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LIVE TICKET EXCHANGING SYSTEM

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ABSTRACT:

This project proposes Live Bus eTickets, an innovative and tech-driven solution to the recurring issue of unused and wasted bus and train tickets due to last-minute cancellations. By offering a real-time ticket resale and swapping platform, the system enables commuters to recover value from tickets they can no longer use while allowing other travelers to purchase those tickets at fair prices. This dynamic digital ecosystem not only improves seat utilization but also aids transit companies in reducing operational losses and increasing ridership. The platform is developed using the MERN stack (MongoDB, Express.js, React.js, Node.js) for building a robust frontend, while the backend is handled by FastAPI with Python, ensuring performance, scalability, and maintainability. It also incorporates automated price caps to prevent exploitation and ensure equitable access for all users.

CHAPTER 1 INTRODUCTION

In the world of public transportation, empty seats caused by cancellations represent significant lost revenue and inefficiencies. With traditional ticketing systems, once a ticket is canceled or unused, that seat is rarely reassigned or resold in time, leading to suboptimal capacity utilization. In a digital-first world where convenience and flexibility are paramount, this is no longer acceptable.

The Live Bus eTickets system bridges this gap by providing an easy-to-use, centralized platform where users can resell or swap their unused tickets in real time. This not only benefits the original ticket holders but also offers last-minute options to those needing a ride. The system promotes resource optimization, ensures greater commuter flexibility, and creates new data points for transport authorities to analyze trends and improve planning. Moreover, this system integrates seamlessly with existing transit company databases, ensuring a smooth transition and minimal disruption to current workflows.

CHAPTER 2 LITERATURE SURVEY

Ticket Cancellations and Revenue Loss

With a large portion of travelers booking tickets in advance, cancellations due to unforeseen changes are inevitable. These often result in vacant seats, especially if there's no real-time mechanism to fill them quickly. This problem, while
widespread, is poorly addressed by current systems that often do not allow resale or transfer of tickets. Studies and industry estimates indicate that millions of dollars are lost annually by transit companies due to such inefficiencies. A well-implemented resale platform can recoup some of these losses.

Resale and Exchange Marketplaces

Marketplaces for services and digital goods have transformed the way users interact, buy, and sell. Platforms like Airbnb, OLX, and Swiggy Genie have revolutionized peer- to-peer and second-hand exchange systems. This project draws from those models, applying them in a transit context. A ticket, which traditionally has limited usability and strict rules, can become a flexible and exchangeable digital asset in such a system.

Transit Integration

The success of any smart transit system depends on its compatibility with existing infrastructure. With the use of RESTful APIs and secure authentication, the Live Bus eTickets platform ensures real-time integration with booking databases of transit providers. It allows for live availability checks, real-time ticket updates, and seamless coordination without disrupting ongoing operations.

Legal and Regulatory Considerations

Ensuring legal compliance is critical in a system involving financial transactions and public services. The platform enforces clear user policies, integrates identity verification using KYC standards, and abides by local transport regulations. Automated pricing ensures no ticket is sold above face value or in violation of terms set by transport companies.

CHAPTER 3 SYSTEM MODULES

System Architecture

The system architecture is designed to handle concurrent users, support high availability, and process real-time requests. The frontend interface built with React.js offers a modern, fast, and responsive user experience. Node.js and Express.js on the server side coordinate requests between the user interface and the database. FastAPI, implemented with Python, handles computationally intensive backend operations and business logic, such as matching swaps or calculating real-time price caps. MongoDB stores user data, ticket listings, and transaction history efficiently in a scalable format.

Resell Module

This module enables users to upload the details of tickets they no longer intend to use. The form captures trip details, seat number, and fare. Once listed, the system publishes the ticket for visibility to potential buyers. When a buyer confirms purchase, payment is processed, and the ticket is reassigned. The module also supports refund calculation, usage history, and audit tracking.

Swap Module

The ticket swap feature is an intelligent tool that allows two users to exchange tickets, given certain conditions are met. The system evaluates multiple criteria such as destination, timing overlap, fare similarity, and availability to suggest possible matches. It then facilitates mutual agreement and automates the ticket switch in both accounts.

Price Cap Algorithm

A standout feature of the system is its price regulation mechanism. Through a pricing engine based on average demand, time to departure, and original ticket value, the platform sets minimum and maximum bounds for listing prices. This avoids price gouging during peak hours and encourages equitable access to travel.

Admin Dashboard

System administrators use this interface to manage platform operations. They can view ticket listings, monitor financial transactions, suspend suspicious accounts, and generate analytics reports on usage, frequency of swaps, and user satisfaction. The dashboard also enables manual override in rare conflict cases and logs all admin actions for transparency.

CHAPTER 4 TECHNOLOGIES USED

- Frontend: React.js, HTML5, CSS3, JavaScript ES6, Bootstrap
- Backend: Node.js, Express.js (REST APIs), FastAPI (Python)
- Database: MongoDB with Mongoose ODM
- Authentication: JWT (JSON Web Tokens), OAuth 2.0 (planned)
- Payment Gateway: Razorpay or Stripe (for secure transactions)
- Integration: RESTful APIs for real- time booking system sync, logging, and notifications

The chosen tech stack provides a balanced mix of performance, modular development, and industry-standard security protocols.

CHAPTER 5 USER BENEFITS

For Riders:

- Resell unused tickets and earn back a fair portion of their cost
- Discover last-minute travel opportunities with significant cost savings
- Easily swap tickets if travel plans change, avoiding cancellation penalties
- Use a mobile-first design that makes transactions seamless and fast

For Transit Companies:

- Boost revenue by reducing unoccupied seats and optimizing capacity
- Access real-time dashboards to understand rider behavior and trends
- Enhance customer loyalty by offering more flexible travel options
- Strengthen operational planning with data-driven insights from the platform

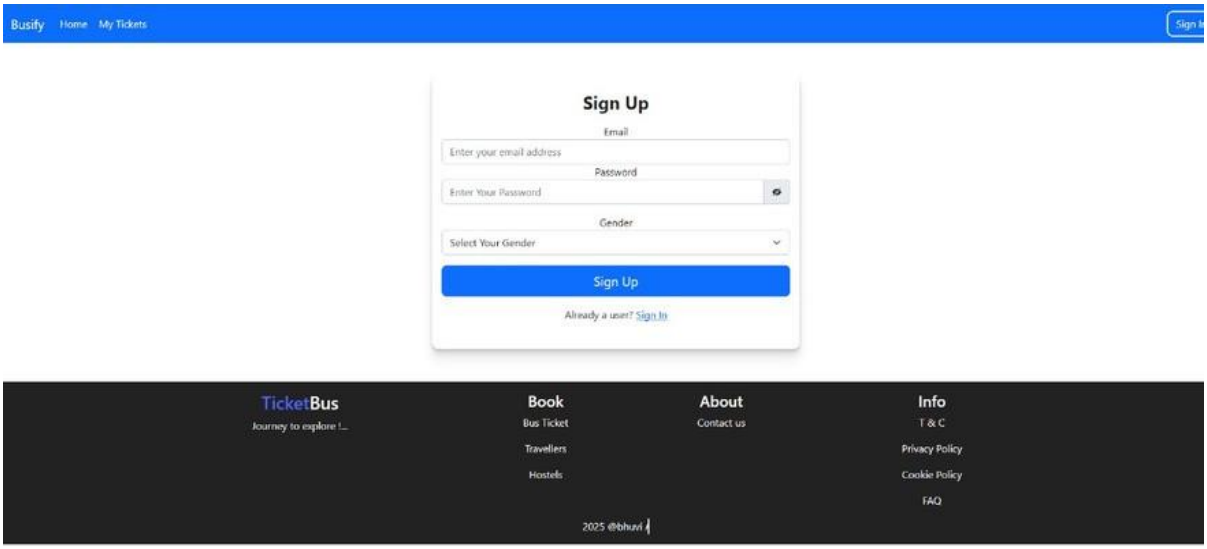
CHAPTER 6 SCREENSHOTS AND MODULE

FLOWS

Screenshots and wireframes (to be included):

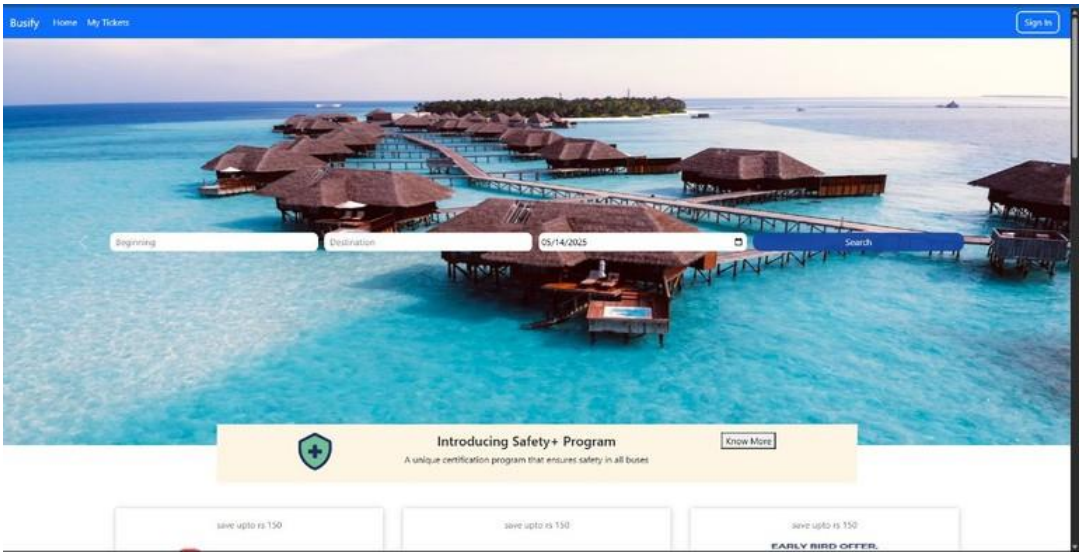
- Login Interface: Features secure email-based sign-in and OTP verification
- User Dashboard: Highlights listed tickets, sales activity, swap options, and balance
- Add Ticket Page: A dynamic form with validation for listing resellable tickets
- Swap Match Results: Displays a list of optimal swap pairings with accept/decline actions
- Transaction Record: A clean, filterable log of all user transactions including receipts

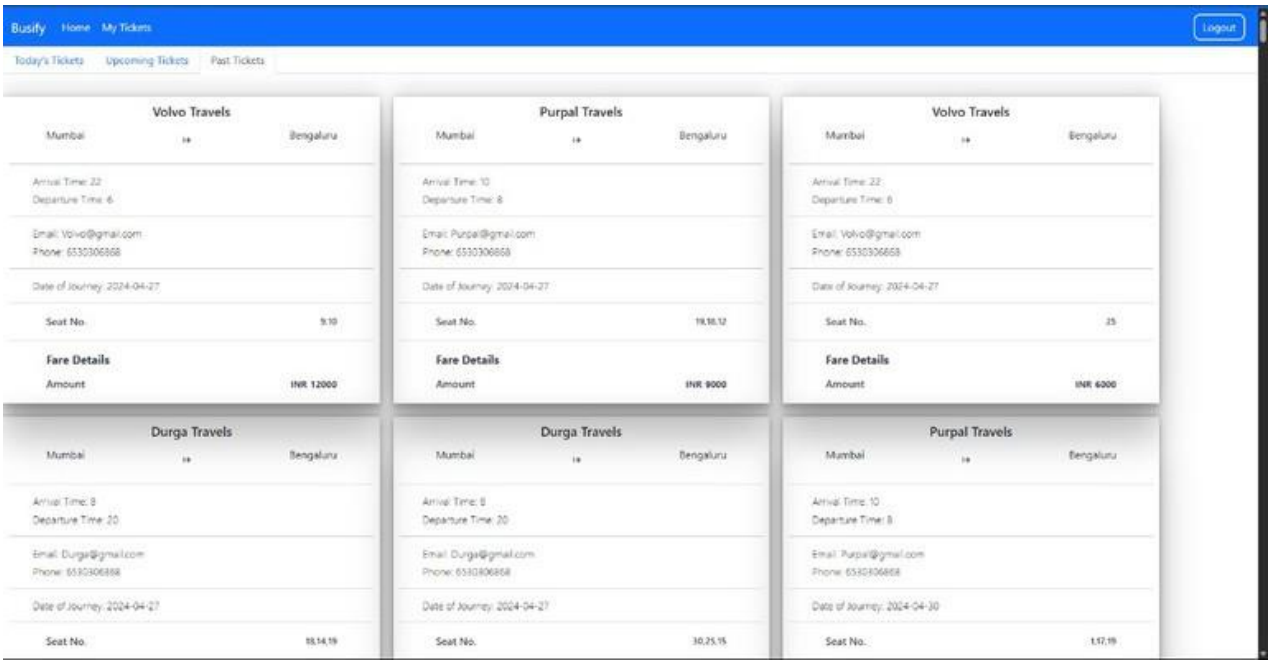
These components ensure that both first- time users and experienced commuters can navigate the platform with ease and confidence.



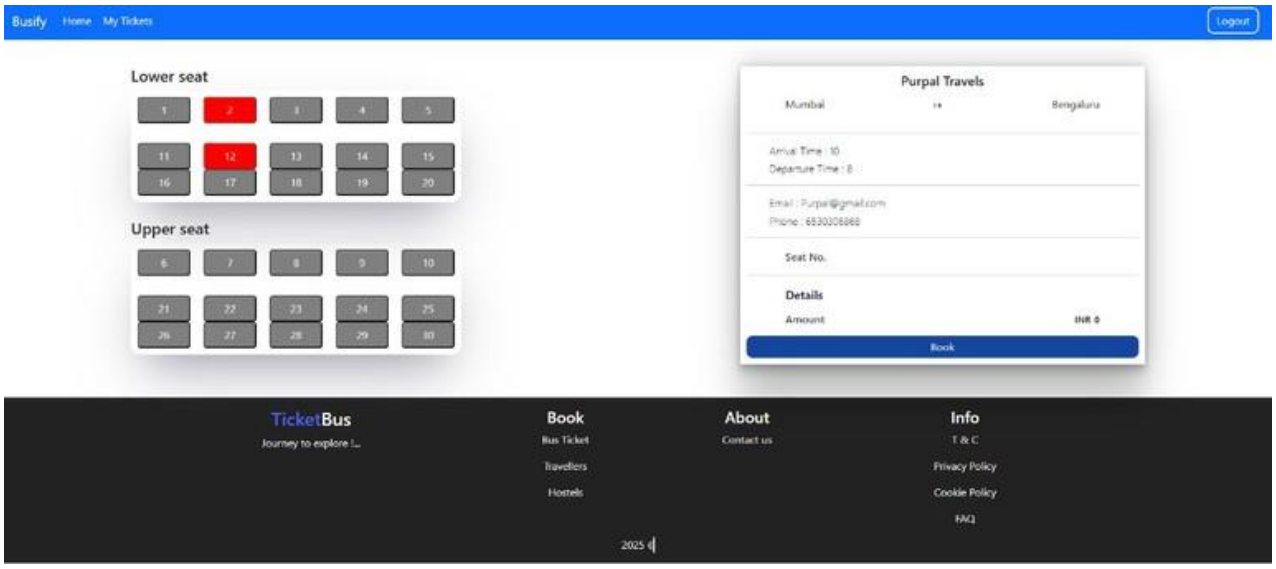
Login Page

Home Page

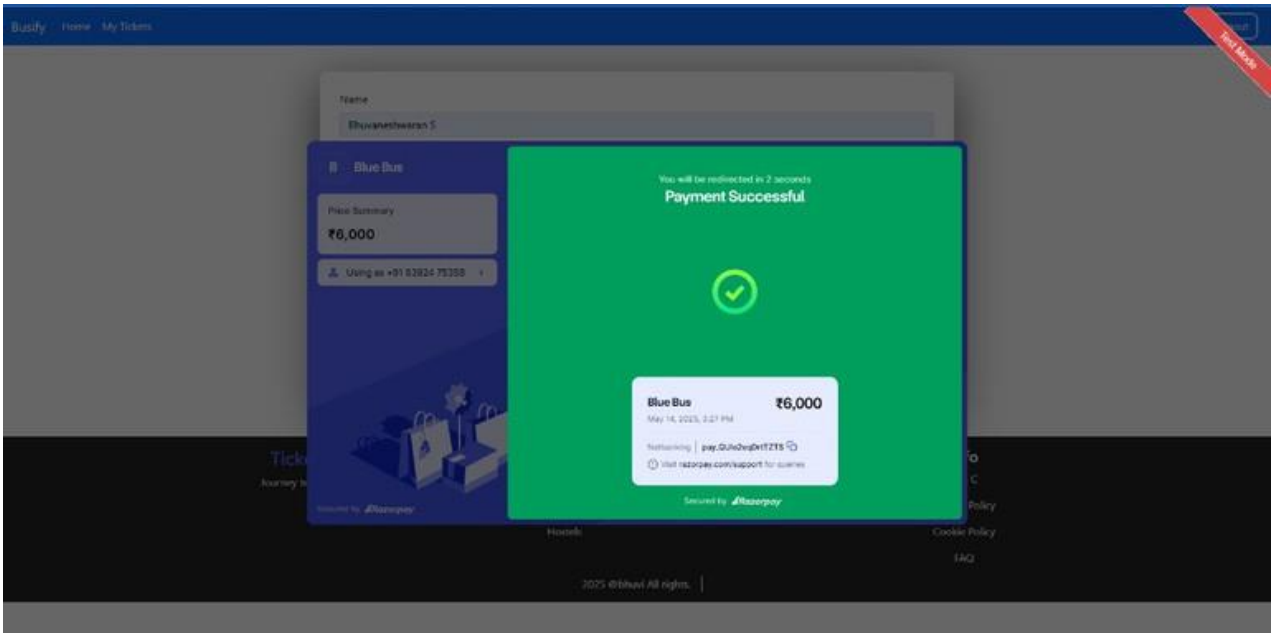




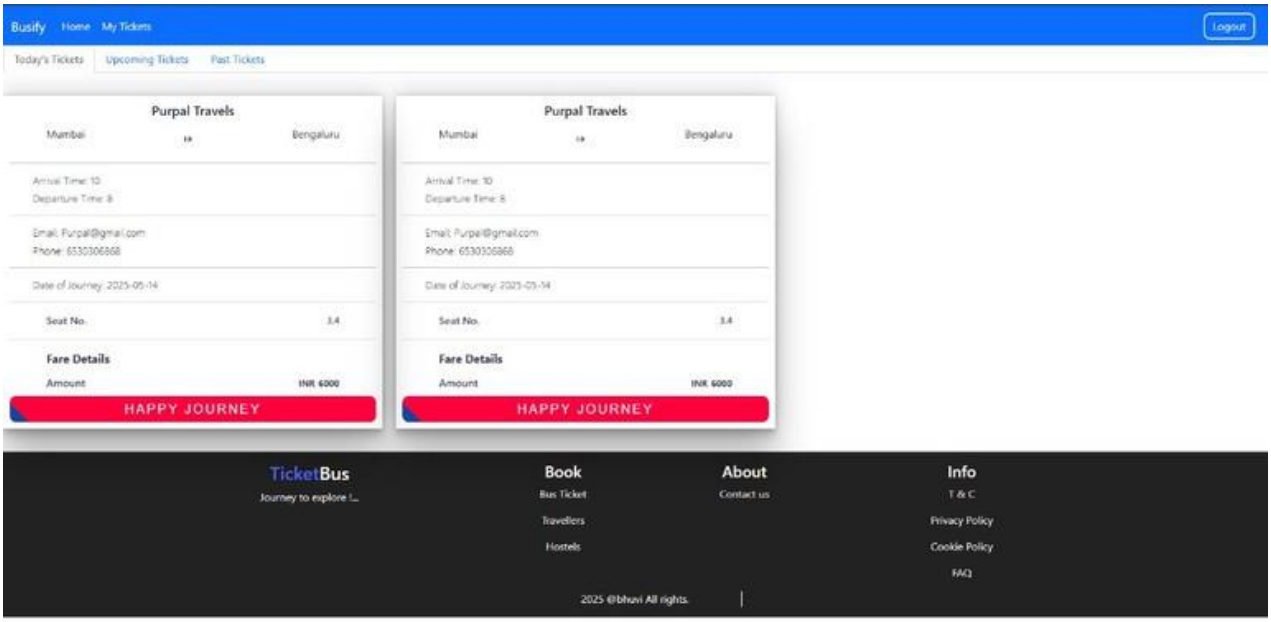
Result Page



Seat Selection Page



Payment Page



Trips Page

CHAPTER 7 FUTURE ENHANCEMENTS

As technology continues to evolve, so too will the capabilities and offerings of the Live Bus eTickets platform. The following future enhancements are designed to increase the platform's reach, security, and user satisfaction:

Blockchain-based Ledger:

By integrating blockchain, every ticket transaction can be recorded in an immutable, transparent ledger. This ensures traceability, builds user trust, and prevents tampering with historical data.

Machine Learning Engine:

An AI-driven recommendation system can enhance user experience by analyzing user preferences, travel history, and real- time demand. It will suggest the best ticket deals, anticipate potential ticket swap opportunities, and even detect fraudulent patterns before they affect users.

Offline Support with Progressive Web App (PWA):

This enhancement allows users in low- connectivity regions or in transit to still access essential features. PWA capabilities include offline ticket viewing, queueing transactions for later sync, and cached notifications.

Dynamic QR Code Boarding Passes:

After a successful purchase or swap, a unique QR code will be generated for each user, which can be scanned at boarding points. This reduces manual verification, enhances security, and speeds up the boarding process.

Voice-enabled Navigation and Multilingual Support:

For users who face language or accessibility barriers, voice command options and a multilingual interface (supporting regional languages) will significantly enhance usability and inclusivity.

Third-party App Integration:

Collaborating with apps like Google Maps, ticket aggregators, and weather services will provide users with a more contextual and informed travel experience. For example, users could get alerts if weather impacts routes or find nearby transportation options via maps.

Enhanced Admin Tools:

Future updates will include more robust administrative controls such as predictive analytics dashboards, user behavior heatmaps, automated alerts on suspicious activity, and advanced ticket tracking mechanisms.

Gamification Elements:

To boost user engagement, features like loyalty points, badges for frequent use, and referral rewards could be introduced. This could also encourage users to maintain platform ethics and provide feedback.

Environmental Impact Metrics:

The system may also include analytics showing how many seats were saved from going empty, contributing to reduced fuel wastage and a smaller carbon footprint. This aligns with sustainability goals and can be reported to authorities or sponsors.

These enhancements are aimed at making the platform not only technologically advanced but also socially impactful, inclusive, and ready to meet the demands of future smart transportation ecosystems.