Portfolio Builder

A PROJECT REPORT

Submitted by

ASHISH - 23BAI70108

In partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

IN

COMPUTER SCIENCE & ENGINEERING

Chandigarh University

November, 2025

TABLE OF CONTENTS

CHAPTER 1: INTRODUCTION

1.1 Introduction to Project

The **Restaurant Table Reservation System** is a full-stack web-based application developed using the **MERN stack (MongoDB, Express.js, React.js, Node.js)**.
The system enables customers to easily book tables at a restaurant through an online platform. It provides a smooth, user-friendly interface for customers to reserve tables in advance and for administrators to manage bookings efficiently.

The application is designed to automate the traditional manual reservation process by providing features such as user authentication, table booking, reservation management, and real-time data synchronization between the frontend and backend. It aims to improve customer experience, reduce manual workload, and ensure optimal restaurant capacity utilization.

1.2 Identification of Problem

Traditionally, restaurant table reservations are handled manually through phone calls or in-person visits. This approach leads to various challenges such as double bookings, mismanagement of slots, lack of real-time availability, and customer inconvenience.

Key challenges identified:

- Difficulty in managing reservations manually.
- No real-time tracking of table availability.
- Inconvenience for customers to book tables remotely.
- Inefficient communication between restaurant staff and customers.

CHAPTER 2: BACKGROUND STUDY

2.1 Existing Solutions

Existing systems for restaurant reservations (such as *OpenTable*, *Dineout*, and *TableAgent*) provide online booking options, but many are commercial and not customizable for small or medium-sized restaurants.

They often require subscription fees, offer limited flexibility for restaurant-specific features, and lack an open-source implementation for educational or institutional use.

The proposed system ensures:

- A cost-free and open-source alternative.
- Customizability according to restaurant needs.
- An intuitive, responsive, and simple user interface.

2.2 Problem Definition

The problem is to design and develop a **web-based restaurant reservation system** that allows:

- Customers to reserve tables online with preferred date, time, and number of guests.
- Administrators are to manage and monitor all reservations from a dashboard.

The solution should be accessible, real-time, and efficient, eliminating manual efforts and reducing booking conflicts.

2.3 Goals/Objectives

The objectives of this project are:

- To create an online platform for customers to book restaurant tables easily.
- To allow restaurant owners/admins to manage reservations efficiently.
- To provide a responsive and visually appealing frontend for user interaction.
- To implement a RESTful API for smooth communication between the client and the server.
- To store and retrieve reservation data securely using MongoDB.

CHAPTER 3: DESIGN FLOW/PROCESS

3.1 Evaluation & Selection of Specifications/Features

- The project is developed using the **MERN stack**, a modern full-stack JavaScript framework that allows end-to-end development using a single language (JavaScript).

Technologies Used:

- **Frontend:** React.js, HTML5, CSS3, JavaScript
- **Backend:** Node.js, Express.js
- **Database:** MongoDB
- **Tools:** Visual Studio Code, Postman, GitHub, MongoDB Compass

3.2 Analysis of Features and Finalization Subject to Constraints

Constraints Considered:

- Time and resource limitations during development.
- Need for scalability for future enhancements.

- Limited hosting and database storage during the testing phase.

Only core features (user management, reservation module, admin interface) were implemented initially. Additional advanced features like online payment and notification systems were planned for future integration..

3.3 Design Flow

1. **User Authentication:** New users sign up or log in using credentials.
2. **Reservation Module:** Users choose the date, time, and number of people.
3. **Booking Confirmation:** The System verifies table availability and stores booking details.
4. **Admin Dashboard:** Admin can view, update, or cancel reservations.
5. **Database Management:** MongoDB stores user and booking data, ensuring fast retrieval.

CHAPTER 4: RESULTS ANALYSIS AND VALIDATION

4.1 Implementation of Solution

The project successfully integrates all four layers of the MERN stack:

- The **frontend** (React.js) provides an interactive interface for customers and admins.
- The **backend** (Node.js + Express.js) handles API requests and server logic.
- The **database** (MongoDB) stores and manages all data related to users and reservations.
- Proper API validation and error handling ensure reliable and secure communication between all layers.

CHAPTER 5: CONCLUSION AND FUTURE WORK

5.1 Conclusion

The **Restaurant Table Reservation System** successfully automates the manual table booking process. It allows customers to reserve tables conveniently and helps restaurant owners manage their operations efficiently.

Through the MERN stack, the system ensures fast performance, scalability, and smooth data handling, achieving the project's primary objective of providing a modern digital solution for restaurant management.

5.2 Future Work

The following enhancements can be added in future versions:

- Integration of a **payment gateway** for online booking payments.
- **Email/SMS notifications** for booking confirmations and reminders.
- **Real-time seat availability** with live updates.
- **Feedback and review module** for customers.
- **Analytics dashboard** for restaurants to track peak booking times and customer trends.