ShuttleInSync – Book. Board. Boom.

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Project GitHub Link: ShuttleInSync
Project Demo Link: Demo Video

Introduction

In the ever-evolving ecosystem of educational institutions and corporate campuses, managing transportation logistics efficiently is critical. Shuttle services are widely used, yet many systems still rely on outdated, manual, or disjointed processes. The need for a streamlined, automated shuttle booking system has never been more urgent. ShuttleInSync was conceptualized and developed as a comprehensive solution to bridge this gap, offering a fully digital platform for shuttle management.

Problem Statement

Many institutions face recurring challenges in managing shuttle services:

- Manual booking leads to overbooking and scheduling conflicts
- No centralized system to track ride history
- Wallet-based fare collection lacks transparency
- Admins lack real-time visibility and control

These inefficiencies affect not only operational effectiveness but also user experience, leading to dissatisfaction and underutilization of resources.

Purpose of the Project

The purpose of this project is to design and implement an intelligent shuttle management system that:

- Enables users to book and manage rides in real time
- Provides admins with dashboards and analytics
- Incorporates a wallet-based digital payment system
- Is scalable, secure, and mobile responsive

Significance of the Study

The digital transformation of logistical operations enhances institutional efficiency, transparency, and accountability. ShuttleInSync offers the following benefits:

- Reduces dependency on manual oversight
- Enhances the commuter experience
- Enables data-driven decision-making for administrators

- Contributes to sustainability by optimizing shuttle utilization

This system can be adapted to any campus or organization with a fixed-route shuttle network.

Tech Stack Overview

Layer	Technology
Frontend	React.js, Tailwind CSS
Backend	Node.js, Express.js
Database	MongoDB Atlas
Auth System	JWT-based Authentication
Deployment	Vercel (Frontend), Render (Backend)

System Architecture

- React frontend interacts with the backend via Axios
- Express.js backend manages business logic and routes
- MongoDB persists data: users, wallets, shuttles, bookings
- JWT secures sessions and authorizes API access

User Roles & Functionality

Student

- Register/Login securely
- Check and manage wallet balance

- Browse and book available shuttles
- View detailed trip history

Admin

- Access admin panel post-login
- Create and update shuttles and routes
- View all bookings and user activity
- Recharge student wallets securely
- Access real-time stats (bookings, revenue)

Results & Observations

- Booking time reduced from several minutes (manual logs) to seconds
- Wallet deductions improved accountability and user trust
- Admins reported improved visibility and reduced disputes
- UI/UX design contributed to higher user satisfaction and engagement

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Security Measures

- Token-based route protection (JWT)
- bcrypt hashing for password protection
- Role-based access control at route and UI level
- CORS policy and environment-based config separation

Deployment Strategy

Backend (Render)

- Deployed as a web service with MONGO_URI and JWT_SECRET set in environment
- Secure endpoints with appropriate role-based access

Frontend (Vercel)

- Uses REACT_APP_API_URL to connect to backend
- Auto CI/CD deployment from GitHub

User Interface

Interface	Functionality
Login/Signup	Authenticates and assigns user role
Dashboard	Shows wallet, shuttles, and recent bookings
Booking Page	Book rides, see route info, wallet fare required
Admin Panel	Create routes, view student activity, recharge
Trip History	Detailed log of past bookings

Limitations & Future Scope

Current Limitations:

- No support for live tracking or QR-based check-ins
- No user notifications for trip confirmations or cancellations

Future Enhancements:

- Integrate Google Maps API for live shuttle tracking
- Add SMS/Email alerts for ride confirmation
- Enable QR code scan-to-board authentication
- Extend for multi-campus and multi-organization use

Demonstration

- Demo video: https://drive.google.com/file/d/1chkLfB_2XthdswzYaCj7dMPgfgF4tZnd/view?usp=sharing
- GitHub repo: https://github.com/LasyaPriya27/ShuttleInSync.git

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Sample Test Credentials

Student:
Email: student@example.com
Password: student123

Admin:
Email: admin@example.com
Password: admin123

Conclusion

ShuttleInSync is a practical and scalable approach to solving shuttle logistics issues in institutional setups. It brings synchronization between users and shuttle resources, reduces manual friction, and enhances transparency for admins. The project's modular and secure design ensures it can be extended to larger ecosystems and more complex transport networks in the future.
