AALIM MUHAMMED SALEGH COLLEGE OF ENGINEERING
Approved by All India Council for Technical Education - New Delhi, Affiliated to Anna University, Chennai
NAAC Accredited Institution
"Nizara Educational Campus", Muthapudupet, Avadi - IAF, Chennai - 600 055.
ANNA UNIVERSITY COUNSELLING CODE : 1101
NBA ACCREDITED COURSES (Mech Engg, ECE, CSE & IT)

Online Flight Ticket Booking and Management

Department of Computer Science and Engineering

Submitted By

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BONAFIDE CERTIFICATE

Certified that this project report on "**Online Flight Ticket Booking and Management**" is the Bonafide record of work done by Bharath S (110121104019), Aathi Siva Ganesh P (110121104001), Madheshwaran S (110121104034), Jayaprakash K (110121104031)

From the Department of Computer Science and Engineering by Anna University,Chennai

Internal Guide

Head of the Department

Internal Examiner

External Examiner

Abstract

The "Online Flight Ticket Booking and Management" project focuses on creating a robust and user-friendly web application for seamless flight booking and management. This system caters to both customers and administrators, providing an array of features such as flight search, booking, payment processing, and schedule management. Built using the MERN stack, the platform ensures security, scalability, and efficiency, addressing common challenges in online booking systems. This report details the system's architecture, functionalities, challenges faced, and future enhancements, emphasizing its potential to revolutionize the flight ticketing process. Additionally, the project aims to demonstrate the efficient use of modern web technologies to deliver a scalable and interactive application that meets real-world demands.

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1. Project Overview

The "Online Flight Ticket Booking and Management" system is a comprehensive web-based application designed to streamline the process of booking, managing, and organizing flight tickets. The platform serves as a bridge between customers and airline services, simplifying the complexities of flight ticketing. By providing an intuitive user interface and robust backend support, the system enables users to search for flights, make bookings, and manage their schedules efficiently. For administrators, the platform provides powerful tools to manage flight details, user accounts, and bookings with ease. This dual-module system is tailored to enhance user experience, optimize administrative workflows, and ensure secure transactions.

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2. Objectives

- **Enhance User Experience:** Develop an intuitive and user-friendly interface for seamless interaction.
- **Efficiency in Management:** Provide administrators with efficient tools for managing flight schedules, tickets, and user data.
- **Secure Transactions:** Ensure data security and transaction integrity through advanced encryption techniques.
- **Scalability:** Design a system capable of handling high user traffic and large volumes of data.
- **Real-Time Updates:** Incorporate real-time functionalities such as seat availability and booking status updates.
- **Accessibility:** Ensure cross-platform compatibility for a wide range of

devices.

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3. Technologies Used

Frontend: React.js, HTML, CSS, JavaScript

- React.js for building dynamic and responsive user interfaces.
- CSS and JavaScript for styling and interactivity.

Backend: Node.js, Express.js

- Node.js for server-side logic.
- Express.js for building RESTful APIs.

Database: MongoDB

- MongoDB for managing structured and unstructured data efficiently.

Other Tools:

- Git for version control.
- Postman for API testing.
- VS Code for development.
- Firebase for secure authentication services.

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4. Features and Functionalities

Customer Module:

1. **Flight Search:**
    - Users can search for flights based on source, destination, date, and preferred airlines.
    - Filter options such as price range and travel class enhance search precision.
2. **Booking:**
    - Customers can book tickets and select preferred seats.
    - Instant booking confirmation via email notifications.

3. **Payment Gateway:**
    - Secure and diverse payment options including credit/debit cards and digital wallets.
4. **Booking History:**
    - View and manage upcoming and past bookings.
    - Download e-tickets for offline use.

Admin Module:

1. **Flight Management:**
    - Add, modify, or delete flight details such as timings, prices, and routes.
2. **User Management:**
    - View and manage customer accounts.
    - Handle user queries and grievances efficiently.
3. **Analytics Dashboard:**
    - Monitor booking trends, revenue generation, and system performance.
    - Generate detailed reports for business insights.

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5. System Architecture

The system utilizes a modular architecture built on the **MERN Stack**:

1. **Frontend:**
    - React.js dynamically renders components, ensuring a seamless user experience.
    - Integration with Redux for state management.
2. **Backend:**
    - Express.js serves as the application's backbone, handling all API endpoints and business logic.
3. **Database:**
    - MongoDB stores user information, booking details, and flight schedules in a structured format.
4. **Integration:**
    - RESTful APIs connect the frontend and backend, ensuring smooth communication.

- Middleware functions manage requests and enforce security policies.

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6. User Workflow

Customer Workflow:

1. **Registration/Login:**
   - Secure sign-up or sign-in using email and password.
2. **Search Flights:**
   - Enter travel details to search for available flights.
3. **Book Tickets:**
   - Select desired flight and proceed to secure payment.
4. **Confirmation:**
   - Receive booking confirmation with detailed information.
5. **Manage Bookings:**
   - Modify or cancel bookings as needed.

Admin Workflow:

1. **Login:**
   - Secure access to the admin dashboard.
2. **Manage Flights:**
   - Add or update flight schedules in real time.
3. **Monitor Activity:**
   - View system analytics and user activities.
4. **Generate Reports:**
   - Extract data for operational improvements.

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7. Challenges Faced

1. **Database Scalability:**
   - Handling large volumes of flight and user data.

- **Solution:** Utilized sharding and indexing in MongoDB.

2. **Integration with Third-Party APIs:**
    - Ensuring smooth payment processing.
    - **Solution:** Adopted reliable APIs like Stripe for secure transactions.
3. **Cross-Browser Compatibility:**
    - Maintaining consistent performance across different browsers.
    - **Solution:** Regular testing and optimization.
4. **User Authentication:**
    - Safeguarding sensitive user data.
    - **Solution:** Implemented Firebase Authentication with multi-factor verification.

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8. Future Enhancements

1. **Global Expansion:**
    - Adding support for international currencies and time zones.
2. **AI Integration:**
    - Personalized flight recommendations based on user preferences and history.
3. **Real-Time Notifications:**
    - SMS and email alerts for booking updates and flight changes.
4. **Enhanced Reporting:**
    - Advanced analytics for better decision-making.
5. **Mobile Applications:**
    - Dedicated apps for Android and iOS platforms.

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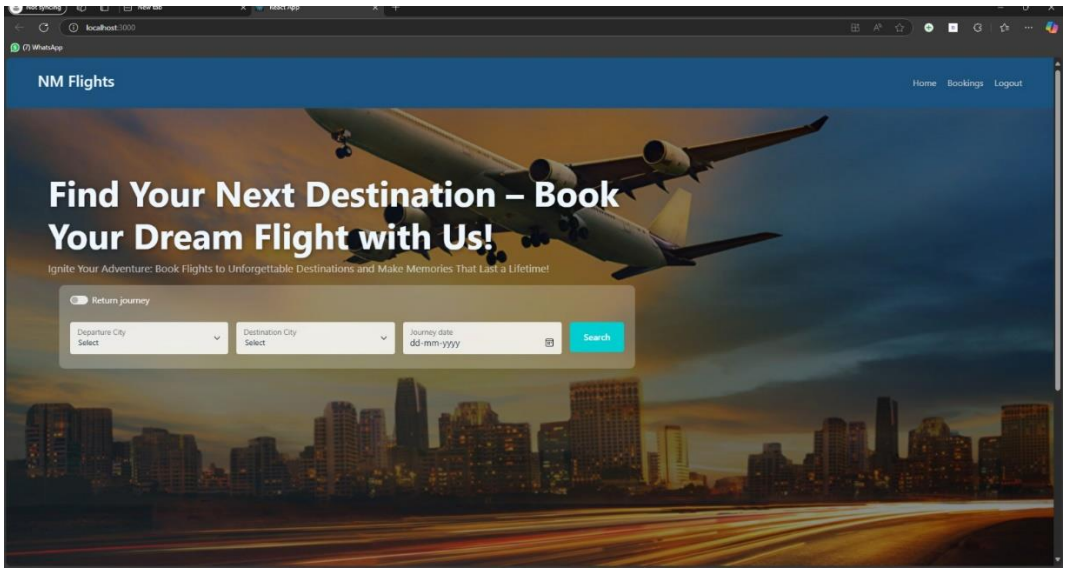
9. Visuals and Media Gallery

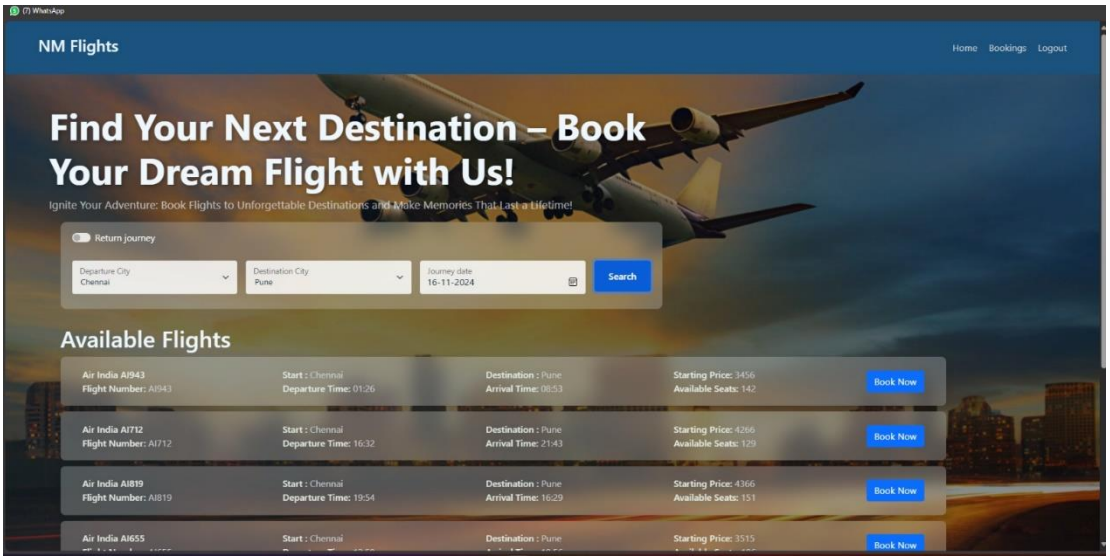
Recommended Screenshots:

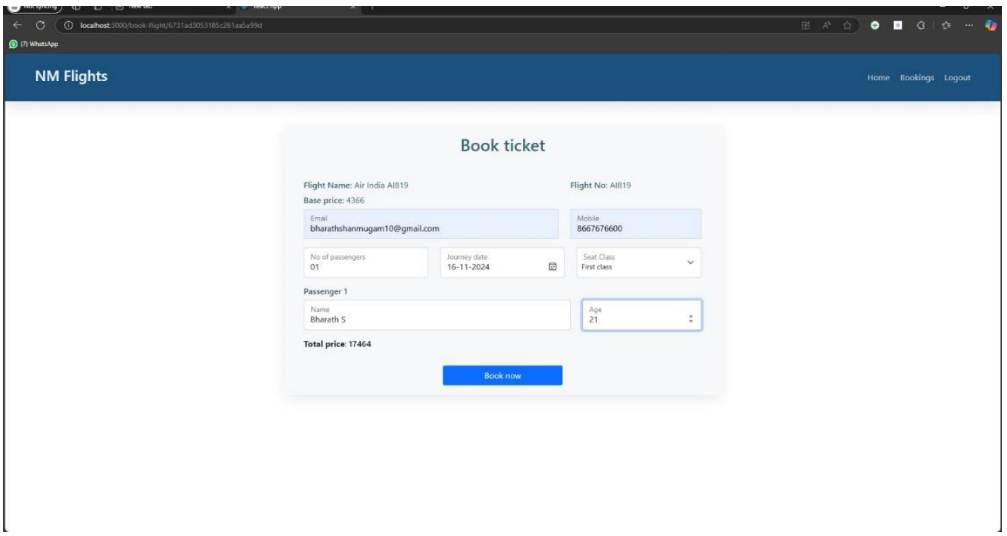
1. **Home Page:**
    - Displaying the flight search interface.



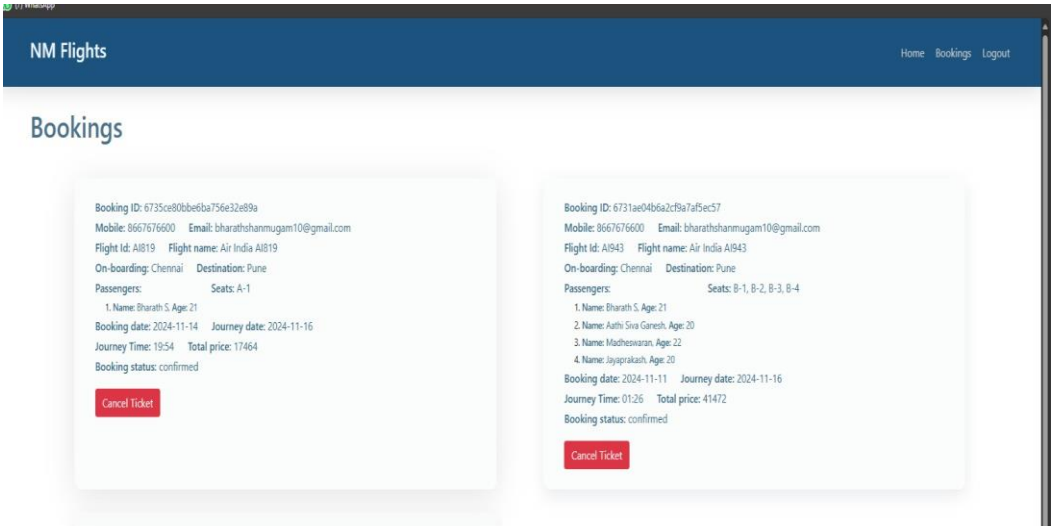
2. **Search Results Page/ Booking:**

- Highlighting filter and sorting options.
- Showcasing the ticket selection and payment process.

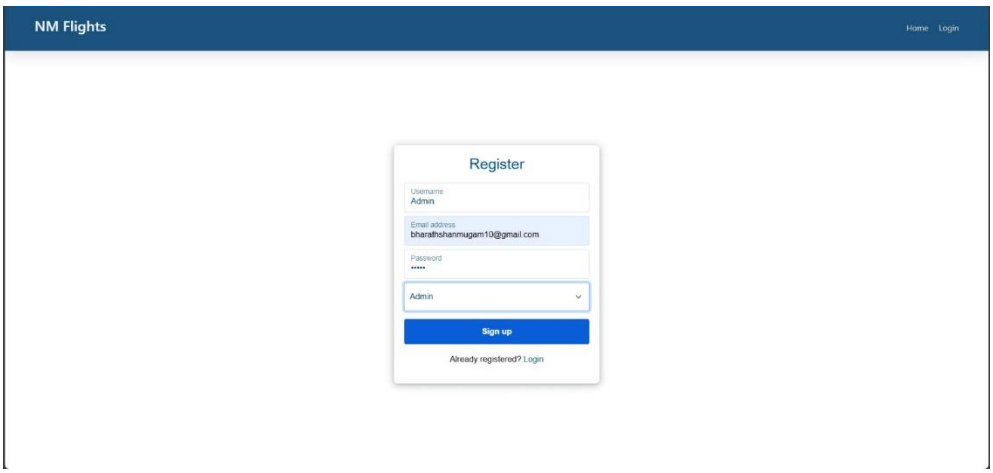


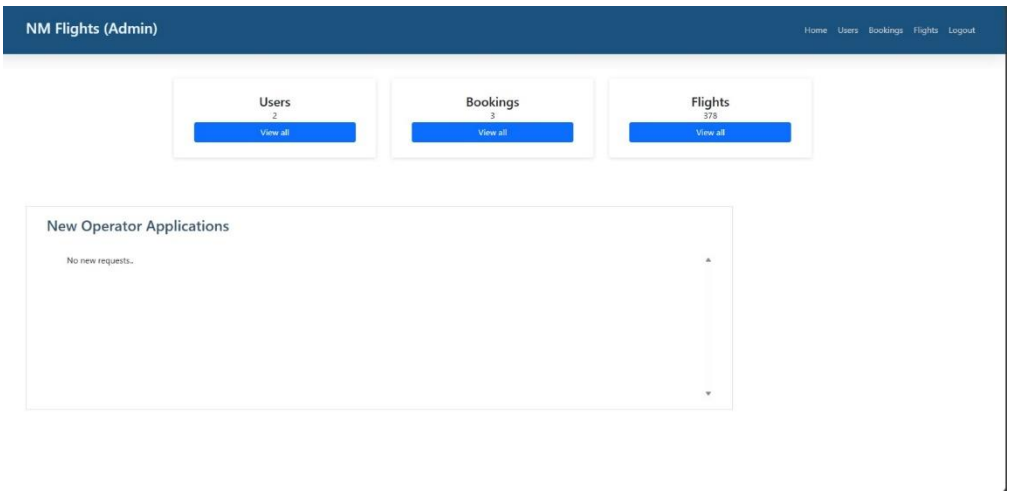


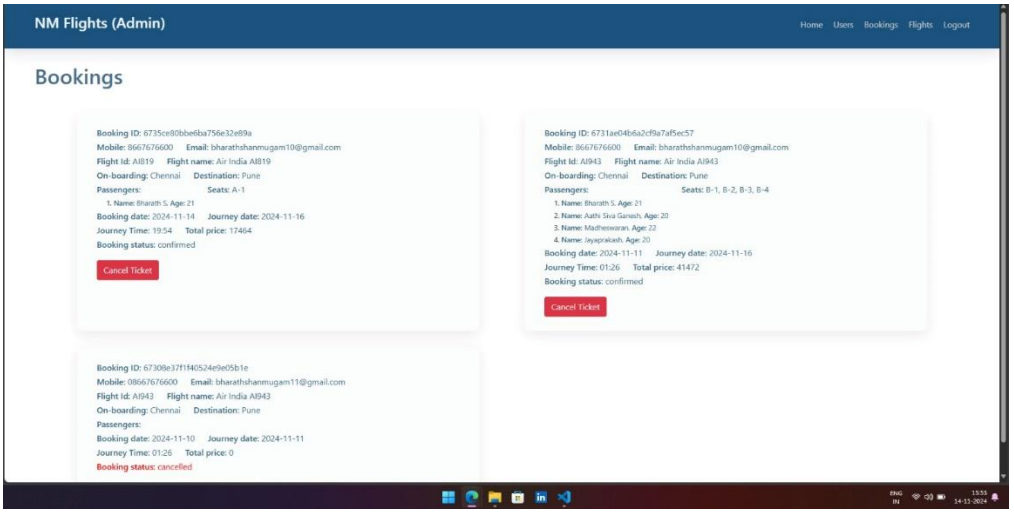
3. **Confirmation Screen:**
    - Demonstrating booking success and details.

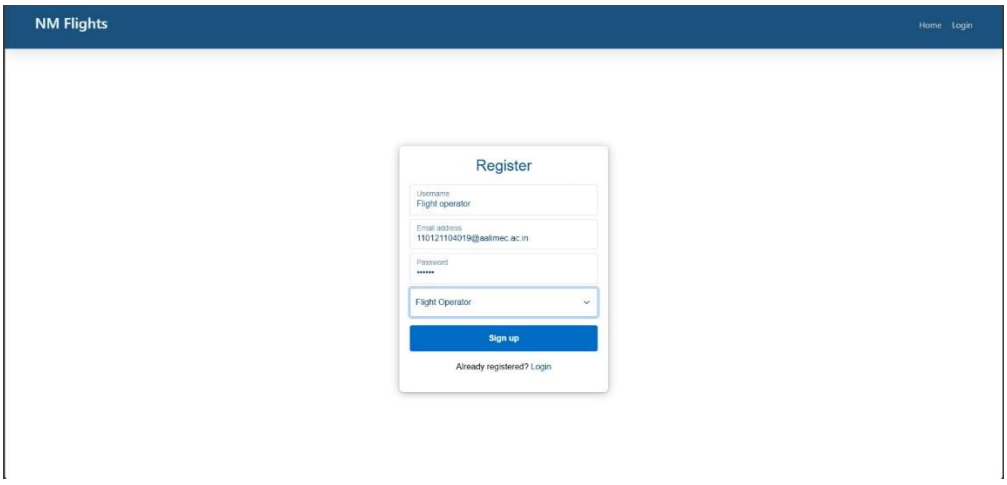


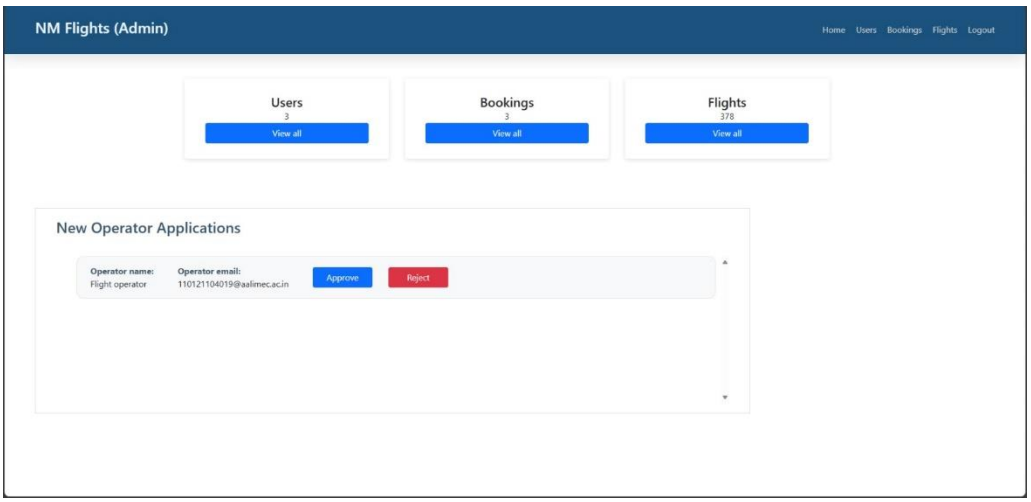
4. **Admin Dashboard:**
    - Illustrating flight and user management.

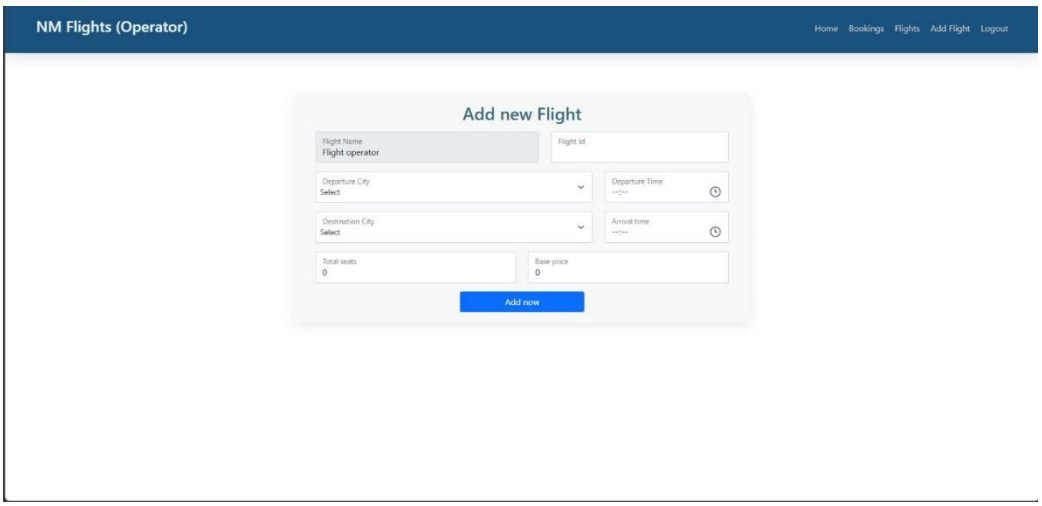


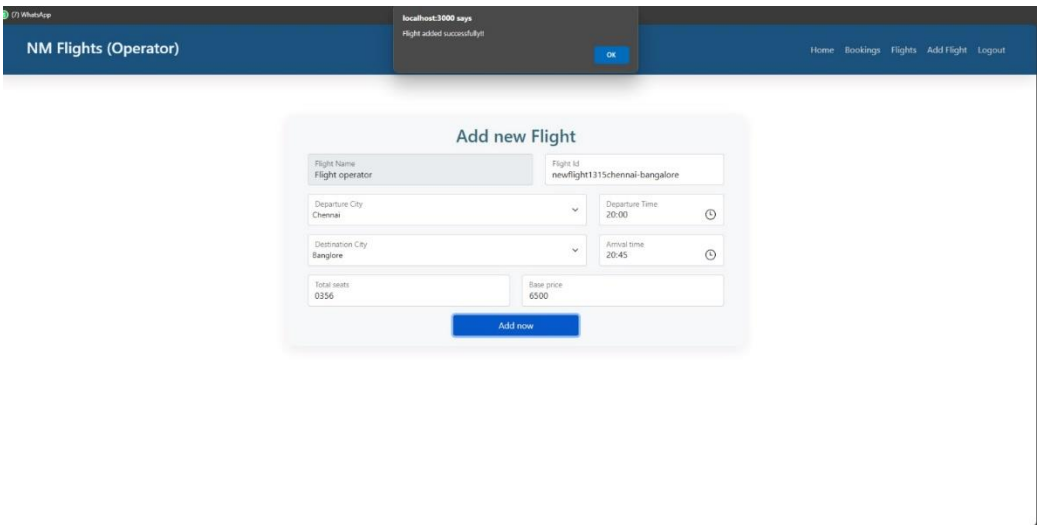

NM Flights (Admin)
Home Users Bookings Flights Logout
Users
2
View all
Bookings
3
View all
Flights
378
View all
New Operator Applications
No new requests.


NM Flights (Admin)
Home Users Bookings Flights Logout
Bookings
Booking ID: 6735ce80bbe6ba756e32e89a
Mobile: 8667676600 Email: bharathshanmugam10@gmail.com
Flight Id: AI819 Flight name: Air India AI819
On-boarding: Chennai Destination: Pune
Passengers: Seats: A-1
1. Name: Bharath S, Age: 21
Booking date: 2024-11-14 Journey date: 2024-11-16
Journey Time: 19:54 Total price: 17464
Booking status: confirmed
Cancel Ticket
Booking ID: 6731ae04b6a2cf9a7af5ec57
Mobile: 8667676600 Email: bharathshanmugam10@gmail.com
Flight Id: AI943 Flight name: Air India AI943
On-boarding: Chennai Destination: Pune
Passengers: Seats: B-1, B-2, B-3, B-4
1. Name: Bharath S, Age: 21
2. Name: Aathi Siva Ganash, Age: 20
3. Name: Matheswaran, Age: 22
4. Name: Jayaprakash, Age: 20
Booking date: 2024-11-11 Journey date: 2024-11-16
Journey Time: 01:26 Total price: 41472
Booking status: confirmed
Cancel Ticket
Booking ID: 673086e37f1f40524e9e05b1e
Mobile: 08667676600 Email: bharathshanmugam11@gmail.com
Flight Id: AI943 Flight name: Air India AI943
On-boarding: Chennai Destination: Pune
Passengers:
Booking date: 2024-11-10 Journey date: 2024-11-11
Journey Time: 01:26 Total price: 0
Booking status: cancelled


NM Flights
Home Login
Register
Username
Flight operator
Email address
110121104019@aalimec.ac.in
Password
Flight Operator
Sign up
Already registered? Login


NM Flights (Admin)
Home Users Bookings Flights Logout
Users
3
View all
Bookings
3
View all
Flights
378
View all
New Operator Applications
Operator name:
Flight operator
Operator email:
110121104019@aalimec.ac.in
Approve
Reject


NM Flights (Operator)
Home Bookings Flights Add Flight Logout
Add new Flight
Flight Name
Flight operator
Flight Id
Departure City
Select
Departure Time
--:--
Destination City
Select
Arrival time
--:--
Total seats
0
Base price
0
Add now


localhost:3000 says
Flight added successfully!!
OK
NM Flights (Operator)
Home Bookings Flights Add Flight Logout
Add new Flight
Flight Name
Flight operator
Flight Id
newflight1315chennai-bangalore
Departure City
Chennai
Departure Time
20:00
Destination City
Banglore
Arrival time
20:45
Total seats
0356
Base price
6500
Add now

10. Conclusion

The "Online Flight Ticket Booking and Management" project successfully addresses the challenges of traditional flight ticketing systems by offering a modern, efficient, and user-friendly platform. Leveraging the MERN stack, the project ensures security, scalability, and flexibility, catering to the needs of both customers and administrators. The system’s robust architecture and potential for future enhancements make it a valuable solution in the domain of online travel booking systems.