps users understand booking processes, check availability, and resolve issues without human intervention. This improves system usability and reduces support delays.

## IX. RESULTS AND DISCUSSION

| Module | Metric | Result |
|---|---|---|
| Booking System | Booking Time | Significantly reduced compared to manual methods |
| Fare Module | Accuracy | High accuracy with minimal errors |
| Tracking System | Response Time | Real-time tracking with quick updates |
| Notification System | Delivery | Instant email alerts and updates |
| Vehicle Management | Utilization | Improved vehicle usage and reduced idle time |
| User Interface | Usability | Easy to use and user-friendly interface |
| Security Module | Data Protection | Secure access with role-based authentication |
| System Performance | Speed | Fast processing and minimal delays |
| AI Chat Support | Response Time | Instant query resolution |

Table III. Performance and Evaluation Summary

The results clearly indicate that the system has significantly improved overall efficiency compared to traditional manual methods. The booking process is faster and more reliable, reducing waiting time for users. Automated fare calculation ensures transparency and eliminates errors, enhancing user trust.

Real-time tracking improves monitoring and allows quick response to any issues during transportation. The notification system keeps users informed at every step, improving communication. Additionally, better vehicle utilization helps in reducing operational costs.

The system's user-friendly interface ensures ease of use for all users, while strong security measures protect sensitive data. Overall, the system enhances performance, reliability, and user satisfaction, making it a practical and scalable solution for modern transportation management.

## X. PROJECT TIMELINE

| Month | Activity |
|---|---|
| Dec 2025 | Problem scoping, literature survey, topic finalization |
| Jan 2026 | Requirements gathering, system analysis, architecture design |
| Feb 2026 | Frontend and backend development across all modules |
| Mar 2026 | Integration, end-to-end testing, debugging, model training |
| Apr 2026 | Documentation, presentation preparation, formal submission |

Table vI. Project Timeline — Academic Year 2025–26

## XI. CONCLUSION

SmartCab demonstrates that a well-designed web-based cab booking system can significantly improve corporate transportation services. By integrating booking, tracking, notification features, and AI-based chat support into a single platform, the system reduces manual effort and enhances user experience.

The addition of AI chat support makes the system more interactive, user-friendly, and efficient by providing real-time assistance. The system is scalable, intelligent, and suitable for real-world deployment in modern organizations.

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