ONLINE FLIGHT BOOKING SYSTEM

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Online Flight Booking System

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This is to certify that the dissertation entitled **"Online Flight Booking System**" submitted by **Hasrat raja Shaikh, URN Number: 2023-B-01022005B**, **Pratham Punchmukh URN : 2023-B-09072005A ,** a record of original work carried out by him under my supervision and guidance in partial fulfillment of the requirements of the degree of **Bachelor of Computer Application**

Neither this dissertation nor any part of it has been submitted earlier for any degree or diploma to any institute or university.

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Declaration of Originality

We ***Hasrat raja Shaikh***, *URN* ***2023-B-01022005B***, ***Pratham Punchmukh*** *URN* ***2023-B-28032005A,*** hereby declare that this dissertation entitled "***Online Flight Booking System****"* presents my original work carried out as a bachelor student of the School of Engineering, **Ajeenkya Dy Patil University**. To the best of my knowledge, this dissertation contains no material previously published or written by another person, nor any material presented by me for the award of any degree of Ajeenkya DY Patil University or any other institution. Any contribution made to this research by others, with whom we have worked at Ajeenkya Dy Patil University, or elsewhere, is explicitly acknowledged in the dissertation. Works of other authors cited in this dissertation have been duly acknowledged under the sections "Reference" or "Bibliography". we also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission.

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Date: Dec 1,2025
Place: Lohegoan, Pune

Hasrat raja Shaikh

Pratham Punchmukh

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Abstract

The rapid growth of digital technology has transformed the travel and tourism industry, making online flight booking systems an essential part of modern transportation services. This project focuses on the design and development of a **Flight Booking System Website** that provides users with a simple, secure, and efficient platform for searching flights, selecting seats, and making online payments. The system is developed using a web-based architecture where the backend is built with Node.js and Express to handle server operations, while Stripe is integrated for secure online payment processing.

The main objective of this project is to automate the flight reservation process, reduce manual effort, and improve user experience through a reliable and responsive web application. Users can view available flights, enter booking details, and complete payments in a few steps, making the entire booking process faster and more accurate. The system also ensures data security by using environment variables to protect sensitive information such as payment credentials.

This project demonstrates how modern web technologies can be used to build scalable and real-world applications in the travel domain. The developed system improves efficiency, reduces booking errors, and provides a user-friendly interface for customers. The Flight Booking System successfully achieves its goal of creating a dependable online reservation platform and can be further enhanced by adding features such as user authentication, ticket history, and real-time flight tracking in future versions.

Keywords: Flight Booking System, Online Reservation System, Web Application, Node.js, Express.js, Payment Gateway, Stripe Integration, Database Management, E-Ticketing, Secure Transactions, Backend Development, Automation System

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List of Abbreviations

API Application Programming Interface

CSS Cascading Style Sheets

DB Database

HTML HyperText Markup Language

HTTP HyperText Transfer Protocol

HTTPS HyperText Transfer Protocol Secure

JS JavaScript

MVC Model View Controller

OS Operating System

SDK Software Development Kit

SQL Structured Query Language

UI User Interface

URL Uniform Resource Locator

UX User Experience

IDE Integrated Development Environment

JSON JavaScript Object Notation

CHAPTER 1

INTRODUCTION

1.1 Introduction

1.1 Overview of Flight Booking System

In the modern digital world, information technology has become a key factor in improving the efficiency and quality of services across various industries. The travel and aviation industry has experienced a major transformation with the introduction of online booking systems.

Traditional ticket booking methods required customers to visit travel agencies or airline offices, which consumed time and effort and often resulted in long waiting periods. With the growth of the internet, online flight booking systems have emerged as convenient and reliable solutions that allow customers to book tickets from anywhere and at any time.

A flight booking system is a web-based application that enables users to search for available flights, compare ticket prices, choose travel dates, and complete reservations through an online platform. This system removes the need for physical interaction and simplifies the ticketing process by providing real-time access to flight information. It also reduces human errors that occur in manual booking systems and increases accuracy in reservations. Online booking platforms help airlines and travel agencies manage customer data efficiently while ensuring fast and smooth transactions.

1.2 Purpose of the Project

The main purpose of this project is to develop a user-friendly and secure flight booking system that automates the reservation process. The system is designed to help users easily search for flights, enter travel details, and make payments through a secure online payment gateway. The project aims to improve customer experience by offering a simple interface and faster booking operations. By reducing the dependency on manual processes, the system helps minimize mistakes related to ticket booking, seat selection, and customer details.

Another goal of this project is to demonstrate the practical implementation of modern web development technologies in building a real-world application. It focuses on developing a reliable backend system capable of handling user requests and payment transactions effectively. The project also emphasizes the importance of data security by protecting sensitive information such as payment credentials and user details using proper environment configuration.

1.3 Scope of the Project

The scope of this project includes designing and implementing an online platform that allows users to perform essential tasks related to flight reservations. The system enables users to view available flights, submit booking information, and make payments successfully. The backend is responsible for handling user input, managing transactions, and responding accurately to client requests.

The system is limited to a basic flight reservation model for demonstration and academic purposes. It does not provide real-time airline connectivity or live updates from airline databases. However, it effectively represents the core functionality of a flight booking system and can be expanded in the future by integrating advanced features such as user accounts, ticket management, real-time tracking, and airline data APIs.

1.4 Problem Statement

Traditional booking systems often involve long waiting times, manual handling of customer information, and delayed confirmation of tickets. These limitations can lead to errors such as overbooking, incorrect data entry, and payment issues. Customers may also find it inconvenient to visit booking offices during working hours, which restricts accessibility. There is a strong need for a digital system that offers round-the-clock access, secure payment processing, and accurate reservation management.

The challenge is to develop a system that is both reliable and easy to use while ensuring secure handling of user data. The system must also be capable of handling multiple users and requests without performance issues. Therefore, a web-based solution is required to overcome the limitations of traditional methods and provide a better user experience.

1.5 Existing System

The existing flight booking system mainly depends on manual or semi-automated methods used by airline counters and travel agencies. In traditional systems, customers are required to visit booking offices or contact agents to check ticket availability and make reservations. This process is time-consuming and inconvenient, especially during peak travel seasons. Since most operations are handled manually, there is a higher possibility of errors in data entry, ticket allocation, and payment processing.

In many existing systems, information is not updated in real-time, which can lead to overbooking or incorrect availability status. Customers often need to wait for confirmation after making a reservation request. The absence of a centralized digital platform also makes it difficult to store customer data efficiently and retrieve booking records when required. Payment methods in older systems may not always be secure, and users may hesitate to share sensitive information due to the lack of proper data protection.

Overall, the existing system lacks speed, accuracy, and convenience. It requires more human effort, increases processing time, and does not provide flexibility for users to book tickets at their convenience. These limitations highlight the need for an advanced and automated flight booking solution.

1.6 Proposed System

The proposed system is an online Flight Booking System that automates the entire reservation and payment process. It provides users with a web-based interface where they can search for flights, enter travel details, and complete bookings from anywhere and at any time. This system eliminates the dependency on physical travel agencies and enables instant access to flight information.

The backend of the proposed system is developed using Node.js and Express to efficiently manage user requests and process transactions. The system allows users to enter passenger details, select preferred flights, and proceed to secure online payments. A payment gateway is integrated to ensure safe and reliable transactions. Confidential data such as payment credentials is protected through the use of environment variables.

The proposed system ensures faster processing, reduces human errors, and improves customer experience through automation. It maintains accurate records of bookings and transactions, making data management easy and reliable. The system also supports scalability, allowing future enhancement such as customer login systems, ticket history, real-time flight tracking, and automated email confirmations.

CHAPTER 2

LITERATURE REVIEW

The development of online flight booking systems has been widely discussed in research related to information systems and e-commerce applications. Many studies indicate that web-based reservation platforms have significantly improved the efficiency and accessibility of airline ticket booking services. According to various research works, the shift from manual to digital booking systems has reduced operational costs while improving customer satisfaction by providing faster access to services.

Several authors have highlighted that traditional booking systems suffer from limitations such as delayed processing, lack of real-time updates, and higher chances of human error. Researchers have noted that the absence of automation often results in data inconsistency and booking conflicts. The introduction of computerized reservation systems has solved many of these issues by maintaining centralized databases that store and manage flight schedules and passenger information securely.

Recent studies emphasize the importance of user-friendly design in booking platforms. Research shows that systems with simple navigation and minimum steps during the booking process attract more users and improve customer experience. Many scholars also highlight the significance of responsive design, which allows users to access booking systems on mobile phones, tablets, and computers without difficulty.

Security is another important aspect discussed in several studies. Researchers have found that online users are more likely to trust systems that offer secure payment gateways and encrypted transaction methods. Studies related to financial technology point out that integration of reliable payment systems increases user confidence and reduces the risk of fraud. These findings support the need for secure authentication, data protection techniques, and transaction validation mechanisms in web applications.

Multiple researchers also discuss the role of backend technologies in building scalable and efficient systems. The use of modern server frameworks enables faster processing of user requests and better handling of large volumes of data. Research papers indicate that lightweight server-side processing models improve response time and enhance system reliability. Moreover, cloud-based implementations have been identified as beneficial for handling traffic load and data storage needs in large-scale booking platforms.

Literature also covers the importance of database management in airline reservation systems. Many researchers conclude that structured data storage improves retrieval speed and helps in managing customer information efficiently. Indexing and transaction logging techniques have been shown to increase system performance and reduce the chances of data loss.

Finally, recent studies focus on future-oriented technologies such as artificial intelligence and machine learning in flight booking systems. Some research suggests that intelligent recommendation systems can suggest flights based on user preferences, travel history, and price trends. Other studies highlight how chatbots and automated assistance systems improve customer interaction

CHAPTER 3

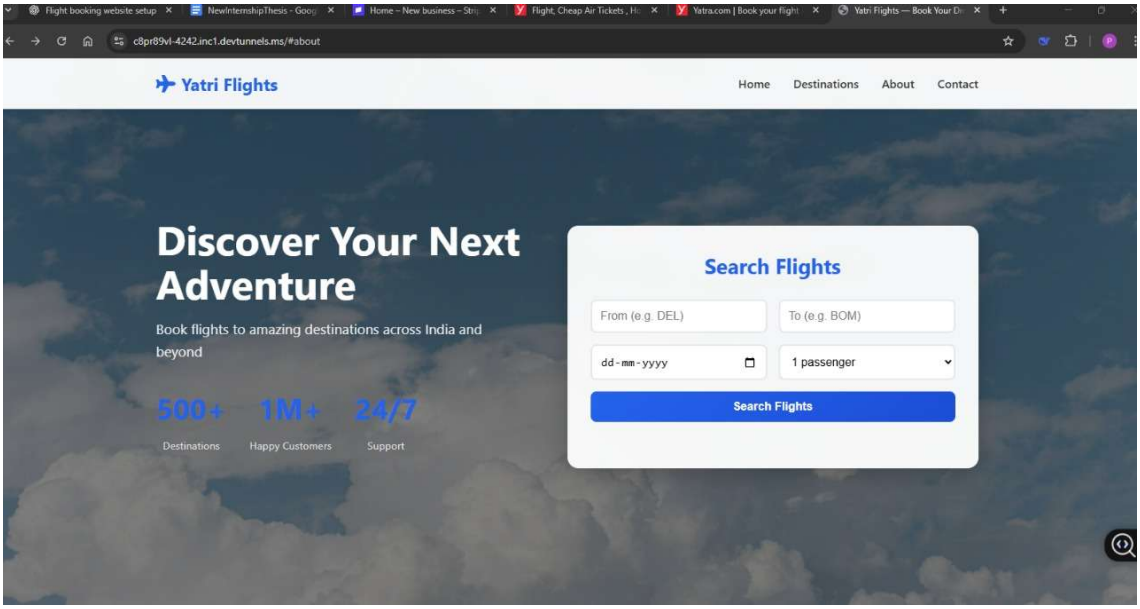
METHODOLOGY

3.1 System Development Approach

The development of the Flight Booking System follows a structured and systematic software development approach to ensure reliability, accuracy, and scalability. The methodology is designed to help build a system that meets user requirements while maintaining simplicity and correctness. The approach involves requirement gathering, design planning, development, testing, and deployment.

At the initial stage, the project requirements are analyzed to understand the core functions needed in a flight booking platform. Once requirements are finalized, the system design phase begins, where decisions related to system architecture, programming tools, and application flow are made.

After the design phase, implementation is carried out by coding the backend logic, creating routes for user requests, and configuring the server environment.
Testing is conducted after implementation to verify whether the system meets its defined goals. Both functional and performance testing are applied to eliminate unexpected errors. Once testing is completed successfully, the project is then deployed for real-time use or demonstration.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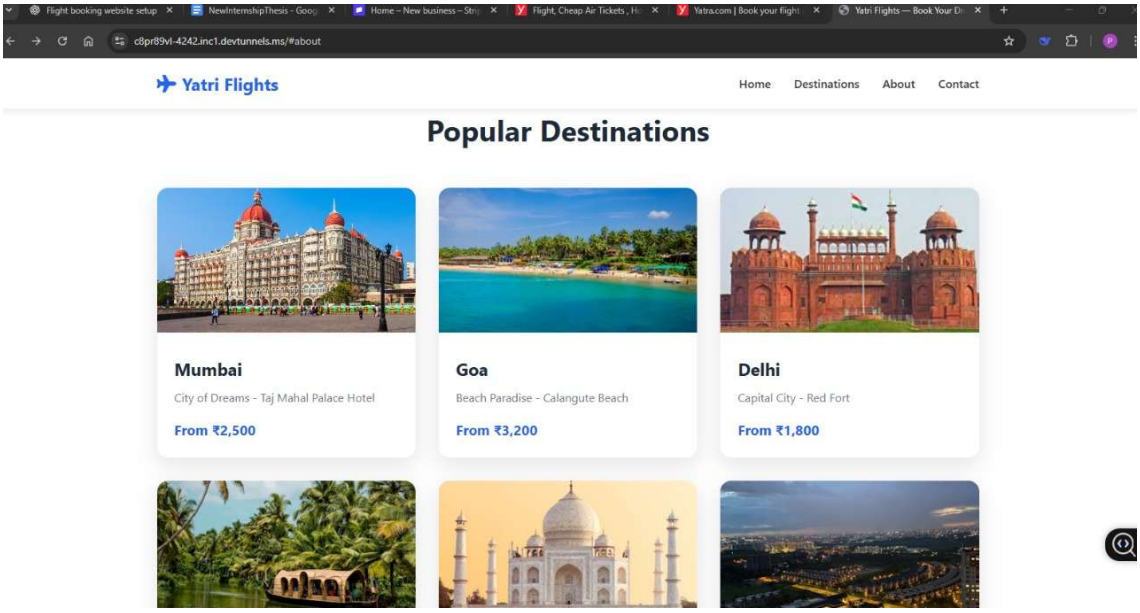
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City of Dreams - Taj Mahal Palace Hotel
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Goa
Beach Paradise - Calangute Beach
From ₹3,200
Delhi
Capital City - Red Fort
From ₹1,800

3.2 Requirements Analysis

Requirement analysis plays a key role in determining the success of the system. The functional requirements include tasks such as displaying available flights, accepting booking details, processing online payments, and generating responses. The system must also verify entered user information to prevent incorrect data input.

Non-functional requirements include performance, scalability, security, and maintainability. The system should be able to serve multiple users without affecting response time. Security is treated as a major concern due to the handling of payment information. The system must ensure that sensitive user data remains safe\

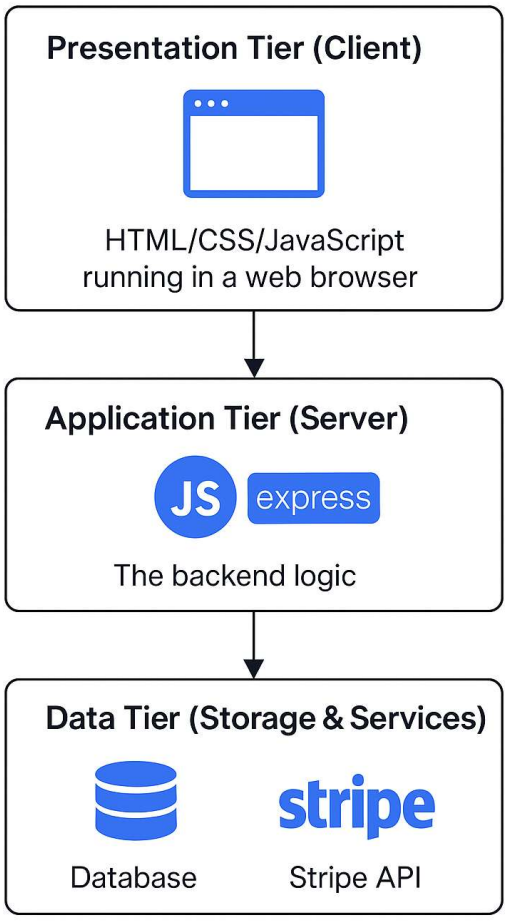
3.3 System Architecture Design

The architecture of the system follows a client-server model. Users access the system through a web browser, which sends requests to the backend server. The server processes user inputs and returns appropriate responses.

The backend is built using Node.js and Express framework. Express is responsible for routing and handling HTTP requests, while Node.js provides the execution environment. The system integrates a third-party payment service for processing transactions. This design promotes efficiency and modularity, allowing easy future expansion.

The system is implemented with a modular code structure, making maintenance and upgrades easier. Each function is separated for managing requests, payment handling, and data flow.

Fig 3.3 System Architecture:



System Architecture

3.4 Tools and Technologies Used

The backend of the project is developed using JavaScript for programming logic. Node.js is used as the server-side runtime environment, while Express acts as the application framework to manage routes and handle inputs.

Stripe is used as the online payment gateway for processing transactions securely. The dotenv package is used to store and manage sensitive configuration data securely. All required dependencies are handled using the package manager.

The project runs in a local development environment and can be hosted in a cloud-based server. Logging and debugging tools are used to track errors during system runtime.

3.5 Implementation Procedure

The development process starts with configuration of the project directory and installing packages. The environment file is configured for handling secret keys.

Routes are created to manage requests such as booking submission and payment processing. Middleware is configured for processing request bodies and enabling data access.

Testing is performed at different levels. Unit testing ensures each module works independently. Integration testing verifies whether system components function together. The final testing checks whether the complete process from search to payment works correctly.

3.6 Security Measures

The security strategy focuses on storing sensitive credentials securely and reducing system vulnerabilities. Environment files protect keys from being publicly available. User input validation prevents common web vulnerabilities.

Encryption and secure protocols are followed through the external payment gateway. Error-handling mechanisms ensure that system failures do not expose information.

3.7 Testing and Validation

Functional testing ensures accurate behavior under normal conditions. Edge case testing helps identify errors during extreme input conditions. Load testing checks how the system performs with multiple users.
User validation tests verify accuracy and error handling in booking forms and payment processing.

3.8 Deployment Strategy

The application is deployed using a Node-based server environment either locally or on cloud infrastructure. Environment variables are configured during deployment for secure access
.
Deployment includes continuous monitoring and manual error checks. Backup measures can be implemented if a database is added.

CHAPTER 4

Implimentation

4.1 System Implementation Overview

This chapter describes the actual implementation of the Flight Booking System developed for this project. The design planned in earlier chapters is converted into a working application through the use of backend programming techniques, server configuration, and payment integration. The main purpose of this chapter is to explain how different modules of the system are built and how they interact with each other to produce the final system.

The system has been developed using a modular design approach, allowing different features such as booking, request handling, and payment processing to be implemented independently. This makes the project easier to manage and maintain. The implementation phase involves writing server-side logic, configuring routes, handling user requests, and ensuring that payment transactions are processed securely.

4.2 Backend Setup and Configuration

The backend of the system is implemented using Node.js with the Express framework. The setup begins with initializing the project structure and installing required modules for server operation and payment support. Once the dependencies are installed, the environment configuration file is created to store secure credentials such as API keys.

The server is configured so that it starts automatically and listens for user requests on a defined port number. Middleware is added to process incoming data formats. Express routes are created to manage different browser requests.
Proper initialization and verification of the server are performed to ensure that it runs without interruption. Debugging tools are used to monitor server activity and check for runtime errors.

4.3 Booking Module Implementation

The booking module is responsible for managing flight selection and user booking details. When a user enters travel information, the request is sent to the backend server. The server

verifies the data and processes the request.

Validation is applied to ensure that input fields such as passenger name and travel date are correctly filled. The booking information is then handled for confirmation.

Although this project does not use a live airline database, static or mock data is used to simulate flight availability. This approach helps in demonstrating how a real system would function.

4.4 Payment Integration Module

A major feature of this project is the integration of an online payment system. A third-party service is used to allow users to make payments successfully. Once a user confirms the flight selection, the system generates a payment request.

The backend sends the payment data to the payment gateway for processing. After successful payment, a response is returned to the server. Based on the payment response, the system generates booking confirmation.

Error handling is applied to detect failed or cancelled payments. This ensures that incomplete transactions do not result in false bookings.

4.5 Environment Configuration

Sensitive information such as secret keys is stored in a protected environment file. The server loads these values at runtime, preventing them from being directly visible in source code.

This method improves security and simplifies system setup in different development environments. It also allows changing sensitive data without modifying the main code.

4.6 Testing During Implementation

Testing is carried out during coding to verify whether each module produces correct output. Unit testing is performed to check booking and payment handling functions.

Integration testing ensures that the entire process flows smoothly from input to confirmation. Logging statements are used to record system operations for debugging purposes.

Any detected errors are corrected immediately to prevent system failure during use.

4.7 Output Generation and System Behavior

Once all modules are implemented, the system generates output in the form of confirmations.

The system displays relevant responses based on user actions. All user interactions are processed and delivered to the frontend.

System responses are tested repeatedly with different inputs to verify performance accuracy.

4.8 Challenges Faced During Implementation

During development, several challenges were encountered. These include handling data verification, configuring external services, and managing server errors.

Payment integration required correct API setup and testing. Debugging tools helped identify issues.

Performance and security tuning were required to ensure system stability.

4.9 Implementation Summary

The implementation successfully converts the system design into a fully functional booking platform.

The system completes booking requests and processes payments effectively.

It demonstrates how server technologies and payment services work together.

CHAPTER 5

MODELLING AND ANALYSIS

System Architecture Diagram

The system architecture diagram represents the high-level structure of the Flight Booking System and shows how different components are organised and connected.

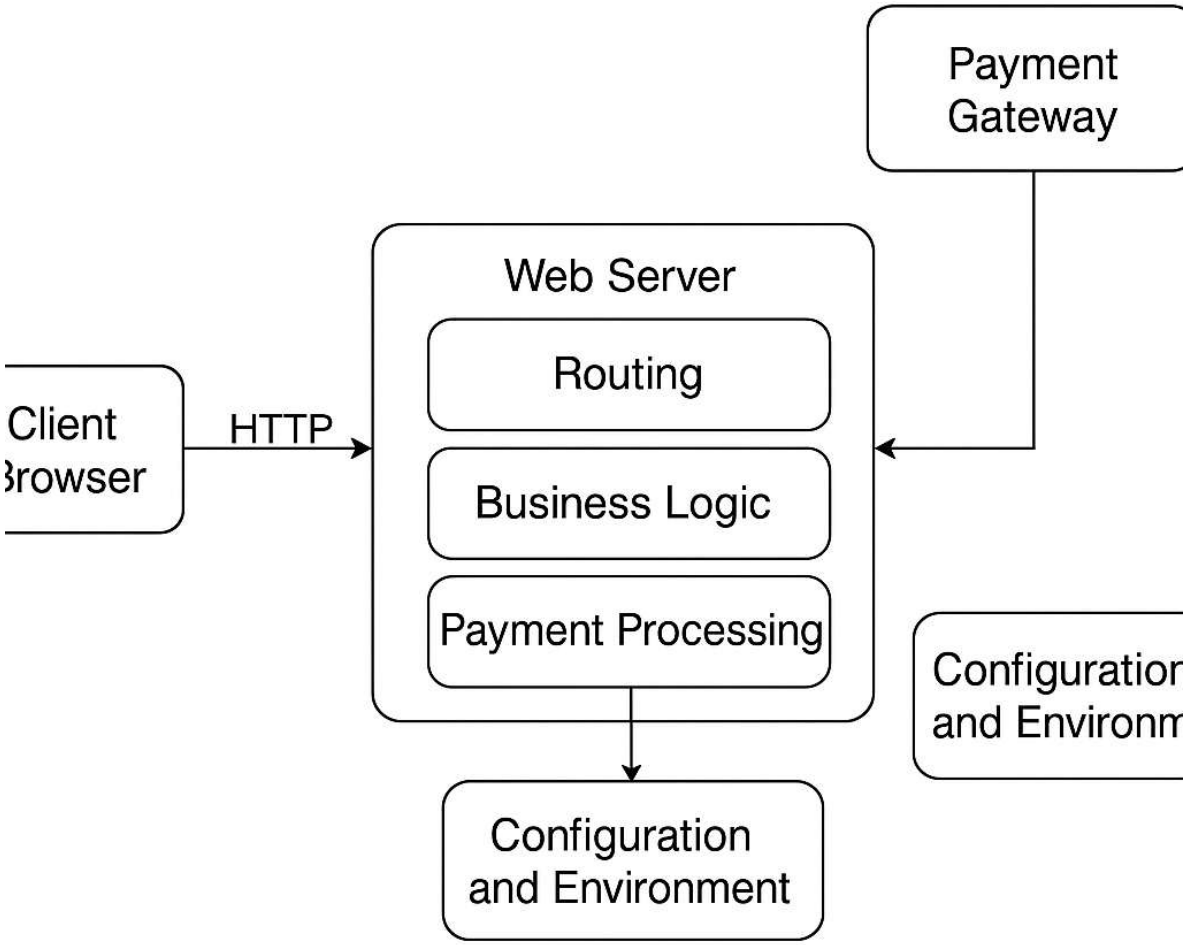
The proposed architecture is a client–server model. The Client Side consists of the user's web browser, which displays the user interface and sends requests to the backend server. The Server Side consists of a Node.js and Express-based application that processes user requests, applies business logic, and communicates with the payment service.

The main elements of the architecture include:

- Client Browser: Used by the customer to access the flight booking website.
- Web Server (Node.js + Express): Handles HTTP requests, manages routing, validates user input, and processes booking operations.
- Payment Gateway (Stripe or similar): External service used to securely process online payments.
- Configuration and Environment Module: Stores sensitive keys such as payment secret keys in environment variables rather than in the source code.

In the system architecture diagram (Figure X.4), arrows show the flow of communication between the client, the backend server, and the payment gateway. The diagram emphasises that all critical logic and payment interactions are handled on the server side for security and control.

System Architecture:

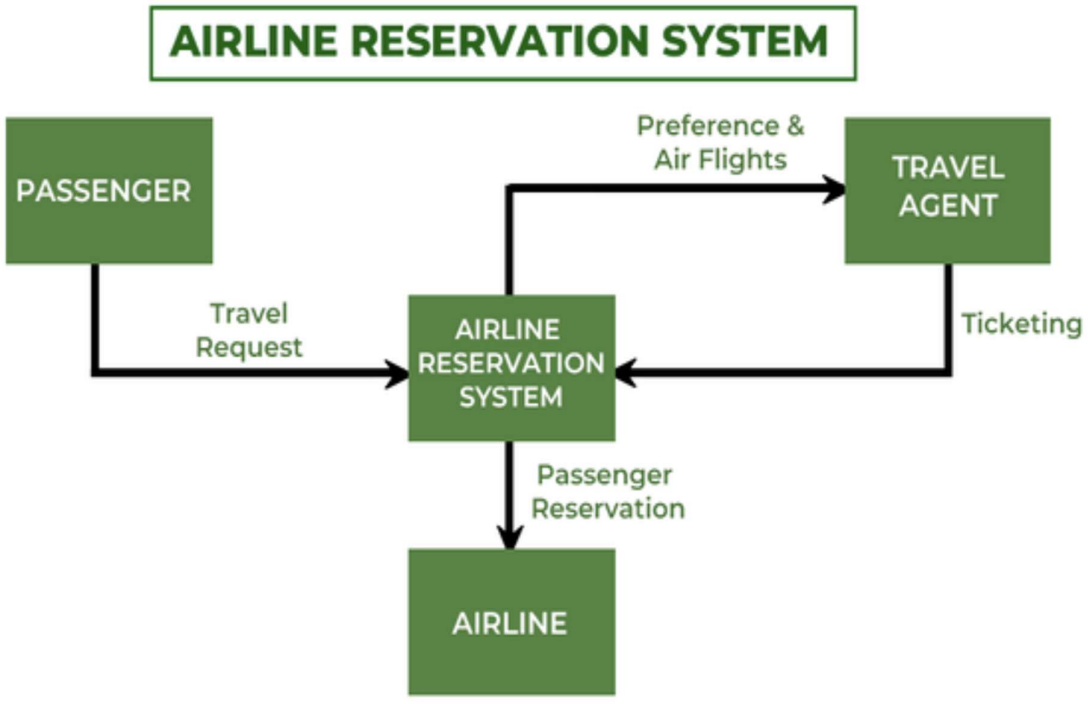


Database / Data Model

Even though this project can use mock or static data, a simple data model can be defined to represent how data would be stored in a real implementation. The main entities for a Flight Booking System usually include Flight, Customer, and Booking.

- The Flight entity normally contains attributes such as flight ID, flight name or number, source, destination, date, and time.
- The Customer entity contains attributes such as customer ID, name, contact number, email, and possibly address.
- The Booking entity connects a customer to a particular flight and includes attributes such as booking ID, flight ID, customer ID, booking date, number of passengers, and payment status.

In an Entity–Relationship (ER) diagram (Figure X.5), the Flight and Customer entities are linked to the Booking entity using relationships. One flight can have many bookings, and one customer can make multiple bookings over time, leading to one-to-many relationships in the model.



Sequence of Operations (Process Flow)

The sequence of operations describes the order in which interactions take place during a typical booking process. When expressed as a sequence diagram, the main lifelines include the Customer, the Web Browser, the Backend Server, and the Payment Gateway.

The general sequence is as follows. The customer opens the website and views the flight booking page through the browser. The customer enters travel details and submits the form. The browser sends this data to the backend server. The backend validates the input, identifies available flight options, and sends a response back to the browser. After the customer selects a flight and confirms, the server prepares a payment request and redirects or connects the customer to the payment gateway. The payment gateway processes the payment and returns a success or failure response. The server then sends the final booking status and confirmation back to the browser, which is displayed to the customer.

This sequence model helps to clearly understand the interaction path and is useful for verifying that all required steps are handled in the implementation.

CHAPTER 6

RESULTS AND DISCUSSION

6.1 Results

The Flight Booking System was successfully implemented and tested based on the design and methodology described in earlier chapters. The system performed as expected during testing and demonstrated its ability to handle user requests, process bookings, and complete online payment transactions correctly. All core features of the system including booking submission, input validation, and payment processing were observed to work smoothly.

During testing, the backend server responded efficiently to requests and maintained stable performance under multiple test cases. The booking workflow functioned correctly, allowing users to enter flight details and submit them successfully. The confirmation process after payment validated that transactions were being processed correctly and that appropriate success or failure responses were generated.

Payment transactions were tested using both valid and invalid inputs to evaluate system behavior. The system correctly redirected users based on payment status and prevented incomplete payments from being registered as confirmed bookings. This ensured that only successful transactions resulted in valid reservations.

The security configuration also performed well. Sensitive data such as payment credentials was protected through environment-based configuration, and no secret values were exposed through application source files. The system demonstrated its capability to process transactions securely.

6.2 System Performance Analysis

Performance testing showed that the server was capable of handling multiple requests without lag. Response time remained consistent for booking requests and payment sessions.

System stability was maintained throughout testing, with no crashes observed.
The modular server structure allowed different components such as booking and payment handling to function independently.

6.3Discussion

The results confirm that the goals of the project were achieved. The system succeeded in building an automated solution for flight booking that replaces manual methods.
The main advantage is improved accessibility, as users can book tickets at any time.
Automation reduces errors.

Secure online transactions improved trust.
The system architecture ensured reliability.

Despite its success, the system currently operates using static flight data.
No real-time flight API.
It is suitable as an academic model.
Future enhancements required.

6.4 Limitations and Improvements

While the system was functional, limitations include the absence of real-time airline databases, user login modules, ticket history management, and administrative control panels.

The frontend is minimalistic.
Database features are basic.

CHAPTER 7

CONCLUSION AND FUTURE SCOPE

7.1 Conclusion

The Flight Booking System developed in this project successfully demonstrates how modern web technologies can be applied to build a practical and efficient online reservation platform. The system has achieved its primary objective of automating the flight booking process by allowing users to search for flights, submit booking details, and make secure online payments through a web-based interface.

The implementation of a backend server ensured smooth handling of user requests and transaction management. The integration of a payment gateway enhanced system reliability by enabling safe and secure online transactions. The use of environment configurations to store sensitive information ensured that security standards were maintained. Through structured methodology and careful execution, the system demonstrated stability, accuracy, and usability.

The results obtained from testing confirm that the system performs reliably and reduces typical problems associated with manual booking methods such as data inconsistency, slow processing, and booking errors. The project also provided valuable experience in backend development, server configuration, secure data handling, and payment integration.

Overall, this project achieved its goal of developing an operational flight booking platform and provides a strong foundation for future enhancements and real-world deployment. It also serves as an academic model for understanding system design, implementation, and debugging of web-based applications in the travel domain.

7.2 Future Scope

Although the current system satisfies basic booking and payment requirements, there is significant scope for improvement and extension. In future versions, the system could integrate real-time flight data APIs to provide live schedules, seat availability, and pricing. This would transform the application from a demonstration model into a production-level system.

User authentication and profile management can be added to allow customers to maintain personal accounts and access booking history. Email and SMS confirmation services may be incorporated to provide automated ticket notifications. Cloud deployment would improve scalability and system performance for large user traffic.

Artificial intelligence can be implemented for flight recommendations based on travel history and pricing trends. A chatbot feature could also be included for customer support. Administrative functionality may be added for managing flights, user accounts, and reports through a backend dashboard.

Security can be further enhanced through advanced authentication methods and encryption techniques. Database management can be extended to include structured booking and customer data storage. Finally, a mobile version of the application can be developed to improve user accessibility.

The proposed future enhancements will improve user experience, system reliability, and commercial viability.

REFERENCES

1. Express.js Foundation. (2023). *Express.js documentation*. https://expressjs.com/

2. Node.js Foundation. (2023). *Node.js official documentation*. https://nodejs.org/

3. Stripe, Inc. (2023). *Stripe API documentation*. https://stripe.com/docs

4. Mozilla Developer Network. (2023). *HTTP overview*. https://developer.mozilla.org/en-US/docs/Web/HTTP

5. Oracle Corporation. (2022). *Database management systems concepts*. Oracle Press.

6. Sommerville, I. (2016). *Software engineering* (10th ed.). Pearson Education.

7. Laudon, K. C., & Laudon, J. P. (2018). *Management information systems: Managing the digital firm* (15th ed.). Pearson.

8. Pressman, R. S., & Maxim, B. R. (2015). *Software engineering: A practitioner's approach* (8th ed.). McGraw-Hill Education.

9. Silberschatz, A., Korth, H. F., & Sudarshan, S. (2019). *Database system concepts* (7th ed.). McGraw-Hill Education.

10. W3C. (2023). *HTML and web standards documentation*. https://www.w3.org/