TRIP-TROVE: AN AI-ENHANCED TRAVEL DISCOVERY PLATFORM

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FINAL YEAR DESIGN PROJECT REPORT

This Report Presented in Partial Fulfillment of the Requirements forthe **Degree of Bachelor of Science in Computer Science and Engineering**

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APPROVAL

This Project titled **"Trip-Trove: An AI Enhanced Travel Discovery Platform"**, submitted by **Md. Al Amin**, ID No: **193-15-13447** to the Department of Computer Science and Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on **17 September, 2025**.

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DECLARATION

We hereby declare that this project has been done by us under the supervision of **Dr. S. M. Aminul Haque of the Supervisor, Professor & Associate Head, Department of Computer Science and Engineering, Daffodil International University**. We also declare that neither this project nor any part of this project has been submitted elsewhere for the award of any degree or diploma.

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ABSTRACT

Trip-Trove is a sophisticated, fun, and instrumental online travel platform for travel enthusiasts and everyone else. Here, users of this platform can easily access a range of facilities suitable for their travel needs. I'm, Al Amin, have worked diligently for two years, researching travel enthusiasts in Bangladesh and around the world, and have created this platform on Trip-Trove. Using this online-based platform will have a significant impact on not only travel enthusiasts but also everyone who wants to visit Vrooman but cannot due to numerous difficulties. They will be able to travel to any tourist place in the country and abroad with their friends and family very easily and relatively cheaply. And by using this online platform, tourists will have access to all kinds of Vrooman guidelines. Here, they can start by choosing a place to visit, determining how to get there, what places to visit, how much money will be spent, and what kind of security will be ensured. Initially, we were only able to develop a website. We are now slowly working on a web application, followed by a mobile application. The Trip-Trove online platform will be handy for people who love to travel. Users will be able to use this online platform very easily. We had planned to build a user-friendly platform from the outset, and we have slowly made this plan a reality. Currently, there is no shortage of online travel platforms worldwide. We have slowly developed a new online platform incorporating some ideas from Shokke's online platform. We are introducing an online travel platform to everyone, where users can easily access a wide range of conveniences in one place. The most interesting aspect is that users can select places in advance for various events, ranging from tourist destinations to booking hotels, restaurants, and even small and large events. Through this platform, users will have access to a range of safety-related facilities. And the most interesting and important thing about the Trip-Trove One Line platform is that we have used this chatbot on the online platform, from which users can access all kinds of travel-related guidelines.

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Chapter 1

Introduction

1.1 Introduction

Travel is now an essential part of people's lives. Whenever we have time, we go out with our friends and family, spending our hard-earned money. We have been hearing for thousands of years that travel is an essential aspect of people's lives. That is why we should all go somewhere whenever we get time. However, many times we cannot go anywhere, even if we want to, because we do not receive the proper guidelines from the Burman. Nowadays, in this era of technology, many types of travel guideline platforms have emerged. Using which we can easily travel from our favorite places with our family and our loved ones. To make this travel easier and less expensive, we have collected a wealth of information from various online travel platforms, journals, and conversations with many people who are passionate about travel over the last two years. And then we started building this Trip-Trove online travel guide platform from some of my own thoughts. By using this online platform, users can easily travel to their favorite destinations at a significantly reduced cost. The interesting thing is that I have utilized a modern artificial intelligence chatbot to make the journey of tourists easier, allowing them to obtain all their travel-related directions more easily. We have built only a website in the first stage, and we will gradually develop both web applications and mobile applications. Over the last two and a third years of planning, with some real information, we have built the Tip-Trove travel discovery platform.
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direction on what to do next. As a result, there is an increasing need for comprehensive solutions that offer individualized experiences that suit the particular preferences of every traveler in addition to streamlining the travel planning process.

1.2 Motivation

Travel is an integral part of human life. Traveling has always been essential to people, as it relieves the boredom of daily life, allows them to learn something new, and provides an opportunity to spend time with loved ones. However, in real life, it is often observed that people encounter various problems when planning a trip. Lack of accurate information, unreliable guides, misconceptions about the destination, unnecessary expenses, or waste of time - for these reasons, many people cannot make it a reality despite their desire to travel.

In the current technology-dependent era, although many online travel guides and platforms have been created, they often become expensive or complicated for users. The general user cannot easily find the right guide or plan there. As a result, the joy of travel fades, and it becomes impossible to achieve the desired experience.

These fundamental problems have particularly inspired me. We thought, 'Why not create a platform that is user-friendly, accessible, cost-effective, and will provide reliable guides for travelers?' This idea is the beginning of the "Trip-Trove" project.

Over the past two years, we have gathered information from various online travel platforms, travel journals, blogs, and the experiences of travel enthusiasts. In light of that experience and research, we have taken the initiative to create this platform. Trip-Trove is more than simply a trip guide; it's a whole travel discovery platform. Users may plan their travels based on their budget here, and an AI-powered chatbot can give them quick and precise answers to any travel questions they have. We made a website in the initial phase, but my major goal is to turn it into a full-fledged web app and mobile app in the future so that more people can use it effortlessly. The Trip-Trove platform will not only make people's travel easier and more affordable, but it will also set a new paradigm in the travel industry.

1.3 Objectives

The main objective of the “Trip-Trove: An AI-Enhanced Travel Discovery Platform” project is to create an integrated travel guide platform using modern technology, which will make travel planning easy, reliable and cost-effective for travelers. In the current era, people consider travel not only as entertainment, but also as an important means of education, cultural exchange, peace of mind and gaining experience. But in many cases, travelers face problems due to lack of accurate information, absence of reliable guides and unnecessary expenses while planning a trip.

The objective of this project is to provide solutions to all these problems. By creating an accessible digital platform, it will be possible to provide accurate answers to any travel-related questions by creating a convenient digital platform. In particular, the use of artificial intelligence-enhanced chatbots will add a new dimension for travelers, which will be able to provide instant advice according to the user’s needs.

The intended projects that I have done with this project:

- **Creating a user-friendly platform for users:**
  We wanted to create a web-based platform that ordinary users can easily use. Later, we will convert that website into a web application and a mobile application, so that all users can take advantage of all travel-related benefits.
- **For users with the proper guidelines:**
  To ensure users obtain accurate information about their expected destination, including arrangements, costs, accommodations, food, sightseeing, and all necessary details, it can be easily accessed from a single platform.
- **Proper travel planning at low cost:**
  We are creating a plan that allows travelers to access all the guidelines for sightseeing places at a very low cost and customize their expenses. In this way, users can visit all their favorite places at a very low price.
- **Artificial Intelligence Chatbot Integration:**
  I have implemented an artificial intelligence chatbot on this Trip-Trove online travel platform. It will allow users to access all travel-related guidelines easily.
- **Information Collection and Planning:**
  We will first collect user experience through this platform, and based on that, we will update the overall features of my platform and everything else so that my online platform can outperform all my competitors' platforms in the future.
- **Future Plans:**
  Although we will initially provide local travel guides, we plan to add international travel information, offers, and customized tour plans in the future, which will require a significant amount of user data and information.

1.4 Methodology

To properly implement the Trip-Trove travel discovery online platform, we followed a step-by-step process, ensuring each step was completed in a well-organized manner, from planning to implementation. When we started to building this "Trip-Trove" travel discovery platform, we used some my personal mythology for building this online platform. Through this process, we had the opportunity to test, validate, and refine each module by dividing the project into smaller components. Like, from nothing to something to everything.

Development Steps:

1. Looking at the requirements

- We study content from different travel blogs, journals, and online travel sites, as well as from people who love to travel, to learn more about the problems that travelers face.

- We looked at the kinds of information that users seek, such as reviews, prices, places to stay, food, and more.

- By this time, I mostly knew what the system needed, what it could do, and what it couldn't do.

2. Making the system

- We developed the first wireframes and mockups to outline the website's User Interface (UI) and User Experience (UX).
- We developed the platform's database structure to store information about hotels, destinations, reviews, and users properly.
- We developed plans for a separate part to include AI chatbots. I developed the first wireframes and mockups to outline the website's User Interface (UI) and User Experience (UX).
- We developed the platform's database structure to store information about hotels, destinations, reviews, and users properly.
- We developed plans for a separate part to include AI chatbots.

3. Picking the Right Tech

- We used React.js on the front end to develop an interface that is fast and simple to use.
- We utilized Node.js and Express.js for the backend, which helped me develop scalable server applications.
- We chose MongoDB as the database because it makes it easier to track and save travel information.
- We are using Natural Language Processing (NLP) methods to help the AI chatbot understand and respond to questions from users.

4. Making it happen

- Initially, we are creating a website where visitors can easily find and use information about places to stay and things to do.
- We included the AI chatbot in the second phase so that it could answer questions from users.
- We put the site on Vercel, which made it possible for anyone to see the live system straight away.

5. Testing

- After We make each module, I undertake unit testing and integration testing.

- After that, we did UI/UX testing from the user's point of view, which made it

easy for me to look around and assess the experience.

- After all of that, I use different test questions to see if the AI chatbot is correct and trustworthy.

6. Putting into action

- We set up the first user test at https://trip-smoky.vercel.app/ and made it.
- Based on what people tell us, we intend to add new features in the future.

7. Future Planning:

- First, we developed web applications, after that we will develop mobile applications and web applications. We have already started working on it.
- We have already started working on adding information and offers of my international tourism facilities and customized tour packages.
- We have already started working on developing the AI-Chatbot to become a personal assistant (Virtual Travel Assistant) for travelers.

1.5 Project Outcome

The main idea behind this project is a website where people may find new places to travel (Trip-Trove). This web platform will give consumers a trip guide that is easy to use, reliable, and easy to get to. With this, passengers will be able to choose their desired destinations, plan their trips within their budgets, get information about places to stay and other travel-related topics, and get instructions right away from an AI-powered chatbot.

Below is a short summary of the project's results:

1. Building and launching a website:

- We have successfully created and launched a website in the first stage: https://trip-smoky.vercel.app/
- This website makes simpler for users to find different types of travel information.

2. Easy-to-Use Interface:

In the first stage, we tried to make a modern and interactive interface with React.js that is easy for users to use. We used my skills to make the website look good and easy to use so that users will have a fantastic time.

3. Adding an AI Chatbot:

We will add a chatbot powered by artificial intelligence for tourists. Users will obtain quick answers to their questions, such where they're going, how much it will cost to travel, reviews, and more, by using the AI chatbot.

4. Affordable Travel Advice:

We made the website so that people may plan trips that fit their budget. The platform will not only make it easy to travel, but it will also save you money.

5. Scalable Architecture:

- We utilized Node.js and Express.js on the back end of this website with MongoDB as the database. This will make it easier to add new features in the future.
- We made the website first, and subsequently the system will become a web app and a mobile app.

6. Features to Get Users Involved:

We will offer a way for people to sign up for a newsletter, leave reviews, and get in touch with me. We will slowly gather input from users and make the site even better.

7. Future Plans:

- For now, we have only made the project a website. In the future, we will turn it into a web app and a mobile app.

- We want to add discounts, personalized packages, and excursions overseas in the future.

Summary:
The Trip-Trove trip Discovery Platform Project's purpose is to employ modern web technologies and AI to prove that it is possible to develop a trip guide platform that is informative, reliable, and economical. This will give travelers a whole experience, which will transform how the tourism sector works in the future.

1.6 Organization of the Report

This project report is presented in a specific structure and logical format, allowing the reader to easily grasp the complete idea of each step, analysis, and results of the project. The report is primarily divided into six chapters; each arranged around a distinct topic and research stage. A brief description of each chapter is given below:

- **Introduction**

  This chapter provides an overview of the project. Here, the project's background, problem statement, research objectives, importance, methodology, potential results, and report format are described. This chapter serves as a guide, providing the reader with a basic understanding of the project's main content.

- **Literature Review**

  This chapter analyzes existing research, relevant models, and previous works. In addition, the limitations of the current travel recommendation system and artificial intelligence-based solutions are identified. The novelty and necessity of this project are logically highlighted by determining the research gap.

- **System Analysis and Design**

  This chapter presents a system requirements analysis, architectural design, data flow diagram, use case diagram, and an entity-relationship (ER) diagram, among other elements. Additionally, the module-based structure of the system and its interaction with the user are explained here.

- **Implementation**

  This chapter provides a detailed description of the project implementation steps. The tools, technologies, programming languages, and development frameworks used are mentioned. The development of each system feature, along with the algorithm or technology used, is explained step by step.

- **Results and Evaluation**

  This chapter evaluates the project's outputs, including the effectiveness and usability of the system. The system's performance has been tested using real data and user feedback. Additionally, the strengths, weaknesses, and practicality of the system are examined.

- **Conclusion and Future Work**

  The final chapter provides a summary of the research. It presents the project's achievements, limitations, and possible future development plans for the system. It will serve as a summary of the entire study for the reader.

Chapter 2

Background

2.1 Introduction

In today's world, technology and the internet have taken people's lives to a new level. With the rapid advancement of information and communication technology (ICT), online services have become an indispensable part of people's daily lives. Especially in the travel and tourism sector, digital services have brought about significant changes. Earlier, people had to rely on various guidebooks, travel agencies, or acquaintances to plan their trips. However, the combination of modern technology, web applications, and artificial intelligence (AI) has made travel planning easier, more affordable, and more personalized.

The primary aim of this chapter is to elucidate the background pertinent to the proposed project. This document will discuss how technology has changed in the travel industry, how current systems work, and how our proposed platform, Trip-Trove: An AI-Enhanced Travel Discovery Platform, fixes these problems and opens up new possibilities. The primary aim of this chapter is to elucidate the background pertinent to the proposed project. This document will discuss how technology has changed in the travel industry, how current systems work, and how our proposed platform, Trip-Trove: An AI-Enhanced Travel Discovery Platform, fixes these problems and opens up new possibilities.

This chapter will first discuss the importance of the travel and tourism industry, then analyze the limitations of the traditional travel system. Finally, it will explain how technology-based solutions and the application of AI are creating an improved experience for users.

2.2 Literature Review

The history of information technology-based research and system development in the travel and tourism industry is extensive. In the last few decades, various researchers and developers have presented technological solutions for travel planning and management. This section reviews the existing research, systems, and methods.

- **Traditional travel planning systems:**
  Initially, travelers mainly relied on guidebooks, travel agencies, or local information centers. This method was time-consuming and full of information limitations. Researchers have shown that in traditional methods, travelers do not always receive personalized or the latest updated information, which results in a decrease in the quality of the trip.

- **Web-based travel systems:**

As Internet technology has improved, sites and platforms like Expedia, TripAdvisor, and Booking.com have grown quite popular. These systems help travelers by letting them book hotels, get information about their trip, and read reviews from other users. But these platforms usually only show static information and can only give personalized suggestions depending on the user's interests.

- **Mobile apps and location-based services:**
  Location-based services (LBS) have become very popular in recent years thanks to mobile apps. Studies have demonstrated that GPS and map integration enables users to promptly access information regarding proximate hotels, eateries, and tourist sites. But these systems don't always give users full solutions that fit their needs, budget, and travel style.

- **AI-based travel recommendation systems:**
  Researchers have been looking into how to combine artificial intelligence (AI) and machine learning with travel systems. AI algorithms can look at a person's browsing history, preferences, budget, and travel style to make unique suggestions. AI-powered recommendation systems have improved the traveler's experience in many research studies, for example. However, many system implementations still face limitations in terms of user data privacy, accurate data collection, and personalization.

- **Our research position:**
  Analyzing the above studies, it becomes apparent that although existing travel planning systems are capable of providing information, they still fall short in terms of meeting user needs and enhancing the user experience. Our proposed project, Trip-Trove, uses AI-based data analysis and recommendation systems to overcome these limitations. This will provide more personalized, innovative, and user-friendly solutions for travelers.

2.2.1 Similar Applications

Numerous travel-related websites and mobile applications are currently on the market to assist users with destination selection, booking, and planning. Below is a discussion of some of the noteworthy applications and their attributes:

1. Travel Review

The popular travel app TripAdvisor gives users ratings and reviews of places to visit, lodging options, dining options, and tourist attractions. Its extensive user-driven review database is its primary strength. However, because it primarily depends on user reviews and information of average quality, it is limited in terms of personalized or AI-driven recommendations.

2. Reservation.com

Travel-related services and hotel reservations are the primary uses of Booking.com. It assists users in finding accommodations within a range of price ranges. It is easy to use,

but it only focuses on lodging; it is not useful for comprehensive travel experiences or personalized trip planning.

3. The Travel Agency

Expedia is a well-known website that provides tools for booking hotels, flights, rental cars, and vacation packages. While it serves as a "one-stop solution," it is not very good at making insightful suggestions based on the user's individual preferences or interests.

4. Google Travel

Previously known as Google Trips, Google Travel assists users in organizing their travels by utilizing information from Google Maps and Gmail. Although its ability to provide personalized information is somewhat advanced, its ability to fully analyze the user's needs and offer tailored recommendations is limited.

5. The Airbnb

Booking homestays and other unusual lodging is Airbnb's main reputation. Although it provides the chance to experience life locally, it is not very good at making insightful suggestions based on comprehensive travel schedules or locations.

Analysis:

Although the aforementioned apps offer a variety of services to assist travelers, the majority of them are only able to offer information or make reservations. We are still in the early stages of developing a fully functional AI-powered recommendation system that takes into account the user's past preferences, travel type, budget, and personal interests. These drawbacks are addressed by our suggested system, Trip-Trove, which gives users a more intelligent and customized experience.

2.2.2 Related Research

Travel planning and recommender systems have been the subject of numerous studies worldwide. Providing intelligent travel recommendations based on user data, preferences, and past travel behavior is the primary goal of these studies. The following list includes a few pertinent studies:

1. Tourism Recommender Systems

In their 2015 study, Ricci, F., Rokach, L., & Shapira, B. examined the application of recommender systems in the travel industry. They gave an example of how to use the algorithms of Collaborative Filtering and Content-Based Filtering to suggest destinations based on a user's past actions.

2. AI-powered Travel Suggestion

In his study, Wörndl (2018) outlined how AI-driven systems can offer more effective and personalized travel plans based on the user's preferences, time constraints, and financial constraints.

3. Tourism-Related Mobile Applications

According to Gretzel, U., & Xiang, Z. (2012), mobile applications are crucial for giving travelers real-time information and location-based suggestions.

4. Analysis of User Behavior

The significance of user behavior analysis in tourism recommender systems has been emphasized by Jannach, D., & Adomavicius, G. (2016). They have demonstrated that taking into account the user's preferences, search history, and travel patterns significantly boosts the system's efficacy.

Analysis: The aforementioned research indicates that recommender systems are crucial for delivering information about travel. The majority of studies, however, have the drawback of only focusing on particular travel-related elements (like lodging or airfare), with little attention paid to offering tailored solutions that take into account the user's entire journey and all of their characteristics. Trip-Trove, our suggested system, will function as an AI-powered, integrated solution in this regard, producing travel schedules that meet user requirements.

2.3: Gap Analysis

- **Disjointed services**
  The majority of current apps only do one thing, such as booking hotels, flights, or providing you with information based on your location. However, there aren't many comprehensive travel plans that consider personal preferences, time, location, and budget.

- **Insufficient customization**
  Many of the travel systems in use today generate recommendations based on user input or popular data. However, there are currently no tailored recommendations based on user preferences, past travel experiences, or behavior.

- **There is little AI integration**
  While AI technology has been used in some studies, many existing systems do not fully utilize sophisticated AI algorithms. Users are unable to create adaptable and imaginative travel plans that satisfy their needs as a result.

- **Poor User Experience**
  The complex user interfaces of certain mobile apps make it challenging for users to locate what they're looking for fast. Furthermore, many apps lack features that would make them entertaining and engaging for users.

- **No context-aware services**
  Many apps don't consider current information or the circumstances (like traffic, weather, or special offers). The user finds it difficult to modify their travel plans to accommodate the actual situation as a result.

Proposed Solution (Trip-Trove's position): To close these gaps, we propose Trip-Trove, an all-in-one AI-powered travel platform. It will make intelligent recommendations based on the user's preferences, financial constraints, available time, and current

circumstances. In addition, it will have an engaging experience and an easy-to-use interface, which will address the issues with existing systems.

2.4: Summary:

Trip-Trove is a modern, easy-to-use internet travel platform made for travelers and other people who want to utilize it. Users can quickly research trip destinations, book hotels and restaurants, obtain information about things to see and do, plan their budgets, and get safety tips through this website.

Trip-Trove employs AI technology to give customers unique recommendations based on their interests, budget, time, and style of trip. This is better than traditional travel planning, which frequently doesn't have enough information about users and doesn't let them customize their plans. This makes it quicker and faster to plan trips, and it also makes sure that consumers have an enjoyable and involved time.

TripAdvisor, Booking.com, Expedia, Google Travel, and Airbnb are some of the other travel applications that are available today. Most of them only give information or help you schedule a trip. But they can't make entirely personalized arrangements based on customers' past trips, likes, and travel needs. Trip-Trove is filling this gap by giving users a complete, AI-powered, and integrated travel solution.

So, Trip-Trove is good for people who love to travel and for people who seek an easy, cheap, and personalized trip experience. Users can organize their visits to any tourist spot in the country or overseas using the site. The chatbot makes it easy to acquire travel advice.

Chapter 3

Research Methodology

3.1 Methodology:

In this chapter, we will go over the research methodology, the requirements analysis, and the design specifications for the proposed system, Trip-Trove: An AI-Enhanced Travel Discovery Platform. The main goal of this project is to create a travel planning platform that is easy to use, powered by AI, and customized for each user. The requirements analysis process figures out what users want, what technical problems there are, and what the system can do. In this way, we can be confident that the system satisfies the needs of its users and makes the trip even better by using new technologies. The design specification describes the system's architecture, modules, functionalities, user interface, and database structure. This is the initial step in developing the system, and it will make it easy to add new features and maintain the platform running.

3.1.1 Overview

The main objective of this research is to develop a user-friendly, integrated, and artificial intelligence (AI)-powered travel planning platform, named Trip-Trove: An AI-Enhanced Travel Discovery Platform. Current travel systems are generally fragmented, do not provide personalized recommendations based on user needs, and do not provide booking, budget planning, and real-time updates. Trip-Trove suggests a system that lets users plan excursions, choose where to go, book hotels and restaurants, set budgets, and obtain real-time travel updates from one place to get around these problems.

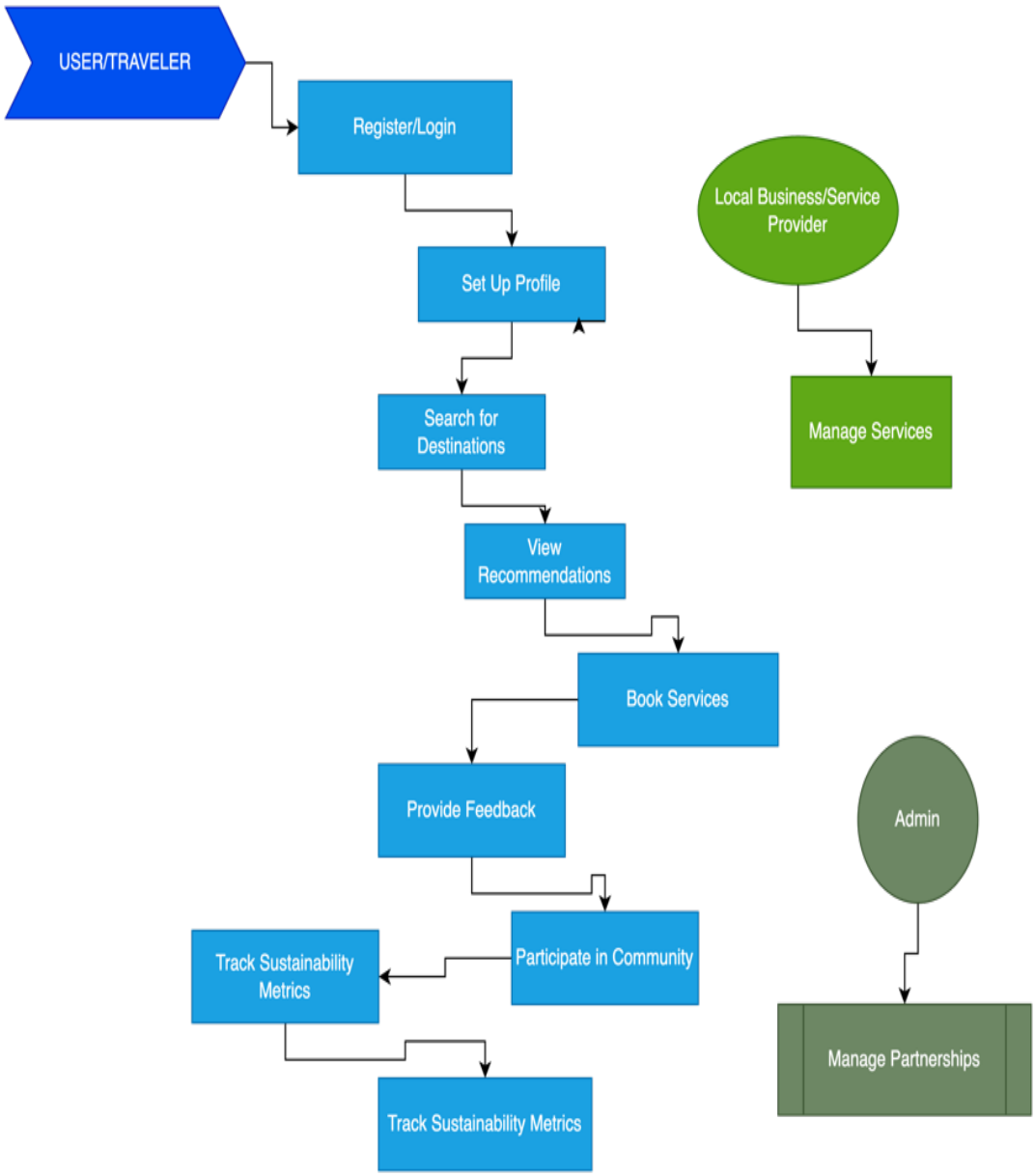
This chapter presents the system methodology, requirements analysis, and design framework. First, user requirements are identified, followed by the design of a modular system architecture that includes an AI-based recommendation engine, booking module, real-time data integration, and user feedback system. In short, the main goal of the Trip-Trove research methodology is to make travel planning easier, more affordable, and more enjoyable through the combination of technology and AI.

3.1.2 Proposed Methodology:

The suggested system, Trip-Trove: An AI-Enhanced Travel Discovery Platform, is meant to be AI-driven and focused on the user. It wants to make a travel planning platform that is easy to use, customizable, and works with other services.

- **Important Steps in System Design:**
- **Layer for User Interaction**
- The user will get into the system by either logging in or signing up. Here, customers can give information like their profile, travel preferences, budget, time range, and more.
- **AI-Based Recommendation Engine:**
- This module will look at the user's hobbies, budget, past travel information, and preferences to make individualized travel plans. AI and machine learning algorithms will suggest places to travel, hotels to stay in, restaurants to eat at, events to go to, and things to do.
- **Module for Booking and Destination:**
- This section will assist people find and book hotels, restaurants, transportation, and things to do while on vacation. It will be linked to APIs from other companies.
- **Integration of Data in Real Time:**
- The system will give you real-time updates on things like the weather, traffic, local deals, and emergency alerts. Users will be able to adjust their travel plans based on the most recent information.
- **System for Feedback and Review:**
- Users will be able to read about other people's trips and share their own, which will help them make better arrangements.
- **Layer for Managing Data:**
- **User Database:** Keeps track of user profiles, login credentials, and travel history.
- **Travel Database:** Keeps track of places to go, hotels, events, and other things.
- **Security and Privacy**: Uses encryption and other security measures to protect user data.
- **Summary of the workflow:**
- User gives information → AI Recommendation Engine looks at it → The system makes travel plans, the user books the trip, the system gives real-time information and updates, and the user gives comments.

USE-CASE DIAGRRAM



3.1.3: Functional and Nonfunctional Requirements:

- **Functional Requirements**

  The functional requirements that we met in this project were:

- User Registration and Authentication.

- Users might make new accounts.
- A secure login and password recovery system was put in place.
- A search and recommendation engine for destinations was also put in place.
- Users could look up places to go.
- Based on what the user liked, an AI-based recommendation system suggested places to travel.
- Planning and budgeting for a trip
- Users could make plans for their trips.
- We utilized a budget calculator to figure out how much transportation, hotels, meals, and other costs would be.
- System for Booking Users could book hotels, restaurants, and transportation.
- Notifications were sent to confirm the booking.
- Updates in Real Time Weather, flight status, traffic updates, and other information were shown in real time.
- User Feedback and Review System ・ Users could write reviews of hotels, services, and places to go.
- Feedback data was used to make future suggestions better.

- **Non-Functional Requirements**

  The non-functional requirements of the system were implemented as follows:

- Performance
- The system was designed to support at least 1000 concurrent users.
- Search results were displayed within 2 seconds.
- Scalability
- The system was designed to be scalable to add new modules and databases in the future.
- Security
- User data was protected by encryption.
- Measures were taken to prevent SQL injection, XSS, and unauthorized access.
- Usability

- The interface was kept simple so that even ordinary users could use it easily.
- The system was effective on both mobile and web platforms.
- Reliability
- The system ensured 99.9% uptime.
- Backup and disaster recovery systems were included.
- Maintainability
- The code was written in a modular format so that it could be easily updated.
- Proper documentation was prepared.

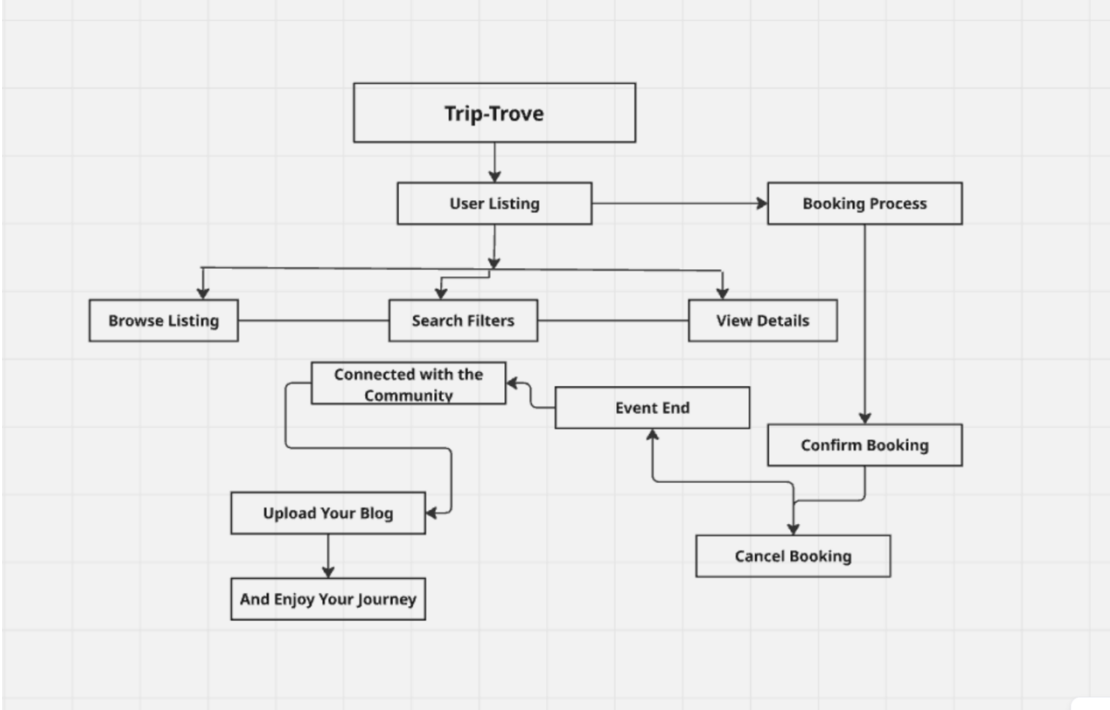
3.1.4: Context Diagram

For this project, we produced a Context Diagram that provided a high-level overview of the entire system. The Context Diagram represented the system as a single process and showed the external entities and data flow related to it.

The following important entities surrounded the Trip-Trove System:

- The user:
- Users made reservations, made financial plans, researched locations, and posted reviews.
- They received recommendations, trip plans, and real-time information from the system.
- Companies that offer travel services (such as accommodation, food, and transportation)
- They provided details about their services to the system.
- The system used the users' data to generate booking confirmations.
- External APIs (such as those for weather, flight status, and map services)
- The system is connected to several third-party APIs to collect data in real-time.
- The manager
- The administrator monitored the system, managed users, and preserved data.
- The meaning of the diagram:
- The user entered data into the system (booking request, feedback, search query).
- After processing data from external sources (API, service provider), the system produced output for the consumers.
- This led to the development of a thorough travel discovery procedure.

ACTIVITY DIAGRAM



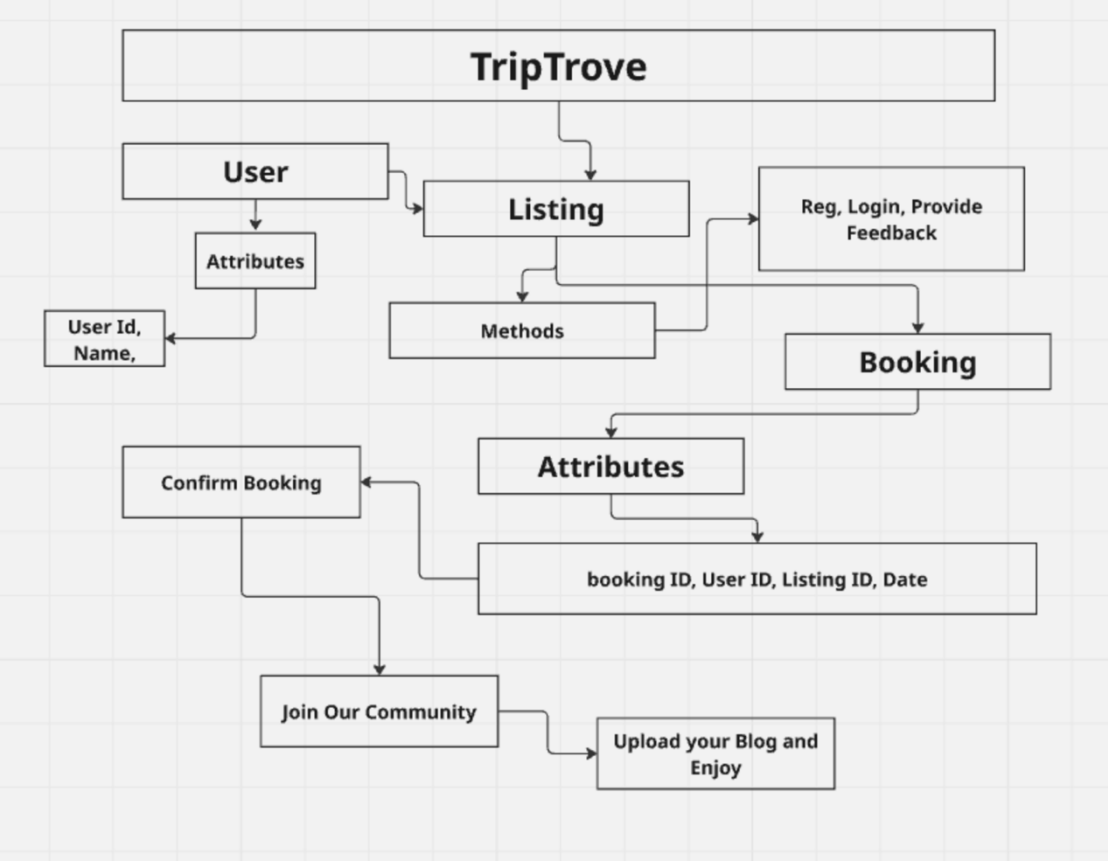
3.1.5: Data Flow Diagram Level 1

We produced a Level-1 Data Flow Diagram for this project that showed the essential steps in the whole system. The Context Diagram portrayed the system as one process, but the Level-1 diagram made it evident how data moved through the system and how the many sub-processes were related to each other.

- The most important steps of DFD Level-1 were:
- Managing Users
- The user gave details to sign up and log in.
- The system checked the user's information in the database and finished the process of registering and logging in.
- Search for and recommend a destination.
- The system took in the user's information when they looked for a place to travel.
- The Recommendation engine looked at the user's interests, budget, and past data to suggest places to go.
- Making plans for a trip and budgeting
- While making a travel plan, the user typed in costs for transportation, hotels, food, and other things.
- The system took that information and made a budget calculation.
- System for Making Reservations

- The user asked to book a hotel, restaurant, or ride.
- The system transmitted the request to the Travel Service Provider and then sent it back to the user to confirm.
- Integration of Data in Real Time
- The system got information on the weather, flights, and traffic from a number of APIs.
- There was a direct link between this data and the user's journey plan.
- System for Feedback and Review
- The user wrote reviews and comments on their trip.
- The system saved the information in the database and used it to make better suggestions in the future.
- The main flow of information was:
- The user gave the system input, which it processed through different steps. Then it talked to the database and outside services, and finally it sent the output back to the user.

CLASS DIARAM



So, DFD Level-1 showed how our system worked more clearly.

To guarantee the timely delivery of the "Trip-Trove" application, effective project management is essential for optimizing resource distribution and enhancing collaboration. The project will integrate agile methodologies with robust project management tools such

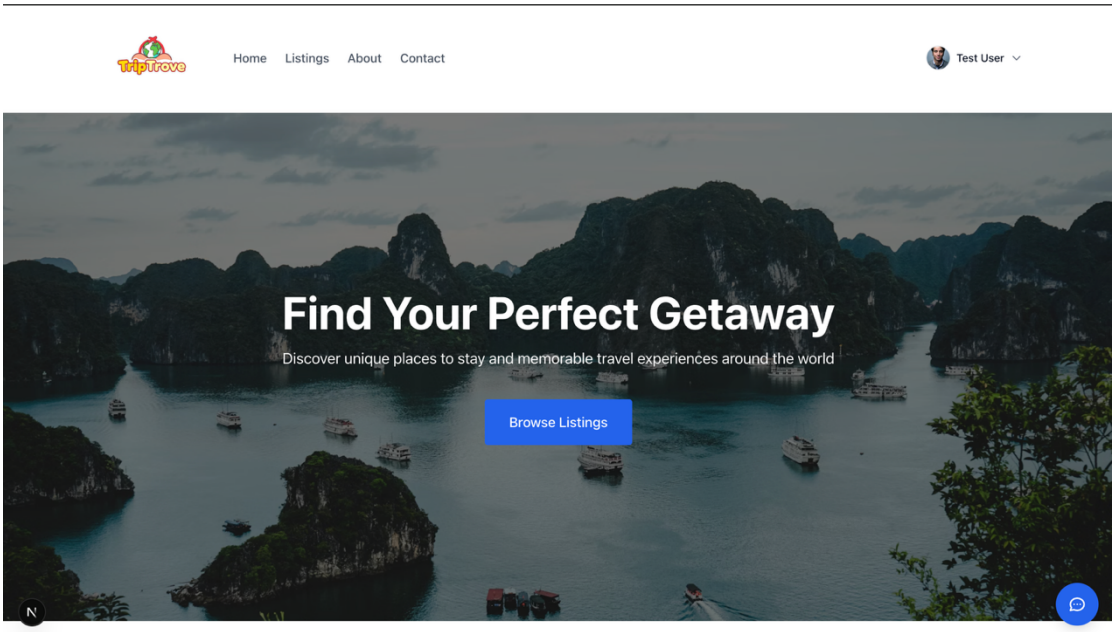
as Jira or Trello to achieve this goal.

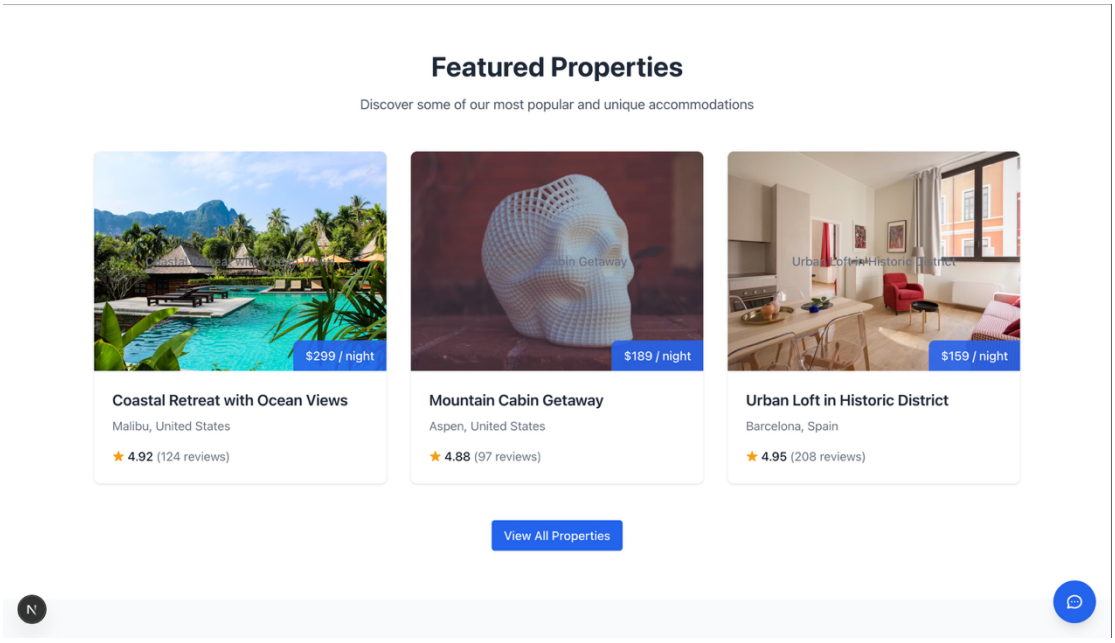
3.1.6: UI Design:

User Interface (UI) Design was a big aspect of my project. We made the decision at the start that the whole system would be easy for anyone, even a first-time user, to comprehend and operate. So, we attempted to make the UI simple, clear, and easy to use.

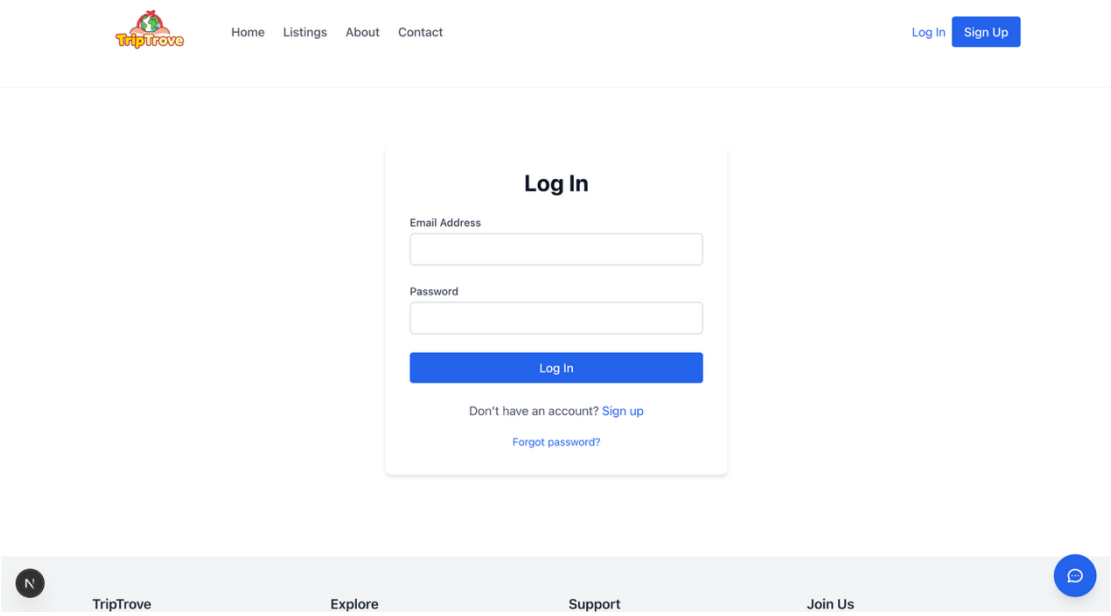
- We started by sketching out the layout of the homepage, login page, dashboard, search choices, and travel suggestions on paper. After that, we used those sketches to make the website's UI.
- These were the primary parts of my UI design:
- Design of the homepage
- We put a simple search bar on the site so that users can quickly find places to vacation.
- We also put a pretty picture and a brief slogan in the hero area to draw in people who love to travel.
- Log in and sign up for User Authentication
- The login and signup pages have a simple design.
- We made the form fields small and easy to understand so that the user can fill them out fast.
- Dashboard
- The dashboard featured the user's past trips, suggestions, and booking information.
- We used a card-based design here to make it clear what each piece of information was.
- Page for Search and Suggestions
- In the UI, the results were shown in a list format when the user searched for a place to go.
- There were pictures, a short explanation, a budget, and ratings for each result.
- Interface for Booking
- We made the booking system's user interface very basic.
- With just one click, the user might book a hotel, airline, or dinner.
- Design that responds
- The whole UI worked on both mobile and desktop.
- We made sure that the UI looked decent even on small screens.
- Lastly, I always felt that the user shouldn't become confused when I was creating the UI. They can find their way around effortlessly and receive the information they need swiftly.

Home Page:

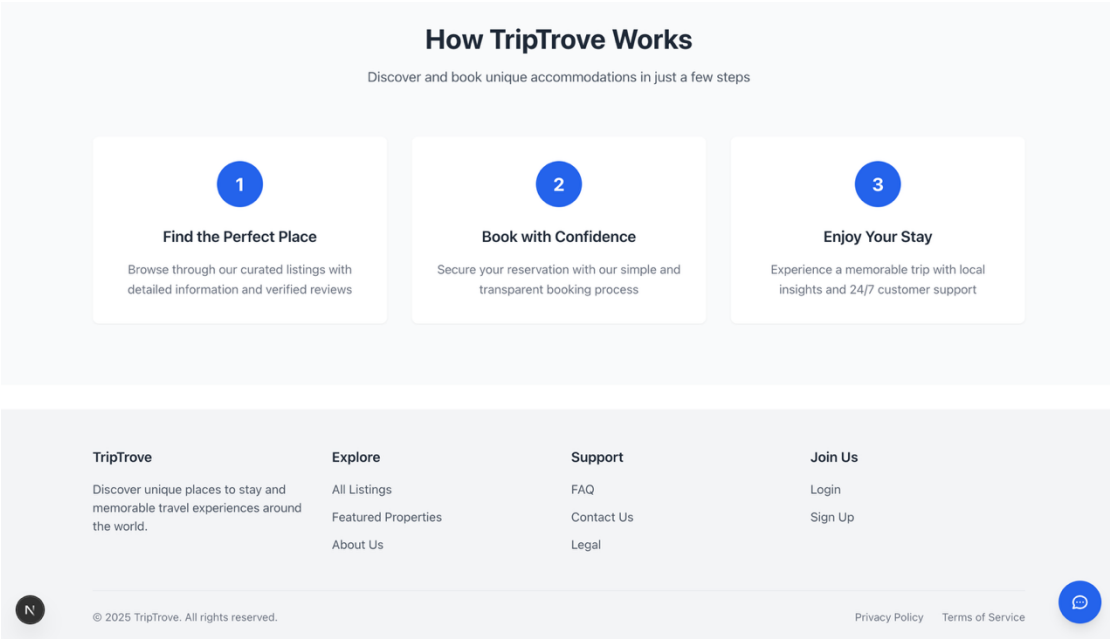

TripTrove
Home
Listings
About
Contact
Test User
Find Your Perfect Getaway
Discover unique places to stay and memorable travel experiences around the world
Browse Listings


Featured Properties
Discover some of our most popular and unique accommodations
$299 / night
Coastal Retreat with Ocean Views
Malibu, United States
4.92 (124 reviews)
$189 / night
Mountain Cabin Getaway
Aspen, United States
4.88 (97 reviews)
$159 / night
Urban Loft in Historic District
Barcelona, Spain
4.95 (208 reviews)
View All Properties

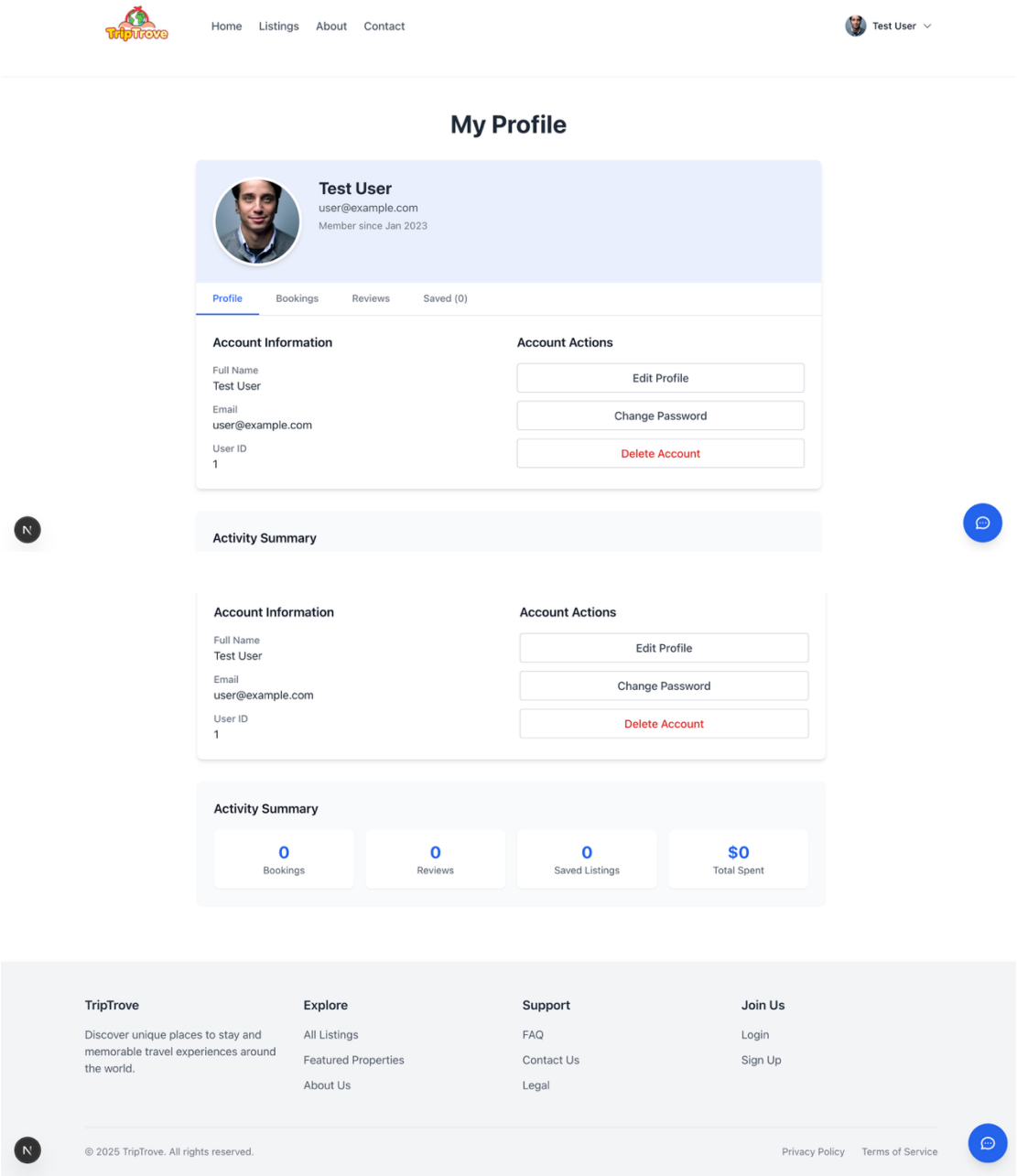
Login Page:



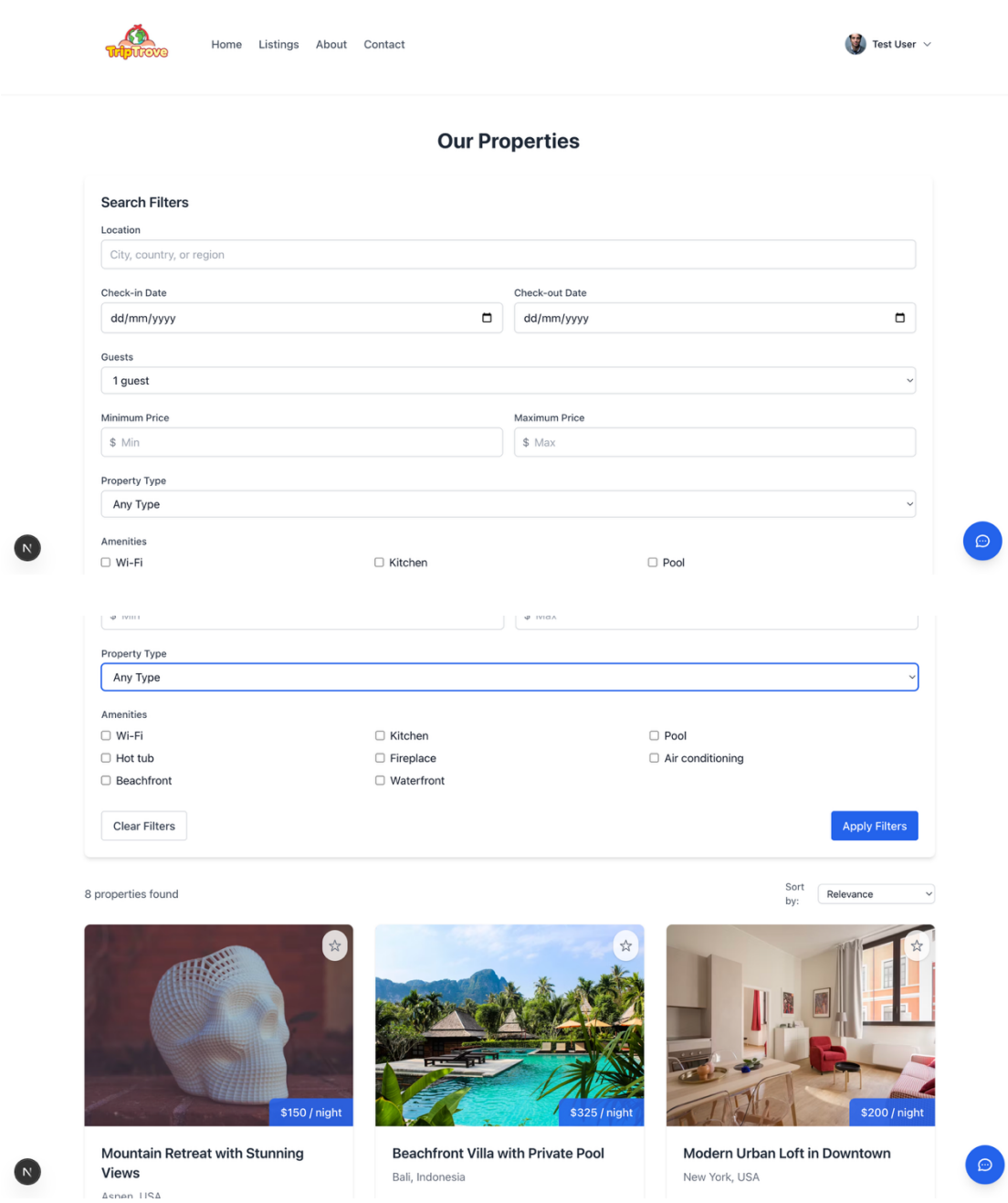
Footer Section:

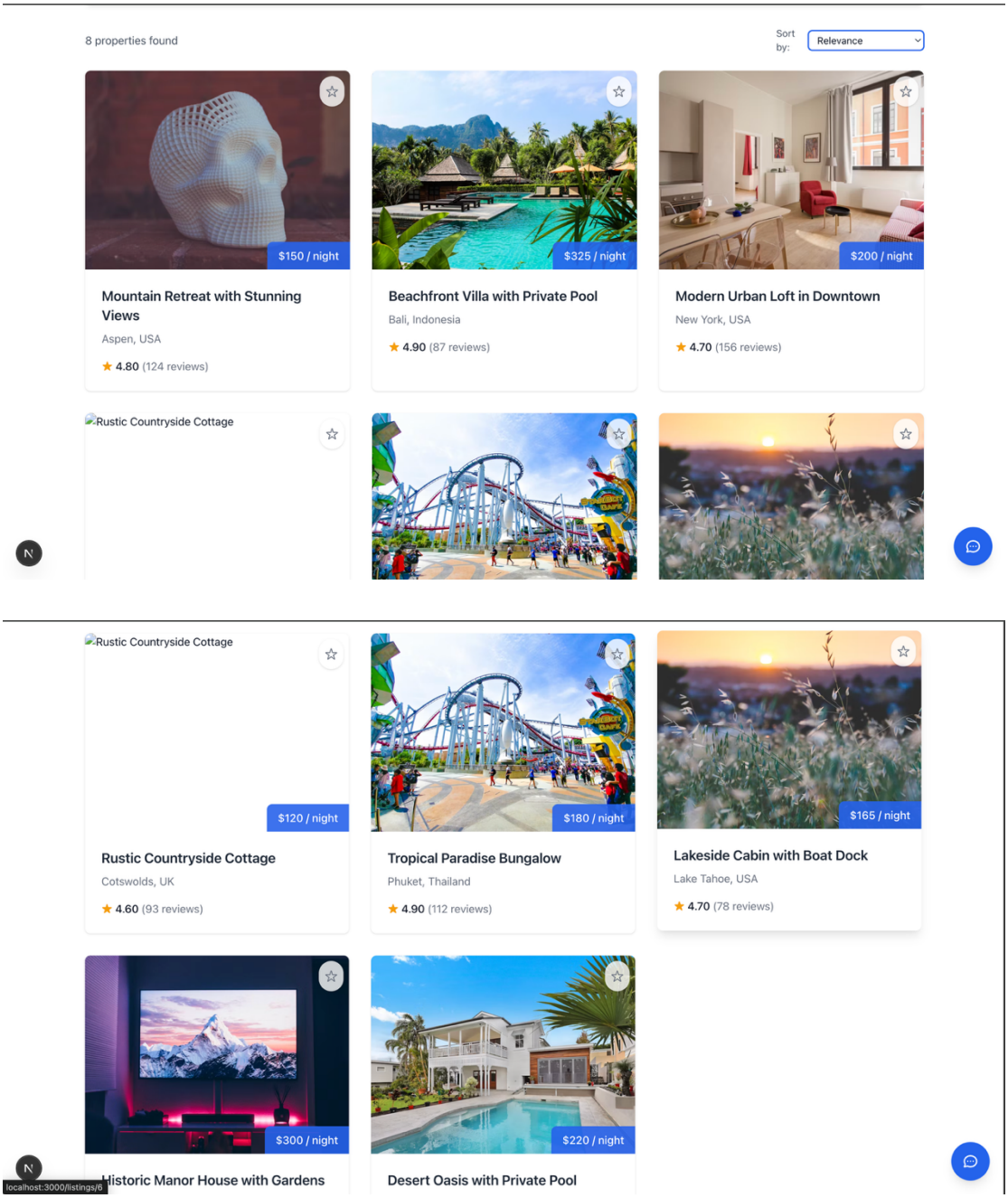


Profile Page:

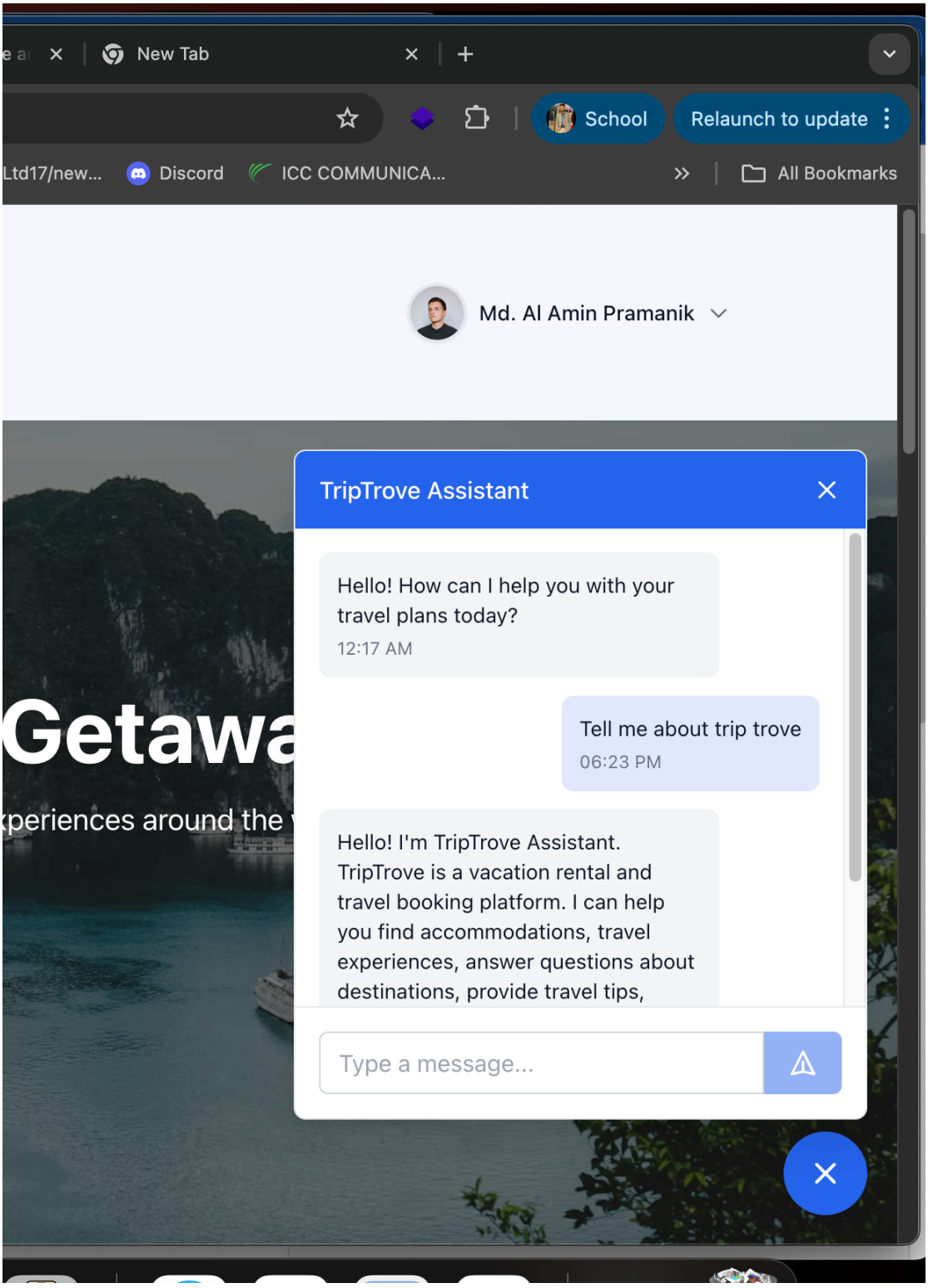


Service Page:

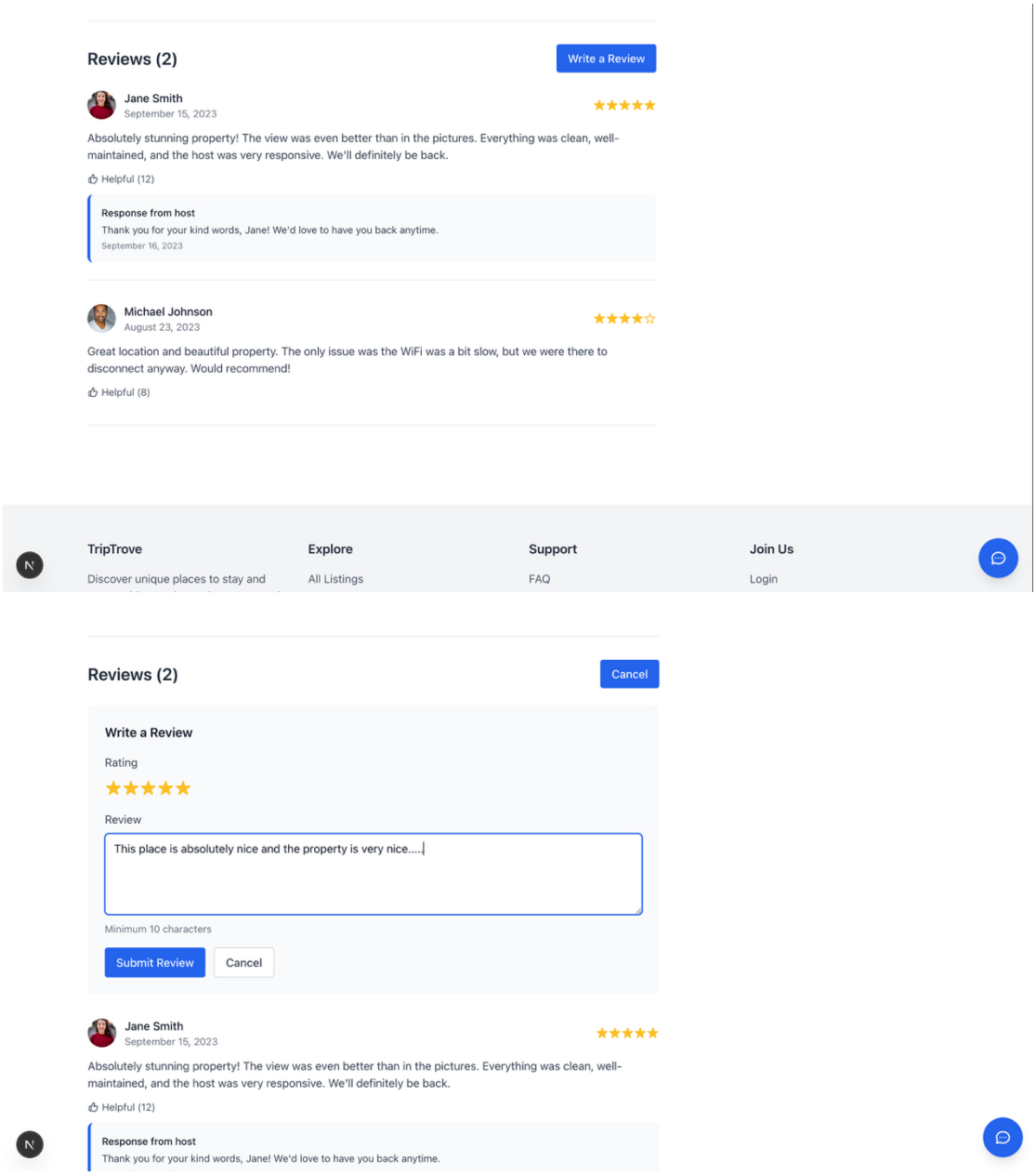



8 properties found
Sort by:
Relevance
$150 / night
Mountain Retreat with Stunning Views
Aspen, USA
★ 4.80 (124 reviews)
$325 / night
Beachfront Villa with Private Pool
Bali, Indonesia
★ 4.90 (87 reviews)
$200 / night
Modern Urban Loft in Downtown
New York, USA
★ 4.70 (156 reviews)
Rustic Countryside Cottage
$120 / night
Rustic Countryside Cottage
Cotswolds, UK
★ 4.60 (93 reviews)
$180 / night
Tropical Paradise Bungalow
Phuket, Thailand
★ 4.90 (112 reviews)
$165 / night
Lakeside Cabin with Boat Dock
Lake Tahoe, USA
★ 4.70 (78 reviews)
$300 / night
Historic Manor House with Gardens
$220 / night
Desert Oasis with Private Pool
localhost:3000/listings/6

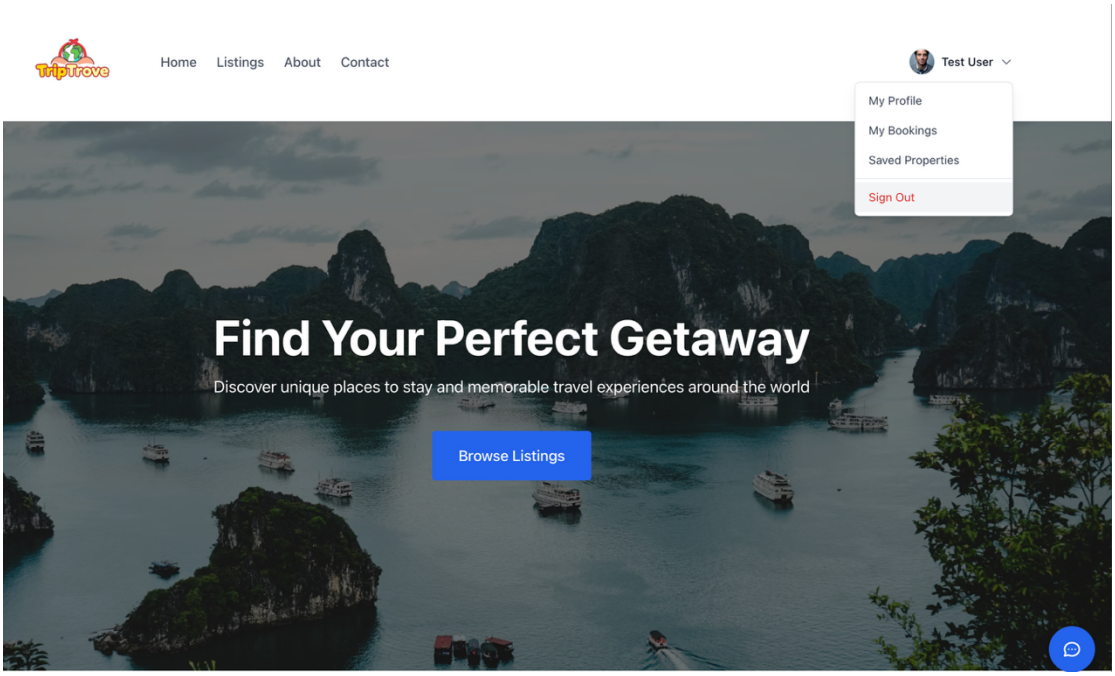
Chatbot Section:

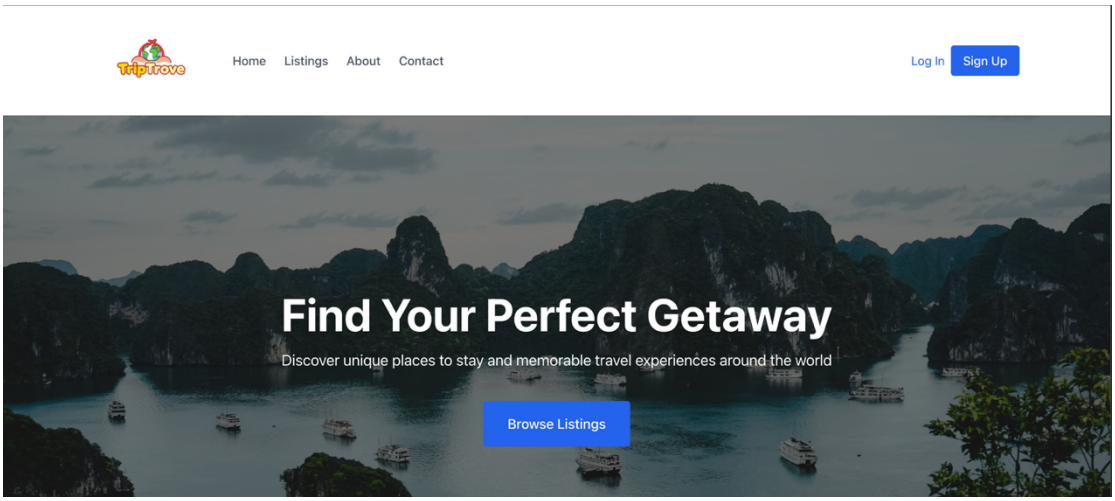


Customer Review Page:

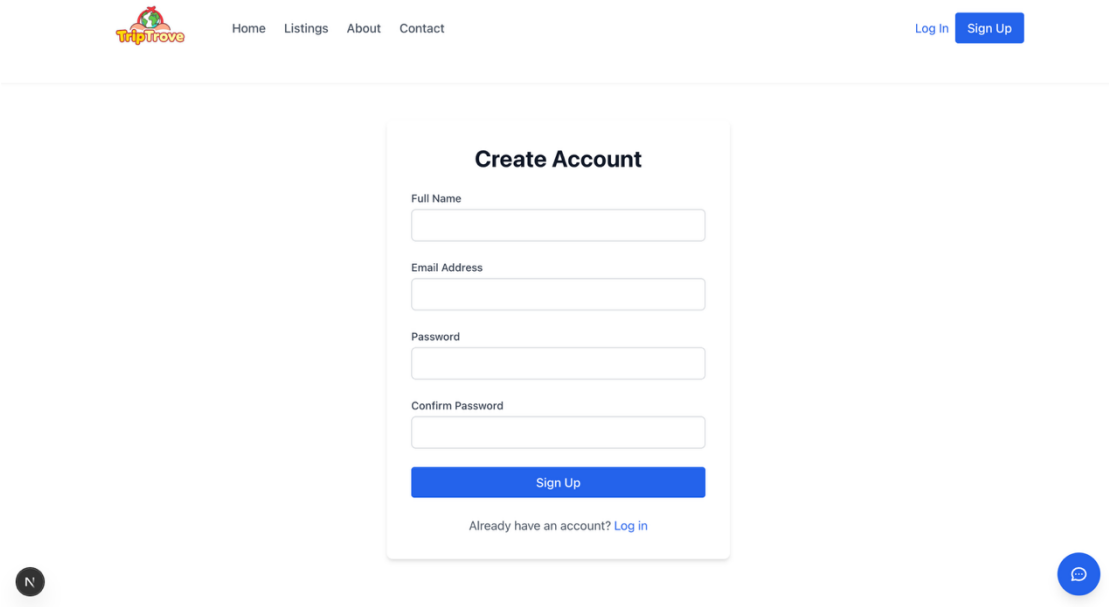


Sign Out Page:

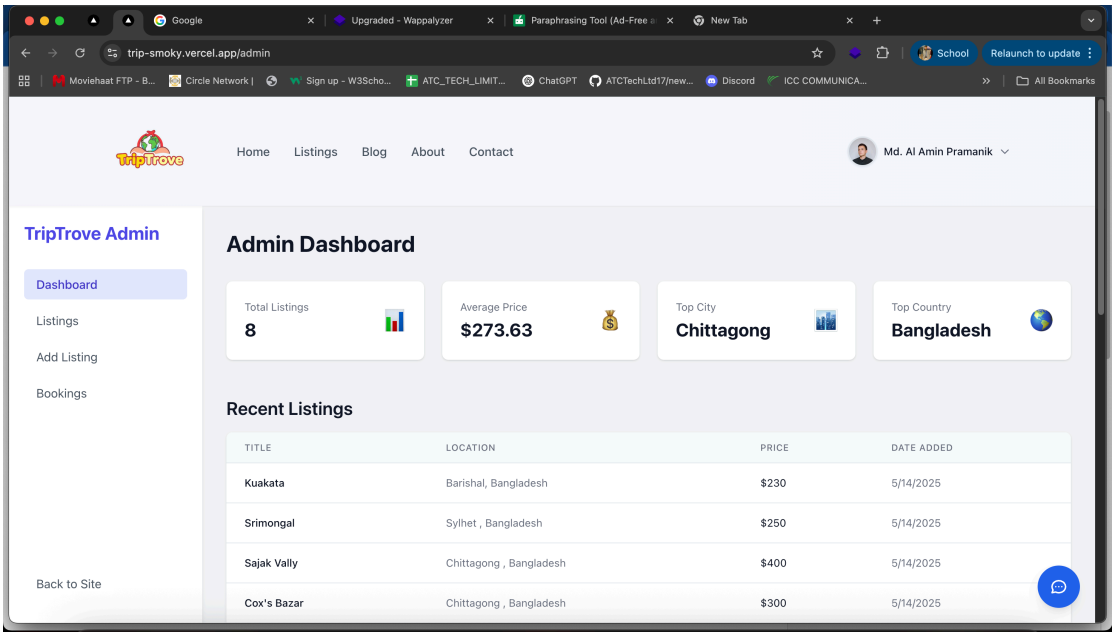


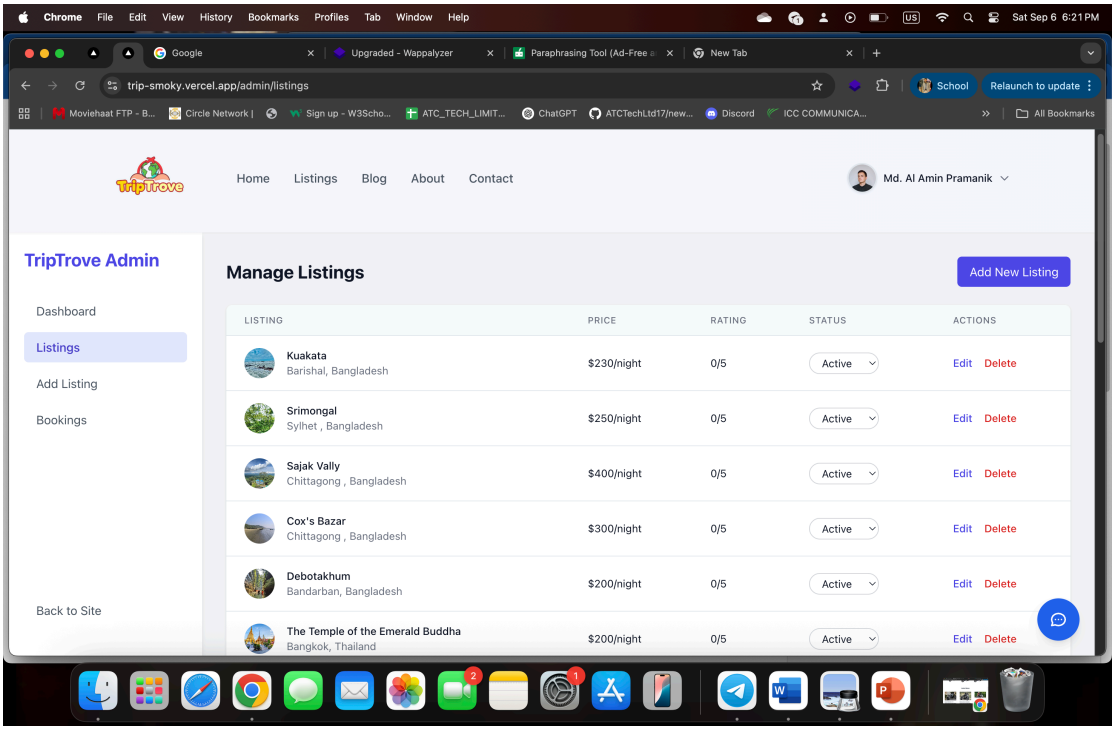


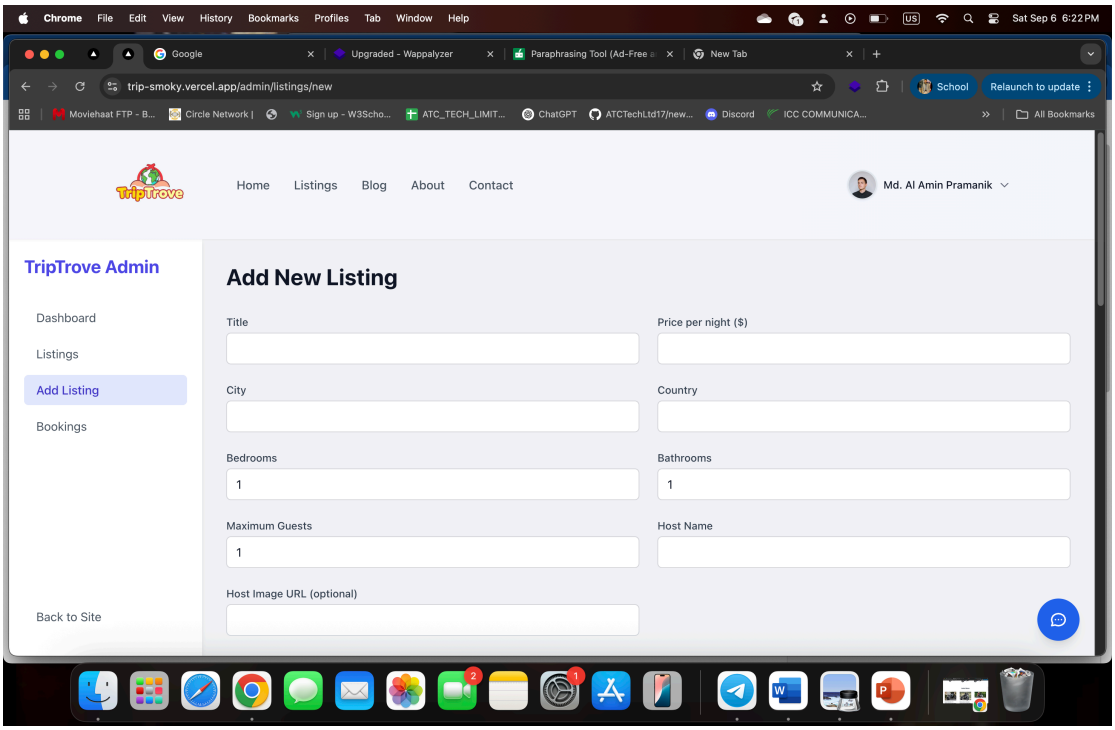
Sign Up Page:

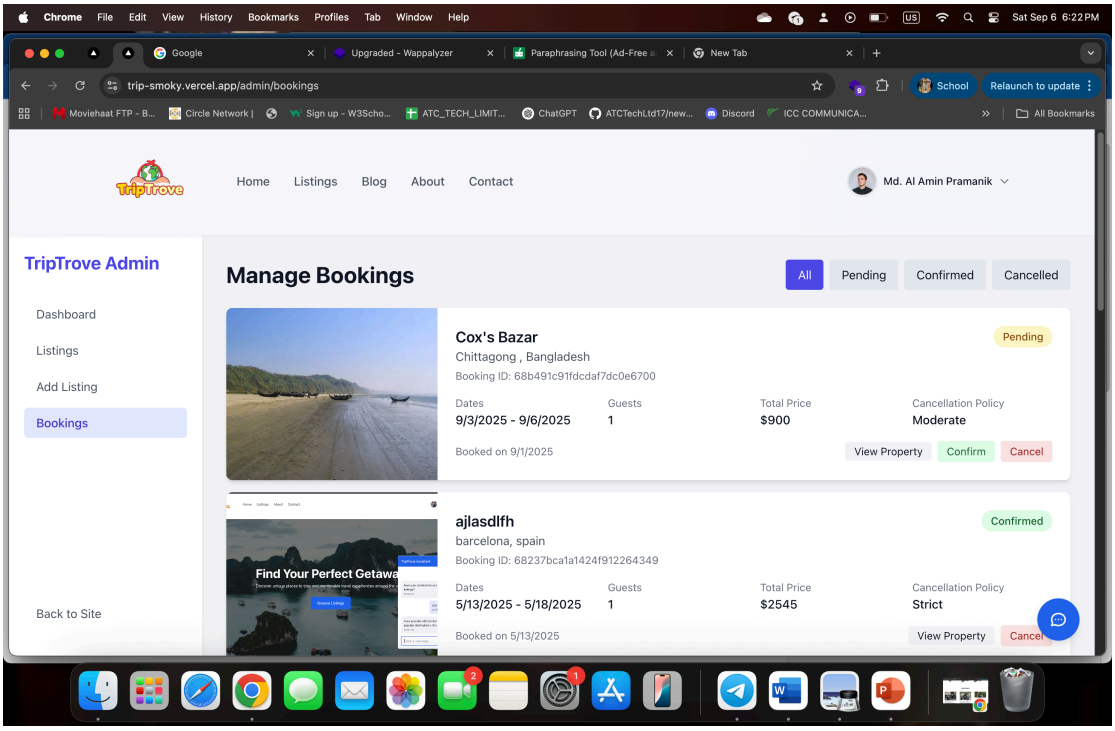


Admin Dashboard:




trip-smoky.vercel.app/admin/listings
Home
Listings
Blog
About
Contact
Md. Al Amin Pramanik
TripTrove Admin
Dashboard
Listings
Add Listing
Bookings
Back to Site
Manage Listings
Add New Listing
LISTING
PRICE
RATING
STATUS
ACTIONS
Kuakata
Barishal, Bangladesh
$230/night
0/5
Active
Edit
Delete
Srimongal
Sylhet , Bangladesh
$250/night
0/5
Active
Edit
Delete
Sajak Vally
Chittagong , Bangladesh
$400/night
0/5
Active
Edit
Delete
Cox's Bazar
Chittagong , Bangladesh
$300/night
0/5
Active
Edit
Delete
Debotakhum
Bandarban, Bangladesh
$200/night
0/5
Active
Edit
Delete
The Temple of the Emerald Buddha
Bangkok, Thailand
$200/night
0/5
Active
Edit
Delete


trip-smoky.vercel.app/admin/listings/new
Home
Listings
Blog
About
Contact
Md. Al Amin Pramanik
TripTrove Admin
Dashboard
Listings
Add Listing
Bookings
Back to Site
Add New Listing
Title
Price per night ($)
City
Country
Bedrooms
1
Bathrooms
1
Maximum Guests
1
Host Name
Host Image URL (optional)



3.5: Detailed Methodology and Design

In this project we use, aspects such as model assessment, prototype development, system testing, and model training. Agile methodologies, which promote flexibility and incremental development, are employed to steer Trip-Trove's creation. This approach enables the development team to swiftly adapt to user input and changing needs, ensuring that the final product is not only effective but also aligns well with user preferences. A primary focus will be the creation of a user-friendly, intuitive platform that leverages cutting-edge artificial intelligence to deliver personalized travel recommendations.

- Here are the steps we took to do my work in detail
- Analyzing Requirements
- First, we got the needs of the users.
- We made a list of the things that the travel system would need, like search, recommendations, booking, and figuring out how much money you have.
- System Design we built a Context Diagram and a DFD Level-1 to show how the data flows.
- This made it evident how the system would turn input into output.
- Designing the database. We made an ER diagram for the database.
- We made a User Table, a Destination Table, a Booking Table, and a Feedback Table here.
- We made sure that the data was consistent by showing how each table was related to the others.
- Putting together an algorithm and an AI model

- We utilized a simple AI model to make the recommendation system.
- The system looked at the user's input (location, budget, preference) and suggested appropriate places to go.
- UI/UX Design・we made the interface basic and clear so that users could utilize it easily.
- We put the homepage, search bar, dashboard, and booking system in different layouts.
- Implementation・At first, we made a system that worked on the web.
- It slowly turned into a full-fledged web app.
- Testing and Evaluation・we tested each module on its own.
- We checked to see if the user input was being sent out and if the suggestions were operating as they should.

In short, in the Detailed Methodology and Design section of this project, we first figured out what the user needed and then made the data flow, database, algorithm, and user interface to meet those needs. Finally, we combined them to create a functional AI-Enhanced Travel Platform. While working on this project, we followed a specific method so that the system development process was completed properly.

3.3: Project Plan

While working on this project, we followed a specific method so that the system development process was completed properly. At first, we tried to figure out what the problem was and what the consumer needed. After that, we made the system architecture, data flow, and user interface design one step at a time.

Here are the steps we took to do my work: Analyzing Requirements. First, we got the needs of the users. We made a list of the things that the travel system would need, like search, recommendations, booking, and figuring out how much money you have.
System Design: We made the data flow in the Context Diagram and DFD Level-1. This made it evident how the system will turn input into output.
Design of the database: We made an ER diagram for the database.
We made a User Table, a Destination Table, a Booking Table, and a Feedback Table here. We made sure that the data was consistent by showing how each table was related to the others. Putting together an algorithm and an AI model, we utilized a simple AI model to make the recommendation system. The system looked at the user's input (location, budget, preference) and suggested appropriate places to go.

UI/UX Design: We designed the interface to be basic and clear, allowing users to use it easily. We put the homepage, search bar, dashboard, and booking system in different layouts.

Implementation: At first, we made a system that worked on the web. It slowly turned into a full-fledged web app.
Testing and Evaluation: We tested each module on its own. We checked to see if the user

input was receiving output and if the suggestions were operating as they should.

In summary, in the Detailed Methodology and Design part of this project, we first understood the user's needs, then created the data flow, database, algorithm, and user interface accordingly. Finally, we combined them to create a functional AI-Enhanced Travel Platform. The implementation phase of "Trip-Trove" signifies an important transition from the theoretical models and designs discussed in previous chapters to a fully functional application. This stage involves more than just coding; it also involves bringing ideas to life and making sure that all of the design and technical parts work together well. This chapter will go into great detail about the implementation process, focusing on the most important parts.

3.4: Task Allocation

Before we started the whole project, we broke each assignment down into smaller ones. This saved time and made sure that everyone had the same amount of work to do. We had to perform all the work by myself because we completed the project independently. However, we broke the work down into smaller pieces and did them one at a time.

My job assignments were as follows:
Requirement Gathering: We gathered user requirements and set the first limits for the system. We built a Context Diagram, a Data Flow Diagram (Level 0 and Level 1), and an ER Diagram for the system analysis and diagram.

Database Design: We set up the tables, primary keys, foreign keys, and relationships.
UI/UX Design: We designed and developed the homepage, login/signup page, dashboard, and booking system.

Frontend Development: We designed and developed the project's user interface using HTML, CSS, and JavaScript.

Backend Development: We developed the server-side code, established the database connection, and implemented the search and recommendation system.
Testing: We tested each module and fixed any problems we noticed.

Final Report and Presentation: We wrote the report, recorded it, and prepared for the talk.
In short, we divided each step of the project according to the plan. We were able to finish the project easily and correctly by splitting up the work, even though we performed it all by myself.

4.4: Summary:

In this chapter, we have discussed the research steps, methodology and various designs used for my project. First, I looked at the project's needs and wrote down both functional and non-functional requirements. Then we made a Context Diagram and a Data Flow Diagram (Level 0 and Level 1) so that people can readily understand how the system works. Later, we have designed UI/UX, where how the user will use the system is clearly presented. In the Detailed Methodology and Design section, we have explained how we worked step by step. I have also divided the entire project work into small parts by creating Project Plan and Task Allocation, so that the work can be completed on time and correctly. Finally, it can be said that through this chapter, the structure, planning and implementation steps of my project have been explained in detail.

CHAPTER 4
Implementation and Results

5.1: Environment Setup:

After putting the project into action, I saw that the system was working as it should. The database is storing the user's input appropriately, and the data may be retrieved again as needed. First of all, we setup VS Code: (NPM, JS and other things.) The search option is operating well and giving users the right information.
The results showed that the method works really well when you look at them. It can handle more than one request at a time. The consumers' responses showed that they were comfortable utilizing the system. They rapidly learned how to utilize it because the UI was straightforward and easy to understand.
But there were certain problems, such how long it took to load data on slow internet connections. Also, the UI didn't always work well on mobile view. The project will be much better if these issues are fixed in the future.

5.2: Testing and Evaluation:

While working on this project, we followed a specific method so that the system development process was completed properly. At first, we tried to figure out what the problem was and what the consumer needed. After that, we made the system architecture, data flow, and user interface design one step at a time. There are two step we follow for the testing (manually testing and automated testing). After putting the project into action, we saw that the system was working as it should. The database is storing the user's input appropriately, and the data may be retrieved again as needed. The search option is operating well and giving users the right information.
The results showed that the method works really well when you look at them. It can handle more than one request at a time. The consumers' responses showed that they were comfortable utilizing the system. They rapidly learned how to utilize it because the UI was straightforward and easy to understand.
But there were certain problems, such how long it took to load data on slow internet connections. Also, the UI didn't always work well on mobile view. The project will be much better if these issues are fixed in the future.

5.3: Results and Discussion:

After putting the project into action, I saw that the system was working as it should. The database is storing the user's input appropriately, and the data may be retrieved again as needed. The search option is operating well and giving users the right information. The results showed that the method works really well when you look at them. It can handle more than one request at a time. The consumers' responses showed that they were comfortable utilizing the system. They rapidly learned how to utilize it because the UI was straightforward and easy to understand.
But there were certain problems, such how long it took to load data on slow internet connections. Also, the UI didn't always work well on mobile view. The project will be much better if these issues are fixed in the future.

5.4: Summary:

We have gone into great depth on how to put my project into action in this chapter. First, we got everything ready and employed the right tools and technology. After that, we ran a number of tests on the system to make sure it was working right and doing what it was supposed to do. The comparison demonstrated that my project is easy to use and works well.
In the end, we can conclude that the endeavor was a success. It has been able to do what it was meant to do, even though there are some problems. It will be a better system in the future if certain new features are implemented and some old problems are fixed.

Chapter 5

Engineering Standards and Design Challenges

5.1: Compliance with the Standards:

While developing my project, we tried to work according to various engineering and software standards. Because when you create a system, it does not just work, but if it is built according to specific rules and criteria, it is sustainable and usable in the long term.

First, we worked according to the steps of the software development life cycle (SDLC). For example, requirements analysis, design, implementation, testing, and maintenance. As a result, the continuity of work was maintained and quality control was possible at each step.

Second, we followed coding standards when I developed the software. For instance, we made sure that the names of variables and functions were basic and made sense, and we included comments to the code so that people might readily understand it in the future. Apart from this, I used modular programming so that each part is separate and reusable.

Third, I followed database design standards. we applied normalization to the database so that there is no data redundancy and the accuracy of the data is maintained. we also added authentication and authorization to protect user information.

Fourth, we also looked at UI/UX standards. We aimed to make the user interface easy to use, quick to respond, and easy to get to. We used colors, typefaces, and layout in a way that made sense to the users.

Lastly, we also thought about security standards. We took necessary measures to prevent attacks like password hashing, input validation, and SQL injection.

In short, my project was developed following internationally accepted software engineering standards and best practices. As a result, the project was not only effective, but also secure, sustainable, and user-friendly.

5.1.1: Software Standards:

We followed various software standards in the software development of my project. We followed naming conventions while coding, so that the names of each variable and function could be clearly understood. We divided the code into small modules, so that it could be easily reused and maintained. We also used to try–catch for error

handling and wrote comments in each code section. We followed normalization in database design and implemented the project step by step in SDLC (Software Development Life Cycle).

5.1.2: Hardware Standards:

We utilized basic yet good quality hardware. We used a PC with a Core i5 CPU, 8GB of RAM, and SSD storage to write the code and run the server. This computer is fast enough to do both. We also utilized the right hardware setup when we set up the server and tested it locally. We made sure that the hardware I chose wouldn't cause slow performance or crashes when we were developing and testing it.

5.1.3: Communication Standards:

We have followed some principles to keep the project's communication standards high. We utilized REST API for client-server communication because it is fast and dependable for exchanging data. We utilized JSON format to send data between the user and the server because it is small and easy to read.
We also utilize the HTTPS protocol to protect data by sending it in an encrypted form. We have used GitHub and Git to talk to others on the internal team. This has made it easier to share code and keep track of different versions.

5.2: Impact on Society, Environment and Sustainability:

- **My initiative, Trip-Trove:** An AI-Enhanced Travel Discovery Platform, has made society, the environment, and sustainable development better in many ways.

- **Effect on society:** This platform has made it easier and faster for people to organize their journeys. In the past, you had to rely on guidebooks, travel agencies, or friends to get around. Now, it is a lot easier to do it online. People can now spend time with their family, travel with friends, and have new experiences because of this. Also, more jobs may become available if new jobs are developed in the tourism industry.

- **Effect on the environment:** AI has reduced unnecessary travel and time spent organizing trips. For instance, users can choose the best route, hotel, and place to stay ahead of time, which cuts down on fuel use and extra trips. Also, consumers can choose eco-friendly solutions, such as eco-friendly hotels or green tourism, once they have the correct information. This makes it easier to protect the environment.

- **Effect on long-term development:** This platform can positively help long-term growth. People can arrange their trips here based on their budget, time, and needs. This cuts down on wasteful costs, makes better use of the travel sector's resources, and generates a balanced ecology. Also, because it is an online system,

there is less need for paper-based guidebooks and pamphlets, which is excellent for the environment.

- **To sum up, my initiative is more than simply a travel platform:** It also helps society go forward, raises awareness of environmental issues, and supports sustainable growth. In order to assess the performance of the prepared Marshall specimens, both mechanical properties, like stability and flow, and volumetric properties, like air void, void in mineral filler (VMA), void filled with asphalt (VFA), were evaluated. These tests are very important in the selection of Optimum Bitumen Content (OBC).

5.2.1: Impact On Life:

My project has made people's daily lives better. Earlier, planning a trip used to take a lot of time. If someone wanted to travel, they had to read guidebooks, ask their acquaintances, or take help from a travel agency. As a result, they had to face a lot of problems before enjoying the trip. Now, anyone can plan their trip very easily and, in less time, using this platform.
This facility has made people's lives easier. Especially those who cannot find time to spare due to their busy work schedule, they can now manage everything from home according to their budget, time, and needs. This reduces stress and increases the opportunity to enjoy the trip.

5.2.2: Impact On Society and Environment:

This platform has made travel culture more important in society. Where before many people did not want to travel because of the hassle, now they can easily plan. As a result, families can spend time together, travel with friends and social relationships are becoming stronger.
At the same time, its impact on the tourism sector is very big. Hotels, restaurants, and transit systems all benefit from more people traveling. This creates new jobs and strengthens the local economy.
It also has positive aspects on the environment. If you plan properly before traveling, then unnecessary travel is reduced. This cuts down on pollution and uses less energy. This portal also lets people pick eco-friendly choices, including eco-friendly hotels, travel packages, or green tourism. This helps keep the environment and nature safe.

5.2.3: Ethical Aspects:

We have considered the ethical aspects very seriously in my project. First, keeping the user's personal information confidential was my top priority. No personal data of the user was shared with third parties without permission. Through this, we have maintained data privacy.

Secondly, we have tried to avoid false or misleading information in the system. All types of data have been collected from reliable sources, so that users get accurate and real information.
Finally, we have designed the platform in such a way that it is safe for the user. There is no harmful or fake advertising in it. Therefore, it is a reliable system from an ethical point of view.

5.2.4: Sustainability Plan:

There is a plan for this project to last a long time. First of all, it's easy to keep up with because it's a web-based system. Plans are in place to turn it into a mobile app in the future so that more people may utilize it simply.
Second, new features will be added to the system regularly, such as real-time traffic updates, weather information or notifications regarding special offers. This will keep the system always updated and users will be interested in using it again and again.
Third, there are plans to further encourage eco-friendly travel. The system will have a special category of eco-friendly hotels or travel packages, so that people can travel without harming the environment.
All in all, this project of mine will bring benefits to society, the environment and people's lives in a sustainable way, not only now, but also in the future.

5.3: Project Management and Financial Analysis:

Project management is an important step, because no project can be completed successfully without proper planning. In my project, we divided the work step by step. First, I did a requirement analysis, where I tried to understand the user needs and system limitations. Then we gradually divided the work of design, development, testing and deployment. We set a time for each step and reviewed it after the work was completed. This reduced the number of errors and the work progressed properly.
During project management, we also divided the work of the team members. For example, someone was in charge of database design, someone worked on UI/UX, and I mainly worked on backend and system integration. This allowed everyone to work according to their skills and the project was completed on time.

- **Financial Analysis:**
- Cost is a big issue in any project. Since my project was done for academic purposes, it did not cost much. However, we analyzed the estimated cost of the entire project.

- **Hardware Cost:** We used my own laptop, so I did not have to buy separate hardware. However, if you buy it new, its cost can be estimated at around 50,000 takas.

- **Software Cost:** We mainly used open-source tools and free software. For example – VS Code, GitHub, MySQL etc. So, there is almost no separate cost here. However, if you use licensed software, the cost would have increased a lot.

- **Internet and Hosting Cost:** The internet cost for development and testing was around 1,000 taka per month. In addition, if you take the domain and hosting charges to host the system online, it will cost around 5,000 taka per year.

- **Manpower Cost:** Since this project was done by myself and my teammates, there was no separate manpower cost. However, if a professional developer or designer had been hired, the cost would have been much higher.

Overall, my total estimated cost of this project could be 55,000 – 60,000 takas, if all the resources were purchased new. Since we used my own resources, the actual cost has been much lower.
In summary, we have completed the project management on time by dividing the work into steps and from the financial analysis we have understood that it is a low-cost but effective solution. If this is taken to a larger scale in the future, the financial investment will increase, but its return will also be much higher, because it can make a big contribution to the travel and tourism sector.

5.4: Complex Engineering Problem:

We designed and built my final year project, Trip-Trove, entirely on my own. We made all the choices and decisions that led to the whole procedure. We had to solve a lot of complex engineering problems on my own, which were hard but also really helpful for me. In this part, we will go over those problems and how we fixed them.

- **Designing the interface and user experience:**

  The hardest part of executing the project alone was making a user-friendly interface that was easy to understand. We wanted to ensure the user did not get confused. We had to put myself in the user's shoes and think about how they would book a hotel or resort, look for a trip, or obtain updates on information. To do this, we developed a responsive and easy-to-use front end with React.js. we had to plan and do everything myself because I was working alone.

- **Managing data and making a database that can grow:**

  One of the most crucial tasks for the project was to keep track of and update information about hotels, resorts, and travel. We created a database using MongoDB, which can easily store and update data. We also designed the database structure myself to manage data relationships and enable fast queries.

- **Adding a safe way to pay online:**

  A vacation booking site needs a way to pay that is safe. We used the Stripe API to make the whole payment process easier, so users didn't have to worry about it. To ensure payment security, we implemented various endpoint protections and encrypted data.

- **Problems with coordination and technology:**

  We had to handle all the technical details on my own, including the frontend, backend, database, and API interface. Sometimes we had to fix flaws in the code, other times we had to make it run faster, and other times we had to learn new technologies. We learned how to solve engineering difficulties and how to deal with real situations during this whole process.

- **Making sure that user needs and reality matchup:**

  As an engineer, your job is not only to write code; you also have to come up with solutions that meet the needs of the user. We thought about this when we were creating each part of the project. Because of this, consumers can quickly plan trips, get information, and book safely.

In short, working on this project by myself has taught me how to solve problems, improve my technical skills, and deal with real-world engineering problems. This is not simply a project for me; it is a great way to learn and gain confidence in a new way.
Project Link: https://trip-smoky.vercel.app/

5.4.1: Complex Problem Solving:

We had to deal with a lot of hard challenges while working on my final year project, Trip-Trove, by myself. It was a test of my talents and imagination to solve each challenge because we did everything myself, from the front end to the back end to the database and API interface.

Table 5.1: Mapping with complex problem solving.

EP1 Dept of Knowledge	EP2 Range Of Conflicting Requirements	EP3 Depth of Analysis	EP4 Familiarity of Issues	EP5 Extent of ApplicableCodes	EP6 Extent Of Stake-holder Involvement	EP7 Interdependence
✓	✓	✓				✓

Mapping with Knowledge Profile for EP1:

Table 5.2: Mapping with knowledge Profile.

K3 Engineering Fundamentals	K4 Specialist Knowledge	K5 Engineering Design	K6 Engineering Practice	K8 Research Literature
✓	✓	✓	✓	✓

- **Making a straightforward and useful flow for the user:** The hardest part was designing a system that people could readily utilize. I made the flow by figuring out what the user needed. we made each page and feature so that it's easy to identify a hotel or resort, book it, and acquire the information you need.

- **Managing data and making it bigger:** There are several kinds of information on the Trip-Trove platform, such as hotels, resorts, and trip places. We made a scalable database with MongoDB on my own, which made it easy to keep the data up to date and make sure that users always got the proper information. It was hard to handle a lot of data and run queries quickly.

- **A Safe and Reliable Payment System:** It's highly crucial for online booking systems to have a safe way to pay. By adding Stripe API, I made sure that users could pay safely. It was a good learning experience; however, it was hard to fix all the security and encryption problems by myself.

- **Only technical coordination:** We had to solve out all the technological problems on my own. I had to fix everything myself, whether it was a problem with the frontend

code or a glitch with the backend. This experience taught me how to swiftly find problems, rank them, and come up with solutions.

- **Working together to solve genuine challenges:** It was hard to find a solution that worked technically and met the user's real demands. We made sure that users could quickly find the information they needed, make a reservation, and have a wonderful time when I was building each feature.

In brief, we learnt how to spot complicated engineering challenges, break them down, and come up with good solutions during this process. Working alone has really helped me get better at solving problems, and it has been a terrific way to get ready for real engineering problems.

5.4.2: Engineering Activities:

We were actively involved in a lot of engineering work while we were creating my final year project, Trip-Trove, by myself. Every stage taught me how to fix problems in the real world and how to use technology. In short, here are the activities:

We were actively involved in a lot of engineering work while we were creating my final year project, Trip-Trove, by myself. Every stage taught me how to fix problems in the real world and how to use technology. In short, here are the activities:

- **Analyze the Requirements:** Before we started the project, we established a goal: to make it easy, safe, and smart for people to plan trips. After that, I considered what kind of features consumers would want, how to handle data, and what kind of user interface would work best. We looked at each feature and made a plan for the project at this step.

- **Design of the system:** First, we planned out how the project would be built. We used Node.js for the backend, React.js for the front end, and MongoDB for the database. We worked with each part of the system to ensure they could all work together and connect.

- **Making the interface:** We designed the UI/UX myself to help users quickly find their way around. We designed each page and feature to make it easy to find and book excursions, as well as view information. We have made the user experience my top priority here.

- **Building the backend:** We built the server, API, and data processing mechanism on the back end with Node.js. We wrote all the code for the logic ourselves, so the user can easily do anything.

- **Managing the database:** Using MongoDB, we created a database that can scale and operate efficiently. We created my own schemas and queries to track and update information about hotels, resorts, and places to visit.

- **Integration of payments:** We used the Stripe API to make sure that online payments are safe. We handled the entire payment process myself, so users can book without worrying.

- **Checking and fixing bugs:** We have tested every part of the project by myself. We detected and fixed any problems with the UI/UX, faults in the functionality, problems with managing data, or issues with payments.

- **Deployment:** Finally, we set up the whole system on Vercel so that people can use the website whenever they want. We made sure that the server and API were working correctly during the deployment.

- All of these technical tasks taught me how to turn a plan into an actual project, how to find flaws, and how to fix them in a way that works. We have gotten a lot better at what I do and am more confident in my abilities by working alone.

- Link to the project: https://trip-smoky.vercel.app/

5.5: Summary:

Table 5.3: Mapping with complex engineering activities.

EA1 Range of re-sources	EA2 Level of Interaction	EA3 Innovation	EA4 Consequences for society and environment	EA5 Familiarity
✓	✓	✓	✓	

We had never done anything like my final year project, Trip-Trove, before. We completed the entire project by myself from start to finish. We had to deal with many problems along the way, and we learnt a lot by doing so. We are initially assumed we needed to create a user system that was easy to use, quick, and safe. After that, we built the frontend, backend, database, API, and payment system all by myself. Sometimes a feature was not operating correctly, other times the data update was not going well, and other times we had to worry about how safe the payment mechanism was. In the end, we had to learn how to solve issues by hand.

We learned how to design based on user needs, break down complex challenges into manageable solutions, and manage the entire project independently. After all the problems were solved and the system was finally working, everyone was happy and satisfied with every moment. In short, Trip-Trove was not simply a project; it was a terrific chance for me to learn, tackle problems, and gain confidence. We learned both technical skills and how to solve engineering problems by working alone.

CHAPTER 6

CONCLUSION

6.1: Summary:

We handled every step of the Trip-Trove project myself, including front-end design, back-end development, database administration, API integration, secure payment system, testing, and deployment. You have to handle and resolve every issue when working alone.

Making travel planning simple, safe, and intelligent was the project's main goal. After all the issues, there was a feeling of satisfaction and excitement when the system finally functioned. We gained knowledge about how to design things according to user needs, deconstruct complex problems, and find workable answers.

6.2: Limitation:

- Even though we finished the project on my own, there are some limits.
- First, some parts of the site, such the rating system and real-time reviews, couldn't be completely used.
- Second, it's hard to scale because we had to manage all the data by myself. If there are a lot of users, the server's performance can go down.
- Third, some advanced user features, such as package customization or intelligent trip suggestions, have not yet been added.
- These limitations leave room for further development in the future.

6.3: Future Work:

- There are many opportunities to make Trip-Trove more user-friendly and robust in the future.
- Adding real-time features for multiple users, such as live booking and reviews.
- Making the app work on mobile devices and be a Native Mobile App.

- Adding a smart AI or recommendation system that can propose trips depending on what the user likes.

- Increasing scalability, so that it can handle more users.
- These future developments will make it possible to transform Trip-Trove into a complete and user-friendly trip platform.

BUSINESS PROCESS MODEL DIAGRAM:

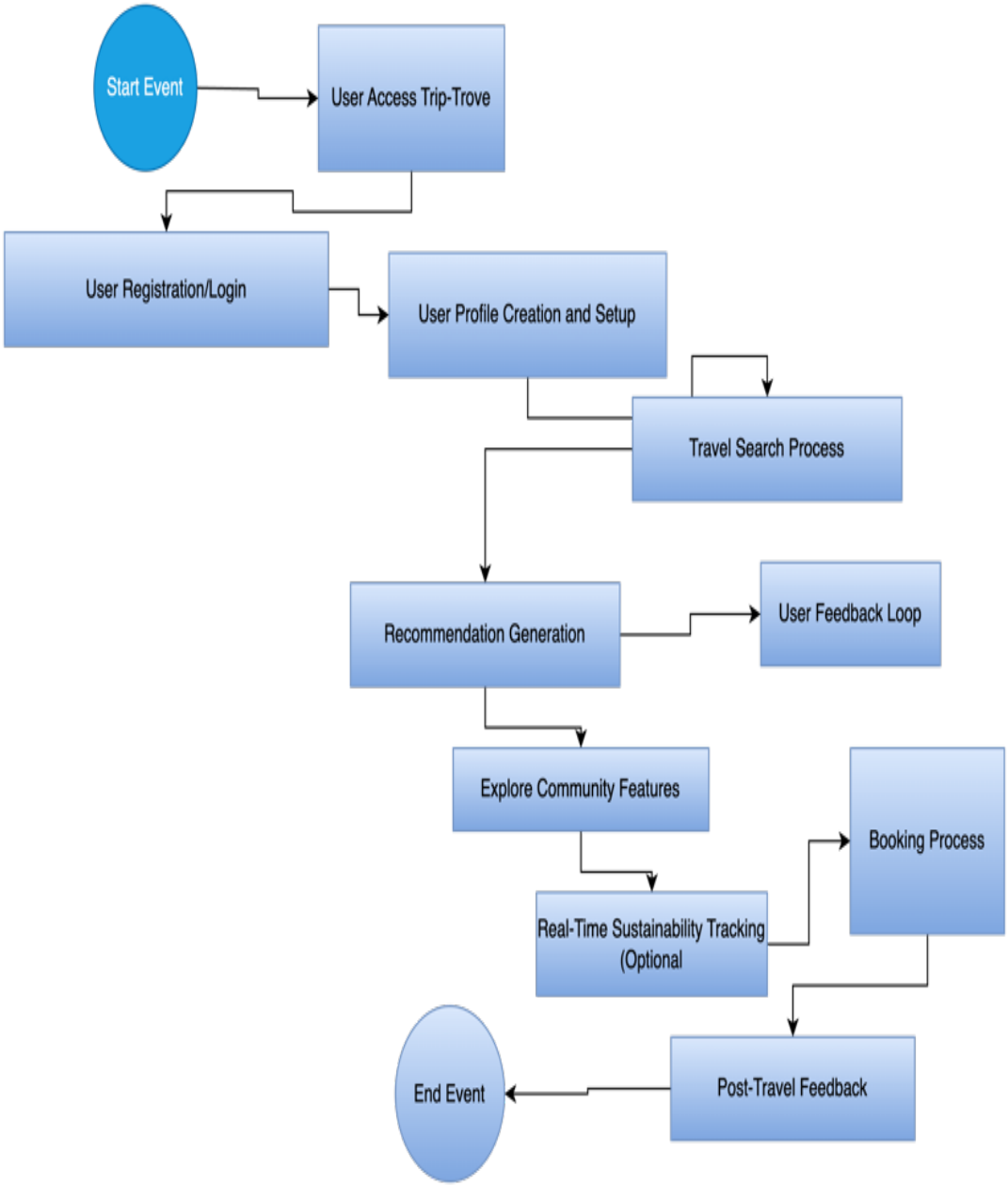


Figure 1: Business Process Model Diagram

USE-CASE DIAGRAM

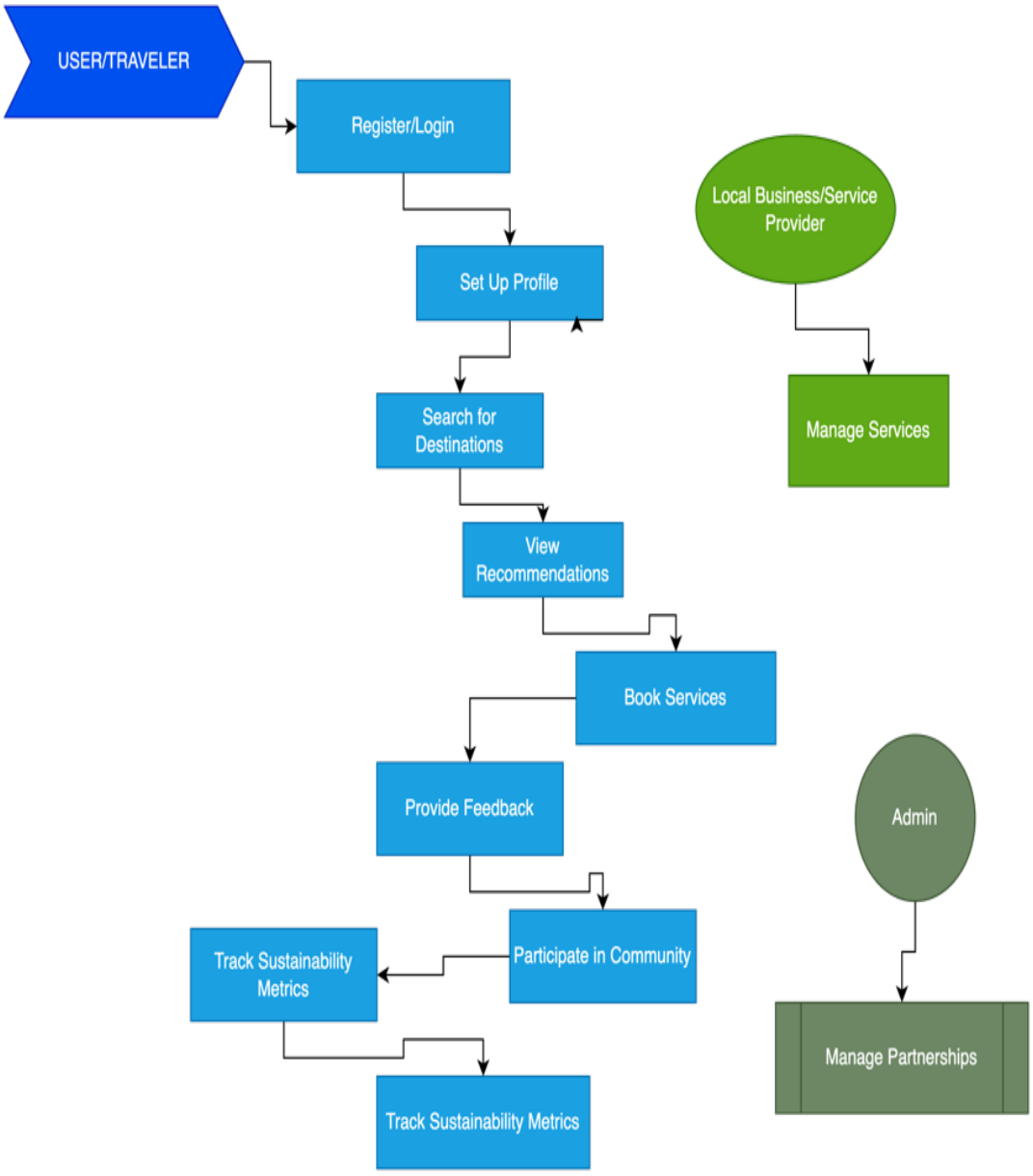


Figure 1.1: Use-Case Diagram

ACTIVITY DIAGRAM

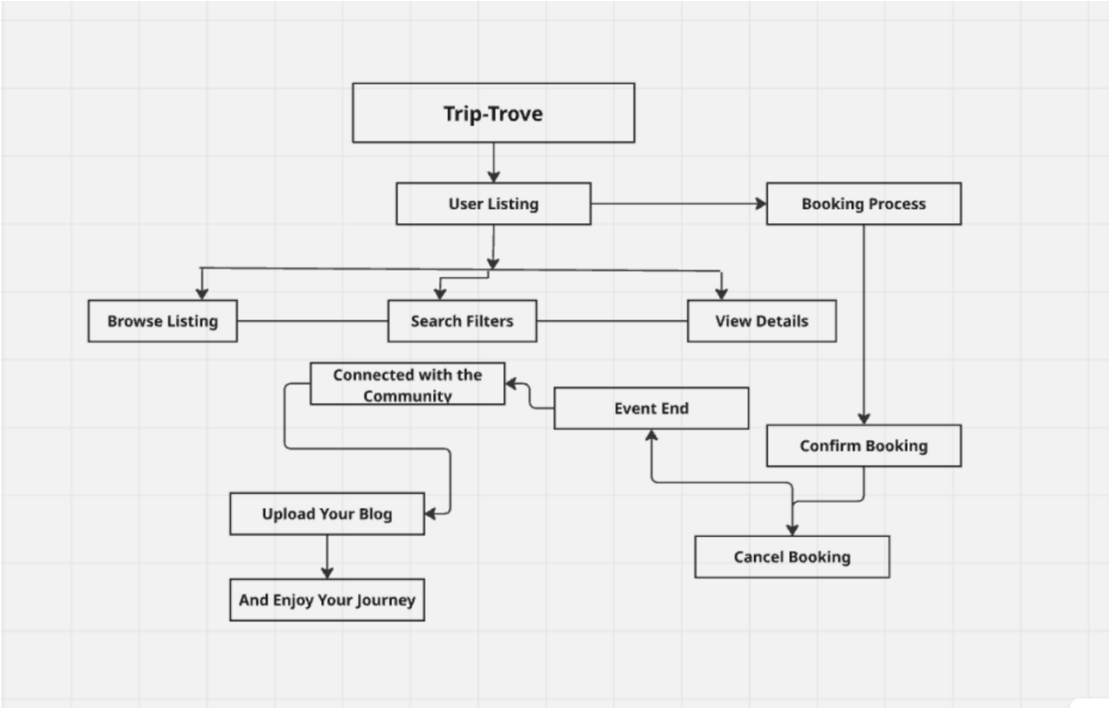


Figure 1.2: Activity Diagram

CLASS DIAGRAM:

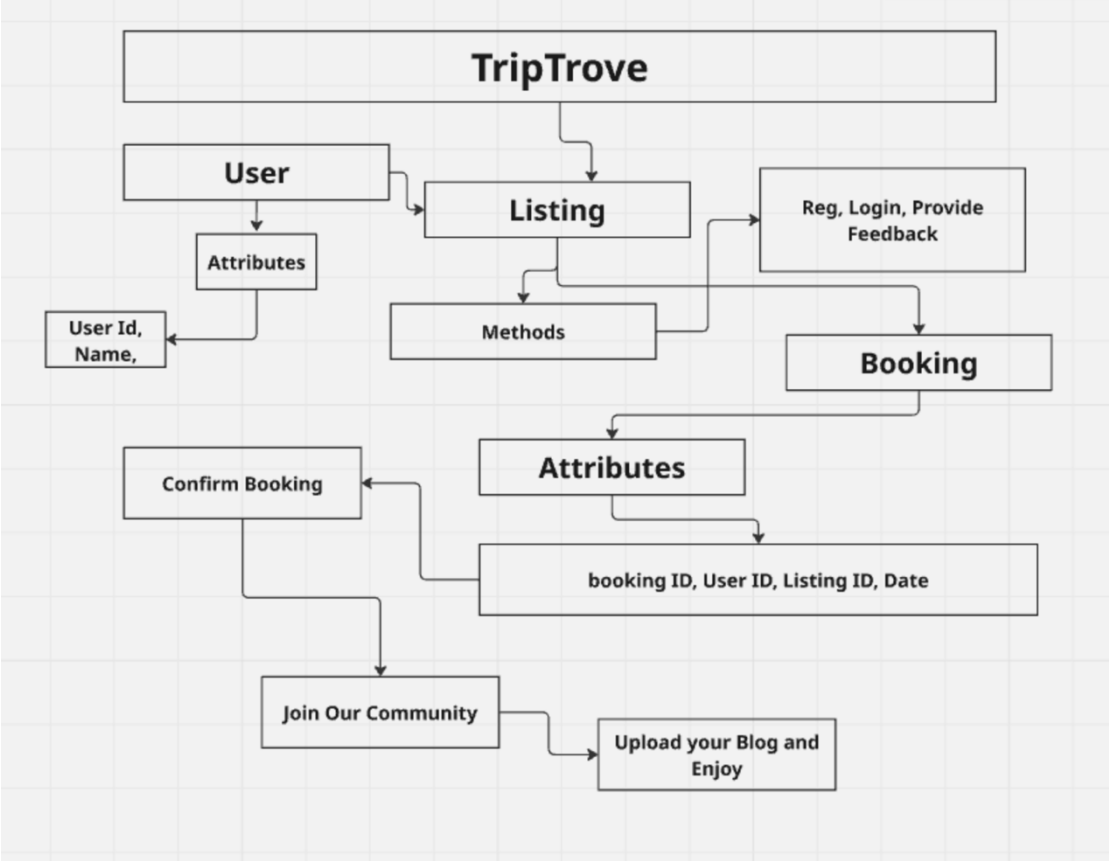
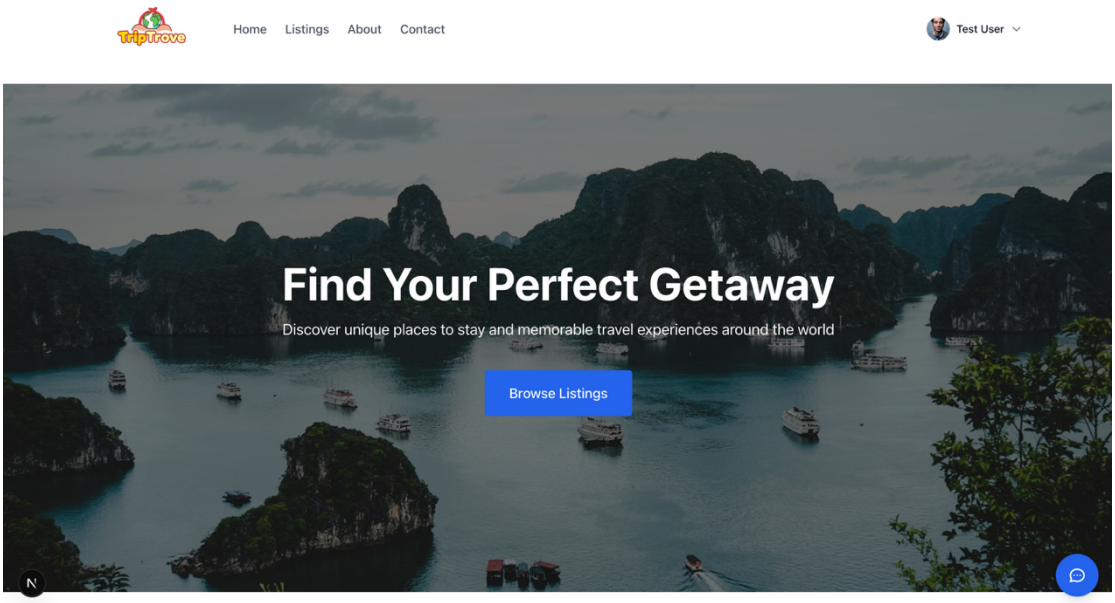
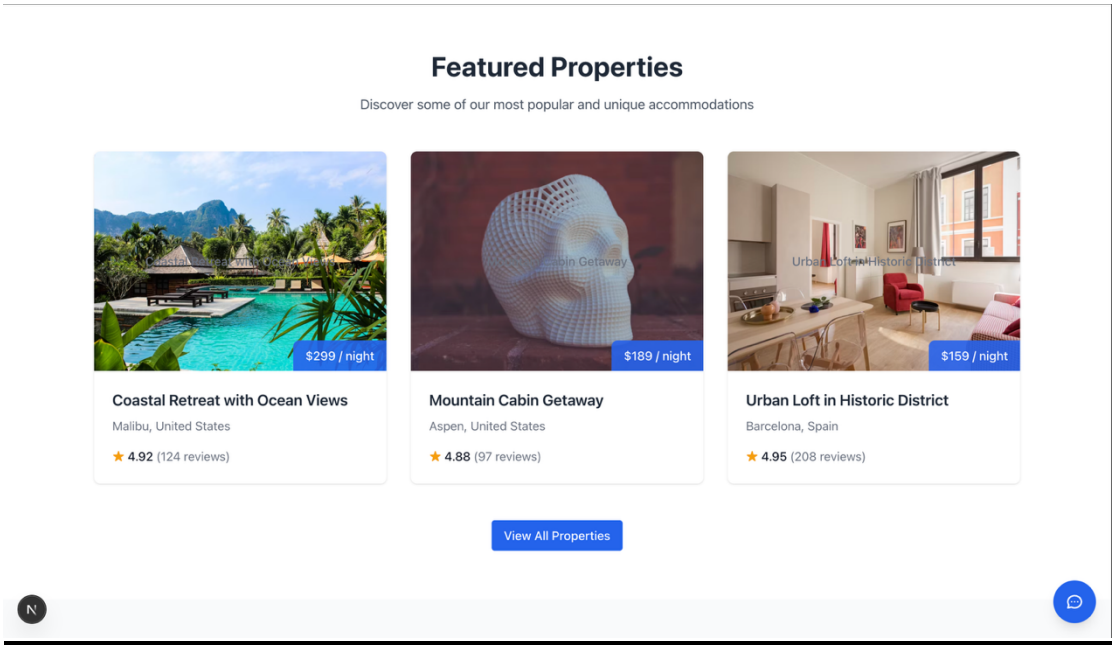


Figure 1.4: Class Diagram

HOME PAGE


Home
Listings
About
Contact
Test User
Find Your Perfect Getaway
Discover unique places to stay and memorable travel experiences around the world
Browse Listings


Featured Properties
Discover some of our most popular and unique accommodations
$299 / night
Coastal Retreat with Ocean Views
Malibu, United States
4.92 (124 reviews)
$189 / night
Mountain Cabin Getaway
Aspen, United States
4.88 (97 reviews)
$159 / night
Urban Loft in Historic District
Barcelona, Spain
4.95 (208 reviews)
View All Properties

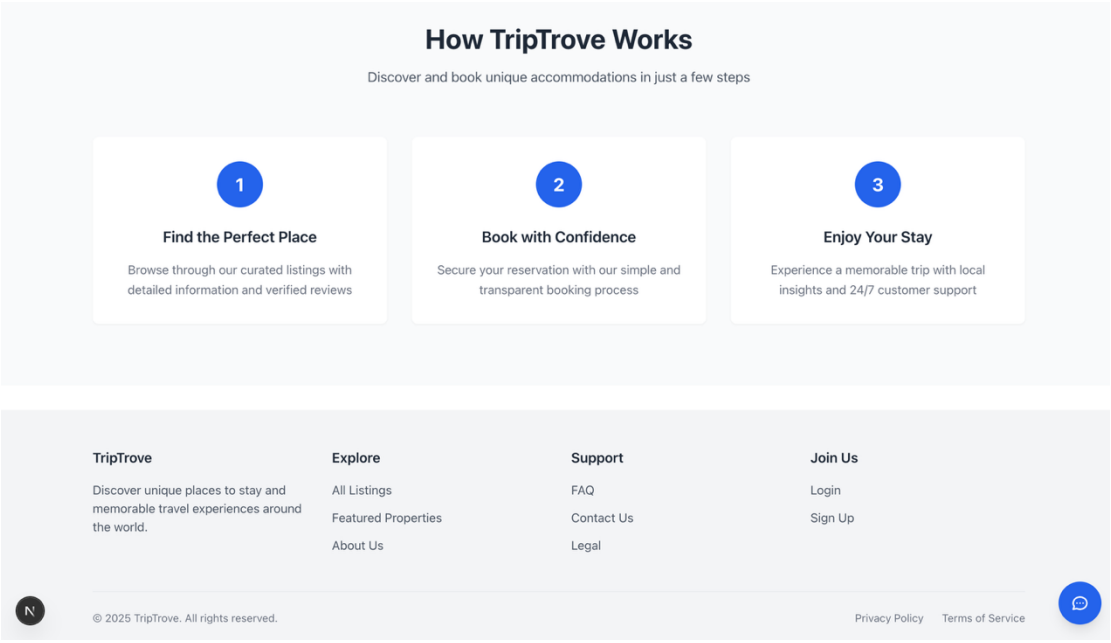
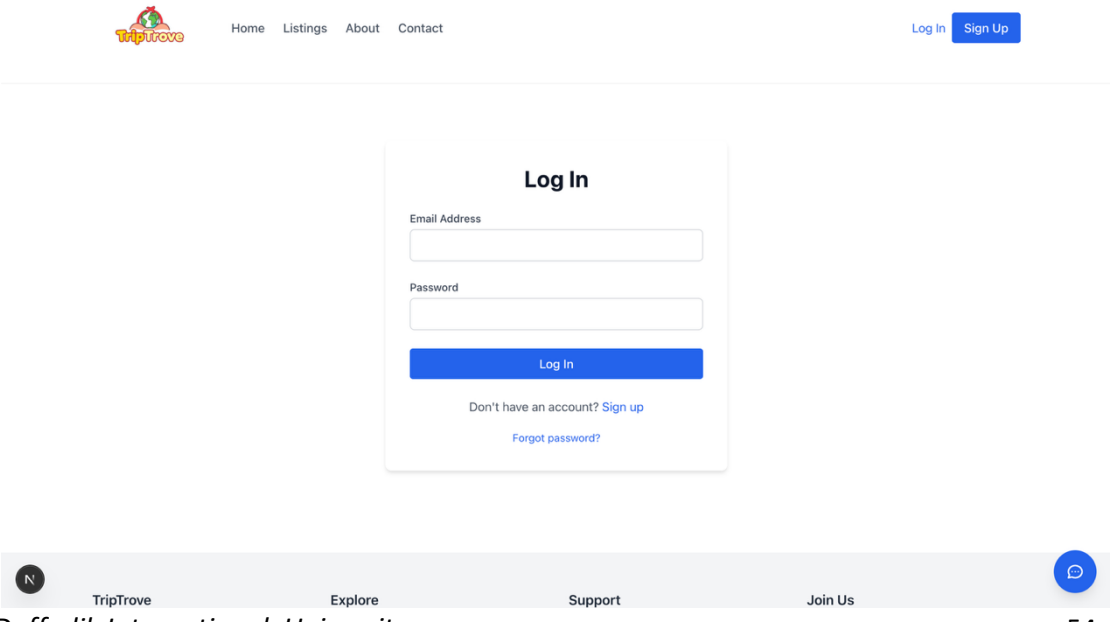


Figure: 2.1.1: Home Page

Login/Sign Up Page



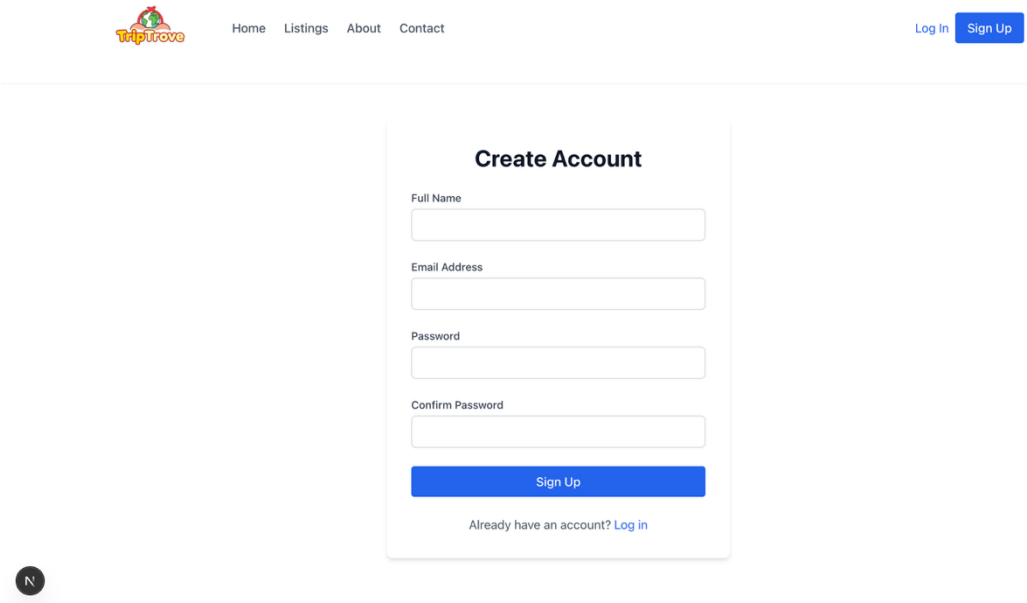
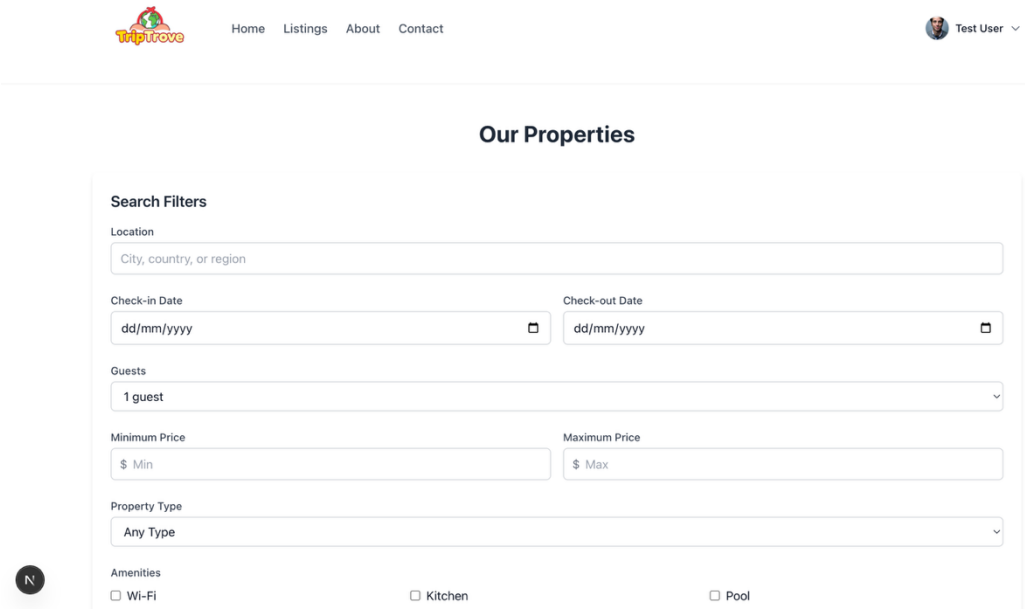
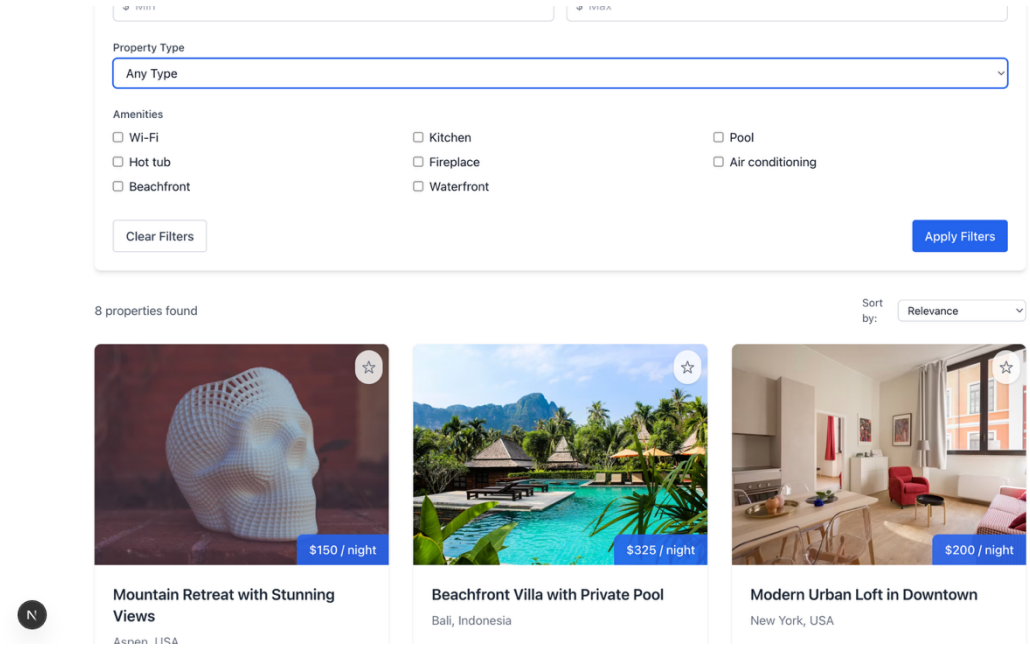
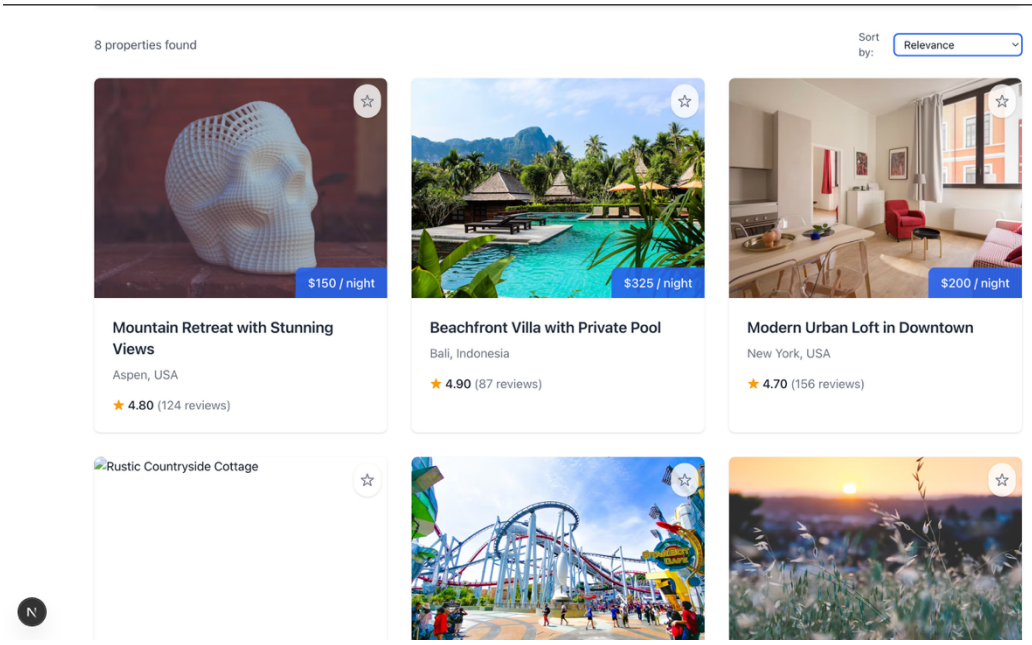


Figure: 2.1.2: Login/Sign Up Page

Service Page:




Property Type
Any Type
Amenities
Wi-Fi
Kitchen
Pool
Hot tub
Fireplace
Air conditioning
Beachfront
Waterfront
Clear Filters
Apply Filters
8 properties found
Sort by:
Relevance
$150 / night
Mountain Retreat with Stunning Views
$325 / night
Beachfront Villa with Private Pool
Bali, Indonesia
$200 / night
Modern Urban Loft in Downtown
New York, USA


8 properties found
Sort by:
Relevance
$150 / night
Mountain Retreat with Stunning Views
Aspen, USA
4.80 (124 reviews)
$325 / night
Beachfront Villa with Private Pool
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$200 / night
Modern Urban Loft in Downtown
New York, USA
4.70 (156 reviews)
Rustic Countryside Cottage

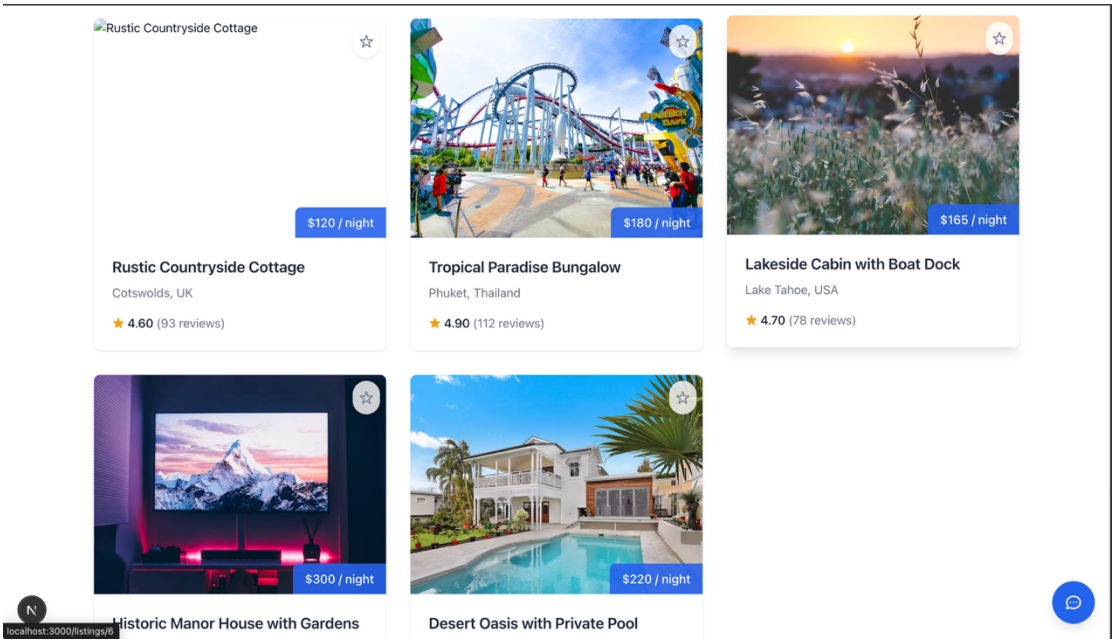


Figure: 2.1.3: Service Page

Chatbot Page:

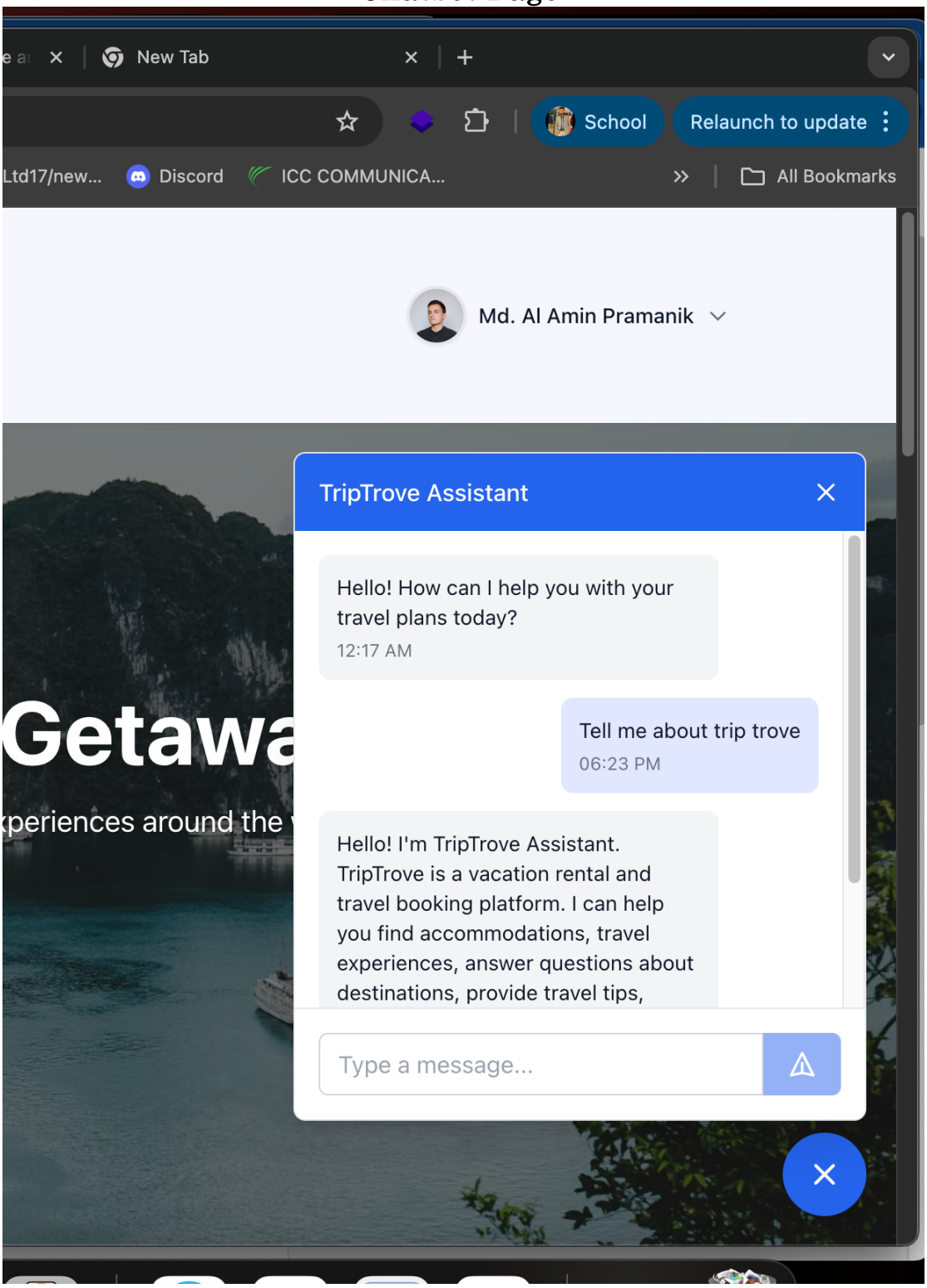
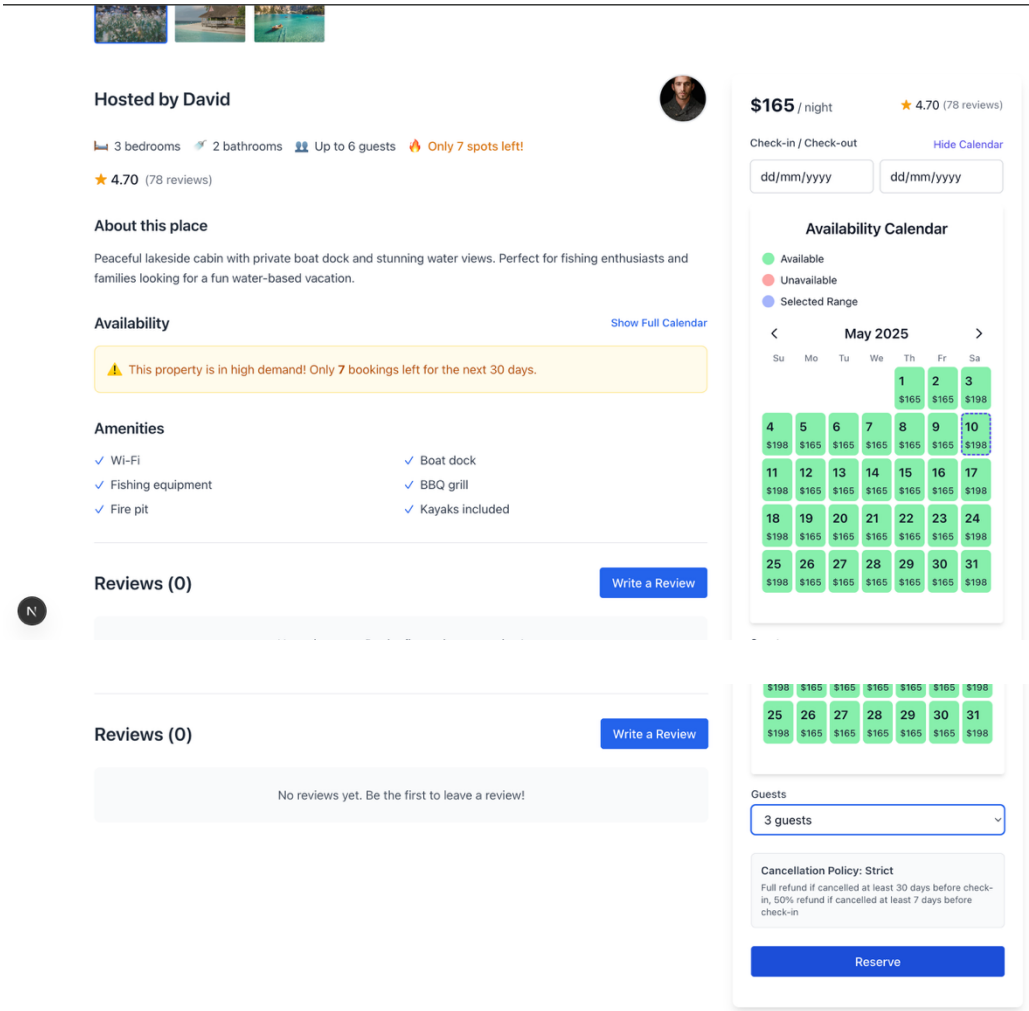


Figure: 2.1.4: Chatbot

BOOKING PAGE



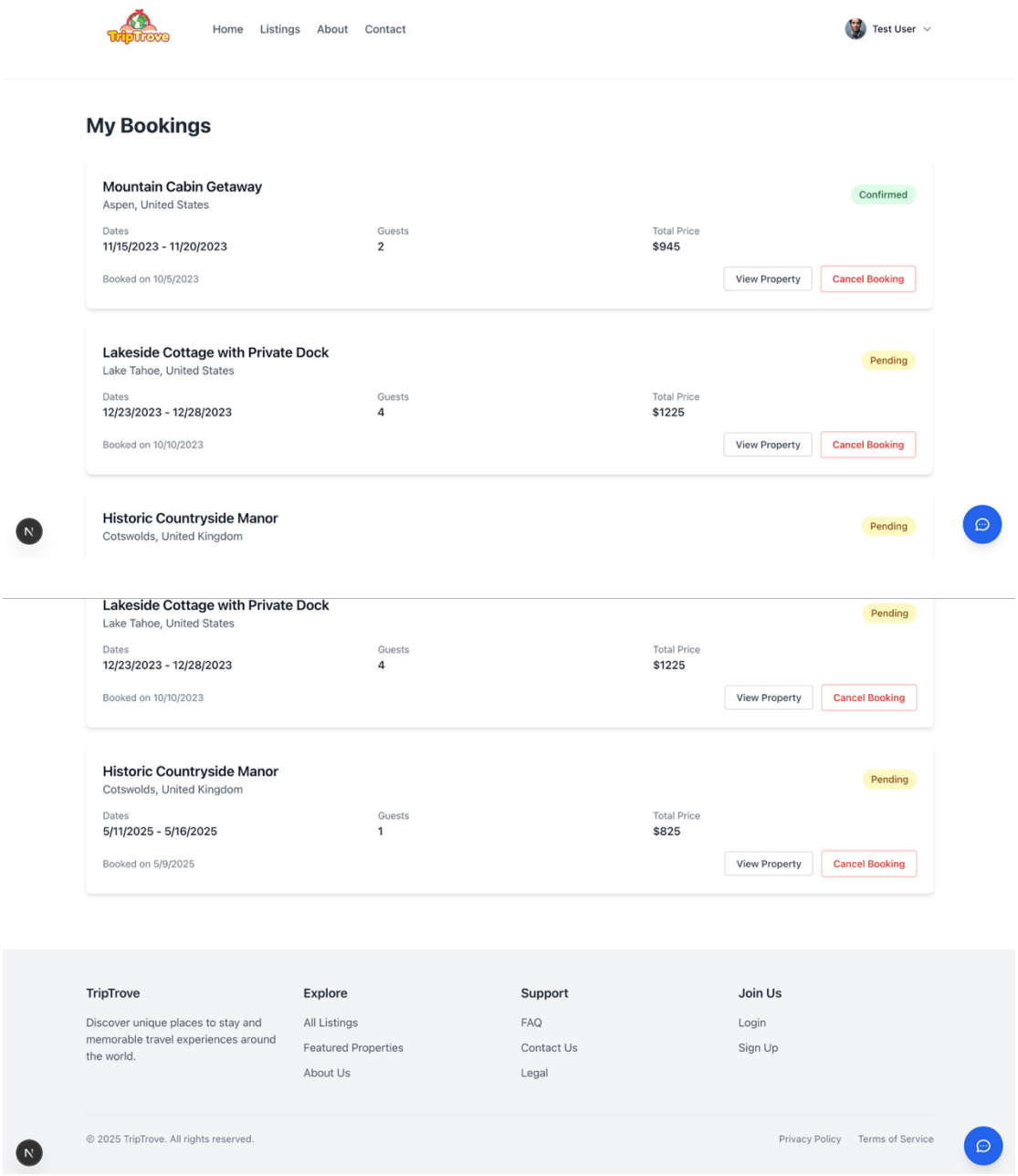


Figure: 2.1.5: Booking Page

TESTIMONIAL PAGE

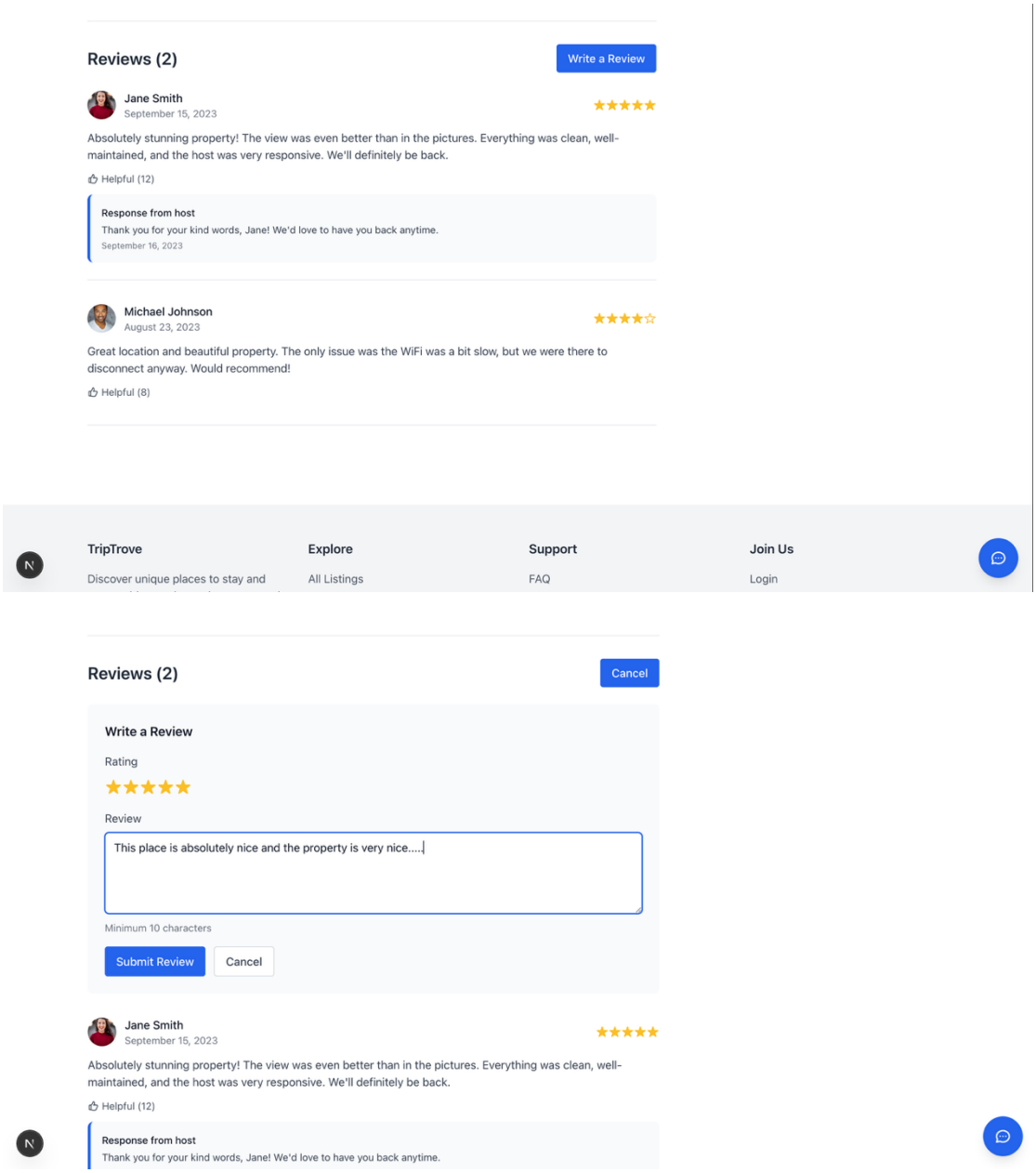


Figure: 2.1.6: Testimonial Page

COMMUNITY PAGE

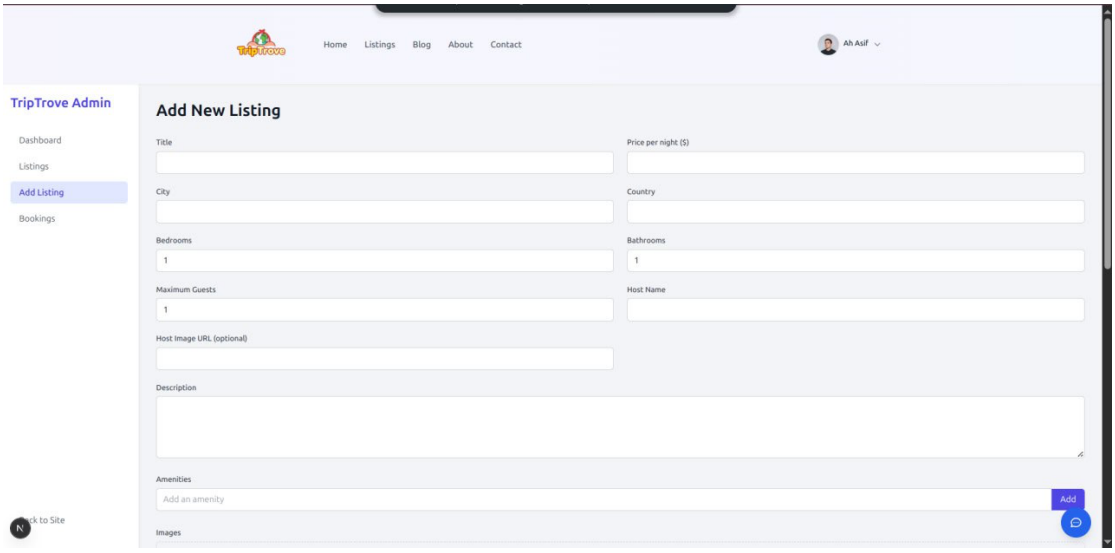


Figure: 2.1.7: Community Page

Blog Page:

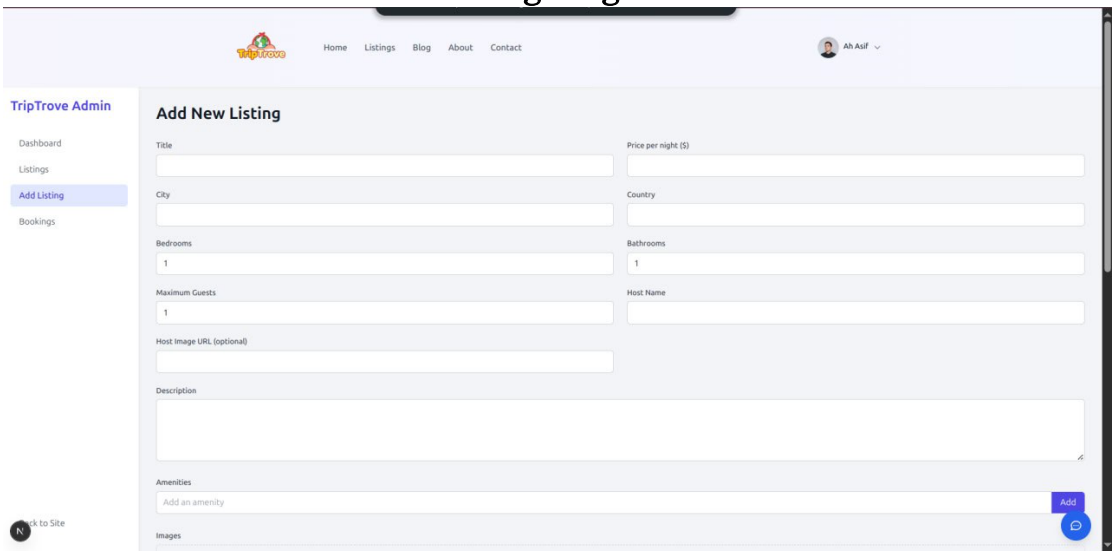


Figure: 2.1.8: Blog Page

Profile Page:

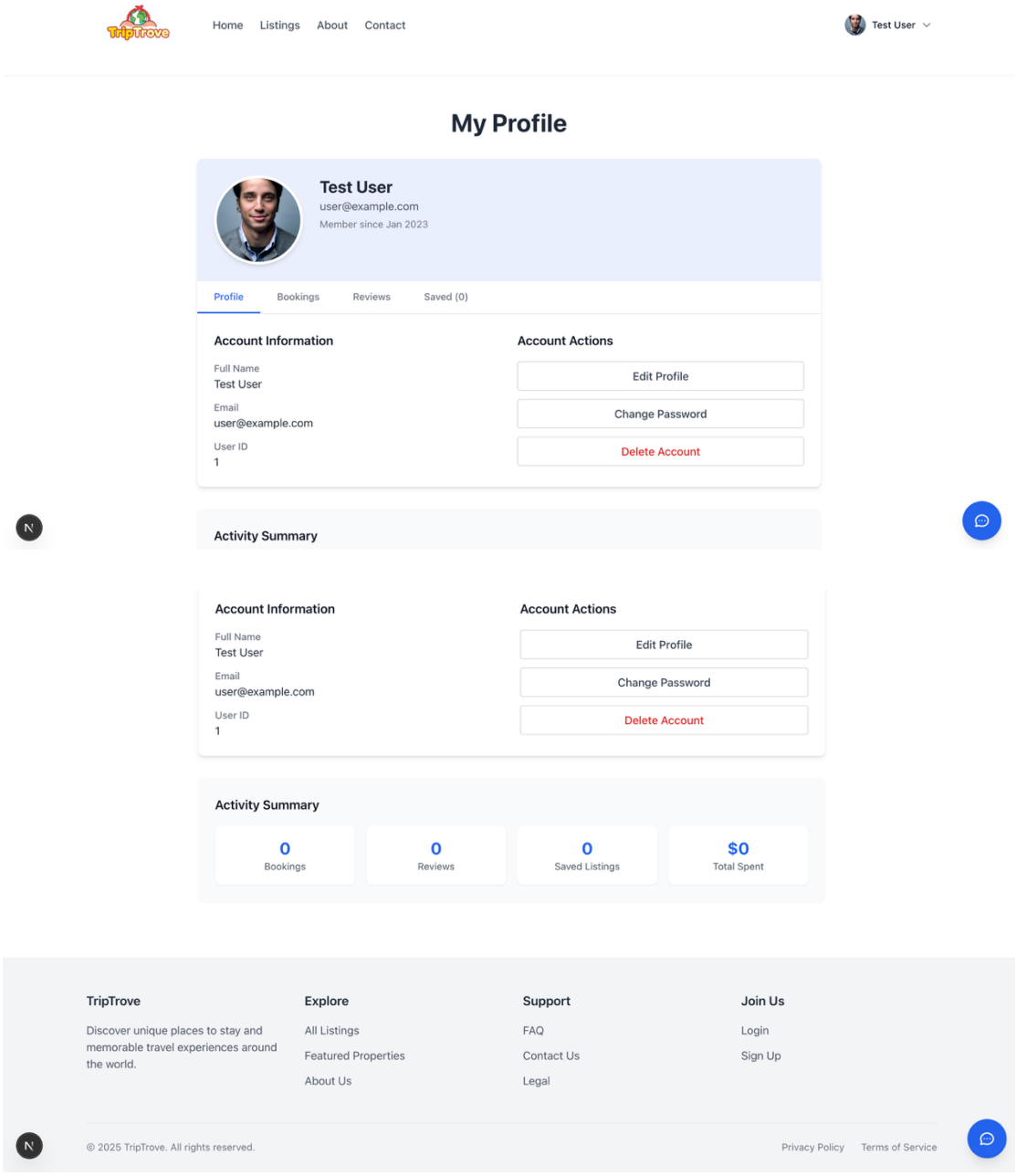


Figure: 2.1.9: User Profile Page

About Page:

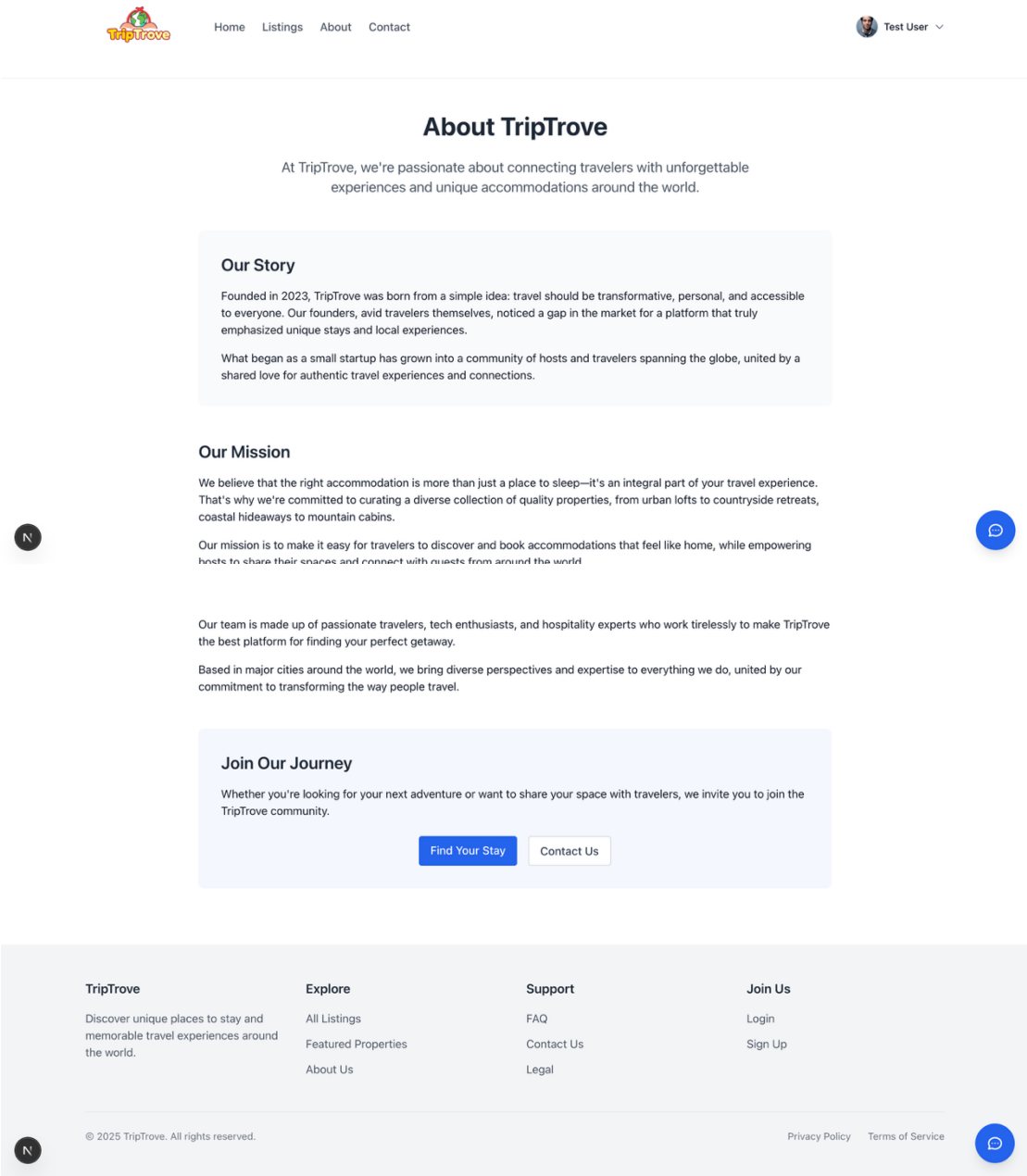
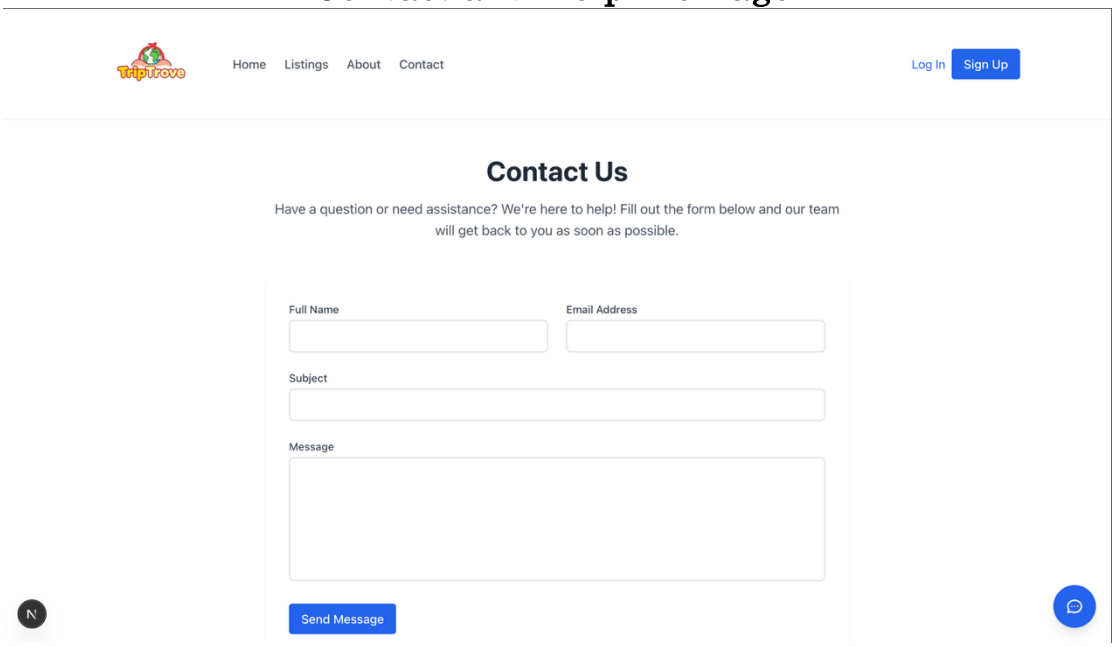


Figure: 2.2.1: About Us Page

Contact and Helpline Page:



2.2.2: Contact Page

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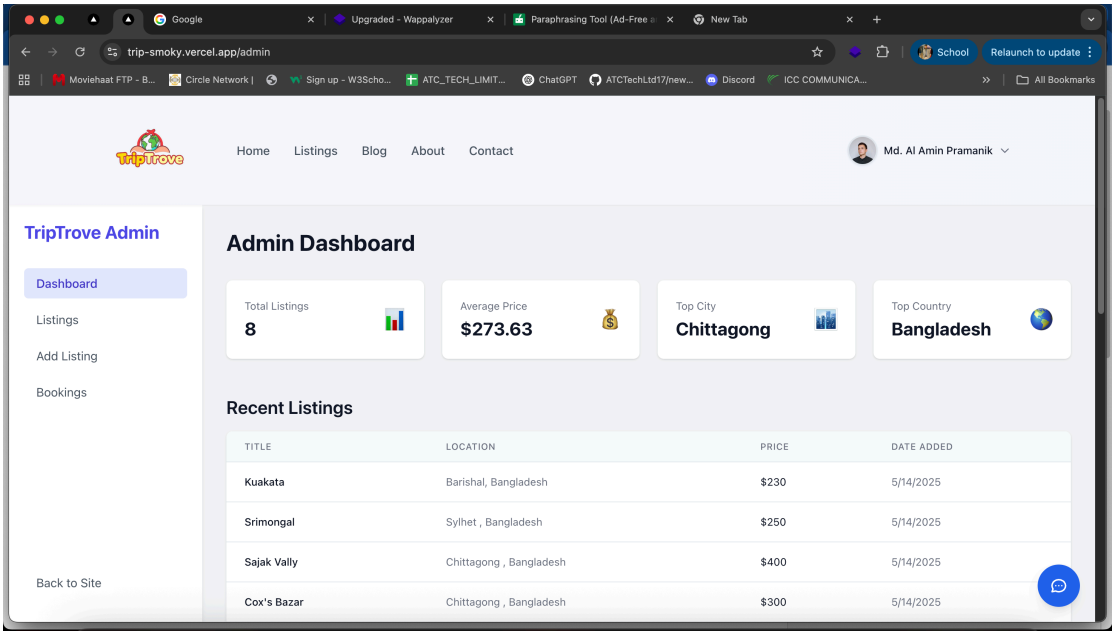

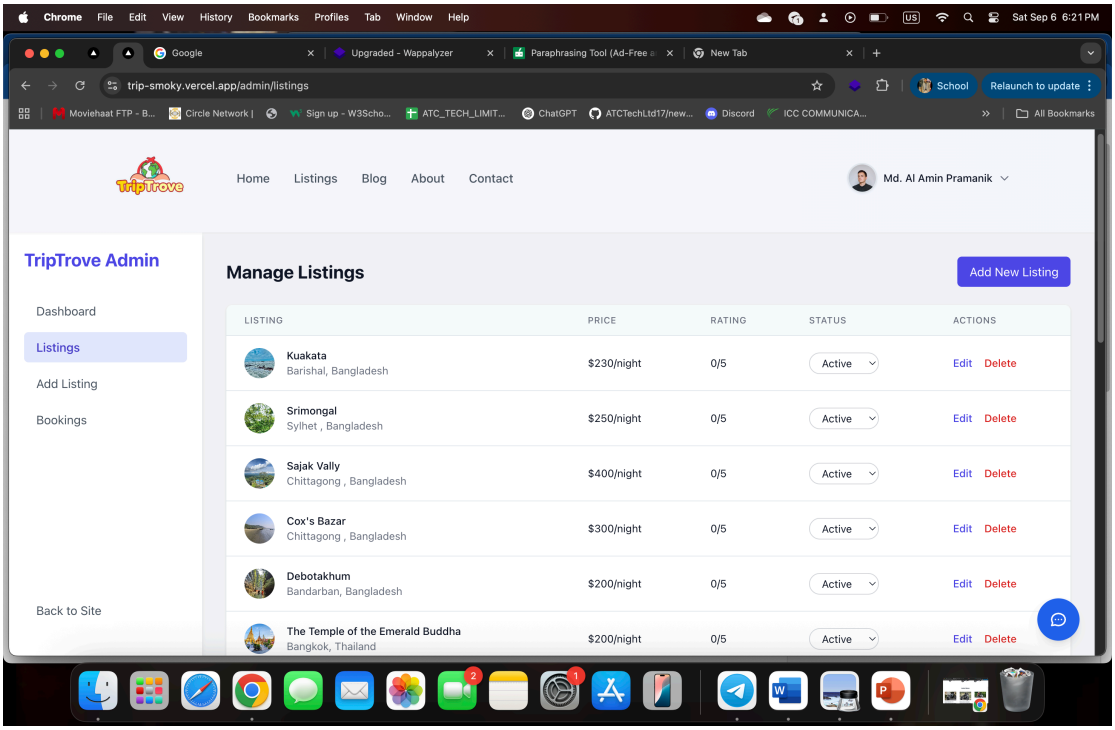
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Md. Al Amin Pramanik
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Dashboard
Listings
Add Listing
Bookings
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Add New Listing
LISTING PRICE RATING STATUS ACTIONS
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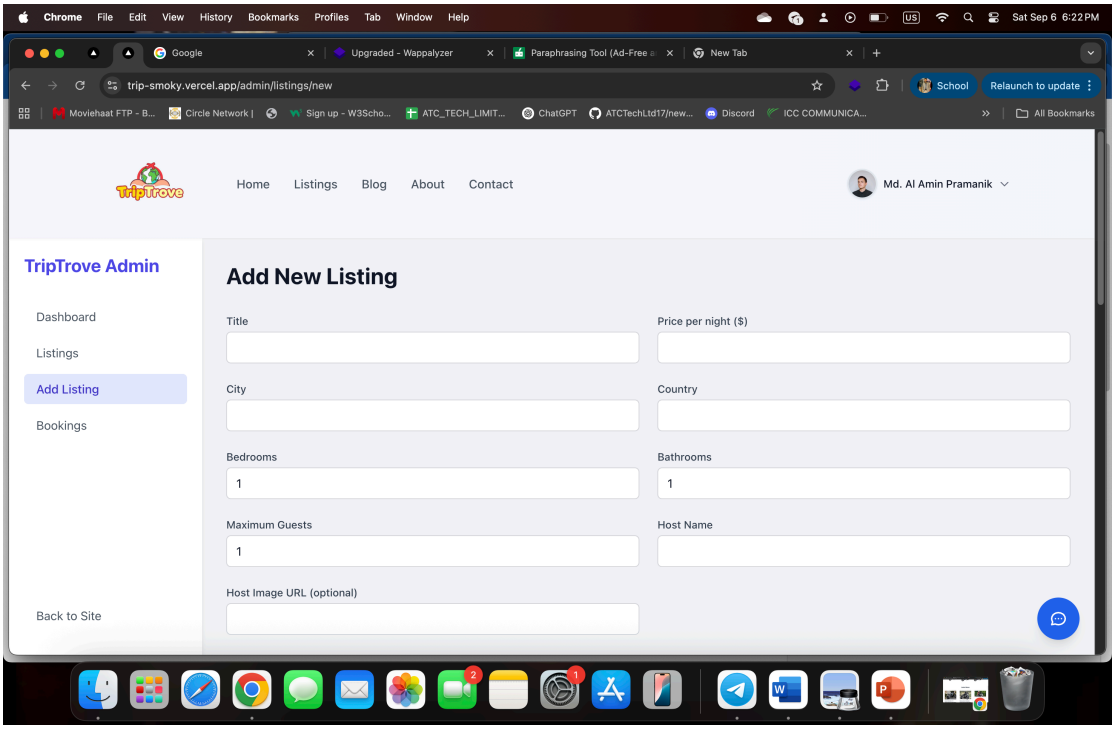
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Dashboard
Listings
Add Listing
Bookings
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Bedrooms
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1
Maximum Guests
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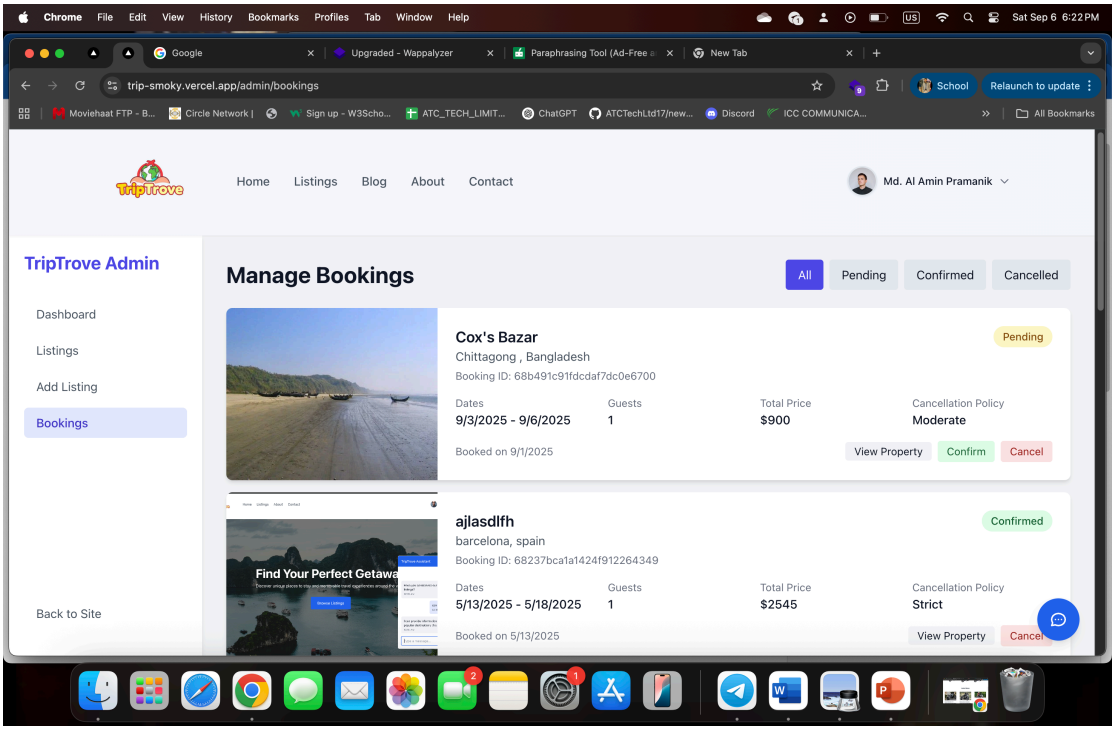
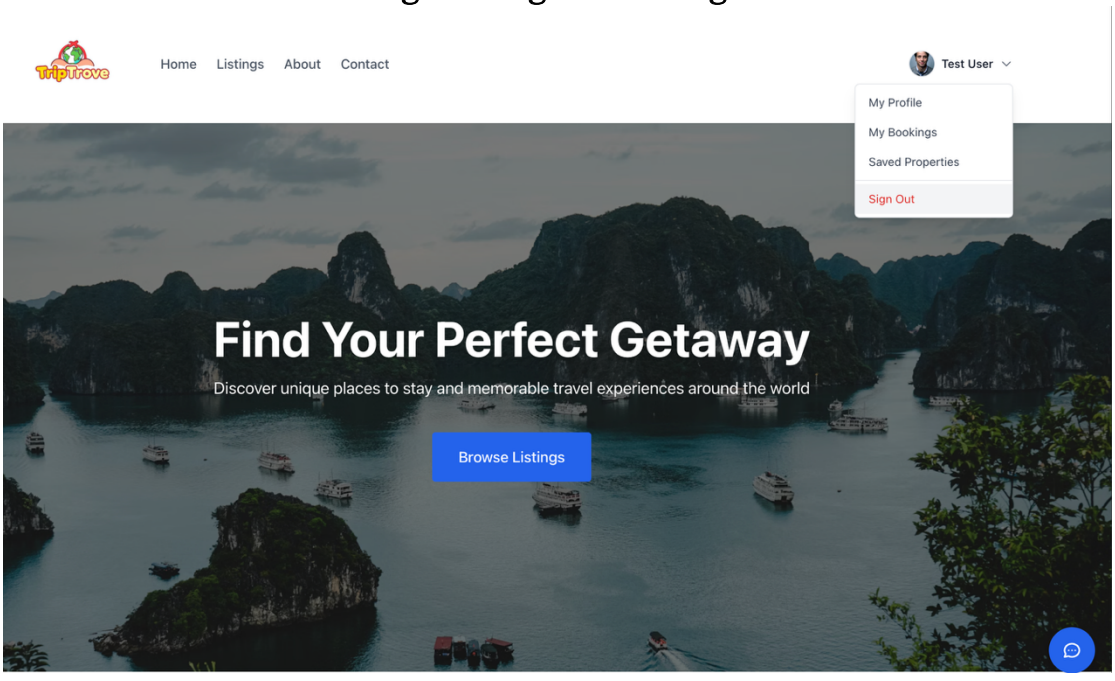


Figure: 2.2.3: Admin Dashboard

Logout/Sign Out Page:



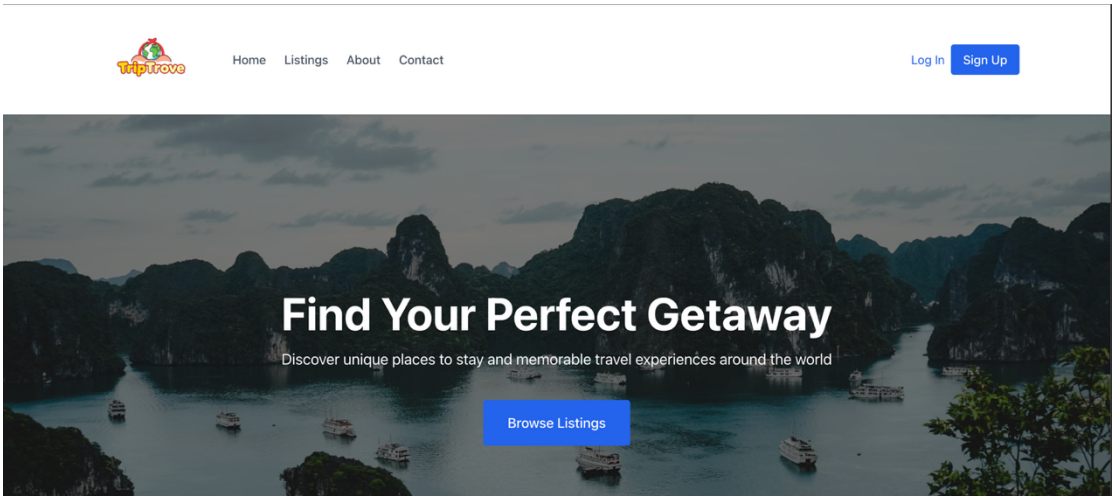


Figure 2.2.4: Log Out/ Sign Out Page

Table 1.1: Hardware Requirements Table

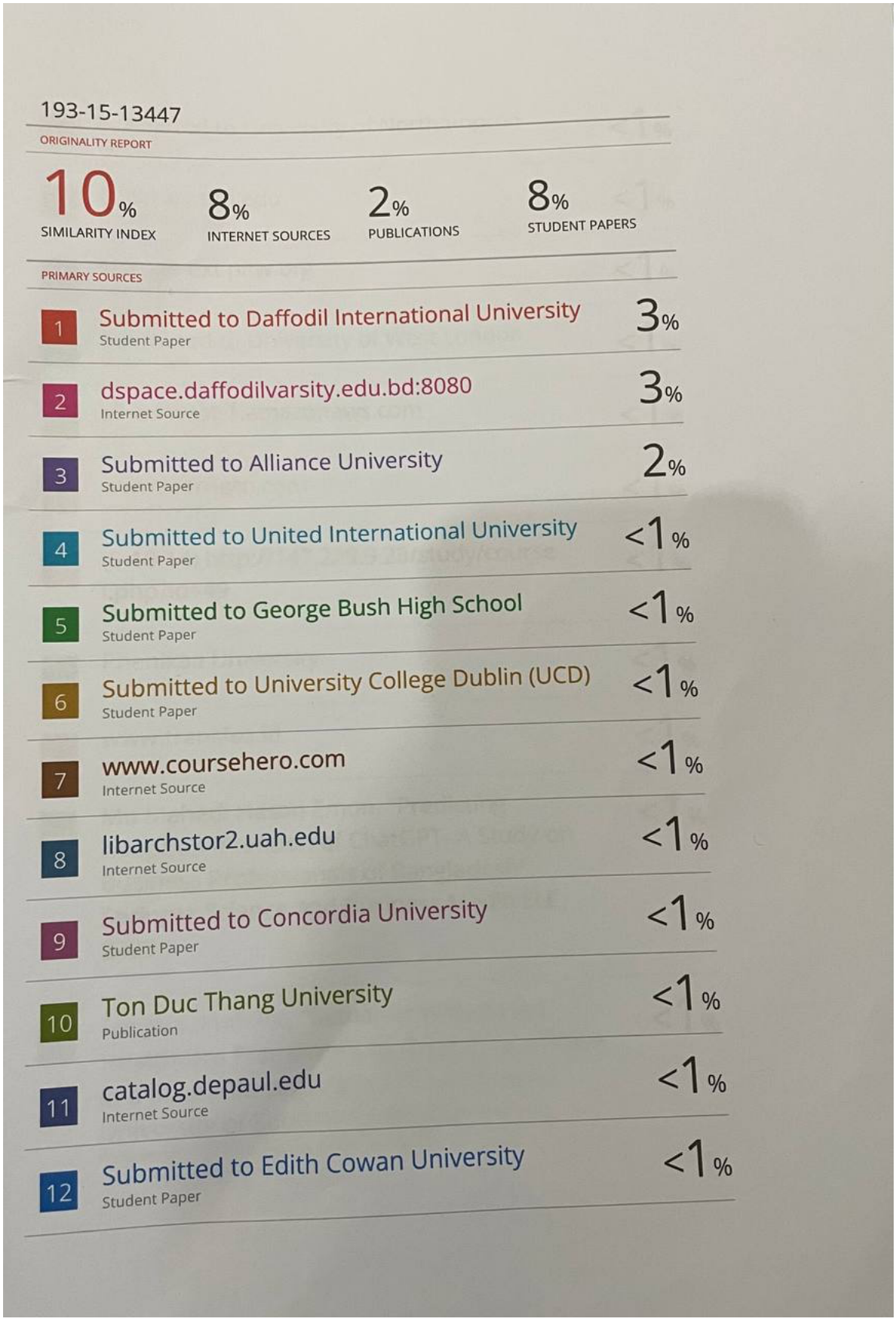
Component	Minimum Requirement	Recommended Requirement
Processor	2.0GHz Dual-Core	3.0 GHz Quad-Core
RAM	4 GB	8 GB
Hard Drive	250 GB HDD	500 GB SSD
Graphics Card	Integrated Graphics	2 GB Dedicated Graphics Card
Network	Ethernet Connection	Board band Internet Connection

Table 1.2: Software Requirements Table:

Software	Version Required	Notes
Operating System	Windows/Linux Ubuntu	64-bit version
Database	MongoDB	Must be installed
Web Server	Vercel	Required for we application
Development Tools	JDK 1.8 or later	For Java application
IDE	Eclipse/IntelliJ IDEA	Recommended for development

1.3: Test Result and Reports

Test Case ID	Description	Expected Result	Actual Result	Status
TC-001	User Login	Login Successful	Login successful	Passed
TC-002	Data Retrieval	Data displayed correctly	Data Displayed correctly	Passed
TC-003	File Upload	File Uploaded successfully	File upload failed	Passed
TC-004	Logout	Logout successfully	Logout Successfully	Passed
TC-005	Error Handling	Error message displayed	Error message displayed	Passed



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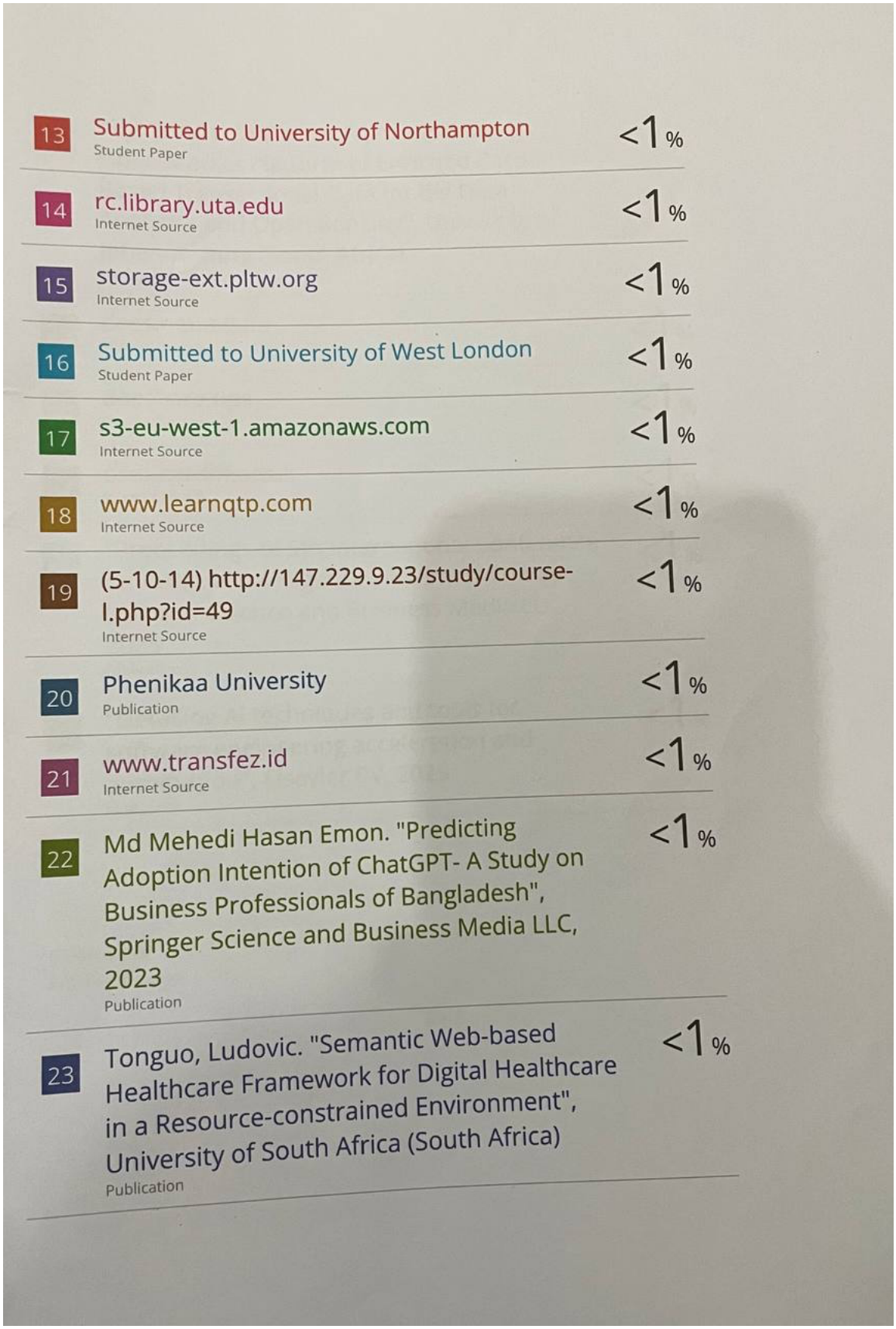

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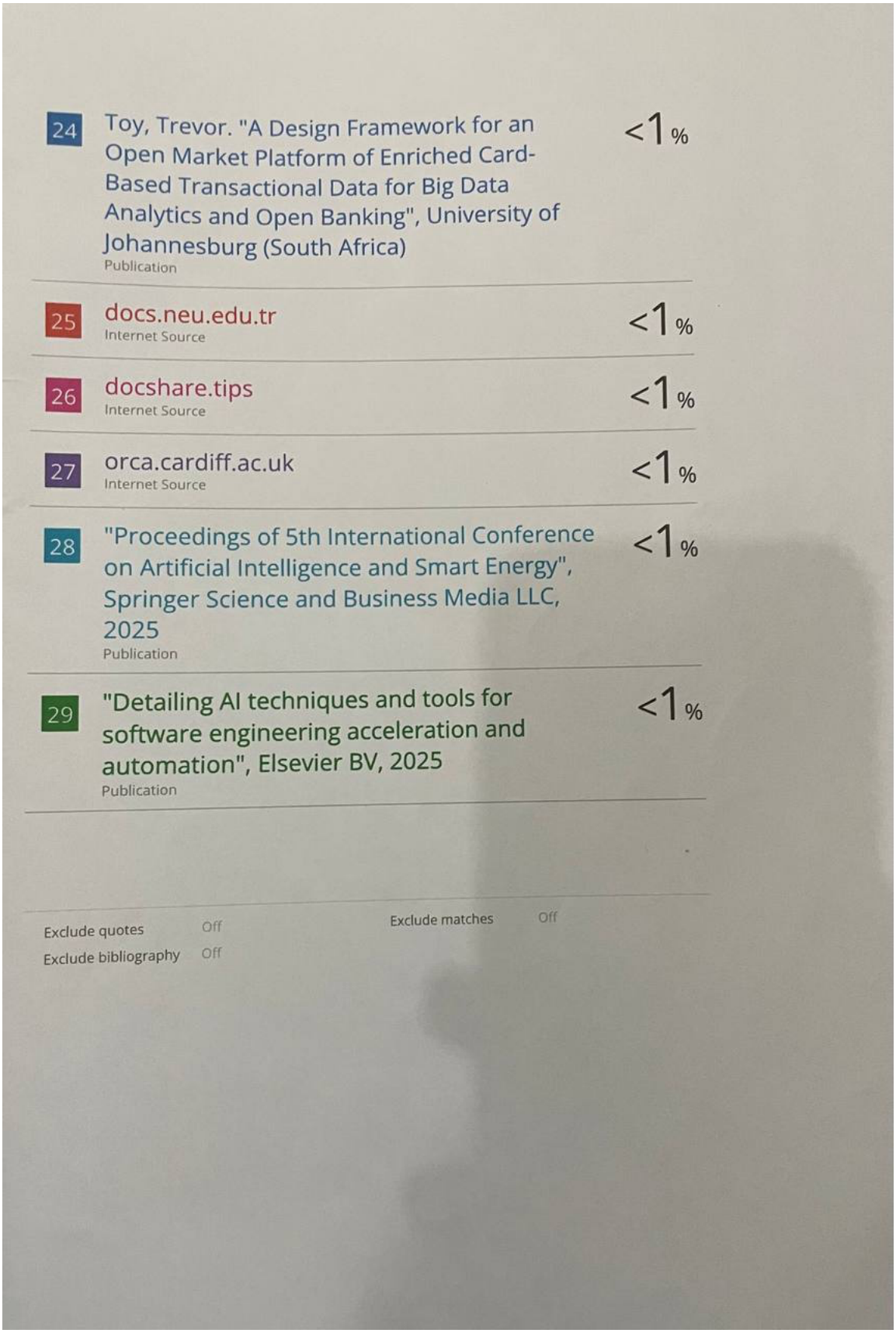

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