TourBangla – Travel & Tourism Guide App

By
Md. Taijul Islam
ID: 213-15-4545

FINAL YEAR DESIGN PROJECT REPORT

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

Supervised by

Mr. Partha Dip Sarkar

Lecturer
Department of Computer Science and Engineering
Daffodil International University

Co-Supervised by

Mr. Mahimul Islam Nadim

Lecturer
Department of Computer Science and Engineering
Daffodil International University

DAFFODIL INTERNATIONAL UNIVERSITY
Dhaka, Bangladesh

September 16, 2025

APPROVAL

This Project titled "**TourBangla – Travel & Tourism Guide App**" submitted by **Md Taijul Islam**, ID NO: **213-15-4545** 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 **16-09-2025**.

BOARD OF EXAMINERS

16.09.25

Dr. Bimal Chandra Das — **Chairman**
Professor and Dean
Department of Computer Science and Engineering
Faculty of Science & Information Technology
Daffodil International University

Most. Hasna Hena — **Internal Examiner**
Assistant Professor
Department of Computer Science and Engineering
Faculty of Science & Information Technology
Daffodil International University

Mr. Mayen Uddin Mojumdar — **Internal Examiner**
Assistant Professor
Department of Computer Science and Engineering
Faculty of Science & Information Technology
Daffodil International University

Nazibur Rahman — **External Examiner**
Technical Lead - Database Administrator
Telenor - Grameen Phone Account

©Daffodil International University

DECLARATION

I hereby declare that this project has been done by us under the supervision of **Mr. Partha Dip Sarkar, Lecturer**, Department of Computer Science and Engineering, Daffodil International University. I also declare that neither this projectnor any part of this project has been submitted elsewhere for the award of any degree or diploma.

Supervised by:

15/9/15

Mr. Partha Dip Sarkar
Lecturer
Department of Computer Science and Engineering
Daffodil International University

Co-Supervised by:

Mr. Mahimul Islam Nadim
Lecturer
Department of Computer Science and Engineering
Daffodil International University

Submitted by:

Taijul

Md. Taijul Islam
Student ID:213-15-4545
Department of Computer Science and Engineering
Daffodil International University

©Daffodil International University

ACKNOWLEDGEMENTS

This work would not have been possible without the support and contributions of many individuals over the past two semesters. I am deeply grateful to everyone who has as- sisted us in one way or another.

First, I express my heartfelt thanks and gratefulness to the almighty for His divine blessing making it possible for me to complete the **Final Year DEFENCE Project (FYDP)** successfully.

I am grateful and wish my profound indebtedness to **Mr. Partha Dip Sarkar, Lecturer**, Department of Computer Science and Engineering, Daffodil International University, Dhaka, Bangladesh. Deep knowledge and keen interest of our supervisor in the field of **Mobile Application** to carry out this project. His endless patience, scholarly guidance, continual encouragement, constant and energetic supervision, constructive criticism, valuable advice, reading many inferior drafts, and correcting themat all stages have made it possible to complete this project.

I would like to express my heartfelt gratitude to the Head of the Department of Computer Science and Engineering, for his kind help in finishing our project and also to other faculty members and the staff of the Department of Computer Science and Engineering, Daffodil International University.

I would like to thank my entire course-mates at Daffodil International University, who took part in this discussion while completing the coursework.

Finally, I must acknowledge with due respect the constant support and patience of my parents.

ABSTRACT

TourBangla is a full package travelling and tourism planner of travelling across the gorgeous Bangladesh. The app is created using the Flutter and Dart language [11], and it offers solutions to the tourism related problems, including a search of the places to visit, route planning, and budget administration, and it is highly usable [1][2][3][4][5]. TourBangla-Tourist Information TourBangla provides the tourists with suggested destinations in various seasons, and convey services on vehicle (CNG, bus, train, boat), hotel, and custom-crafted tours based on the budget and the interest of the dwellers.The application is user-based [7][9] and has operation that can be easily understood by a user like attractions broswing, mode of traffic (selection and trip planning). Destination search, budget guided trip recommendation, transport cost comparision, hotel details and personalized travel planning are the most important features. Experimental evidence demonstrates that the user control and right on its data is maintained by TourBangla, as well as its data handling is efficient [1][2][5], and user interactions are also smooth and the utility is convenient to both local and international tourists visiting Bangladesh [7]. The system architecture is cross platform developed 11, scalable, and flexible, which implies that it is a trusted tool to add value to the travel experiences. Informed travel decision making, budget maximization, and convenient travel destinations exploration has an effect on sustainable tourism and good tourism practices [7] [9] through TourBangla.

Table of Contents

List of Figures

List of Tables

Chapter 1

Introduction

This chapter introduces the project of the TourBangla and the reasons of why the development of a full-fledged travel companion app on the country of Bangladesh was needed. It talks about the challenges that individuals have in the process of arranging travel and how TourBangla is overcoming these challenges using convenient features and being accessible in various platforms.

1.1 Introduction

Trip planning in a world that is becoming more and more fast-paced is overwhelming and at the same time can be therapeutic to all those in the go. It is frequently a difficult task to get updated information about the attractions to visit, lodging facilities and seasonal attractions particularly in the less developed regions [7]. The solution to this dilemma is offered to you in a very convenient to use and all round in one travel companion travel application called TourBangla to explore Bangladesh. The application will help provide the user with easy access to a detailed information on a destination, planning aids and tips. Similar to a neighborhood guide, TourBangla helps the customers to make a good choice on a successful trip what to visit, where to move and how to plan all things at the last minutes [1]. The application reduces the chances of confusion and the possibility of being distracted by displaying a user-friendly interface and the presence of such categories as Explore and Categories and Gallery, reducing the number of hours and efforts spent managing the travel, and making the travel even easier and more entertaining [7][9]. TourBangla is compatible with Flutter in order to deliver cross-platform capability [11] so that it can be readily available to both Android phones and web browsers to deliver travel information wherever and whenever required [10].

1.2 Motivation

TourBangla is conceived due to his disappointment as a tourist about the hassles Bangladesh presents to the tourists. Tourists especially new ones spend hours searching the appropriate information on destination, accommodation, transport and seasonal attraction [7]. No standard way of arranging this information on

communication exists, therefore the planning of travelling may turn into chaos, the process that takes much time and effort and is stressful [7]. Local travel guides or travel agencies might not have up to date or full information in every destination, particularly in the third world countries which leaves the traveller with a partial view of where they are going [7][9]. Conversely, the smartphone is depicted to have gone viral 10, making it possible to use an interactive and easy method to plan trips [1]. TourBangla is based on the idea of empowering the travelers in the sense of planning their trips on their own. The combination of the information about the destinations, seasonal suggestions, tour-planning alternatives, photo galleries, etc., as the features of the app allow making the well-considered decisions, to experience the journey to the full extent and to explore Bangladesh independently without having to rely on the external guides absolutely [7].

1.3 Objectives

The basic purpose of the TourBangla is to mitigate the traveling complexity in Bangladesh and will be a one-stop-solution for visitation-related information i.e., from exploring destinations to creating trips, navigating to required information files the indepth visitation in a centreanked forum site in a centralized way [3][5]. Improve Customer Experience: Simple, low cost, and high quality fruit buying by using the digital commerce platforms.

I. All Inclusive Destination Information: Publish elaborate articles, photographs and tips to explain the dots, the attractions during the season, the films [1][3].

II. Tour Planning Support: The ability to assist users who want to organize a personal tour, estimation of budgets and choice of suitable accommodation and activities [1][2][3].

III. Cross Device Access: The application is built with Flutter and can be used on Android and on the web, where everyone can have an unproblematic experience 11.

IV. User Interface: Design simple and pleasant interface to be used by all users to navigate, do the search and prepare a site survey in their location. 7[9].

V. Scalable Design: The application must be created in such a manner that it can add new users and destinations without compromising on its performance [5].

1.4 Methodology

Application of agile methodology of developing the project TourBangla has introduced flexibility, iterative process, and constant improvement, which is undertaken through the process. We made preliminary conferences with the travelers, local guides, transport, and hotel owners to learn what they expected, and what their problems are. This helped us to acquire the tremendous range of needs of the tourists and service providers. The feasibility study and the competitor analysis of the existing travel apps also conducted the gaps and opportunities of the Bangladeshi tourism market. The design of the system was initiated with the understanding of the requirements. The platform was built based on a three tier architecture using modular microservices to scale to and maintain a functional platform. This stage was also devoted to discussing such exceptional characteristics as seasonal destination selection, the ability to plan a trip based on price, and the ability to book transport (CNG, boats, buses, trains) in order to make the application distinctive. It was particularly concerned with map and weather forecast combination and hotel proposition as a guarantee of a good trip. Under APIs, the backend was developed at the development stage to connect databases, which would manage user accounts, trip arrangements, transportation times and booking records. Android front end has been developed using Flutter that ensures the visual flow and ease of use with the interface in addition to device compatibility. This was also the period when useful features like user reviews and travel tips were incorporated into the community and made the app more interactive and useful. Different levels of testing were also performed with the aim of recruiting quality such as unit testing, integration testing, and performance testing. Such tests established that the systems of booking, trip planners, and the authentication systems worked. The application was introduced to limited travelers who got the chance to provide feedback which helped to identify improvement after successful internal testing. The backend and database were deployed on the cloud solutions like AWS or Google Cloud to make it highly available and scalable. This application was then made available in Google Play Store which could be accessed by any user. A monitoring process would be carried out all the time after the launch and the user feedback would be incorporated to enhance the features, fix the bugs and the general enhancement of the performance. The front end was written in Flutter and Dart and the backend in Node.js/ Python (Django/ Flask). Depending on the requirements of the module, databases such as MySQL, PostgreSQL or Firebase Firestore were used. CI/CD pipelines have been put into place so that they can have

quick, continuous, and error free updates. TourBangla will continue expanding to meet the demands of the users in the long run by incorporating more advanced services to make traveling in Bangladesh a fun experience.

1.5 Project Outcome

TourBangla project has been formulated in a way that will generate both short and long-term utility to the travelers, the local communities and the tourism sector in Bangladesh. The effect of the system can be felt across the area of user experience, business development, technological development, and community development depending on the way the system is set and integrated.

Improved Customer Interaction and Customer Experience.

Simplifying the travel planning process and making the process enjoyable is one of the primary goals of TourBangla, which is achieved through an easy to use and user friendly web platform. The users will be able to access the destinations based on their season, type or budget, design their own itineraries, and get the necessary information about the hotels, transportation or other measures of transportation, local sightseeing. The real time suggestions, and the rough cost of the travel in the application is not only a reminder of keeping the attention of the user but also an invitation to use the application frequently. The idea of tracking the travels, costs, and ambitions makes the travelers enthusiastic and enables them to organize the more efficient and successful travels.

Domestic Tourism will be marketed.

A wonderful concept behind TourBangla could be said that it is promoting domestic tourism by creating awareness on popular and off beat tourist destination across Bangladesh. The app also supports the user to find new destinations with ease by giving detailed guides and cultural details and travel advice. Not only does this enhance the travelling experience, but also leads to the tourist activity being less concentrated on areas that are more visited, making the region grow economically, thereby equalising the benefits of tourism.

Local Businesses.

The first beneficiaries of the platform are the local hotels, restaurants, transport providers and tour guides as they are the ones contacted by prospective visitors. Such functionalities

as recommendations on how to plan trips, top sites and path suggestions will enable such companies to attract more clients and operate efficiently. This exposure will help in adding quality of services, in addition to giving small businesses the chance of extending their coverage and incomes.

Developments and Growth of technology.

The technical aspect of the TourBangla has been geared towards the characteristics and the growing number of users. Flutter and Firebase are cross-platformable and rely on the service of the backend, which guarantees a fluent work, safe operation with data and real-time updating. The modular architecture is flexible in the sense that it can be enhanced in the future and it will be in the form of route planning, collaboration and also the integration of guide services and it is also stable and easy to maintain.

Social and Environmental Impact.

TourBangla is also undertaking socio-environmental welfare as well as convenience and business support. The app advises responsible tourism that reduces the negative effect on the environment by recommending environmentally friendly tourism, low season tourism, and minimal foot traffic. In the meantime, the end-users can become familiar with the local culture and heritage and will experience a more substantial sense of connection to the communities they explore. These projects contribute towards a community development and facilitate the sustainable tourism practices.

More so with solutions with information.

TourBangla also provides useful data on the preferences of the users, the way the traveling is organized, and the most popular destinations. The information can be utilized in order to refine the recommendations of apps, to update in the future, and to inform local businesses and tourist organizations about the trend of travelers. This type of knowledge based on data enhances user experience and strategic planning of tourism ecosystem in Bangladesh.

In general, the TourBangla project is a phenomenal idea that does not only make the experience of planning a trip easier but also directly impacts the surrounding communities in a positive way, creating a more sustainable tourism approach and utilizes technology to deliver a more knowledgeable and engaging experience in tourism.

1.6 Organization of the Report

To present a comprehensive picture of the TourBangla project, its future development and its purpose in affecting the travelers and tourism ecosystem in Bangladesh, the current report will be organized into chapters. Each chapter is dedicated to this or that aspect of the project, which is represented in a logical and understandable manner, and the reader can easily follow the chronology of the thought into the taking of it.

Chapter 1: Introduction

The chapter gives the context of the project and why TourBangla needs to be created. It will include the problem statement, project goals, project scope, project methodology and expected deliverables. Readers will also learn the dilemma that tourists in Bangladesh experience and the way in which TourBangla aims to facilitate the process of planning on travel as well as enhance the tourism experience.

Chapter 2: Literature Review

This chapter focuses on the existing travel and tourism applications, mobile applications trends and tourism practices in Bangladesh. It takes into account the literature on the topic at hand and the available platforms, discovers the gaps in the market and the trends in technology and best practices that have influenced the design and development of TourBangla.

Part 3: Analysis and Design of Systems

This chapter presents the system requirements, user and design of the architecture of TourBangla. It discusses the implementation of the Model-View- Controller (MVC) pattern, database layout, user interface layout and how to structure components in a modular fashion. Other details that are described in the chapter are the itinerary planning, seasonal destination recommendations, hotel and transportation information and how all these are perfectly incorporated.

Chapter 4: Concluding it all

The focus on the real-life development of TourBangla is paid in this case. The chapter covers the technologies, including Flutter, Firebase, Dart and cloud hosting services. Front end and backend development, API integration, database management and deployment strategy have already been described in such a way that it gives a clear picture of how the system was developed into a working mobile and web application.

Chapter 5: Testing and Validation

In this chapter, they discuss the testing processes that will be used, to test reliability, performance and usability of TourBangla. The concept of unit testing, integration testing, performance testing, as well as user testing is explained. It also details the process of how tester-feedback was implemented to improve the system to make it fit the user expectations and real travelling requirements.

Chapter 6: Results and Discussion

This chapter analyses the results of the project. It covers the interaction between the user and the effectiveness of the trip planning functions, as well as their impact on the local businesses and domestic tourism. The obstacles, constraints and the potential means of making the future versions of TourBangla better are also addressed providing insights on the broader impacts of the app.

Chapter 7: Conclusion

The final chapter is the conclusion which defines the key achievements and results of the project. It demonstrates the ways in which TourBangla can improve the experiences of travellers, develop local tourism and adopt sustainable practices. Recommendations of the additions and improvements of the future are provided, and they are aimed at the creation of the platform being more inclusive, accessible and efficient.

Chapter 2

Background

The chapter gives the detailed report on the project called TourBangla, and it has a consideration of the current state of affairs in the field of travelling and tourism in Bangladesh, the current mobile solutions and the technological and methodological foundation of the application. It is focused on the demands of the users, challenges of travel planning, and integrates the most recent technologies such as Flutter, Firebase Firestore, and user-friendly interface.

2.1 Introduction

The travel planning and experience is dramatically changing around the world as mobile technology and internet connectivity have soared to unprecedented levels over the last few years. The tourism in Bangladesh is actually a fledgling industry, and though there is no problem being encountered in the country as far as tourism is concerned, there is a problem in terms of provision of reliable information, estimations that the cost of travel will cost and proper transportation and understanding the local culture. Existing solutions are fragmented or lack extensive planning features, and users are forced to rely on multiple sources and trial and error that may lead to inefficiencies, time and cost wastage. TourBangla has been created to fill these gaps and provide a smart, centralized and interactive business to local and foreign tourists. The application offers solutions of seasonal destination suggestions, economical, hotel and eatery and tours all within a single ecosystem. It also provides internet-based time access to the transport schedules and route directions which ensures that the users can plan trips conveniently and efficiently. It is constructed around Flutter as a cross-platform front-end, which offers both a cross-platform mobile and web experience. Firebase Firestore and Realtime database operate functions at the back-end; hence, ensuring that data is securely stored, real time updates and scalability to support growing users. It is developed using agile development methodology, which allows it to quickly adapt with user feedback and changes in trends in tourism and technology. Combining travel planning, local knowledge, and interactivity, TourBangla simplifies the travel process and encourages to visit the destinations that are not so popular, support local enterprises,

and sustainable tourism activities. It will assist them in both offering convenience to users, and offering users improved travel experiences and establish themselves as a positive contributor in the local tourism ecosystem.

2.2 Literature Review

A critical examination of the current literature, studies and technological models that are relevant in the creation of digital platforms in the context of travel and tourism in Bangladesh in particular is provided in the literature review. This part addresses possible solutions, the gap in the tourism and travel application ecosystem and identifies the TourBangla project together with the new technology and the socio-economic trend. The previous literature references user-centered-design, real-time-process of accessing information, and integration of different services to enable a pleasant travelling experience. According to Rahman and Karim [1], whilst mobile travel applications have the capability to make tourism services easier and more efficient, there are concerns of quality destination information, route guidance and user adoption in the developing world. User trust, user-friendly navigation and new personalized recommendations are crucial, according to Hasan and Chowdhury [2], in the context of influencing how travelers embrace mobile travel platforms. Ahmed et al. [3] demonstrate that integration of transport schedules, route planning and accommodation options into a single platform will improve the user engagement and satisfaction particularly in domestic tourism. Flutter has also become a promising cross-platform development system technologically, allowing developers to create fast and have a stable user experience on Android and web operating systems [4], [5]. Firebase can be used to store and retrieve user generated travel plans and information on destinations in safe and real time fashion using services such as Firestore and Realtime database as well as [6], [7]. The cloud infrastructure, which involves AWS and Google cloud, is reliable, scalable and able to be executed smoothly as the number of users increases [8]. In addition, studies conducted on the provision of travel information emphasize the importance of map and visual interfaces, as well as interactive interfaces. Among the measures that can be put in place, similar to the ones discussed by Karim and Hossain [9], are gamified suggestions and seasonal recommendations, which can improve the user decision making process and encourage exploration of new tourist destinations. The next crucial aspect is accessibility, W3C suggestions regarding web and mobile accessibility [10] ensure that the platforms will be accessible to travelers with different capabilities. The other

aspect that the World Bank [11] stresses is that fair economic and social growth is possible with the inclusion of digital solutions as they ensure the unification of urban and rural users. Most of the research that has been conducted so far in Bangladesh has been in travel booking, route guidance or tourist information individually. The number of sources that can be considered a complete solution is limited, that is, combining the organization of a trip, the calculation of the budget, cultural databases, and the current news. TourBangla will aim to capitalize on this gap by integrating the features in a single convenient ecosystem that will allow planning a trip, will facilitate the local business, and will encourage sustainable tourism.

Table 2.1: Summary of Literature Reviewed.

Reference	Focus Area	Key Findings	Relevance to TourBangla
Rahman & Karim, 2022[1]	Adoption of travel apps	They do not believe in applications with false data.	TourBangla makes sure that it verifies any destination information.
Hasan & Chowdhury, 2021[2]	User Experience	Personalization keeps the user entertained. The design is smooth and enhances satisfaction	TourBangla displays seasonal destinations and paths as per customer demand.
Ahmed et al. 2020[3]	Travel Planning	It is very convenient to combine the transport plans, hotels and plans.	TourBangla includes one-stop travel planning services

Google, 2023[4]	Flutter	Flutter is a faster and consistent cross-platform development	TourBangla is an Android and web application that has a smooth experience.
Google, 2023[5]	Flutter UI	Ready-made widgets cause interfaces to be responsive and user-friendly.	The interface of TourBangla is easily adjustable to any kind of device.
Google, 2023[6]	Firebase Firestore	The information is stored securely and can be accessed rapidly.	The data on user notes, user trips and user preferences are securely stored.
Google, 2023[7]	Firebase Realtime DB	The updates are real-time and are made to all devices.	New transport and route details will be updated instantly in the application.
AWS / Google Cloud, 2023[8]	Scalability of the clouds	Cloud computing helps to expand the number of users and provides stability of the system.	The backend of TourBangla is on cloud services to support more traffic with no downtime.

Karim & Hossain, 2021[9]	Interactive Travel Guides	The interactive and gamified information makes users remain interested and enhances the retention of information.	TourBangla has interactive maps, seasonal guides and games in planning tours so as to make the exploration fun.
W3C, 2023[10]	Accessibility	Use in accordance with the principles of accessibility enables platforms to be accessible to individuals with disabilities or different levels of technical abilities.	TourBangla makes the app friendly in that it is easy to navigate and read by anyone.
World Bank, 2023[11]	Digital Inclusion	Platforms must overcome socio-economic differences and equal access must be made to all users.	TourBangla will also target to enable travel planning among the urban and rural travelers in Bangladesh.

2.2.1 Similar Applications

Several travel and tourism applications have also been created by Bangladesh and other nations, assisting users to plan their trips, visit the locations, and handle their bookings. Tourbangla project has learnt through these websites and created a more complete and convenient travel solution. These applications prove the various possibilities of how users can be reached, make use of technology and offer structured information on traveling. They also point out strengths and weaknesses that influenced the creation of TourBangla.

1. BRTC (Bangladesh Road Transport Corporation) offers official time tables of buses and route maps all over Bangladesh. It has strengths in providing correct and trustworthy information in transportation but has weaknesses in providing personalised travel advice, destination attractions and itinerary planning. TourBangla employs this fact to incorporate real-time transport information as well as destination-based recommendations.

2. Both Pathao and Shohoz are mobile-based service platforms, which have robust app-based interfaces, real-time tracking regarding orders, and user verification systems. They were platforms that demonstrate how mobile applications should be designed, ways to enhance user experience, and how to incorporate secure payment. These methods, together with Flutter and Firebase Authentication were used to develop the Tourbangla mobile app.

3. TripAdvisor and Lonely Planet offer reviews of travels, tourist guides and cultural information. They have good destination data but lack transport and hotel reservation and budgeting functionality all in one package. TourBangla is a fusion of these strengths as it provides a detailed guide to destinations, local attractions, cultural arts and seasonal recommendations.

4. Google Maps is popular in navigation and optimization of routes. It is not a tourism planning tool though it can be good in giving directions and information on traffic. TourBangla applies the mapping and routing principles of Google Maps and incorporates interactive tourist travel planning, recommended routes, and points of interest.

5. Local Guide Services and Hotels provide reservation and custom travel service. These services are useful in terms of insider knowledge but might be frequently split and difficult to find at a single location. TourBangla collates this information under one

umbrella so that the customers can book hotels and get guides as well as manage the itineraries with ease.

TourBangla researched such similar applications to determine what is most successful in user interactions, app functionality and safe management of information. Simultaneously, it helped to solve such gaps as combining budget planning, trip suggestions, and interactive maps with such cultural knowledge. The observations were used to influence the technical design and methodology of the TourBangla project and guarantee the smooth and stable process of travel planning.

2.3 Gap Analysis

This segment identifies the gaps and shortcomings of the existing travel and tourism applications in Bangladesh and beyond based on which the TourBangla was designed. Though there are many travel applications with hotel booking, transportation or destination travel options, these are not all-in-one and unified. Users often have to switch between different applications in order to plan traveling, the means of transportation, and local culture. The second weakness that is experienced is the lack of personalized recommendations and real-time updates. Many applications contain pre-defined content that is not dynamically updated based on the season destinations, travelling preferences or cost considerations. Another problem is the accessibility and usability of most apps because they are not produced to serve all age groups and those with low technical literacy. In addition to that, there is also a lack of tourist, local business and administrator role-based management. Not very many platforms can support such unique user-type requirements in one platform. Security and reliability are also not thought of as good particularly when it comes to sensitive travel information and reservations. By offering one travel system where the information about the destination, transportation, and hotel, the seasonal recommendations, budgeting preparation will be offered, TourBangla will fill these gaps. The role based dashboards will be designed to serve the tourists, local businesses and administrators and the cloud-hosted infrastructure will be scalable, real time synchronized and one that safely processes data. By closing these loopholes, TourBangla can provide a more interesting, accessible and trusted traveling experience. The Table 2.2 shows feature Comparison Between Existing Systems and the Proposed System

Table 2.2: Feature Comparison Between Existing Systems and the Proposed System

Features	Existing Systems	Proposed System
All-in-One Travel Planning	All-in-One would require different apps to handle hotels, buses, trains or traveler information	All the destinations, transport, hotels, guides and cultural tips are all in one app.
Individualized Recommendations	Mostly generic recommendations; no seasonal or budget plans.	Offers a recommendation on season, user budget and traveling preferences of a smoother planning.
Real-Time Updates	Schedules, availability and bookings are likely to be obsolete.	The transport, hotel reservations and trip arrangements are updated in real time such that the user is always up to date.
User Friendliness	Certain applications are full of clutter, lack user-friendliness or are difficult to use by non-technological users.	Easy, user-friendly interface of any age and experience.
Security & Data Privacy	Data are not necessarily completely safe; privacy regulations are ambiguous.	Powerful encryption, safe cloud backup, and privacy of data in the hands of the user.
Local Culture and Community understandings	Primarily logistics; very little on culture and secret places.	It also provides local customs, local seasonal advice, and local suggestions on how to make a more enriched travel experience.

2.4 Summary

The literature review and other uses on the type of traveling were useful in exploring the current state of the travel planning platforms in Bangladesh and beyond. Although there are a lot of apps to reserve a hotel, transportation or tourism destination, there are still gaps in the providing of the easy to use and integrated travel experience. Most of the websites focus on any of the aspects of the travelling experience e.g. reserving a hotel or bus schedule, however, they do not provide all the required services under one roof e.g. seasonal travelling, economicalness, cultural information and transport information. Moreover, the role based application is not offered in many apps to tourists, local businesses and administrators and there is a difficulty in controlling and monitoring activities. The other gaping hole is the absence of personalization or the lack of an interactive aspect; the current apps barely modify the recommendations based on the preferences of the user, the time of the year they travel, or the budget. Scalability, access and secure data management are also key challenges in existing solutions when the same platform contains various types of users at a given moment. TourBangla helps in bridging these gaps by offering one travel ecosystem, which unites destination guides, schedule of transportation, hotel and restaurant details, local culture and cultural knowledge and the customised trip planning into a single platform. The app uses the real-time updates of data, role-based dashboard, and Firebase Firestore cloud-based storage to offer reliability, scalability, and safety of data. TourBangla with its friendly user-friendly design built upon the Flutter framework opens the potential of travel planning to both younger and more technologically able generations. Overall, the project is meant to enable the traveling experience in Bangladesh, encourage local tourism and provide sustainable, efficient, and enjoyable way of interaction of the tourists and service providers to the tourism ecosystem.

Chapter 3

Research Methodology

The chapter describes the development of the TourBangla platform and the research methods used during the development. It brings to fore the tools, techniques, and development methods that the analysis of requirements, system design, implementation of features and testing of the overall functionality. It also includes the rationale of selecting certain frameworks, technologies, and testing patterns in order to make the platform user-friendly, scalable, and reliable to meet the requirements of tourism.

3.1 Requirement Analysis & Design Specification

3.1.1 Overview

This section shows the system requirements and design specifications of the TourBangla application. It addresses the functional and non-functional requirements with which the design process was driven. The features of functional requirements consist of destination search, transport and hotel booking, seasonal trip suggestions and user role dashboards, i.e. tourist, vendors and administrator. Non functional requirements are security, scalability, performance, and inter- device accessibility. The business objectives of the platform are to ensure that tourists have a one-stop shop to plan and manage their trips and give local businesses and administrators more effective ways to promote tourism. Architectural choices, including opting to use Firebase Firestore as real-time data management and Flutter as the built-in cross-platform mobile platform and cloud hosting as the sustainability tool, were implemented so that the platform would not only serve the needs of the users but also offer long-term sustainability to the Bangladeshi tourism ecosystem.

3.1.2 System Design

Business Process Modeling

TourBangla business process model shows the interaction between various user roles (Tourist, Vendor, and Admin) and the system components of only one digital ecosystem. This model focuses on five processes that are interdependent such as secure login and

role-based access, trip planning and booking, vendor service fulfilment, travel assistance and updates and customer engagement with seasonal travel advice. Identity and Access Management provides the secure onboarding with Firebase Authentication of all roles of the user. Trip Planning and Booking combines transport schedules (bus, train and CNG), hotel booking, and budget estimation and lets tourists plan their entire trip in the same place. Vendor Fulfillment specializes in the local firms (hotels, restaurants, guides) modernization of services and real-time bookings. Travel Assistance offers tourists real-time updates (e.g., transport delays, confirmation of booking, etc.) and administration announcements. Customized recommendations on budget, season or destination trends improve Customer Engagement and promote repetition. Through BPMN diagrams as a tool of defining responsibilities, decision points, and exception handling, TourBangla exemplifies how digital tourism, support of local vendors, and travel planning based on the needs of users can be smoothly integrated into the tourism development agenda of Bangladesh.

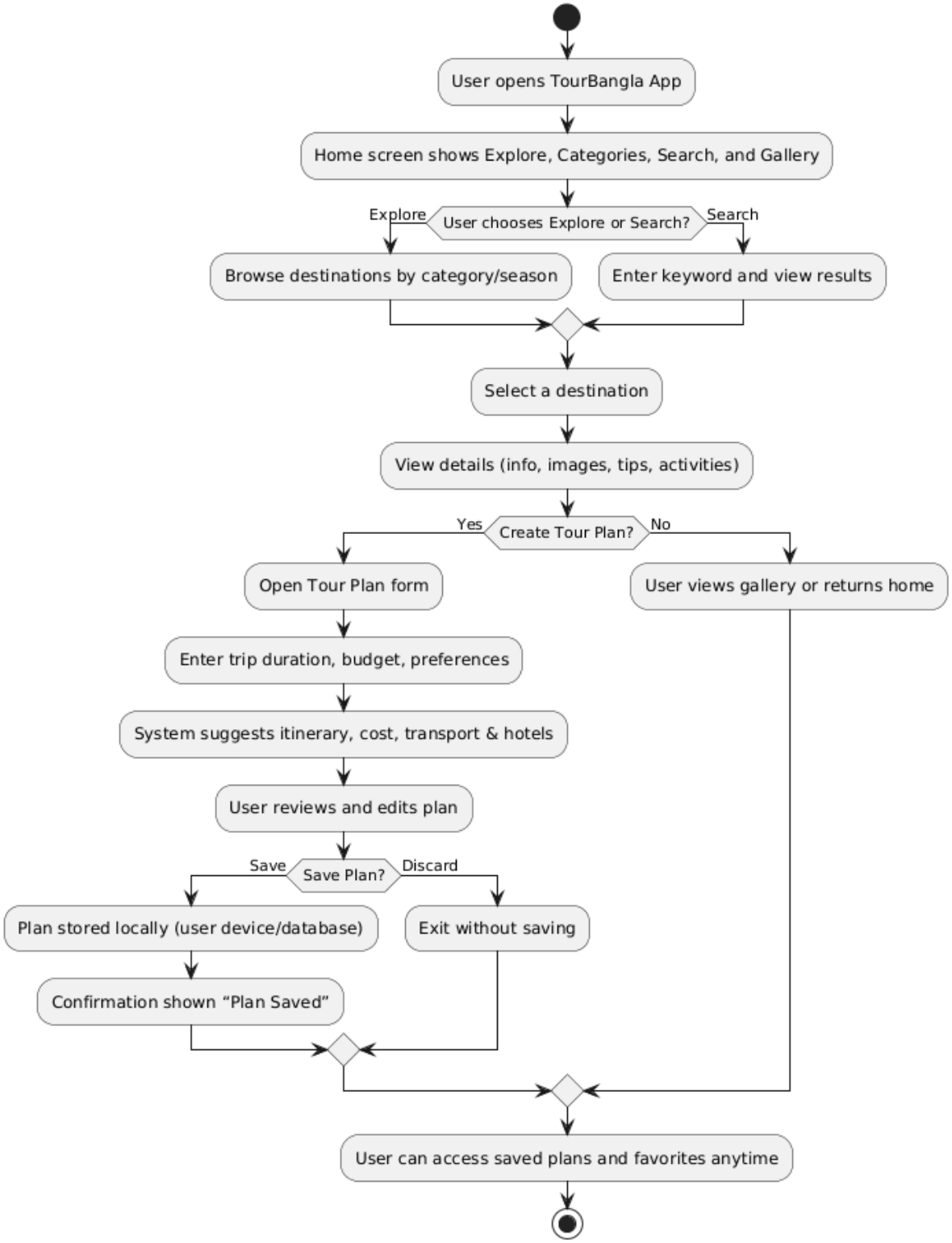

Figure 3.1: Business Process Modelling

Use Case Modeling

Figure 3.2 use case diagram depicts the actor-system functionalities relationships, which guarantee a strategic alignment of the business and technical Processes.

Use Case Descriptions

Case 1: Customer Logging in and choosing a role.

1. Participants: Customer, Vendor, Admin, Firebase Backend.
2. Prerequisite: The application is installed by the user.
3. Trigger: User clicks on the options of Login.
4. Principle: When entering the credentials, the user is required to select both role and credentials; the Firebase authenticates the credentials and role, and the system directs the user to the relevant dashboard.
5. Postcondition: User is redirected with the correct interface after being authenticated.
6. Exceptions: User name and password mismatch, role mismatch.

Case 2: Plan & Book a Trip

1. Actors: Vendor, Tourist, Firebase Backend, Payment Gateway.
2. Precondition: Tourist is registered and has chosen destinations/services.
3. Trigger: Tourist clicks accept Booking.
4. Process: System develops booking - Request payment - Gateway success/failures - Vendor informed whether success.
5. Postcondition: Booking confirmed and vendor begins working on services.
6. Errors: Refusal to pay, out of service.

Case 3: Vendor Cares of Inventory

1. Players: Firebase Backend, Vendor.
2. Condition: Rating of Vendor account by Admin.
3. Condition: Vendor gets into dashboard.
4. Steps: Vendor updates hotel/transport information - Determines availability and price - Firestore is updated in real-time.
5. Postcondition: Post-adjusted information that is displayed to tourists.
6. Exceptions There is a connection error, invalid input.

Case 4: Destination Recommendations

1. Traveler: Firebase Backend, Firebase Excellence.
2. Requirements: Traveler is authenticated.

3. Trigger: Traveler chooses the option of Seasonal Recommendations.
4. Swipes: System recommends destinations - Traveler visits recommended destinations - Save/book destination.
5. Postcondition: Traveler is presented with travel ideas that are curated.
6. Exceptions: No information provided, server outage.

Case 5: Registration and Approval of Vendors

1. Players: Vendor, Firebase Backend, Admin.
2. Precondition: Vendor presents registration and documents.
3. Trigger: Application is reviewed by the Admin.
4. Actions: Admin checks - Approves / rejects - Firestore changes the status of the vendor.
5. Postcondition: Vendor either obtains/denies access to dashboard.
6. Exception: Fraudulent/Incomplete documents.

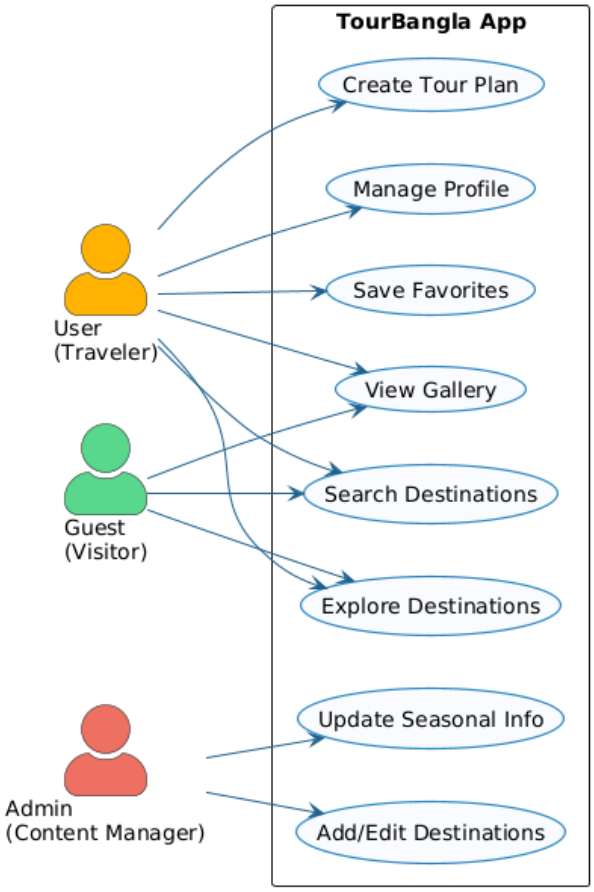

Figure 3.2: Use Case Diagram

3.1.3 Functional and Nonfunctional Requirements

1. Functional Requirements

I. Registration and Authentication of users: The travelers, vendors (hotels, transport providers) and administrators must be capable of registering and logging in safely. Role-based secure access will be provided by Firebase Authentication.

II. Service and Destination Management: Vendors can input, update or delete their services which include hotel accommodation, transport tickets (bus, train, boat, CNG), or tour packages.

III. Trip Planning and Booking: The travelers would be in a position to make plans by selecting destinations and making reservations in terms of budget and preferences.

IV. Payment Integration: The system must allow the secure payment via mobile financial services, such as bKash, Nagad, Rocket, and debit cards and credit cards.

V. Suggestions of seasonal travel: The site ought to suggest places to visit according to seasons. To give an instance, Coxs Bazar in winter or Sylhet in monsoon.

VI. Role-Based Dashboards: Travelers, vendors and administrators will have their own dashboards in order to have an easy access to the information and tools that each type of user needs.

VII. Search and Filtering: There should be an option of searching destinations, hotel and services according to location, price, rating and availability.

VIII. Real-Time Analytics: Vendors and admins will be able to access real-time booking and user tracking and trends on travel.

IX. User Engagement Features: The system must enable users to leave review, rating as well as blogging experiences of their travels to add value to the community.

.

2. Nonfunctional Requirements

Performance and Scalability: It should be able to support thousands of users simultaneously without any observable performance problems, and should be able to scale effectively as the user base increases.

I. Security: Enhanced security measures against personal and payment related information will be implemented.

II. Usability: The user interface must be easy and straightforward to use to ensure first time users navigate the app with ease.

III. Availability & Reliability: The site must ensure that it is highly accessible with

little downtime to ensure that customers can make bookings or search any time.

IV. Compatibility: The application will be compatible with android smartphones and tablets; iOS can be supported at later stages.

V. Maintainability: This system will be developed using modular and well documented code such that new features can be added or bugs fixed without much struggle.

VI. Data Privacy & Compliance: The site will adhere to the requirements of data protection and make sure that personal and financial data do not get leaked to other parties.

3.1.4 Data Flow Diagram

A Data Flow Diagram (DFD) is meant to show how information travels within the TourBangla system and the interaction between the system and external elements. It is a good representation of the way data is gathered, processed, stored, and circulated across the platform. It becomes simpler to comprehend the functional requirements and general design of the TourBangla application.

TourBangla system comprises of various important parts, which outline the general flow of data. The key processes, data stores, and information flow between data stores have been outlined in each section. The DFD is also offered at different levels, and each level displays a more detailed view of the system. The main DFD of the TourBangla comprises the following elements:

1. External Entities:

I. **Customer**: Sorts destinations, considers offered tour packages, reserves hotels or transportation, pays and tracks the history of the booking.

II. **Vendor**: Services travel-related services including transport, hotels and guides; changes availability; communication of bookings; and payment of transactions made.

III. **Administrator**: Charlies the whole TourBangla system, checks on the service providers, data protection, content management and platform regulations and policies.

2. Processes: TourBangla system handles various types of data, which include destination

information, transportation and hotel reservation, booking, travel recommendations, user reviews, and payment.

3. Data Storage:

I. **Destination and Service Data Store**: Location of data on destinations, hotels, guides, transport services posted on the site.

II. **Booking Data Store:** Stores all traveler booking, booking status, payment confirmation and trip histories.

III. **User Data Store**: Stores profiles of the travelers, preferences, reviews, feedback, and individual travel recommendations.

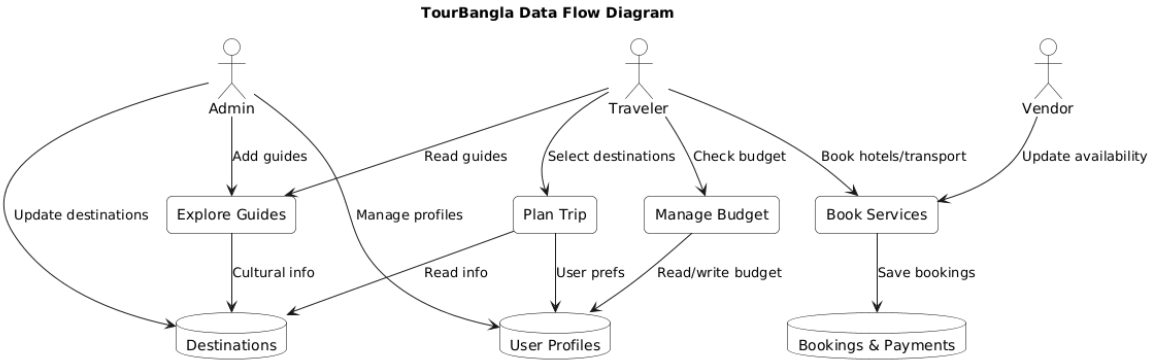

Figure 3.3: Data flow

3.1.5 UI Design

Flutter TourBangla Front-end

I. Authentication Interface: Basic information login screen with the ability to select the role dropdown (Tourist, Vendor, Admin) and to create a new account or sign-in without any complications. Firebase secure authentication.

II. Tourist Dashboard: User-friendly portal which displays seasonal touring suggestions, places to visit, and choices according to financial means (train, bus, boat, CNG) and hotel information in the area Navigation of the already saved itineraries and destinations of interest quickly.

III. Vendor Dashboard: Dashboard which will enable the hotels, guesthouses and travel operators to manage listings, update availabilities, track bookings as well as address tourists. Positive numbers when it comes to bookings, customer review and income.

IV. Admin Dashboard: Full control panel user, vendor and booking monitoring in real-time. Decision reports, trend and health analytics.

V. Destination & Hotel Management Screens: Interactive lists and cards containing destination data, images, ratings, hotel options and price range among others and reservation details. Filters such as location, price and amenity.

VI. Booking and Payment Interface: Flow to reservation is smooth and does not have any problems, numerous payment options (mobile banking, cards), a booking confirmation, the status tracking, and notification. Status indicators to be perceiveable in colour.

VII. Travel planner and learning hub: This gamified service, i.e., itinerary planning, travel tips, cultural guides and reward point on visiting new locations are optional among the tourists. Fosters communication and creates travelling as an interesting experience.

3.2 Detailed Methodology and Design

TourBangla application was created with the purpose of simplifying the traveling process in Bangladesh and simplifying and streamlining it. In making it, we conducted research and tried different ways and system design in order to make the app flexible, reliable and user friendly. This part of the report explains the rationale behind the development approach that we chose, the options we considered and the technologies that we eventually settled on.

1. **Choosing a Choosing a Methodology**

   The Agile Development Method is what we have decided to apply to TourBangla. Agile was the best among them since it allows us to break down into small chunks, do frequent testing, and improve the app based on the feedback. Since traveling-related apps tend to be heterogeneous (e.g. adding new destinations, updating transport, or seasonal offers), Agile gave us the ability to constantly improve the app during the process.

2. **Alternatives Considered**

   I. Waterfall: It is excessively inflexible because once a stage is done, it becomes hard to go back, so to speak. Does not work well with a project that needs frequent updates.

   II. V-Model: Stage tests cannot however withstand change of requirements.

III. Agile : Rapid, flexible and suitable to the app like TourBangla where user feedback and modifications are of high concerns.

3. System Design Architecture

TourBangla was designed in three levels. This separates the system into three:

I. Frontend- The screens that are used by travelers on their mobile phones.
II. Backend - Trip planning, budget and bookings.
III. Database- Stores user accounts, destination information, hotels, transport time etc.

Such a structure will enhance the organization of the app, maintenance of the app and later upgrading.

4. Options Explored

I. Monolithic Design: This is easy, yet everything is enclosed that it becomes hard to expand further in future.
II. Three-tier Design (Chosen): It is cleaner and safer and is far easier to upgrade and add features when we want.

5. Technology Stack

I. Front end: Flutter - We decided to use Flutter, which can be utilized in Android and iOS and offers a recent appearance. It also develops quicker.
II. Backend: Node.js - It is appropriate to do the real-time activity, like the schedule or booking of the transport.
III. Database: Firebase Firestore - The most appropriate to update on real-time i.e. users can view live data on the hotel, the bus or the train.

6. Alternatives Reviewed

Frontend:

I. React Native: Flutter was more uniform in its design and it was considered.
II. Native Android (Java/Kotlin): Powerful but, at the same time, would take much more time, since now we would need to possess different applications on Android and iOS.

Backend:

Python Django/Flask: It is simple and easy to operate but Node.js can handle

real-time requests much faster.

Database:

I. MySQL/PostgreSQL: Reliable and does not offer the possibility of instant updating.

II. MongoDB: Scalable and not so simple to work with Flutter as Firestore.

7. **Payment Integration**

   Since most of the people in Bangladesh use bKash and Nagad, the former and the latter were chosen as the main payment methods. We also considered adding Stripe to international travelers to the future.

8. **Further functionality and Gamification.**

   We have also desired that TourBangla become more interactive. This is the reason why we added small elements of gamification. As an example, they can be offered badges by visiting places that are seasonal or planning greener trips. This renders the transporting process to be entertaining and it motivates people to explore new destinations. We initially thought about using simple travel manuals, but they did not appear to be engaging enough. Gamified and rewarded elements can make the app more interactive and exciting to the users..

3.3 Project Plan

The TourBangla Project Plan consists of the key tasks, activities, resources, and milestones that should be taken to create and launch the app successfully. With the organized approach, we ensured that the project was done one step at a time and was on schedule. The section also outlines the project key phases, and the anticipated outputs at each of these phases. To visualise the timeline a Gantt chart was developed, but in this case the plan is described.

I. Requirement analysis and gathering.

   At the beginning we collected information on what is actually needed by customers. We have interviewed different type of travelers (students, families, and regular commuters) and researched other travel applications. It was through this that we listed the functional requirements (booking, trip planning, and hotel

search) and also non-functional requirements (speed, security and usability). Requirements Document including user stories, use cases and specifications.

II. System Design and Planning.

The focus at this stage was on how the system looked and how it worked. The app system architecture, database design and wireframes of the UI were done in our team. The structure was based on three levels that separated the presentation (frontend), business logic (backend) and database.

III. Implementation and Development.

The design was done and then the development process was entered. The database, transport and hotel modules, and the front end were configured using Firebase Firestore, which was designed using Flutter. The basic functionality of the destination navigation, budgeting and booking of TourBangla was performed at this stage. Alpha release having simple features, Development Codebase and Testing Plan.

IV. Quality Assurance and testing.

Having developed it, we did exhaustive testing to ensure that all went well. This comprised unit testing, integration testing, performance testing and security checks. This stage was also used to gather user feedback in order to polish the app.

V. Launch and Deployment

At the point where the app was mature, we launched it on cloud-based (Firebase Hosting/Google Cloud) infrastructure. A limited number of users were used to do a soft launch to receive the final feedback. When the adjustments were made successfully, we were ready to be officially released.

VI. Post-Launch and Maintenance

The app needs to be monitored even after its introduction. Our periodic updates, bug fixing and implementation of new features such as seasonal travelling recommendations, eco-friendly tours and gamified badges were planned.

3.4 Task Allocation

Table 3.1 offers the overview of the major activities performed during the project and ranging between week 1 and week 33.

Table 3.1: Task Allocation Timeline

Tasks	Weeks																
	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33
Project Planing and scoping.																	
Field Survey																	
UI/UX Design																	
Environment Setup(Flutter ,Firebase etc)																	
Project implementation																	
Testing and Bug finding																	
Fix the error and test again																	
Final Product and Report Writing																	

3.5 Summary

This part gave the approach and the blueprint of the TourBangla application. It described how the development strategy, system architecture and selection of technologies were deliberated to ensure the goals of the project were achieved. The functional and non-functional requirements were described and the rationale behind the application of a three-tier architecture, Firebase Firestore as a database, and Flutter as a cross-platform development frontend, was provided. The project plan was also outlined with different stages of requirement analysis, system design,

implementation, testing, and deployment, with definite milestones and deliverables. Moreover, the section covered the aspects of risk management to make the progress unproblematic. Next, the project will reach the implementation phase in which the main aspects of TourBangla will be created, tested, and ready to launch.

Chapter 4

Implementation and Results

This chapter is a report of how the TourBangla application was implemented and the chapter will focus on how the system design was integrated into a working platform. It also identifies the consequences or the outcome of the development, the outstanding features, the performance of the system, and the initial experience of the users after testing.

4.1 Environment Setup

Implementation of Database

In TourBangla, the backend was implemented with Firebase Firestore, which is a scalable and cloud-hosted solution that is real-time and suitable in the case of a tourism and travel planning system. The database shown in Figure 4.1 and 4.2 is designed in a manner that they facilitate different user roles (Traveler, Vendor/Service Provider, and Admin) besides handling the tour bookings, destination information, and transport modes and personalized travel arrangements. Its data model has also been done so that the primary entities are clustered together under their parent collection to enable them be accessed and modified easily.

The data model contains such fields like:

I. User data - name, email, phone, position, and travelling preferences, and verification status.
II. The information on the vendors - what kind of service (hotel, transport, guide), license/approval papers, ratings.
III. Destination list - name, type of entry (nature, heritage, adventure) of the destination, entry fee, photos and description.
IV. Tour packages - name of the tour, duration of the tour, and services that the tour offers and its price.
V. Booking records - reference to customer, reference to vendor/service, booking status, amount and dates of travel.
VI. Payment information - method of payment, transaction number, amount of payment and confirmation.

VII. Travel directions and advice - article number, article title, type of guide (budget, safety, cultural), media files.

VIII. User-tracking- where they have been, packages they have booked, trips they have made and reviews.

IX. Reward points - acquired through the use of the app (reviews, referrals, trip completion) and a history of redemption.

X. Notifications - confirmation of booking, payment read/unread, promotions read/unread.

XI. Analytics of the platform - active users per day, total purchases, a report on income earned, vendor activity, and feedback of customers.

In this structure, coordination of various roles of users is easily synchronized. In the instance where a traveler has already made a reservation, traveler and vendor dashboards will not fully refresh, they will be updated in real time, at least. Similarly the destination suggestions, individualized clues and reward balances are dynamically updated and this makes traveling planning experience easy and interesting.

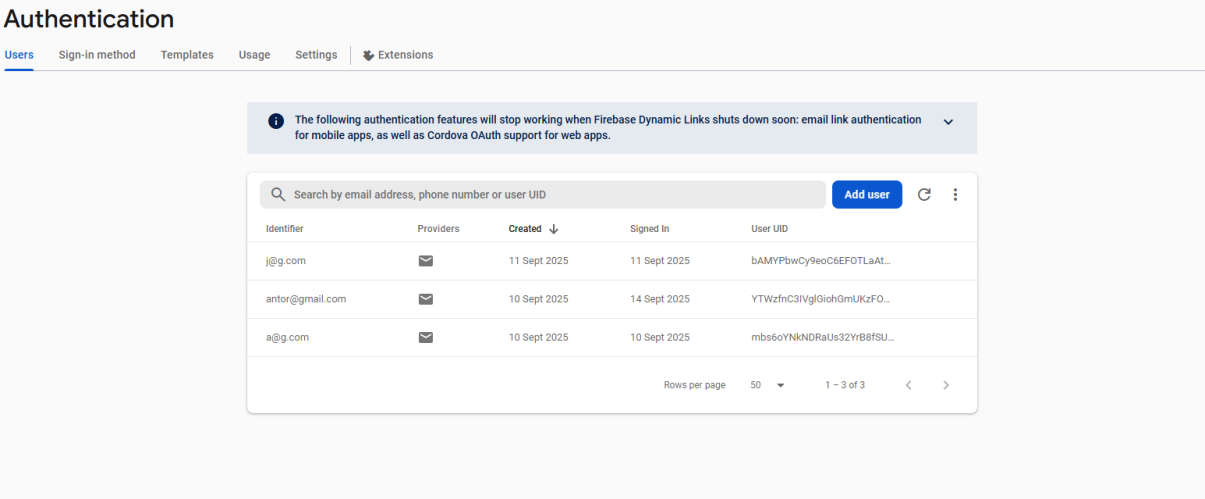

Figure 4.1: Database Architecture

4.2 Testing and Evaluation

The TourBangla application needed to be reliable, user-friendly and capable of use in real world, as such, we conducted multiple layers of testing. The objective was to ensure that all features operate as intended, various modules interact well and the application can accommodate mistakes or unforeseen circumstances amicably.

The major techniques of testing were:

I. Unit Testing - The following core features were tested individually to ensure that they were functional individually: user login / registration, destination listing, and budget calculation.

II. Integration Testing - We verified how various modules collaborated with each other, such as to choosing a destination and then get the proper hotel and transport suggestions.

III. Travel Workflow Testing - This was a full-scale simulation of the travel planning process. The user would be able to search destinations, budget, recommendations and save his or her travel plan without interruption.

IV. Recommendation Module Testing - Seasonal recommendations and budget-based recommendations were extensively tested to ensure that the system was producing the relevant and correct results.

V. Privacy and Access Control testing - Role based access was tested. Travel-related features were only accessible to regular users and only to the admin accounts were the administrative tools available.

VI. Android Compatibility Testing - The app has been tested on a variety of Android devices of various screen size and hardware specification. This made the layout to be responsive and functional on devices.

VII. Error Handling Testing - We tested errors like lack of internet connection, invalid logins and budget constraints to ensure the app did not crash when errors occurred.

4.3 Results and Discussion

The application was tested on various Android devices and in varying network conditions. Below is a summary of the results from the Figure (4.3 to 4.17).

Figure 4.3: Splash Screen

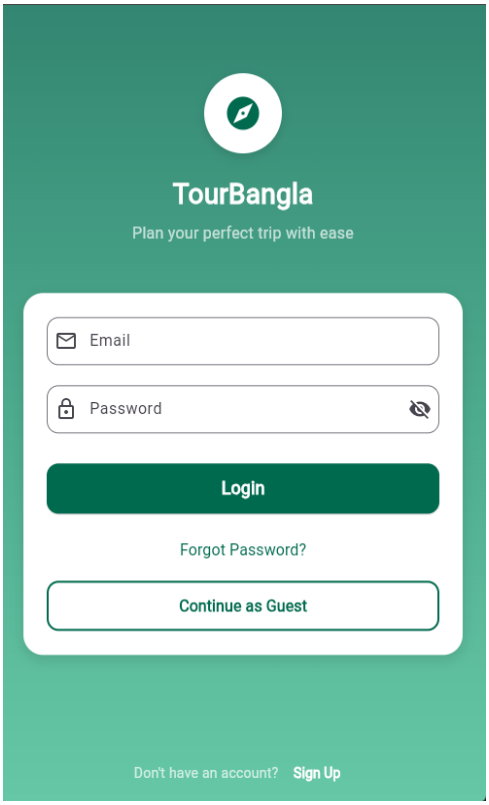

Figure 4.4: Log In/Sign In Screen

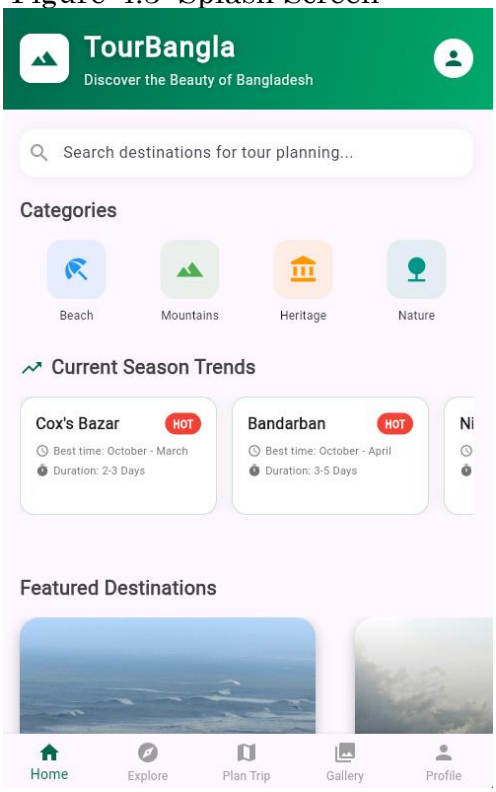

Figure 4.5: Home Screen

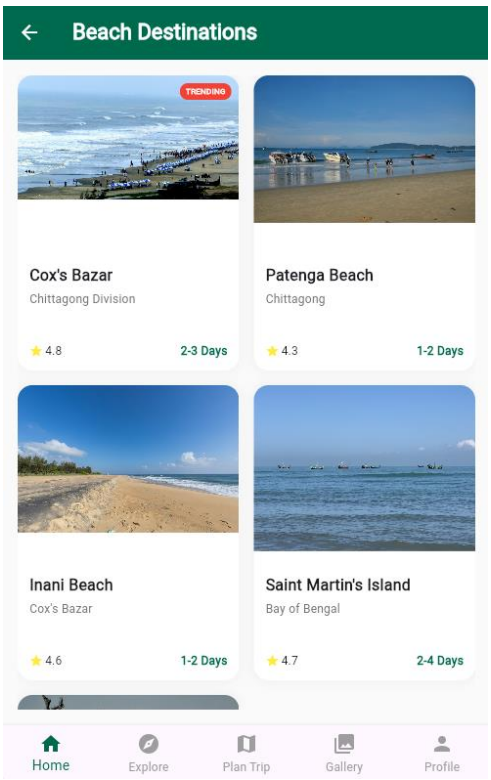

Figure 4.6: Categories Screen

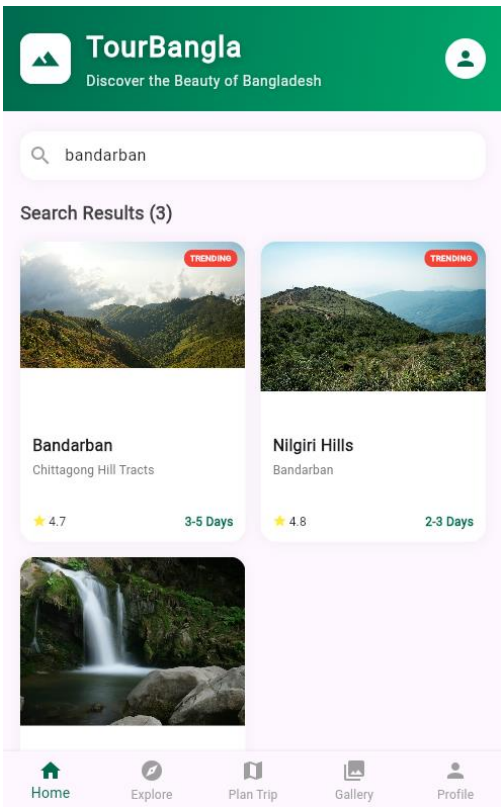

Figure 4.7: Search Screen

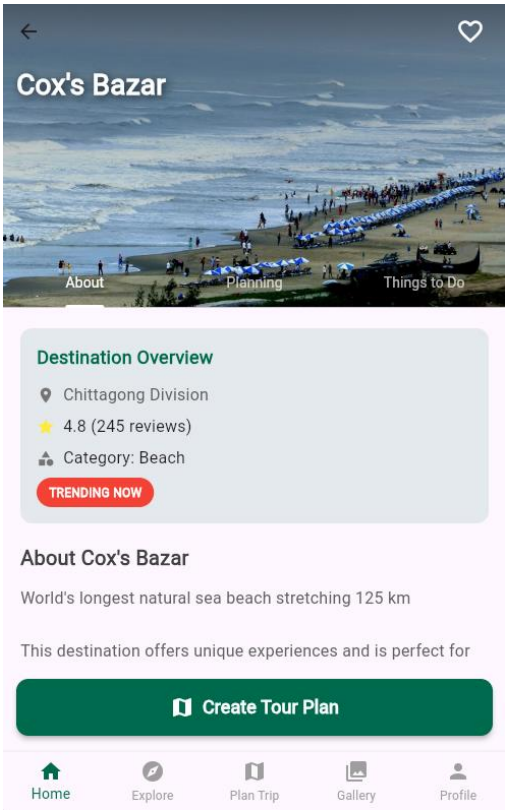

Figure 4.8: Destination Details

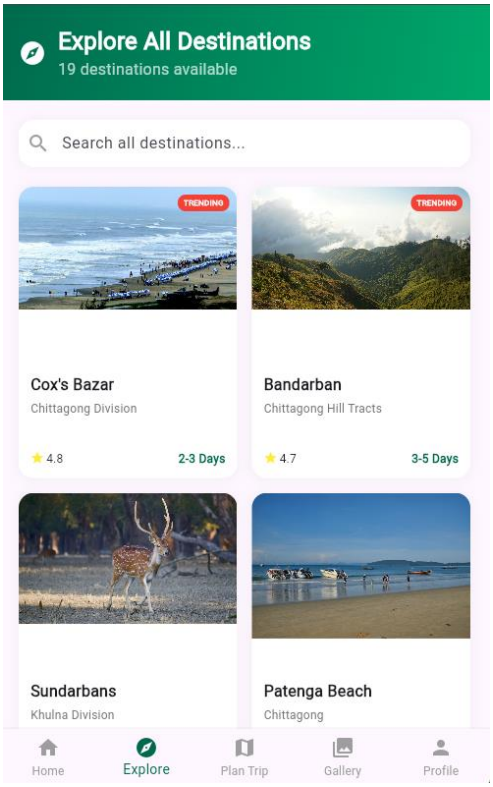

Figure 4.9: Explore All Destination

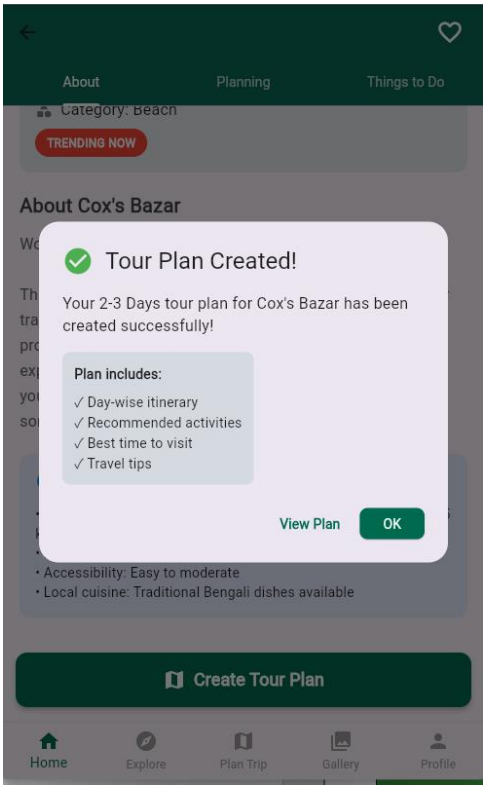

Figure 4.10: Create tour plan

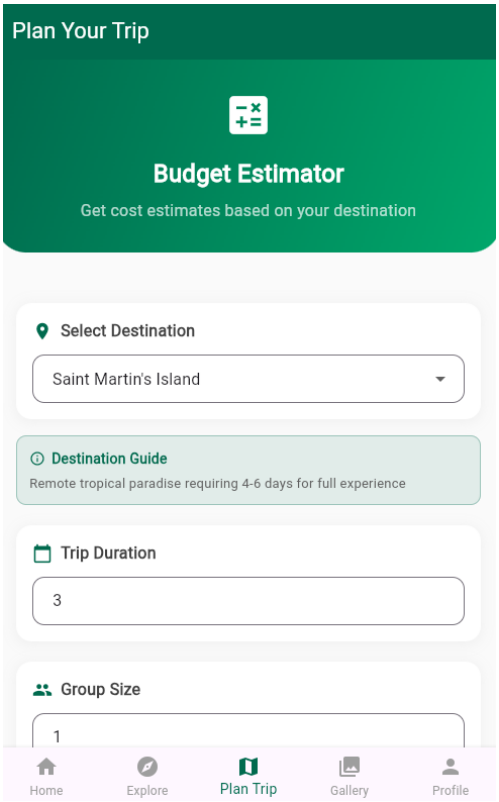

Figure 4.11: Budget Estimator

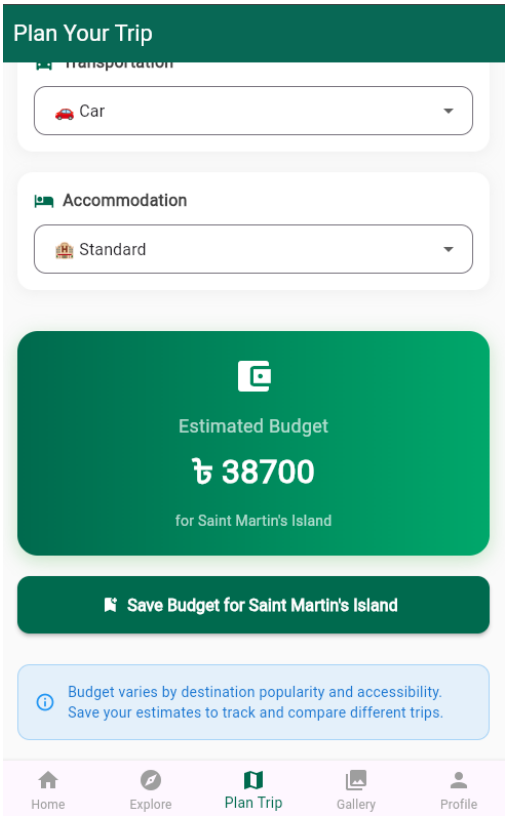

Figure 4.12: Save Budget Screen

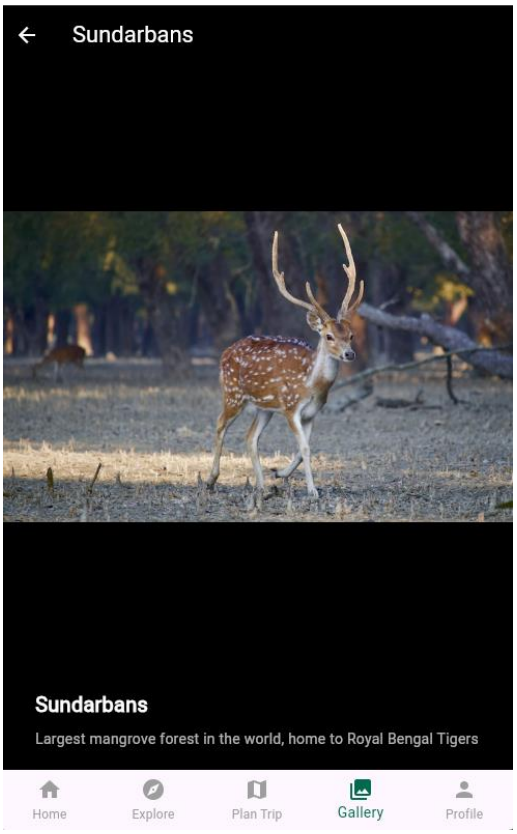

Figure 4.13: Photo Album

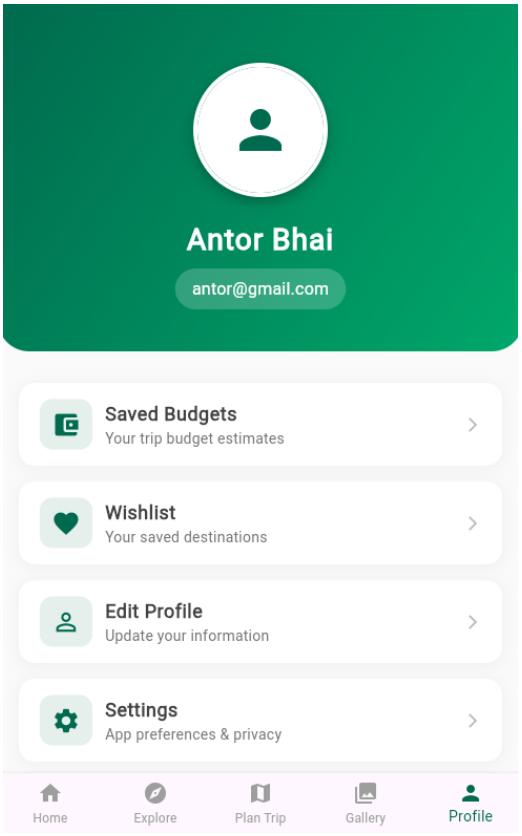

Figure 4.14: Profile Screen

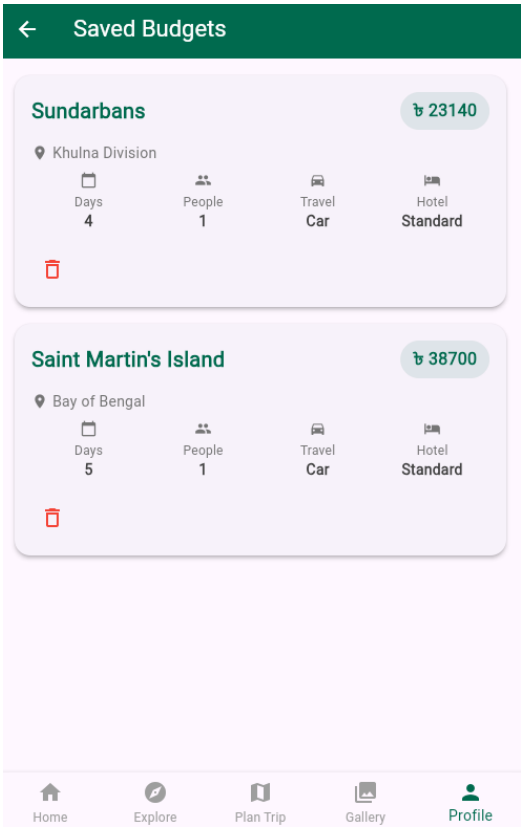

Figure 4.15: Saved Budget Screen

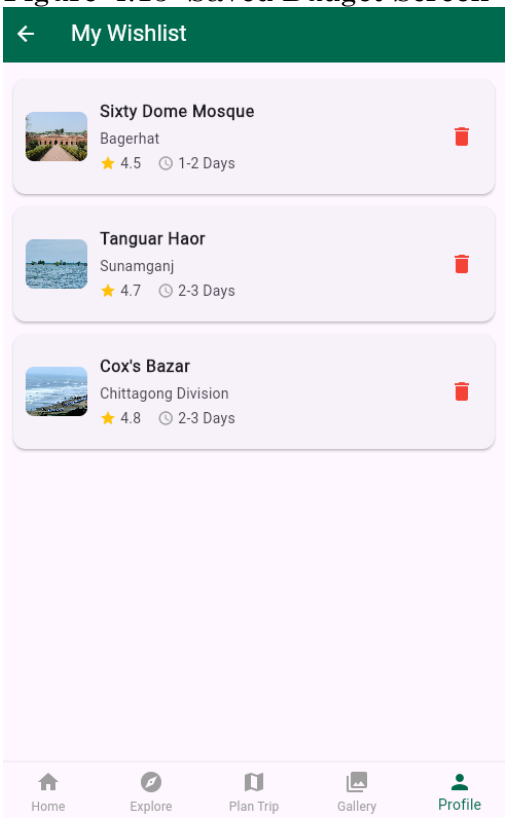

Figure 4.16: Wishlist Screen

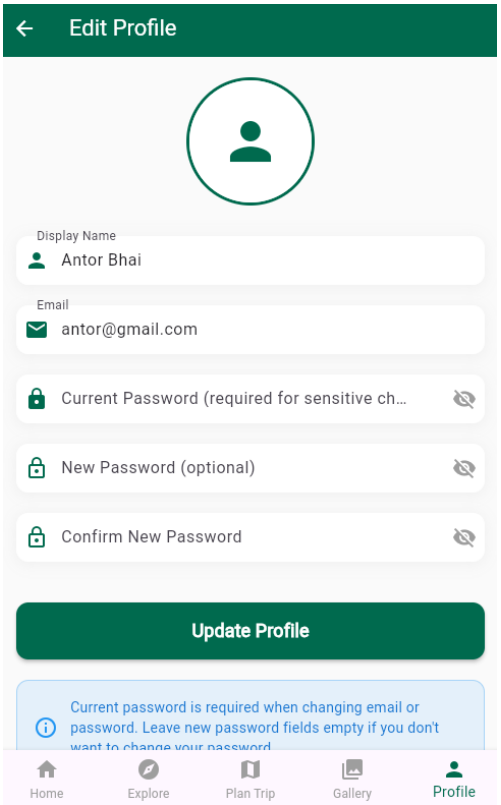

Figure 4.17: Edit Profile

Test Results and Reports

User Authentication - Both registration and logging in functions were performed properly and role-based access (User/Admin) was applied without any failures - Pass.

Destination & Recommendation Module - Destinations were populated with correct information and seasonal and budget based recommendations were created correctly - Pass.

Travel Plan Creation- The users could easily create, save and update travel plans without any loss of data - Pass.

Transportation and Hotel Recommendations - Suggestions were shown in a clear and corresponding format to the destination and budget chosen - Pass.

Error Handling - Wrong logins, blank budgets and poor internet connection should have resulted in appropriate error messages rather than crashing the application - Pass.

Compatibility with Devices - The app worked well with various android devices that had various screen sizes and specifications - Pass.

In general, the testing has verified that the application is stable, user-friendly and can be deployed.

4.4 Summary

This part was a comprehensive review of the process of the TourBangla platform development and what lessons were learned along the way. It has pointed out the main features of the system, which consist of recommending travel destinations, individual travel planning, transport and hotel recommendations, and interactive trip management. The testing phase results were also reviewed in the section, and it indicated the quality of the platform in terms of functionality, usability, and reliability. The testing feedback allowed determining the areas where improvements could be made to make the end release user-friendly and robust. In general, the analysis has revealed that TourBangla is prepared to provide a smooth and interesting experience to tourists traveling around Bangladesh.

Chapter 5

Engineering Standards and Design Challenges

In the following chapter, we will discuss engineering standard we used in developing the TourBangla platform, and the design challenges we encountered. It also details the best practices and industry standards and technical requirements applied in the project and challenges that have been experienced in the process of making the platform reliable, scalable and user-friendly.

5.1 Compliance with the Standards

Certain significant engineering criteria were noted so that TourBangla can provide high performance, safe, and smooth experience. The objective here was to make it accessible, secure and scalable in addition to provide an unendowed process of travel plan. The most important standards are considered:

I. GDPR and Data Protection on Local Level.
Standard Used: GDPR
Pros: Protects the personal data of the traveller of the profiles, booking arrangements and payment.
Builds credibility among the users and facilitates further expansion to the foreign users.
Cons: Compliant and intricate needs should be closely monitored.
Alternatives: Bangladeshi data protection legislation at domestic level.
Advantages: It is less rigid to local demands and conformity.
Con: Lacks foreign image, may limit the trust of the users outside Bangladesh.
Reason to Choose: GDPR offers a globally recognized framework of privacy in users, which would be useful in the internationalization of TourBangla to non-local markets.

II. Google cloud and AWS.
Standard Used: Google cloud (Firebase Firestore).
Pros: Live information integration which is important during the booking process, amendment of the itinerary and travel advices.
Development and testing can be made easier with the help of Flutter and close interaction with it.

Weaknesses: Its costs go up as the number of users increases.
Alternative: AWS
Pros: Scalability at state of the art level, global infrastructure, cost management infrastructure.
Disadvantages: It is more complex to install and use, and it requires special skills.
Firebase Firestore on Google Cloud was selected because it combines the real-time nature, its compatibility with the tech stack, and ease of use.

III. WCAG 2.1 for Accessibility
Standard Used: WCAG 2.1
Pros: Ensures that the disabled are able to use the platform.
Encourages openness of every passenger.
Cons: The implementation of accessibility can create more time to develop.
Alternatives: ADA (Americans with Disabilities act).
Merits: Easy steps to follow in the U.S.
Cons: Lets largely focuses on U.S. market, but not that of the rest of the world.
Reason of Choosing: WCAG 2.1 is more precise in providing access to all the users of the world and ensuring that TourBangla will be inclusive.

IV. Payments Compliance of PCI-DSS.
Standard Used: PCI-DSS
Pros: Improves the reservation of hotels, tickets and transport by means of credit card type payment.
Puts in important financial data, which forms the basis of payment assurance.
Disadvantages: It is a very strict form of certification failure to which will be followed by extreme legal and financial penalties.
Stripe, PayPal are available.
Benefits Benefits Pre-built PCI-DSS compliance and easy integration.
Cons: Transaction fees apply.
Rationale: Stripe was selected on the premise that its security architecture is solid, the level of integration is high, and it can also grow without the necessity to deal with sensitive data.

V. Software Development Methodology Agile vs. Waterfall.
Standard Used: Agile Development.
Pros: Provides the choice of incessant user and stakeholder feedback, developing in an iterative way. Flexible to the new trends in traveling or user preference.
Cons: Stakeholders involvement should be involved at all times; in case of poor management, the scope creep will arise.
Alternative: Waterfall
Benefits: The fixed needs are foreseen and formalized.

Cons: Static; cannot adapt to a change inside of the project.
Reason: Agile will offer flexibility and the flexibility which TravelBangla will need, i.e. the possibility to create features of travel planning, recommendation algorithms, and user experiences depending on testing.

.

5.1.1 Software Standards

The front-end of the TourBangla is a Flutter based program which combines travel planning, booking, and educational tourism. It has a clean log in screen wherein it has role selection dropdowns of Travelers, Tour Guides, and Admins.

Traveler Dashboard: A hybrid hub that provides destination exploration, itinerary building, seasonal suggestions, transportation and hotel reservation as well as an itinerary cart that can be utilized to store a saved trip.

Tour Guide Dashboard: Business-oriented dashboard which allows to monitor performance, booking, availability, and simplify tour scheduling processes.

Admin Dashboard: Systemwide control features that provide real-time views on the activities, traveler and guide analytics, and comprehensive platform management reports.

Destination Meshes and Booking Meshes: Incorporate brow-by-category features, destination cards, hotels, and transportation, built-in wishlists, cart, and so on.

Booking Processing Interface: This is the full booking lifecycle management interface, which has notifications, payment confirmation, and status updates.

Travel Learning & Gamification Hub: It includes interactive modules with the gamified itinerary planning, quizzes on the destinations, tracking of progress, and integration of reward system.

5.1.2 Hardware Standards

TourBangla is something that can be accessed via typical consumer gadgets such as Android smartphones and tablets. Hardware requirements to guarantee a smooth performance are:

RAM: 2 GB

Storage: 32 GB

Processor: Mid-level processor that is stable.

The hosting service is Firebase Firestore that provides real-time synchronization, cloud scalability, and multi-roles. It enables rapid read/write to do bookings, itineraries, schedules of the guides and gamified modules without using local servers.

5.1.3 Communication Standards

Communication between client and server is all through HTTPS to transmit data in a secure manner.

RESTful API: This gives assistance to data communication between Firebase back-end and Flutter front-end.

Firebase Cloud Messaging (FCM): Pushes confirmations of all booking, updates of itinerary, offers during the season, and reminders.

5.2 Impact on Society, Environment and Sustainability

5.2.1 Impact on Life

The site of TourBangla contributes a lot to the traveling experience and planning ability of the clients. This interactive itinerary planning, the subsequent suggestions of where to go and when to go there can assist the traveler to make a superior choice, plan his or her trips in a more convenient manner and manage the budgets. The structured online ecosystem of the platform can be exploited by the travelers, tour guides and local businesses. The travelers have one-on-one suggestions, simplified hotel booking, transportation and places of interest within the country to enhance the satisfaction of the trip. Travel agencies and tour guiding companies have the tools to organize the bookings and schedule and to channel the communications with the customers in an effective way. It minimizes the old and manual procedure of travelling planning, conserving time and energy, and enables the user to make more decisions in their travelling.

5.2.2 Impact on Society & Environment

The TourBangla offers digital inclusion and connectivity to rural and urban societies by connecting them to the resources and possibilities of tourism. The small local guides and businesses become exposed to a larger audience and the economic and social distance is reduced. This site builds confidence and cooperation between the travelers and the guides since it makes their transactions clear in terms of booking and costs. Educational modules based on gamification can also enhance awareness of responsible tourism in terms of sustainable travel behaviour, positive attitude towards local business, and appreciation of local culture. This instills a sustainable socio economic development.

5.2.3 Ethical Aspects

TourBangla has more of an eco-tourism/saving the giver orientation. Physical offices and paperless bookings are deferred and minimize the release of vehicles. Internet booking and itinerary management also alleviate overbooking and unwarranted travel and therefore conserves resources. As it is stated in a cloud-based storage (Firebase Firestore), the service guarantees a cost-efficient way of controlling information without having to use local servers and regular hardware updates. Normal architecture and good back end systems reduce the level of wastages in the computation therefore favoring a green digital infrastructure. The site has also provided privacy and security on user information by secure authentication, encrypted storage and role based access management to make sure sensitive information of the guides and the travelers are not lost.

5.2.4 Sustainability Plan

TourBangla sustainability plan will be based on the ethical, social and technological responsibility:

Data Protection: API encryption, and severe authentication of user data, payment and bookings are kept. Fair pricing policy, clearly comprehensible reward systems used in gamified modules, user-friendly interfaces, enable transparency and make the platform accessible to users with different levels of digital illiteracy. Feedbacks are constantly taken and fed to the site to facilitate an evolving platform that can expand with the community requirements. TourBangla is willful to make its online business surrounding sustainable in the sense of unnecessary traveling minimisation, maximising the number of bookings along with the energy saving cloud services to guarantee the responsible tourism. In general, the platform will be built on the basis of social empowerment, nature protection, and humanistic digital design to create a stable traveling ecosystem that will be of value to all people.

5.3 Project Management and Financial Analysis

The intended development model that will be employed in the development of the TourBangla project to ensure that it is flexible and offers an iterative development process with the help of continuous user, local guide, and stakeholder feedback is Agile, phased development model.

The project scope includes-

1. **Android Mobile Application Development through flutter:**

One of the applications in the travel and tourism group that can be used to plan your own trip, give recommendations on a destination, make hotel and transport reservations and also information about services offered on specific deals in the seasons. Traveler, tour guide and administrator Multi-role dashboards. Gamified educational modules to enhance the knowledge and budget management proficiency on travelling. Authentication and access control of different types of users. Activity of users, analytics of trip booking and engagement.

2. **Time Management**

The project is planned in 408-month steps that will comprise of 4 major steps:
Phase 1 (Months 1-2): Competitor Analysis and Requirement Dynamics, UI/UX Design and Database schema.
Phase 2 (Months 3-4): the core module is implemented, which includes the trip planning, booking management and the guide dashboards.
Months 5-6 (Phase 3): Gamification of learning modules, payment system to bookings, and rewarding systems.
Phase 4 (Months 7-8): Unit, integration and user acceptance testing (UAT), bug fix, pilot and performance testing.

3. **Quality Control**

Sprint Testing: Sprint testing is the stability testing and performance testing that is done on every development sprint.
User Acceptance Testing (UAT): This phase will test the app among the user (real travelers and local guides) in terms of usability, reliability and trustworthiness.
Performance Benchmarks: [?]5 seconds to complete the transactions and searches and [?]99% server uptime.

4. **Risk Management**

Technical Risks: The latency associated with the payment system or booking system was prevented by the coordination in advance with the local gateways and transport providers.
Operational Risks: The reluctance of local guides to utilize the platform was dealt with through training, onboarding bonuses and trust-building courses.
Financial Risks: The initial adoption will be broken by use of freemium model and slow marketing campaigns to bring in travelers and guides.

5. **Human Resource Management**

Project Owner: Final third-year student who is going to lead the project.

Development Team: 2-3 developers that would be working on Flutter frontend and backend and Firebase integration.

UI/UX Designer: Ensures that the experience and use of the product is comfortable and uncomplicated.

Supervisor/Advisor: Gives instructions technical and academic.

6. **Financial Feasibility**

Despite the fact that this project is an academic project, real financial analysis indicates that the project is a long term project.

Estimated Development Costs: Table 5.1 gives a brief description on the projected development cost of TourBangla application design, development, testing and deployment.

Table 5.1: Financial Analysis table.

SN	Item or Component's	Cost in BDT
01	Tools & Equipment AMD Ryzen 5 5600 (6-core), 16 GB DDR5 RAM, NVIDIA RTX 3050 6 GB, and Others	95,300
02	Power consumption for GPU computing	10,000
03	Field Survey	11,500
04	App Publishing, Domain, Fees	26,600
05	Testing	10,000
06	Miscellaneous	35,000
Total Cost		188,400 BTD

5.4 Complex Engineering Problem

This chapter explains the tricky engineering issues that were faced in the process of developing the TourBangla platform. A combination of the technical, functional, social, and operational considerations can create complex engineering problems, which can only be solved by multi-dimensional approach of problems. This section is a mapping of the engineering challenges at TourBangla to the existing problem-solving categories and the reasoning behind mapping.

5.4.1 Complex Problem Solving

In TourBangla, complex problem solving was done through analyzing the platform based on seven problem dimensions as shown in Table 5.2. No engineering challenge is discussed without considering the knowledge requirements, conflicting requirements, the depth of the analysis, familiarity, applicability of the standards, stakeholder involvement, system interdependencies.

Table 5.2: Mapping with Complex Engineering Problem.

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

Depth of Knowledge (EP1): To address the issues faced by TourBangla, it was necessary to have expertise in cloud databases, mobile application interface/user experience, real-time data processing, booking management systems, and CI/CD pipelines. The engineers had to make sure that they were scalable, reliable, and easy to use in addition to adding travel planning, transport scheduling as well as local guide features.

Familiarity of Issues (EP4): Although the use of travel apps and mobile dashboards is a popular trend, the idea of real-time itinerary planning, gamified travel advice, and guided integration came with its own problems. All these attributes meant that unique ideas were needed to facilitate smooth operations.

Scope of Applicable Codes (EP5): The data privacy, GDPR compliance, secure payment processing (Stripe integration), and cloud hosting standards were the ones that were adhered to rigorously to protect the user data, such as the booking history, payments details, and locations.

Stakeholder Involvement (EP6): The users, local guides and administrators were involved in feedback loops. Travelers gave usability feedback, guides helped to keep the systems well integrated, and admins were checking the performance and security of the system. Functionality and user experience were refined using this partnership.

Mapping with Knowledge Profile

Table 5.3: Mapping with knowledge Profile.

K1 Natural Science	K2 Mathematics	K3 Engineering Fundamentals	K4 Specialist Knowledge	K5 Engineering Design	K6 Engineering Practice	K7 Comprehension	K8 Research Literature
		✓	✓	✓	✓	✓	✓

K3: This is the background knowledge of the essential concepts in engineering such as the system architecture, networking, and database theory. System architecture offers an outline on how different elements of a system can be organized and structured in order to achieve effective interaction. Networking deals with the communication techniques among the parts of the system and the theory of databases deals with the concept of data storage, management and retrieval. The following are essential to the creation of scalable, reliable, and efficient systems. A good understanding of these aspects will help engineers develop systems which will work together, with reliable data transfer and maximum efficiency.

K4: This includes the further insight of such high-tech applications as cloud computing, real-time data synchronization, and gamified learning tools. Cloud computing enables the deployment and scaling of applications on spread out servers providing flexibility and cost-effective services. Real time data synchronization will also make sure that data on different devices or platforms are updated at the same time, which will facilitate a smooth experience with the user. Gamified learning systems utilize the components of games with the learning materials, improving the degree of engagement as well as motivation. The control of these spheres is the key to the creation of new innovative solutions in such spheres as e-commerce, education and management of data.

K5: This principle is concerned with practical experience with the design concepts, such as system integration, user interface (UI) and user experience (UX) design, and database management. System integration makes different parts of the system to interact in a harmonious manner. UI/UX design focuses on designing interfaces which are user

friendly and easy to use to give a positive experience. Database management entails the structuring and organization of data in an efficient way to enable easy access and modification. An adequately developed system will include all these factors which will make the system functional, usable, and data integrity is guaranteed as well as giving the end-users a smooth experience.

K6: This is associated with applying theoretical principles of design to the actual systems. Engineering practice fills the gap between idea and implementation, thereby concentrating in the area of implementing and enacting designs. It entails coding, prototyping, testing as well as refinements over the systems depending on the real world requirements. Some of the challenges that engineers have to grapple with will include system performance, scalability as well as user feedbacks. This is the stage where the abstract ideas are translated into operational, stable products fulfilling the expectations of the users and stakeholders and in accordance with industry standards and practices.

K7: Engineering Comprehension at the high school level entails the capacity to perceive and use theoretical as well as practical knowledge about engineering. It demands a clear understanding of the basics, in addition to being able to interpret and reason out issues based on the knowledge. Not only are engineers required to remember concepts but have to apply them in all sorts of places, make informed decisions in the course of design, implementation, and troubleshooting. This capability to combine theory and practice is vital to development of effective and efficient solutions to real world problems and to technology development.

K8: This entails the collection and analysis of knowledge of academic research, industry reports and case studies to make an informed decision regarding engineering practice. The engineers can keep abreast with the emerging trends, new technologies and best practices by going through the latest literature. The research literature is a good basis of decision-making as it gives evidence-based solutions to complex issues. It enables engineers to realize the bigger picture of what they do, learn out of past achievements and mistakes, and use established practices to create and develop their systems. The inclusion of diverse sources will make the engineering solutions efficient and at the forefront.

5.4.2 Engineering Activities

Mapping with Complex Engineering Activities

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
✓		✓	✓	✓

EA1: Range of Resources

The range of resources is the quantity and type of resources (e.g., human, technical, financial) needed in every engineering activity. As an illustration, the Backend Development (Database Design) is a process that consumes significant resources including the cloud services (Firebase Firestore), developers experienced in Backend technologies (Node.js, Firebase) and system architects.

EA3: Innovation

The concept of innovation portrays the extent of creativity and emergent strategies brought about by the engineering activity. The Gamified Financial Education Integration is unique because of its new application of gamification in order to make financial literacy more interactive with the user. CI/CD Pipeline & Deployment on the other hand entails putting old best practice into new effective application in an attempt to deliver faster.

EA4: Implications to Society and Environment.

There are societal and environmental impacts of each activity. To illustrate, the Backend Development (Database Design) influences user data privacy and system security whereas the Real-time Data Processing (Order Management) is minimizing logistical wastes and positively influencing the environment by minimizing unneeded transportation to fulfill the order. Gamified Education is used to democratize financial knowledge, which influences the economic behavior at greater scale.

EA5: Familiarity

Familiarity means how common the engineering activity is in the industry or how well known it is. CI/CD Pipeline & Deployment is a common practice that is prevalent in the industry hence very familiar. Gamified Financial Education Integration, in turn, brings

more unheard-of learning methods, making an approach to the material of education unique.

5.5 Summary

The chapter was an overall coverage of engineering standardization, design issues, and complicated engineering problems involved in the TourBangla platform development. It presented the essential engineering actions, such as real-time booking backend development, user-friendly dashboards design, and seamless integration of the travel learning modules, which was lit to the respective engineering problem-solving models and tasks. Another issue that the chapter highlighted was adherence to industry best practice and technical standards, including secure data management, cloud-based architecture, and scalable system design, to make the solution robust, efficient and sustainable. The mapping of these activities identified the resource needs, the stakeholder participation, innovation, and the impact on the society. In this case, real-time itinerary coordination and guide integration maximized travel planning and minimized environmental effect and user experience. Most gamified travel modules promoted cultural and environmental knowledge and made the platform interactive. In general, the analysis will make sure that the TourBangla does not merely comply with the technical requirements but delivers viable value that will unite travelers with guides, boost local tourism, and encourage responsible travel practices and offer a scalable, reliable, and user-friendly system.

Chapter 6

Conclusion

The chapter gives an overview of the project TourBangla, outlining the major successes and obstacles, as well as the perspectives. It highlights how the platform has affected the customers, the technical choices undertaken, and the contribution of the platform to the local travel and tourism ecosystem.

6.1 Summary

In this chapter, the author gives a clear overview of the TourBangla project summarizing its key accomplishments and inputs into tourism management and travel planning. The process of development is outlined, and it starts with the gathering of the requirements and design, proceeds to the implementation of the system, testing and refining. Among the key deliverables of the project, it is possible to note the combination of real-time travel planning capabilities with educational and gamified tourist guidance modules, which allows offering an interactive and user-friendly platform. TourBangla helps users have a better user experience through providing easy access to transportation, hotel reservation, suggestions of seasons to travel, and the management of their itinerary, supplemented with gamified learning modules regarding the tourist destinations and the local culture. Platforms create digital inclusions and impact the power of travelers and local service providers alike to bridge disparities in information availability and efficiency of operation. Technically, the project is based on the best practices of the industry and is focused on scalability, security, and user-centered design. The platform is currently in the early implementation stage, but the experience that was acquired in the course of development serves as good guidance in the further development. TourBangla preconditions the improvement of the infrastructure in the tourism industry and the development of the economy through providing convenient travel experiences.

6.2 Limitation

Despite the fact that the TourBangla platform meets the fundamental objectives, there are a number of limitations which can be enhanced: The management with a greater number of users will necessitate database optimization, load balancing methods and

caching. Low-digital-literacy users, particularly rural ones, can experience challenges with accessibility, which requires more sensible UI/UX patterns and instructions. Certain local transportation and hotel companies are too slow to implement the platform because they do not know about using digital tools, and it will need training and incentive programs. Cultural and tourism awareness gamified educational modules should be evaluated further to get the most engagement and learning results. Connecting with third-party services such as payment gateways, travel API and mapping solutions necessitate unceasing monitoring and adjustment to fluctuating compliance and technical benchmarks.

6.3 Future Work

The next generation of the TourBangla will be based on the improvement of the performance, scalability, and user experience. The areas of improvement comprise database design, caching and multi-region deployment to the cloud to have fast and reliable operations. Onboarding through games, training and incentive programs will increase both user and vendor adoption of the platform. An overall enhancement of the experience will be provided by introducing AI-based, personal, recommendations, predictive travel features, and user behavior and demand forecasting analytics. The inclusion of multilingual assistance, user disability support, and the inclusion of localized content will widen the usability. I will also incorporate advanced tourism education, cultural modules, interactive quizzes, and so on to enhance knowledge retention among users. The compliance with GDPR and local data privacy and the improvement of security measures will provide both trust and safety. The integrations with payment gateways, local guides, transportation networks, and third-party booking platforms will allow building a full tourism ecosystem. These enhancements in the future should be made to make TourBangla a complete, dependable, and easy to use site that will be of benefit to travelers, the local service providers and the local tourism sector.

References

[1] M. Chowdhury and M. Uddin, "Digital tourism and travel app growth in Bangladesh: Opportunities and challenges," *Journal of Business and Technology*, vol. 17, no. 2, pp. 45–58, 2022.

[2] Google, "Firebase Realtime Database documentation," 2023. [Online]. Available: https://firebase.google.com/docs/database

[3] Google, "Firebase Authentication documentation," 2023. [Online]. Available: https://firebase.google.com/docs/auth

[4] A. Gupta and A. Arora, "Gamification in travel education: A systematic review," International Journal of Tourism Studies, vol. 9, no. 3, p. 47, 2021. doi: 10.3390/ijts9030047

[5] M. S. Hossain and M. Rahman, "Mobile tourism services in Bangladesh: Enhancing travel planning through innovation," Asian Journal of Economics and Tourism, vol. 3, no. 1, pp. 89–103, 2021.

[6] S. Md. Alamgir and S. Akter, "Tourism app adoption in Bangladesh: User perspective," Bangladesh Journal of Business Research, vol. 12, no. 1, pp. 77–96, 2020.

[7] M. Rahman and M. Huda, "Digital travel guides and mobile applications in Bangladesh: Case study," South Asian Journal of Tourism, vol. 8, no. 2, pp. 112–125, 2022.

[8] M. M. Rahman and M. Hasan, "Tourism apps in Bangladesh: Status, potential and constraints," Bangladesh Development Studies, vol. 42, no. 1, pp. 95–110, 2019.

[9] The World Bank, "Digital Bangladesh: Promoting inclusion through technology," 2023. [Online]. Available: https://www.worldbank.org/

[10] W3C, "Web accessibility guidelines (WCAG 2.1)," 2023. [Online]. Available: https://www.w3.org/TR/WCAG21/

[11] Google, "Flutter documentation," 2023. [Online]. Available: https://docs.flutter.dev/

[12] A. Borsato, Flutter Complete Reference: Create beautiful, fast and native-quality apps with Flutter, Leanpub, 2022.

[13] M. Rahman, S. Rahman, and M. A. Hossain, "Impact of mobile tourism apps on local business growth in Bangladesh," International Journal of Mobile Marketing, vol. 8, no. 4, pp. 54–70, 2022.

[14] P. Kumar and S. Gupta, "Mobile app development using Flutter for travel and tourism: A survey," International Journal of Computer Applications, vol. 178, no. 2, pp. 36–42, 2021.

[15] T. Mahmud, S. S. Biswas, and M. Ahmed, "State of digital travel education in Bangladesh: Opportunities and challenges," Journal of Travel Services, vol. 25, no. 3, pp. 233–247, 2022.

[16] M. S. R. Jahan and M. R. Khan, "Digital tourism: Technological innovations for social and economic growth," Bangladesh Journal of Information Technology, vol. 5, no. 1, pp. 43–58, 2021.

[17] L. U. Zaman, "Mobile tourism apps and their impact on small and medium enterprises in Bangladesh," Asian Economic Policy Review, vol. 16, no. 2, pp. 98–106, 2022.

[18] R. M. Bhuiyan and M. M. Rahman, "Role of digital marketing in tourism app success in Bangladesh," Journal of Digital Marketing, vol. 12, no. 1, pp. 45–61, 2022.

[19] F. T. Ali and H. Z. Hassan, "Towards smarter tourism: Role of digital inclusion in Bangladesh," Global Policy Review, vol. 23, no. 2, pp. 139–155, 2021.

[20] M. S. Islam, "Challenges and opportunities of travel apps in Bangladesh: A case study," International Journal of Digital Tourism, vol. 3, no. 1, pp. 35–48, 2022.

[21] A. S. Bhuian and M. Hossain, "Tourism inclusion through mobile travel apps in Bangladesh," World Development Review, vol. 6, no. 1, pp. 61–75, 2021.

[22] M. K. R. Sarker, "Techniques for digital travel services: Bangladesh perspective," Journal of Digital Travel Systems, vol. 8, no. 3, pp. 122–137, 2023.

[23] B. Roy and A. Sharma, "Tourism technology in Bangladesh: Potential for growth and innovation," Journal of Travel & Innovation, vol. 14, no. 4, pp. 180–194, 2022.

[24] M. S. Hossain, "Blockchain and travel apps in Bangladesh: A new approach to tour management," International Journal of Blockchain Tourism, vol. 9, no. 2, pp. 57–73, 2022.

[25] K. Rahman and S. Abdullah, "Trends in mobile tourism and travel startups in Bangladesh," Bangladesh Business Review, vol. 18, no. 4, pp. 25–40, 2022.

TourBangla_Travel_&_Tourism_Guide_App.pdf

ORIGINALITY REPORT

9%	6%	2%	7%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Submitted to Daffodil International University Student Paper	6%
2	Submitted to United International University Student Paper	1%
3	dspace.daffodilvarsity.edu.bd:8080 Internet Source	<1%
4	Submitted to Lovely Professional University Student Paper	<1%
5	Fadi Al-Turjman. "Artificial Intelligence Learning Facilitators - Creating Smart Education Systems", CRC Press, 2025 Publication	<1%
6	de Jesus Moita, Catarina. "A Consumer-Oriented Mobile Application for Assessment of Household Appliances.", Universidade de Lisboa (Portugal), 2024 Publication	<1%
7	Submitted to University of Sheffield Student Paper	<1%
8	hb.diva-portal.org Internet Source	<1%
9	Submitted to Higher Education Commission Pakistan Student Paper	<1%
10	www.diva-portal.org Internet Source	<1%