



An-Najah National University

Faculty of Engineering and Information Technology

Computer Engineering Department

Graduation Project 1



TOURISTINE

Accomplished by:

- Jenan Abualrub
- Israa Odeh

Supervisor:

Dr. Anas Toma

Presented in partial fulfillment of the requirements for Bachelor degree
in Computer Engineering.

January 29, 2024

Acknowledgement

We extend our heartfelt gratitude to all those who have supported and contributed to the successful completion of our software graduation project, Touristine. Their invaluable guidance, encouragement, and assistance were integral to the realization of this endeavor. Foremost, we express our sincere thanks to our supervisor, Dr. Anas Toma, whose support, expertise, and insightful feedback were pivotal throughout the project's entirety. His mentorship has been truly invaluable, enriching our learning experience.

Additionally, our appreciation extends to the faculty members of the Computer Engineering Department for fostering a suitable learning environment throughout the years. We are equally thankful to our extraordinary families and friends, who consistently offered encouragement, understanding, and belief in our capabilities.

In closing, our profound gratitude extends to every individual who played a part, regardless of its magnitude, in shaping this project and contributing to the achievement of this milestone. Your contributions have indelibly marked our academic journey, and for that, we are truly thankful.

Disclaimer

This report was written by students Jenan Abualrub and Israa Odeh at the Computer Engineering Department, Faculty of Engineering, An-Najah National University. It has not been altered or corrected, other than editorial corrections, as a result of assessment and it may contain language as well as content errors. The views expressed in it together with any outcomes and recommendations are solely those of the students. An-Najah National University accepts no responsibility or liability for the consequences of this report being used for a purpose other than the purpose for which it was commissioned.

Table of Contents

Acknowledgement	1
Disclaimer	2
1. Introduction	7
2. Constraints and Standards	8
2.1 Constraints and limitations	8
2.2 Standards	8
3. Literature Review	9
4. Methodology	10
4.1 Tools, Programming Languages, and Database	10
4.1.1 Tools	10
4.1.2 Programming Languages	11
4.1.3 Database	11
4.2 System Features	15
4.3 Crack analysis:	65
5. Results and Discussion	66
6. Conclusion and Future Work	67
6.1. Conclusion	67
6.1. Future work	67
7. References	68

List of Figures

Figure 4.1.3. 1. Tourists Collection.....	12
Figure 4.1.3. 2. Interests Field Inside Tourists Collection.	12
Figure 4.1.3. 3. Admins Collection. Main Admin's Document.	13
Figure 4.1.3. 4Admins Collection. Worker's Document	13
Figure 4.1.3. 5.Destinations Collection.....	14
Figure 4.1.3. 6. Suggestions Collection.	14
Figure 4.1.3. 7. Plans Collection.....	15
Figure 4.2. 1. Touristine Logo.....	16
Figure 4.2. 2.Touristine Logo Deconstructed: Logo Idea.	16
Figure 4.2. 3.The mobile app's introductory splash screen.....	17
Figure 4.2. 4.Landing Splash Screen.	18
Figure 4.2. 5.Landing Page.....	19
Figure 4.2. 6. Account Verification Interface.....	20
Figure 4.2. 7. Signup Interface.....	20
Figure 4.2. 8. Login Interface.	21
Figure 4.2. 9. Reset Password Interface.....	21
Figure 4.2. 10. Confirmation Screen.....	21
Figure 4.2. 11. Tourist Onboarding Interfaces.	22
Figure 4.2. 12. Coordinator Onboarding Interfaces.	25
Figure 4.2. 13. User's Home Page.	26
Figure 4.2. 14. Search Interface.	27
Figure 4.2. 15. Filtering Options Dialog.....	27
Figure 4.2. 16. Searching for Historical Sites.	27
Figure 4.2. 17. Historical Sites Search Result.....	27
Figure 4.2. 18. About Mahmoud Darwish Museum Tab.....	28
Figure 4.2. 19. About Mahmoud Darwish Museum Dialog.....	28
Figure 4.2. 20. Mahmoud Darwish Museum Description Tab.....	29
Figure 4.2. 21. Mahmoud Darwish Museum Services Tab.....	30
Figure 4.2. 22. Mahmoud Darwish Museum Location Tab.	30
Figure 4.2. 23. Real Time Estimation.	31
Figure 4.2. 24. Location Live Tracking.	31
Figure 4.2. 25. Virtual Tour.....	32
Figure 4.2. 26. Mahmoud Darwish Museum Virtual Tour Tab.....	32
Figure 4.2. 27. Reviews Tab.....	33
Figure 4.2. 28. Adding Review Interface.....	33
Figure 4.2. 29. Users' Reviews Interface.	33
Figure 4.2. 30. Complaints Tab.....	34
Figure 4.2. 31. User's Complaints Interface.	34

Figure 4.2. 32. Complaints Adding Interface.....	34
Figure 4.2. 33. User’s Uploads Interface.	35
Figure 4.2. 34. Images Upload Tab.	35
Figure 4.2. 35. Image Upload Interface.	35
Figure 4.2. 36. Plan Maker Interfaces.....	36
Figure 4.2. 37. The Created Plan Places.	37
Figure 4.2. 38. The Created Plan Paths.....	38
Figure 4.2. 39. User’s Plans Tab.	39
Figure 4.2. 40. Place Suggestion Interfaces.....	40
Figure 4.2. 41. User’s Suggested Places Tab.	41
Figure 4.2. 42. Chat Page.....	42
Figure 4.2. 43. Chatting List Interface.....	42
Figure 4.2. 44. User’s Profile Page.	42
Figure 4.2. 45. User’s Account Interface.	43
Figure 4.2. 46. Interests Filling Interface.....	44
Figure 4.2. 47. Location Acquisition Interface.	45
Figure 4.2. 48. Coordinator’s Home Page.....	46
Figure 4.2. 49. Place Generator Interfaces.....	51
Figure 4.2. 50. Coordinator’s Added Places Tab.....	52
Figure 4.2. 51. User Interactions Interface.....	52
Figure 4.2. 52. Al-Aqsa Mosque Complaints Interface.	53
Figure 4.2. 53. Al-Aqsa Mosque Uploads Interface.....	53
Figure 4.2. 54. Al-Aqsa Mosque Reviews Interface.	54
Figure 4.2. 55. User Suggestions Interface.	54
Figure 4.2. 56. Cracks Analysis Interface.	55
Figure 4.2. 57. Uploaded Cracks Interface.	56
Figure 4.2. 58. Chatting List.	56
Figure 4.2. 59. Chat Page.....	57
Figure 4.2. 60. Coordinator’s Account Page.....	57
Figure 4.2. 61. Touristine Administrator Homepage.....	59
Figure 4.2. 62. Touristine Destinations	59
Figure 4.2. 63. Map View of Cracks Analysis Results.....	61
Figure 4.2. 64. Destinations in Jerusalem with Uploaded Crack Images.....	61
Figure 4.2. 65. Admin’s Chatting List.....	62
Figure 4.2. 66. Admin’s Chat Page.	62
Figure 4.2. 67. Admin’s Account Interface.	63
Figure 4.2. 68. The Interface of Adding New Coordinators.	64
Figure 4.2. 69. Current Coordinators Interface.....	64

Abstract

Throughout history, Palestine has consistently captivated attention due to its strategic geographical position. Consequently, this encouraged the rise of subsequent civilizations on this holy land, making it a uniquely appealing destination for sightseers worldwide, especially given Palestine's wealth of diverse attractions. However, the lack of modern approaches to promote landmarks or guide tourists effectively, alongside, the campaigns held by Israeli and Western media to distort any cultural significance of the Palestinian heritage, seriously threaten to erase the Palestinian identity.

In response to these challenges, this paper introduces Touristine, a cross-platform that serves as a comprehensive travel companion, enabling users to explore Palestine's diverse and historically rich landscapes. Touristine targets tourists and locals. It provides the user with destinations that align with their interests, weather status, and health conditions. Users can quickly access a wealth of information, use location tracking to reach the destination, enjoy a virtual tour, share feedback, and view others' experiences to make decisions. Additionally, Touristine offers a unique planning feature, it generates personalized plans to the users, based on specific criteria such as date, trip duration, age categories, and preferred destination types. It also encourages communication between users and administrators, either by raising complaints, suggesting new possible destinations, or by chatting directly. Users can upload recent images of any destination for the purpose of helping other users see recent imagery of it, or they could be directed towards the administrators to show cracks in the buildings using image processing techniques, which aims to repair such defects and maintain a good-looking structure for future visitors.

1. Introduction

Since Palestine is gifted with a generous number of attractions that embrace its cultural, historical, and religious significance, it is necessary to maintain these sites. Furthermore, it is undoubtedly essential to deploy technology to enhance the tourism industry in Palestine. However, there does not seem to be enough websites or applications that showcase Palestinian sights in a modern way. This deficiency could undesirably reduce the tourism sector's contribution to the economy.

In light of this, Touristine stands firm in overcoming the flaws and issues associated with old-fashioned online methods. It recognizes the imperative of providing personalized data to users while satisfying their curiosity with comprehensive information about their destination, covering general descriptions, availability, and services. This resolves the traditional generic methods' problems in searching for destinations, as users receive suggestions based on their preferences. Moreover, the lack of follow-up on most currently existing websites results in displaying outdated images, eroding the trust of the users and overlooking any possible needs to refactor structural flaws, or general issues faced by visitors. Hence, this app provides multiple features that keep the administrators in touch with reality, by gathering feedback, complaints, and recent images from users to keep the destinations in a presentable form. This builds a strong bond between users and the app, as it offers recent and up-to-date information, preventing any potential misleading that could disappoint users. Furthermore, as this app is primarily designed to meet all possible needs in one place, it helps users by creating on-the-spot plans that align with their specifications. This enlightens tourists about the tourist sights they did not know before. Also, users can get a peek on their destination by having a virtual tour provided by the app.

In order to maintain a robust tourist industry, administrators can access statistics regarding ratings, reviews, complaints, and the number of times a destination is viewed by users. This information helps pinpoint areas that require attention or improvement. Additionally, administrators can obtain images containing wall defects detected using image processing, originally uploaded by users. This capability is crucial for enforcing regular maintenance and periodic checkups on destinations.

Touristine is available as both an application and a website. It aspires to encourage people worldwide to visit Palestine, and even locals to explore different cities. Touristine is built to make touring Palestine easy and enjoyable for everyone.

2. Constraints and Standards

2.1 Constraints and limitations

- Finding a dataset to fill the database with was quite challenging. This was mainly caused due to the lack of resources, and the spread of false information. Hence, there was a huge reliance on Palestinian municipalities of different cities to at least get basic information, however, extensive research was done to gather the rest of the data.
- Mapping different frameworks and collecting the group work was somewhat of a fuss at the beginning. Thus, Github was used to mentor and group all the project's parts together. Also, Render website was used to host the server, which made it easier to connect the front-end side with the back-end.

2.2 Standards

- MVC: it is a software architecture. It was deployed to build a scalable project and ease up the maintenance when problems occurred.

3. Literature Review

In general, tourism is a huge concern for countries, as it usually holds a significant role in the economy and exposes a country's culture to the outside world. Many websites are built for different places around the world that helped determine the bar to state the basic features that should exist in any tourism guidance platform.

Viator[1] is an exemplar website dedicated in sightseeing tours in Paris. It shows tourists the most famous landmarks in Paris, as well as, gives an option to view attractions based on certain filtering types. Nevertheless, its main focus was upon priced tours that tourists can enroll in online.

Although the internet is full of such platforms, it was more important to check platforms built for Palestine, in order to find the flaws and make up for them in Touristine. Hence, there happened to be a cross-platform called Explore Palestine[2]. It suggests places in some cities of Palestine's. However, the suggestions do not consider the user's preferences and it only provides a short overview over each attraction. It also offers a virtual tour option in each city rather attraction. The user can choose between 3 tours, where each tour is a 360° photo. Moreover, it gives the user an option to suggest new attractions, which, as a matter of a fact, seemed to malfunction completely on the mobile app as the interface would not open. Meanwhile, on the website the interface would open but the location acquisition would fail due to technical details as provided on their official website at the time.

4. Methodology

4.1 Tools, Programming Languages, and Database

4.1.1 Tools



Visual Studio Code:

- This IDE was used for writing both the front-end, and the back-end sides of the project. It is light weighted and executes the code seamlessly.



Android Studio:

- It is a powerful simulation environment for testing Android applications. It provides a user interface to create customized emulators. It was utilized to mimic an Android device, which was used to test and assess the application.



GitHub:

- It served as a centralized platform between team members, which helped organize and track the different units of the project.



Firebase:

- It provided cloud storage for the efficient organization and management of images in distinct folders based on usage patterns. This not only streamlined data retrieval but also significantly eased maintenance, ensuring a more efficient and manageable system.
- It was capable of facilitating seamless communication through real-time chatting between users.
- It enabled the delivery of notifications to mobile devices.

Render:



- It was employed to host the server. Hence, requests sent did not require a localhost to respond; on the contrary, the server can securely receive requests from any source.

**Postman:**

- It performed a vital role in testing the APIs. It offers a friendly user-interface from which HTTP requests could be sent to the server, and responses could be displayed as well.

**MongoDB:**

- It was deployed to implement, and manage the database, ensuring efficient storage and retrieval of data.

4.1.2 Programming Languages

Frontend:

Touristine's frontend platforms, Flutter and Dart, were chosen for their alignment with the project needs, considering factors like learning curve, cross-platform support, technical requirements, and package availability.

Backend:

The server was developed using Node.js in conjunction with the Express framework, resulting in enhanced performance and scalability on the server side. As Node.js is built with a non-blocking, event-driven architecture, it efficiently handles multiple requests simultaneously. This aligns with the application's structure, designed to function in real-time. Additionally, the Express framework provides middleware support, enabling a well-organized routing structure through the server's components.

Python was also deployed to perform some analysis on images, but the python script was executed from the Node.js side as a child-process.

4.1.3 Database

As the primary database, MongoDB Atlas, a cloud service, was deployed to store and manage the non-relational database created for this project. Opting for a non-relational schema proved more convenient, aligning with the nature of the data and ensuring easier manipulation when interacting with the database. Furthermore, MongoDB Atlas is a reliable service that performs with the means of scalability and secure data access.

The database comprises 5 distinct collections, which are the following:

Tourists:

This collection stores the regular user's basic information, in addition to an 'interests' field which aims to gather insights into user preferences. This information is crucial for presenting personalized data and plays a pivotal role in generating tailored plans for users. To provide further secure usage of the application, the user's password is encrypted as it is saved. There is also a device token field. This field is managed in corporation with Firebase, it is used to send notifications to the users even when they are offline.

```
  _id: ObjectId('654ab9b19e178dad3b811e2b')
  firstName: "Dwight"
  lastName: "Schrute"
  email: "jenanahmad182@gmail.com"
  password: "$2b$10$HIRE80lpzvs1i4VPmqRoD0ZFo3IQTxm6WYvrJ97L6YPGZT.jf8RwS"
  __v: 0
  profileImage: "https://firebasestorage.googleapis.com/v0/b/touristine-9a51a.appspot.c..."
  interests: Object
  location: Object
    address: "Ramallah"
    latitude: "31.9151617"
    longitude: "35.1783083"
  deviceToken: "dB4tqsgRrad4VAKHunHsJ:APA91bH2wppy5Suz0iBtEwSwjBk0HyiB7aGnuItS00hGcpW..."
```

Figure 4.1.3. 1. Tourists Collection.

```
i [ + ] ▼ interests: Object      Object
9      BudgetFriendly: "true/"   String
10     Luxurious: "false/"       String
11     MidRange: "true/"         String
12     No: "false/"              String
13     Yes: "true/"              String
14     coastalAreas: "false/"    String
15     cognitive: "true/"        String
16     countrySide: "false/"     String
17     diabetes: "true/"         String
18     family: "true/"           String
19     friends: "true/"          String
20     hearing: "false/"         String
21     historicalSites: "true/"  String
22     majorCities: "true/"      String
23     mobility: "true/"         String
24     mountains: "false/"      String
25     nationalParks: "true/"    String
26     religiousLandmarks: "true/" String
27     solo: "true/"             String
28     visual: "false/"          String
29     aquariums: "false/"      String
30     others: "true/"           String
31     zoos: "false/"            String
```

Figure 4.1.3. 2. Interests Field Inside Tourists Collection.

Admin:

This collection stores the documents for the main admin alongside the workers. Each user in this collection has access to the information in one city, except for the main admin who has access to all cities.

```
_id: ObjectId('658f4439674dd23bb7d68a5e')
firstName: "Touristine"
lastName: "Official"
email: "touristineapp@gmail.com"
password: "$2b$10$P/3gA./XwfcepG.R2F5WlUxD87Wd8bpgLt5r4mvBFFCWq3Gez0AE1"
newAdmin: "false"
__v: 0
profileImage: "https://firebasestorage.googleapis.com/v0/b/touristine-9a51a.appspot.c..."
city: "all"
deviceToken: "dB4tqsgrTrad4VAKHunHsJ:APA91bH2wppy5Suz0iBtEwSWjBk0HyiB7aGnuIts00hGcPW..."
```

Figure 4.1.3. 3. Admins Collection. Main Admin's Document.

```
_id: ObjectId('6579b711fcbdef6abbb12ebd')
email: "s1192440@stu.najah.edu"
firstName: "Jenan"
lastName: "Abualrub"
password: "$2b$10$y3s809FLMJQMeuuFDPqoye.fyCtJmcK3ZM5jHG4YFAx5ddhr7fgHq"
profileImage: "https://firebasestorage.googleapis.com/v0/b/touristine-9a51a.appspot.c..."
newAdmin: "false"
deviceToken: "dB4tqsgrTrad4VAKHunHsJ:APA91bH2wppy5Suz0iBtEwSWjBk0HyiB7aGnuIts00hGcPW..."
city: "Ramallah"
```

Figure 4.1.3. 4Admins Collection. Worker's Document

Destinations:

Each destination document stores a variety of fields to ensure the regular user can reach a wealth of information in one place. The 'images' field stores the destination images displayed to the user, the images uploaded by the users, and images used for cracks documentation. Some fields are used to for the sake of personalizing data to the users.

```

_id: ObjectId('65b798561adb451ec115ac7d')      ObjectId
name: "Mahmoud Darwish Museum"                String
description: "In honor and recognition of the"  String
activityList: Array (2)                       Array
location: Object                              Object
images: Object                                Object
category: "historicalsites"                   String
services: Array (3)                           Array
geotags: Array (13)                           Array
rating: Object                                Object
contact: "jenanahmad182@gmail.com"            String
budget: "budgetfriendly"                      String
workingHours: Object                          Object
estimatedDuration: Object                     Object
visitorsType: Array (3)                       Array
sheltered: "true"                             String
viewedTimes: 126                              Int32
reviews: Array (empty)                        Array
complaints: Array (empty)                     Array
__v: 0                                         Int32
ageCategory: Array (4)                        Array
addedBy: "s11924400@stu.najah.edu"           String
date: "28/01/2024"                            String
virtualTourLink: "https://www.youtube.com/watch?v=..." String

```

Figure 4.1.3. 5.Destinations Collection.

Suggestions:

To maintain an interactive platform, users can upload suggestions which would be reviewed later by the worker responsible for that city. The suggestion is a destination the user managed to share with the administrators to help add new destinations to the platform.

```

_id: ObjectId('657671f5bcadae9e44fc423e')
name: "Mar Saba"
about: "The Holy Lavra of Saint Sabbas, known in Arabic and Syriac as Mar Saba..."
city: "Bethlehem"
images: Array (3)
category: "Religious Landmarks"
budget: "Budget-Friendly"
estimatedDuration: 4
sheltered: "true"
date: "11/12/2023"
email: "israa.k.odeh@gmail.com"
status: "Seen"
__v: 0
comment: Object
  admin: "s11927086@stu.najah.edu"
  reply: "What a fantastic suggestion! This historical site is truly remarkable,..."

```

Figure 4.1.3. 6. Suggestions Collection.

Plans:

As users can use the create plan feature, a collection dedicated to store users' plans was built. This helps users view their plans when wanted.

- **Camera Frame:** The logo elements are enclosed by a camera frame, indicating that the application involves collaborative sharing of destination images and content to represent different destinations.
- **Application Name:** The name Touristine is derived from the words "tourist" and the last four characters of "Palestine". Indicating that the app conveys a strong sense of attachment and belonging to the region, and reflecting the app's commitment to promoting Palestinian tourism.

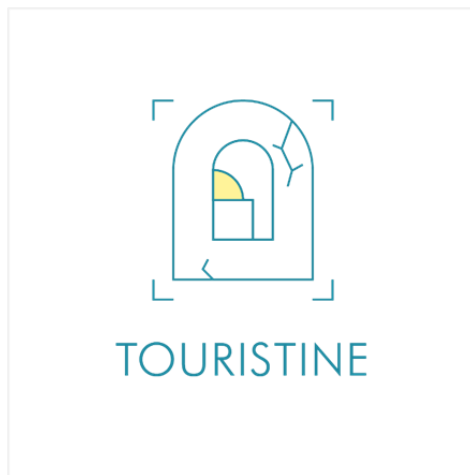


Figure 4.2. 1. Touristine Logo.

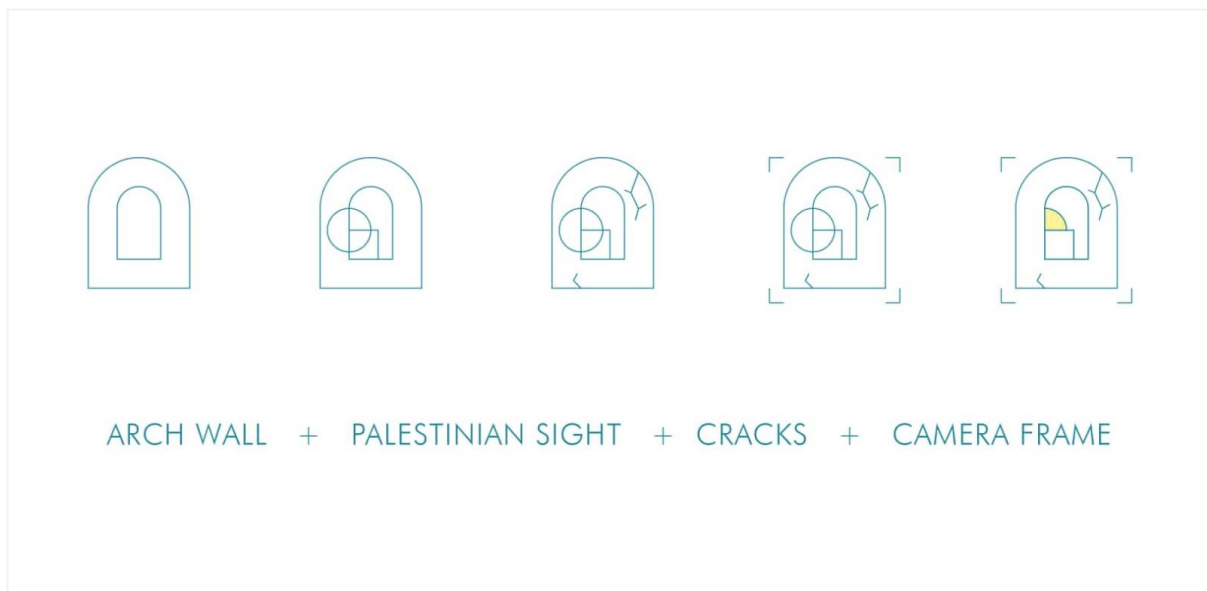


Figure 4.2. 2. Touristine Logo Deconstructed: Logo Idea.

Touristine has various interfaces that cater to the needs of different users. These interfaces are designed to offer a unique experience tailored to the specific user type, whether they are tourists, locals, coordinators, or administrators. There are five main categories of interfaces: splash screens, landing interface, login interfaces, onboarding interfaces, and user-specific interfaces. Each interface is designed to enhance usability and functionality. Moreover, specialized registration interfaces are created for tourists who are joining Touristine for the first time.

1. Splash Screens

The splash screens are designed as a visually appealing entrance to the digital platform while content is loading in the background. Two types of splash screens are utilized: an introductory splash screen and a landing splash screen.

- Introductory Splash Screen

Upon opening the digital platform, the initial splash screen appears. This particular screen showcases the Dome of the Rock, a significant religious landmark that symbolizes the exclusivity of the app to Palestine. Figure (4.2.3) depicts the mobile app's introductory splash screen.



Figure 4.2. 3.The mobile app's introductory splash screen.

- Landing Splash Screen

After a successful login to a registered account, a splash screen is displayed before accessing the app's user-specific interfaces. The splash screen comprises various elements, including the app's logo, an olive oil tree, and a camel. The olive oil tree is a symbol of resilience and connection to the land in Palestine, representing the endurance of the Palestinian people amidst adversity. The camel, historically essential for transportation and survival in the desert regions of Palestine. The purpose of the splash screen is to provide visual feedback that the app is starting up. This screen can be seen on the mobile application in Figure (4.2.4).

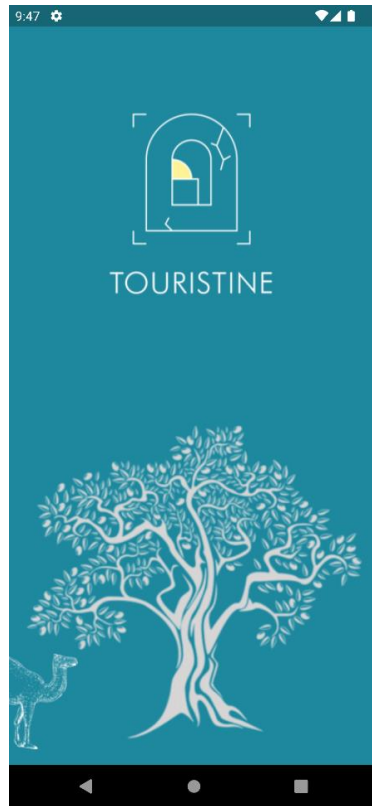


Figure 4.2. 4.Landing Splash Screen.

2. Landing Page

This is the default entry point for users to the digital platform. Its purpose is to streamline user access and interaction by offering clear pathways for both existing users to log in and new users such as tourists and locals to sign up for an account. Figure (4.2.5) displays this interface for the mobile app.

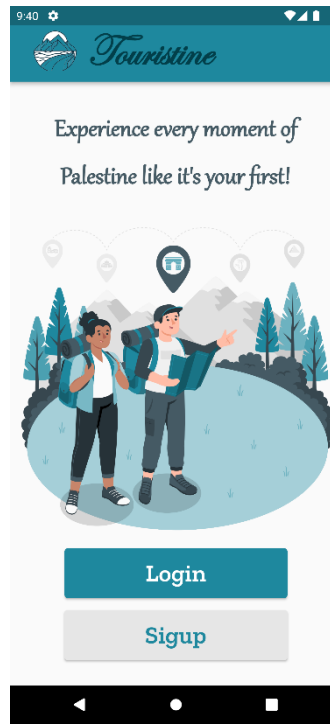


Figure 4.2. 5.Landing Page.

3. Signup Interfaces

Touristine welcomes both tourists and locals who are interested in exploring new places. To get started, users need to complete a quick and easy registration process. This involves filling out a signup form with personal information including first name, last name, email address, and password. The form involves several validations, such as allowing only valid characters in names, ensuring valid email formats, and requiring matching passwords with at least eight characters. The signup interface is illustrated in Figure (4.2.6).

Once the user hits the sign-up button, an account verification link will be sent to their email. They will be redirected to an account verification interface, which is shown in Figure (4.2.7) for the mobile app. From here, they can either click on the activation link in the email or request a resend of the verification link if they have not received it yet. After the account verification process is completed, clicking "Get Started" allows users to embark on their journey by accessing the interfaces designed for tourist onboarding.

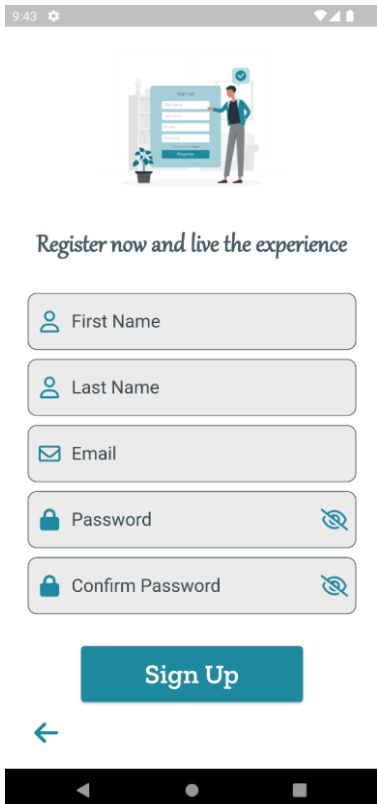


Figure 4.2. 7. Signup Interface

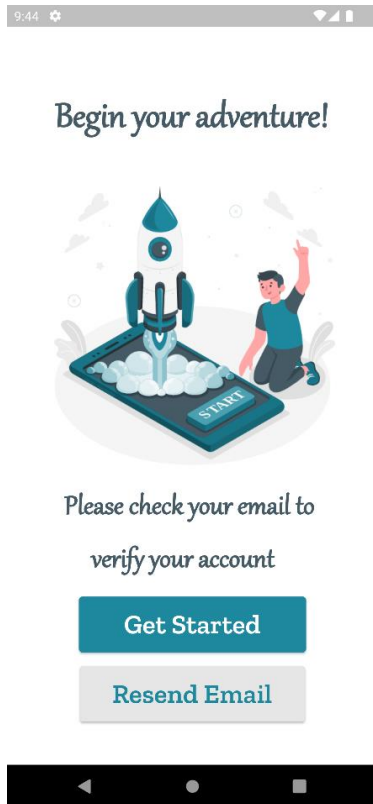
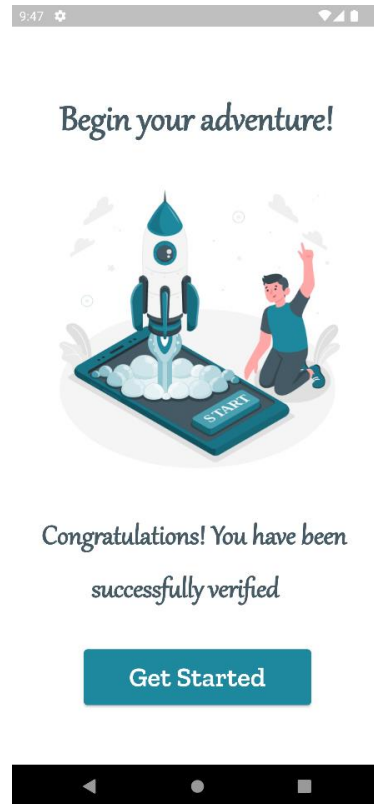


Figure 4.2. 6. Account Verification Interface.



4. Login Interfaces

When a user wants to access their account, they need to go through a login interface, exemplified in Figure (4.2.8) for the mobile application. The interface prompts the user to enter their email and password. Once they submit the required information, the system validates if the user is registered and has an account to allow them to sign in. Additionally, the system checks if the email address and password entered by the user are valid. These validation checks ensure a secure login process for the user.

or increased login convenience, the "Remember Me" option can be checked before signing in, enabling user data to be persistently saved on the device via shared preferences. In the event of a forgotten password, the "Forgot Password" option can be pressed, leading the user to a reset password screen, as depicted in Figure (4.2.9), where the password can be reset by clicking "Reset Password" after entering the email associated with the user's account for validation and delivery of the new password. On the subsequent screen, which is displayed in Figure (17), the user is provided with the option to either return to the login interface or request another password reset.

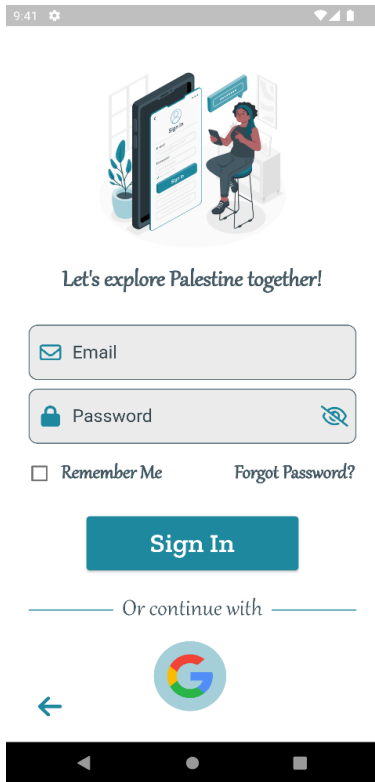


Figure 4.2. 8. Login Interface.

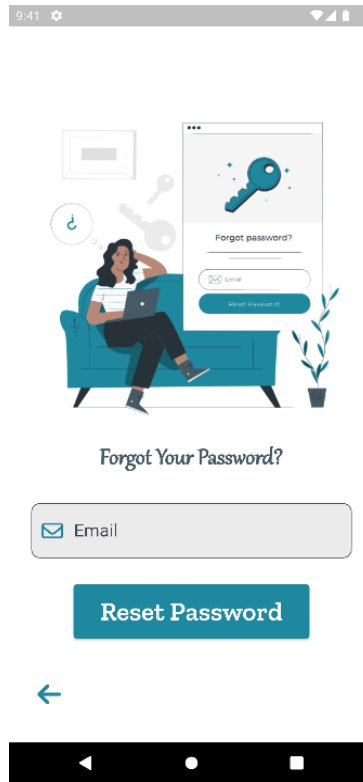


Figure 4.2. 9. Reset Password Interface.

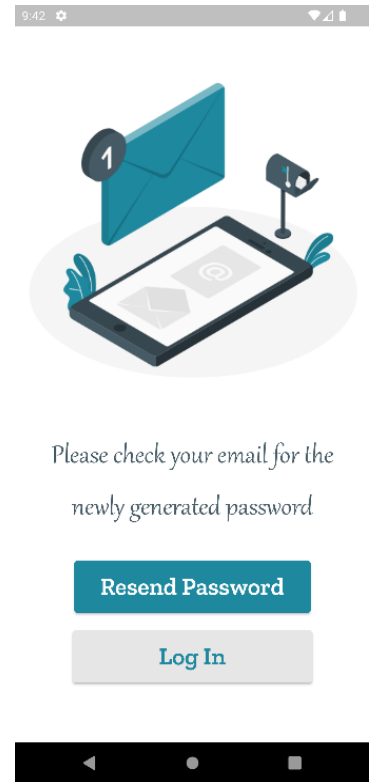


Figure 4.2. 10. Confirmation Screen

In addition to the traditional email and password authentication, this platform provides the option of logging in with Google credentials. Users can easily access this feature by clicking on the "Sign in with Google" icon button on the login interface. Upon clicking, they will be directed to Google's authentication page to choose their account. After successful authentication, the system checks if the Google account is linked to an active platform account before securely granting access. This streamlined process ensures both convenience and adherence to security protocols.

5. Onboarding Interfaces

These interfaces serve as the first touchpoint between users and the digital platform. They are designed to familiarize users with key features and overall functionality of the platform.

- Tourist Onboarding Interfaces

The platform offers various features for tourists including destination discovery, ratings, trip planning, community sharing, chatting, and GPS navigation. The onboarding interfaces showcase these features in a sequential manner, as depicted in Figure (4.2.11).

Destinations Discovery



Search destinations and explore their available services

Skip [Progress indicator] →



Destinations Rating



Browse ratings for destinations and services, and share yours

Skip [Progress indicator] →



Trip Planning



Generate customized itineraries based on your preferences

Skip [Progress indicator] →



Community Share



Share images of destinations, including building cracks

Skip [Progress indicator] →



Chatting



In case of any issues, contact the visited destination admin

Skip [Progress indicator] →



GPS Navigation



Utilize GPS services to navigate to your selected destination

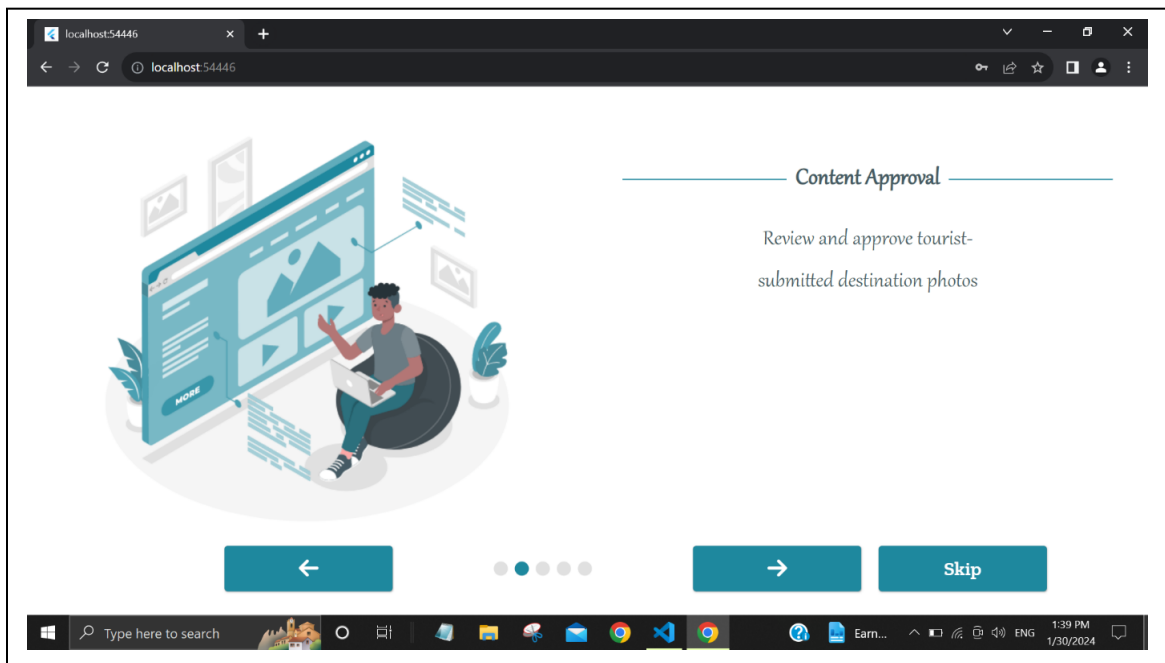
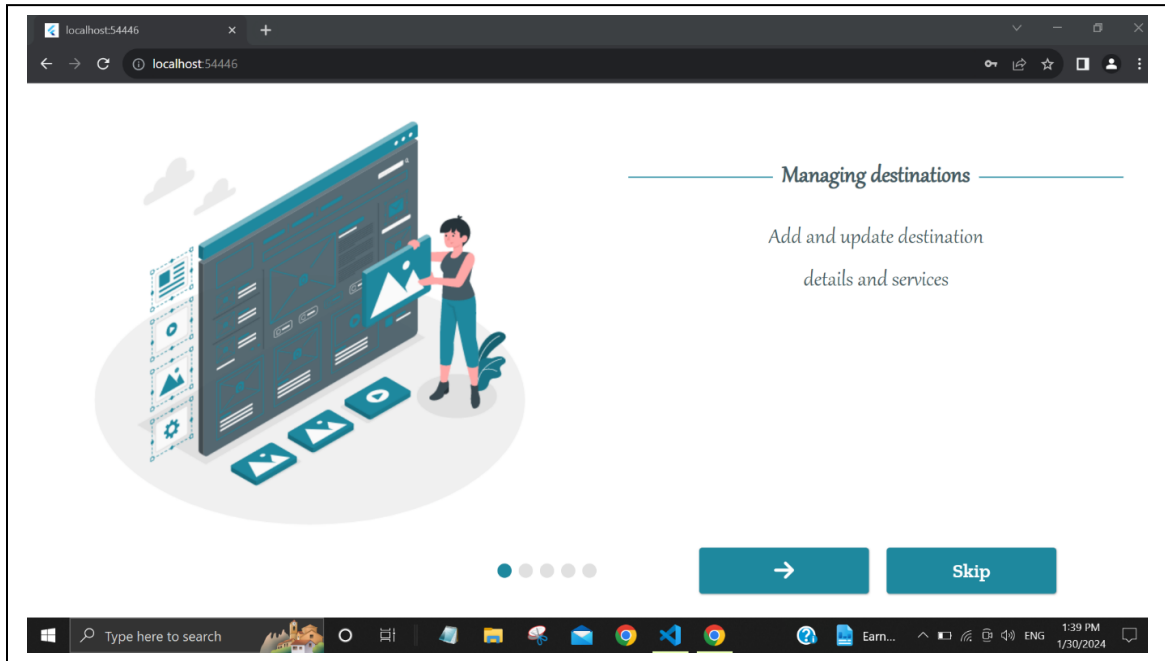
[Progress indicator] Done



Figure 4.2. 11. Tourist Onboarding Interfaces.

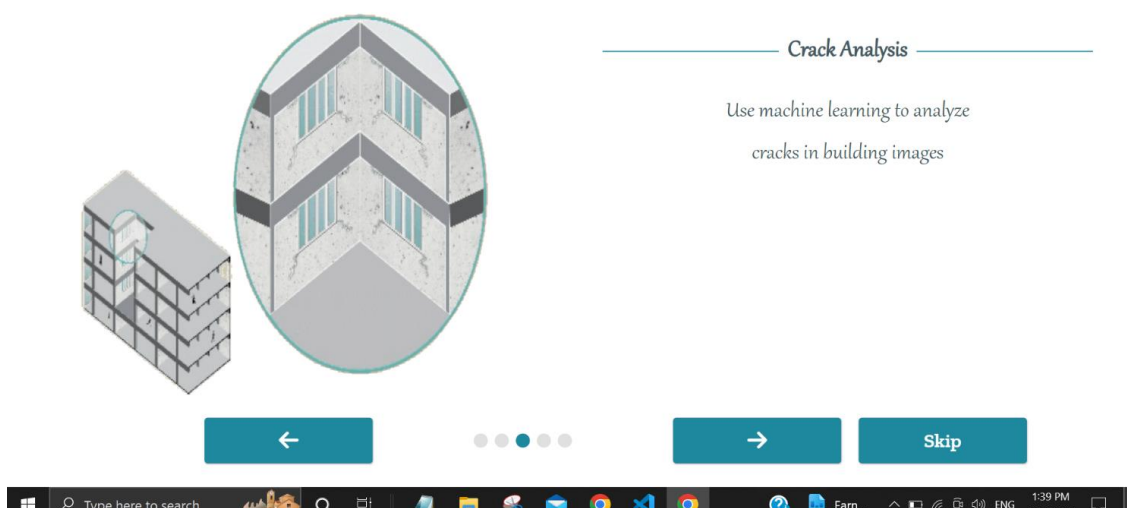
- Coordinator Onboarding Interfaces

Coordinators are provided with a range of platform features, such as destination management, content approval, cracks analysis, cracks count map view, and statistics generation. These features are presented in a progressive manner through the onboarding interfaces, as displayed in Figure (4.2.12).



localhost:54446

localhost:54446



Crack Analysis

Use machine learning to analyze cracks in building images

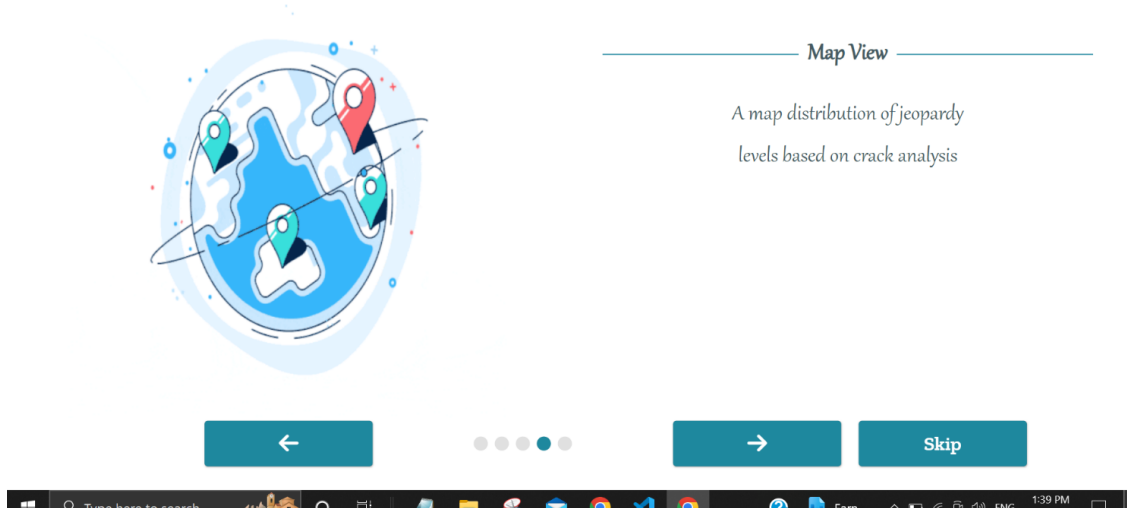
← ● ● ● ● → Skip

Type here to search Earn... 1:39 PM 1/30/2024

The slide features a 3D architectural rendering of a building corner on the left, showing a grid of windows. To its right is a circular inset showing a close-up of a concrete wall with several vertical and horizontal cracks. The text 'Crack Analysis' is centered at the top, with a subtitle below it. Navigation buttons for back, forward, and skip are located at the bottom of the slide area.

localhost:54446

localhost:54446



Map View

A map distribution of jeopardy levels based on crack analysis

← ● ● ● ● → Skip

Type here to search Earn... 1:39 PM 1/30/2024

The slide features a stylized globe on the left with several location pins in red, green, and blue. The text 'Map View' is centered at the top, with a subtitle below it. Navigation buttons for back, forward, and skip are located at the bottom of the slide area.

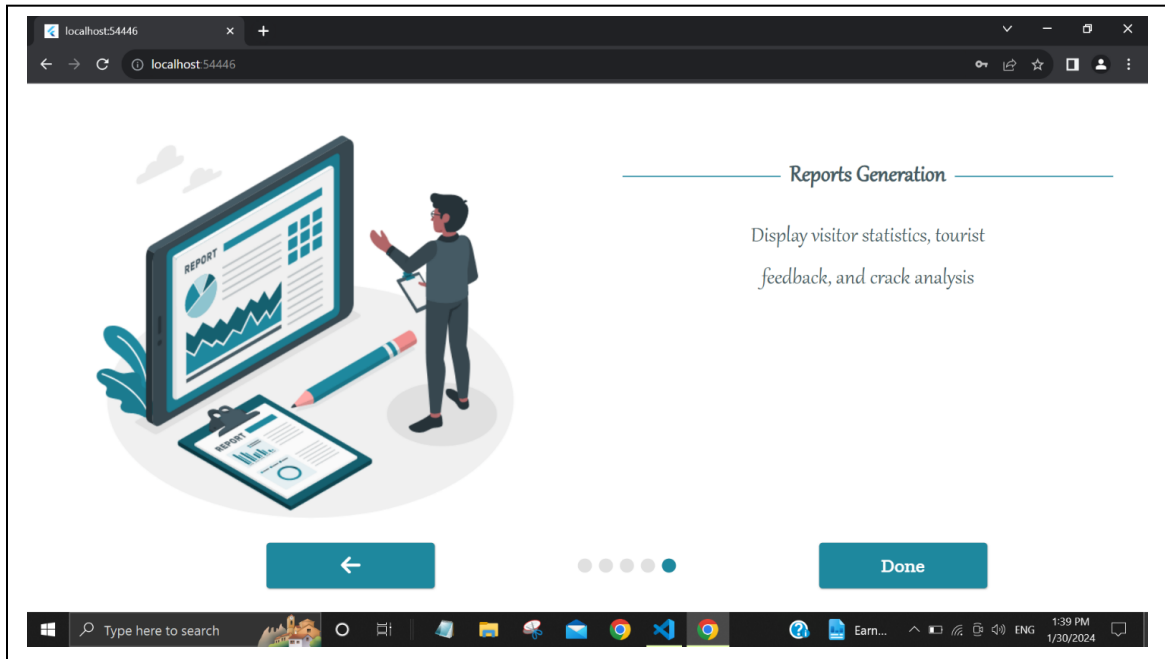


Figure 4.2. 12. Coordinator Onboarding Interfaces.

6. User-Specific Interfaces

- Tourist-Specific Interfaces

Various interfaces are developed to cater to the diverse needs of tourists and locals regarding a particular destination. These interfaces are organized into five primary sections, each featuring its subset of interactive interfaces: home, plans, user suggestions, chatting, and profile.

- Home Section

Touristine distinguishes itself from other platforms by incorporating tourist preferences and geographic location when structuring the user's homepage. The homepage shown in Figure (4.2.13) is categorized into three distinct sections to optimize user engagement. Firstly, it features specialized destinations tailored to closely align with user preferences. Secondly, it presents popular destinations that exhibit some relevance to the user's interests, albeit to a lesser degree. Finally, it offers a broader selection of alternative destinations for users seeking to explore beyond a predefined set of options. This systematic approach enhances the user experience by providing personalized and diversified content offerings.

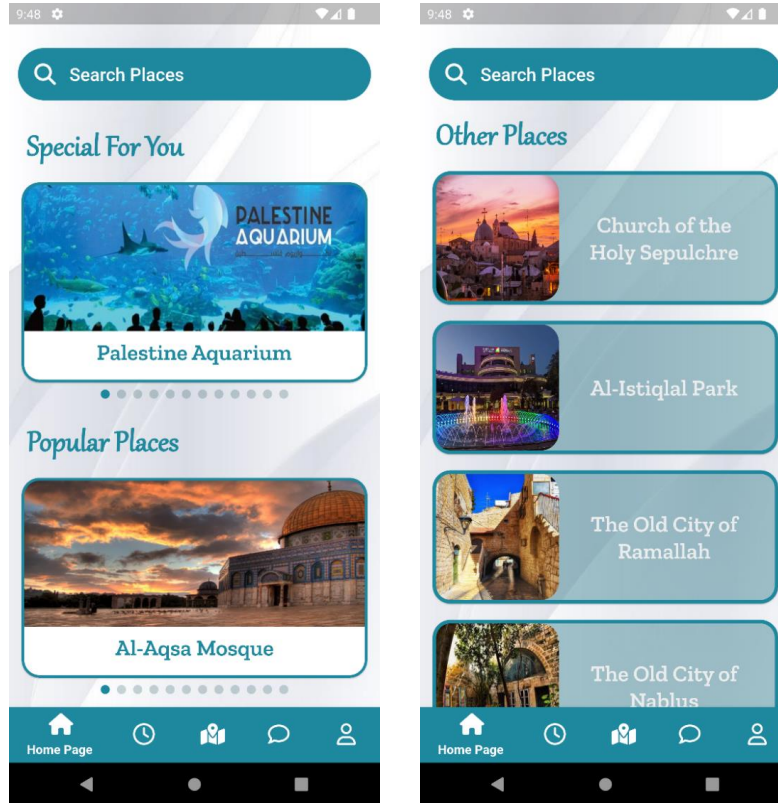


Figure 4.2. 13. User's Home Page.

A search service is provided for users to discover places, with filtering options such as budget level and the specification of whether sheltered or unsheltered locations are favored. This feature allows destinations to be effortlessly explored by users based on their inclinations. Figures (4.2.[14-17]) demonstrate search interfaces.



Figure 4.2. 14. Search Interface.

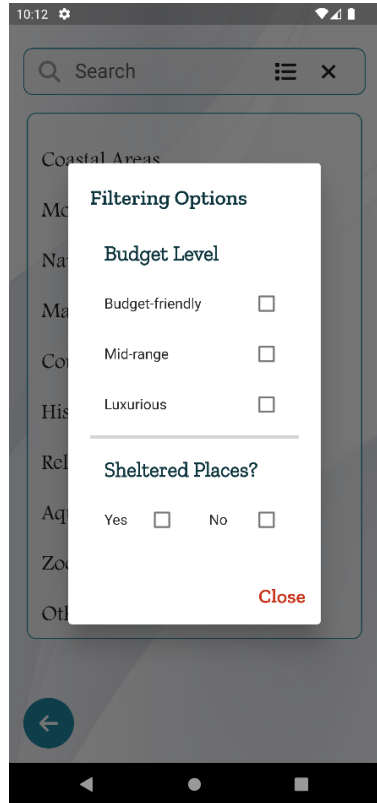


Figure 4.2. 15. Filtering Options Dialog.



Figure 4.2. 16. Searching for Historical Sites.

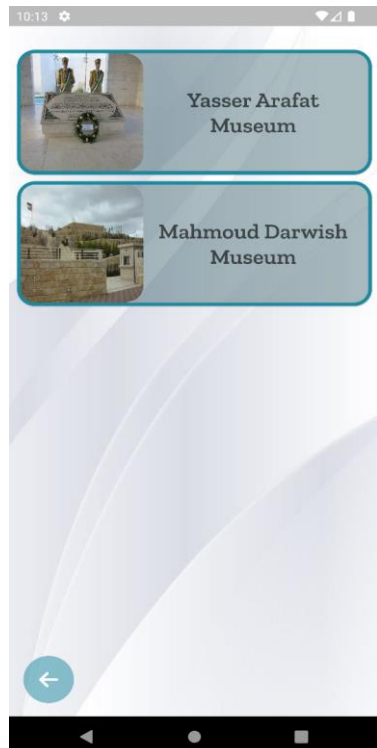


Figure 4.2. 17. Historical Sites Search Result.

Within each section, various destinations are displayed with their main image and name, allowing the user to get a quick overview of each place. For further exploration of details about a destination, it simply can be pressed. Once tapped, a destination view interface will appear, which contains a wealth of useful information about the selected destination. The destination view includes multiple tabs, each with its own set of information to help the user better understand the chosen location.

- About Tab

This tab gives a detailed overview of the place, as shown in figures (4.2.18) and (4.2.19). It includes information about the history, culture, location, and other important details of the destination.

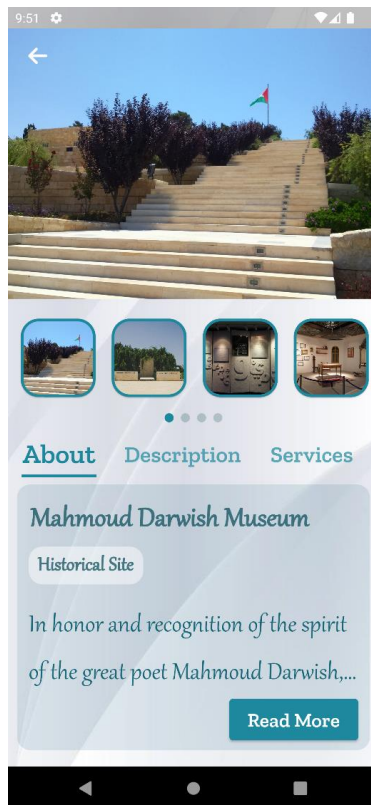


Figure 4.2. 18. About Mahmoud Darwish Museum Tab.

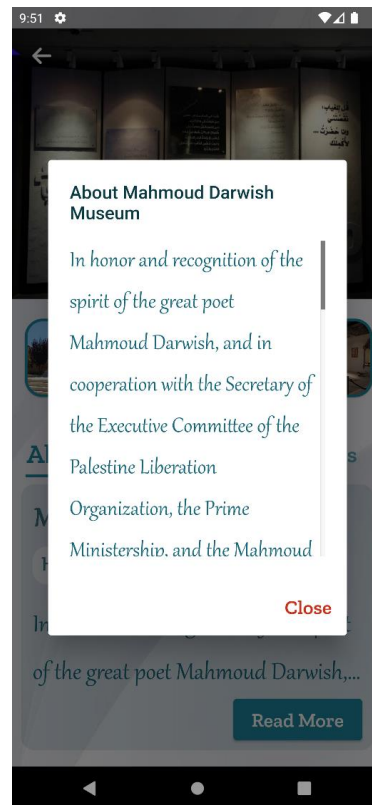


Figure 4.2. 19. About Mahmoud Darwish Museum Dialog.

- Description Tab

Before embarking on a journey to a destination, visitors often seek comprehensive information about the place they intend to visit. Recognizing this need, Touristine endeavors to furnish users with pertinent details. Within this designated tab depicted in Figure (4.2.20), Touristine offers essential

information such as current weather conditions and descriptions, place ratings, operating hours and days, budget estimations, whether the location is indoors or outdoors, and recommended durations for visitation.

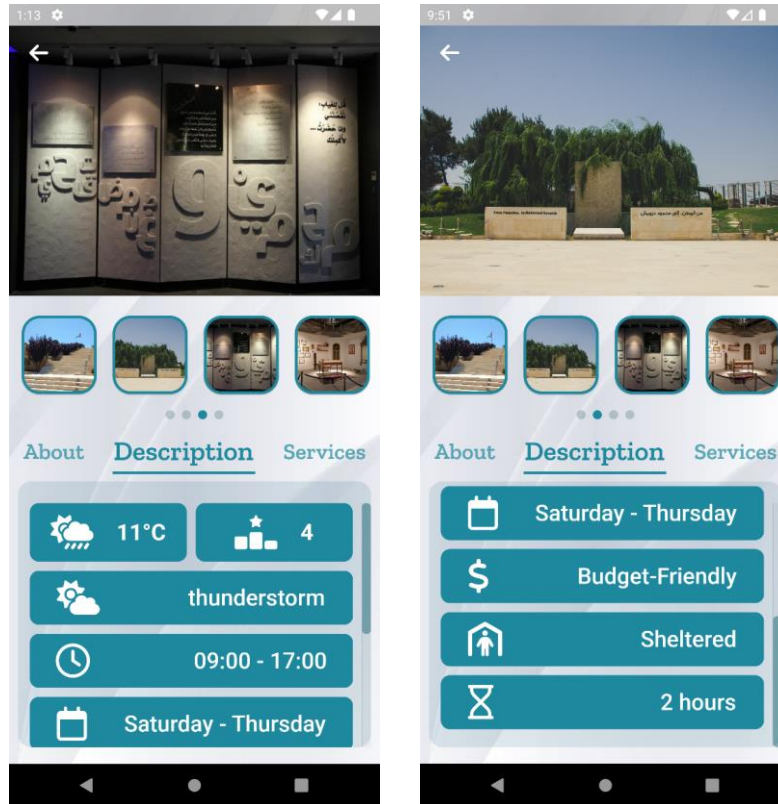


Figure 4.2. 20. Mahmoud Darwish Museum Description Tab.

- Services Tab

Before heading to a location, it is crucial for users to familiarize themselves with the available services. This empowers them to make informed decisions and prevents potential time wastage if the services fail to align with their requirements. The Services tab is depicted in Figure (4.2.21).

- Location Tab

GPS location and navigation services are utilized in Touristine to ensure its comprehensiveness, consolidating a multitude of features within a unified, all-in-one platform. This strategy provides users with a rich experience, eliminating the need to engage with multiple platforms concurrently. Notably, the location feature is solely available on the mobile application and is not integrated into the website. This tab is visually depicted in Figure (4.2.22).

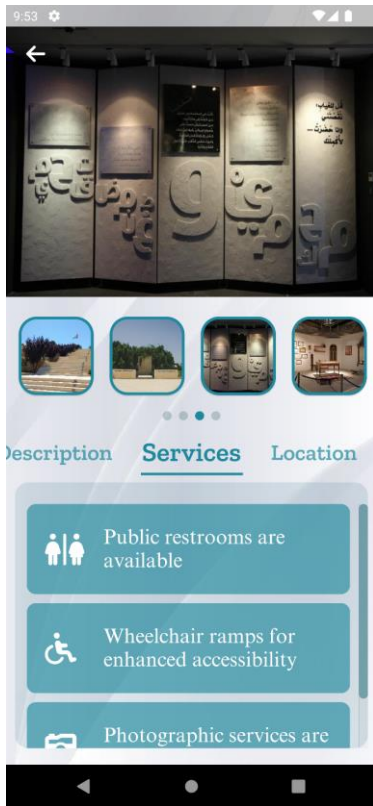


Figure 4.2. 21. Mahmoud Darwish Museum Services Tab.

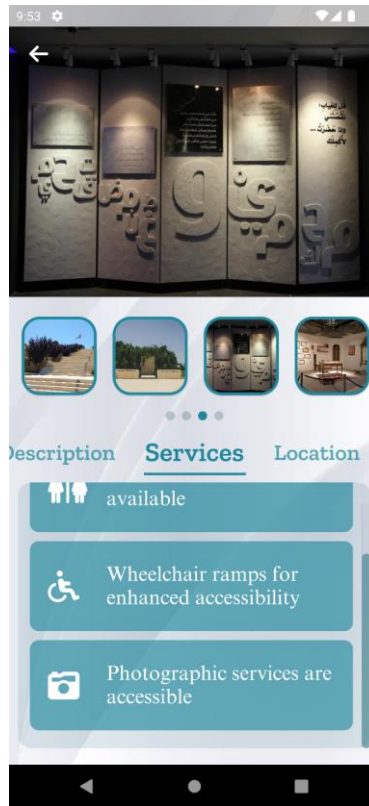
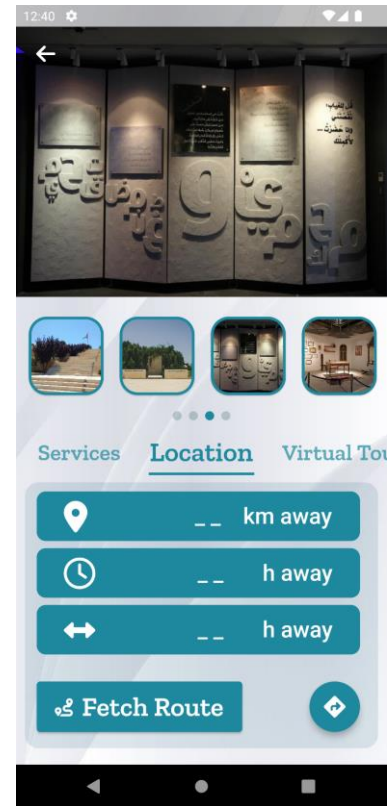


Figure 4.2. 22. Mahmoud Darwish Museum Location Tab.



To enable positioning, the geolocation package is employed, leveraging the device's built-in GPS alongside supplementary location services such as Wi-Fi. Complementing this functionality, geocoding facilitates the conversion of human-readable addresses into geographic coordinates latitude and longitude. These integrated packages, in conjunction with other developed functionalities, facilitate various tasks illustrated in Figure (4.2.23) including real estimation of the distance from the user's current location to the destination, calculation of air distance, and approximation of the time required for arrival.

Figure (4.2.23) illustrates real-time estimations, including the distance from Israa's residence in Qusra-Nablus to Mahmoud Darwish Museum in Ramallah, the air distance, and an approximation of the arrival time.

Additionally, a live tracking service has been created to facilitate users in reaching their destinations effortlessly. This service places a marker at the user's starting point and another, distinguished by a different color, at their destination. A polyline path is then drawn between these markers. As the user moves, their marker dynamically adjusts to reflect their current position along the path. This feature is particularly beneficial for tourists navigating unfamiliar routes in Palestine, as well as for locals seeking navigation assistance.

Such a feature is achieved through the utilization of the Google Maps API, which provides access to real-time location data, map rendering, and navigation

functionalities. Additionally, the geolocator package is used, offering a position stream that allows continuous updates of the device's location to be received. By subscribing to this stream, real-time location data can be accessed, supporting the operation of the live tracking functionality.

This feature can be activated by clicking on the "get directions" icon, after which a location live tracking interface displayed in Figure (4.2.24) will be opened, initiating live tracking of the user's location as they navigate from the initial position to the destination.

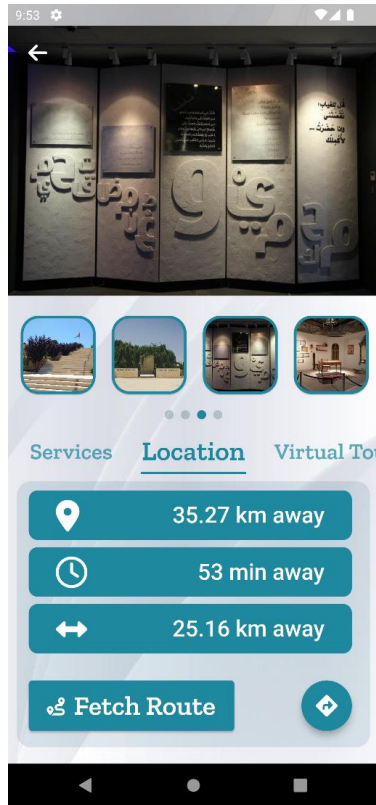


Figure 4.2. 23. Real Time Estimation.

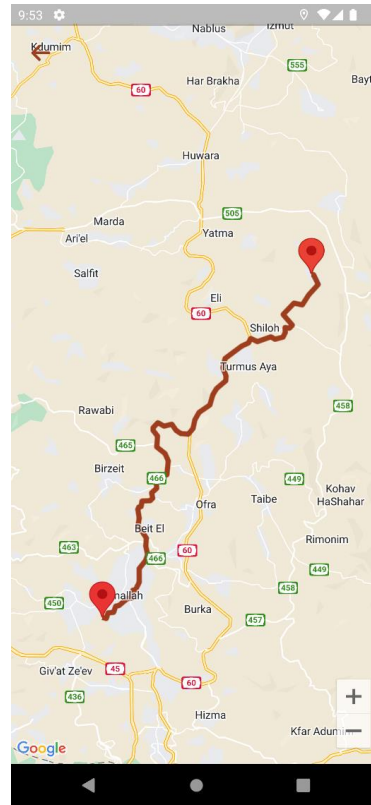


Figure 4.2. 24. Location Live Tracking.

Figure (4.2.24) showcases the live tracking of the journey, commencing from Israa's home in Qusra-Nablus to Mahmoud Darwish Museum in Ramallah.

- Virtual Tour Tab

Touristine enhances the user experience by offering virtual tours of various locations. Through a digital simulation of physical spaces, users can enjoy an immersive adventure featuring multimedia elements, including images, videos, textual descriptions, and sometimes audio. This allows users to take a pre-overview of destinations before actually visiting them. However, this feature is only available for locations that have virtual tours available. Figures (4.2.25) and (4.2.26) exhibit the interfaces associated with this tab.



Figure 4.2. 25. Virtual Tour.



Figure 4.2. 26. Mahmoud Darwish Museum Virtual Tour Tab.

- Reviews Tab

User reviews are essential in this app, acting as a foundation for building trust between users and coordinators. They provide valuable insights for coordinators and enable continuous improvement, fostering interactivity that is crucial for instilling confidence among users.

The reviews tab has two buttons for users to interact with, as shown in Figure (4.2.26). Clicking the "See All" button will display all users' reviews for that destination through an interface depicted in Figure (4.2.27). On the other hand, clicking the plus icon will direct users to the review submission interface displayed in Figure (4.2.28). Within this interface, users will be asked to provide details such as the review's star rating, ranging from one to five, a title, and content before submitting the review.

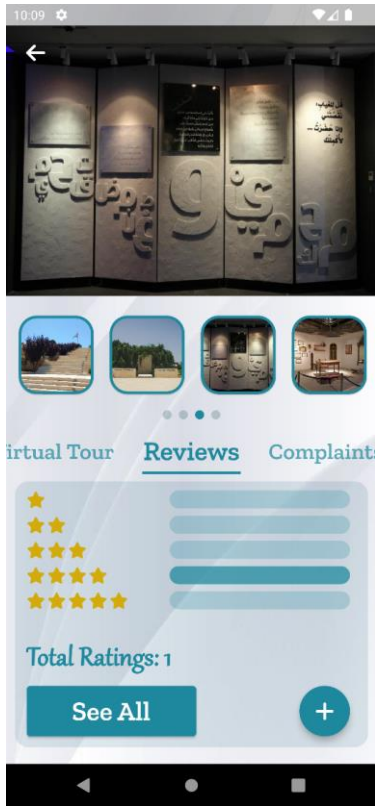


Figure 4.2. 27. Reviews Tab.

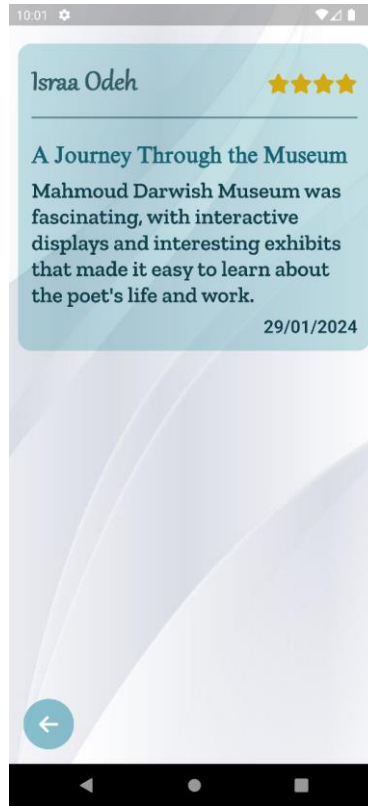


Figure 4.2. 28. Users' Reviews Interface.

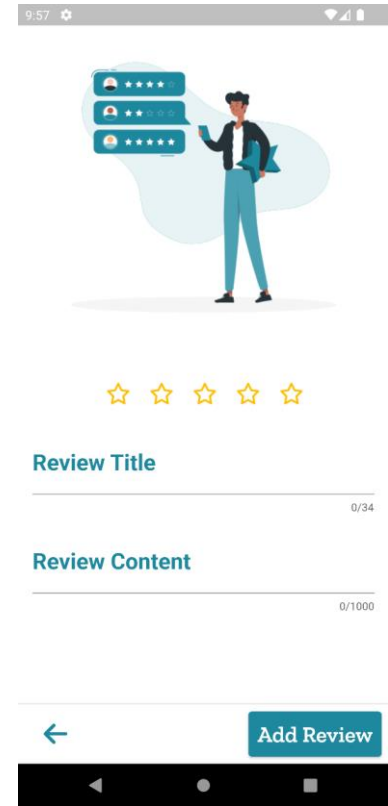


Figure 4.2. 29. Adding Review Interface.

- Complaints Tab

Touristine prioritizes user privacy and recognizes that users might prefer to submit complaints about specific destination issues confidentially, directly to the responsible coordinator. To accommodate this requirement, the complaints tab is organized accordingly.

The complaints tab depicted in Figure (4.2.28) offers users two distinct options. They can access all their complaints by selecting the "View All" button, which leads to a specialized interface dedicated to complaints about the destination, as displayed in Figure (4.2.29). This interface allows users to monitor the status of their complaints and see whether they have been reviewed by the destination coordinator. In addition, users can submit a new complaint through the interface depicted in Figure (4.2.30). This process involves providing essential details such as the complaint's title, content, and optionally attaching images.

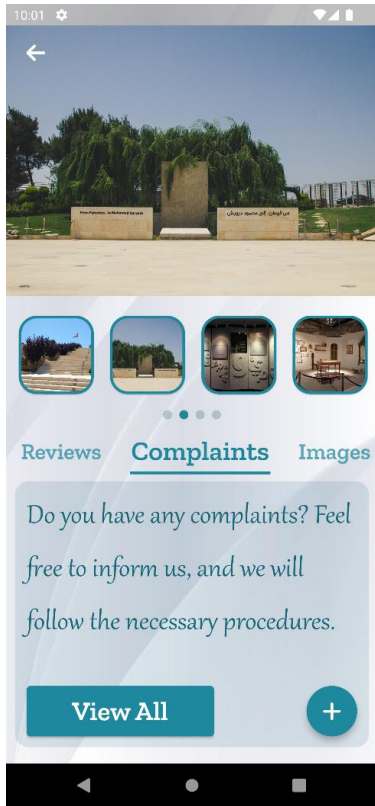


Figure 4.2. 28. Complaints Tab.



Figure 4.2. 29. User's Complaints Interface.

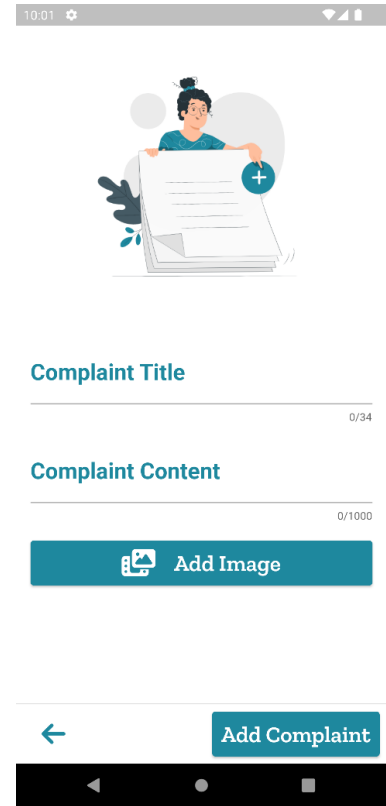


Figure 4.2. 30. Complaints Adding Interface.

- Images Upload Tab

To maintain the destination's image gallery with up-to-date and accurate representations, a collaborative system has been implemented. Figure (4.2.33) illustrates an image upload tab designed to foster cooperation between coordinators and users. Through this feature, users can share and upload destination images directly within the app. Coordinators then review these submissions to ensure quality and relevance, ensuring that the displayed images accurately reflect the destination.

Users have two options for managing their images: they can either access their uploaded images through the dedicated uploads interface, accessible by clicking the "My Uploads" button, as depicted in Figure (3.2.34), or they can upload new images for the destination by clicking the plus icon. This action redirects them to the image-uploading interface, illustrated in Figure (4.2.35). Within this interface, users can upload new images and specify their category, such as general images, images related to provided services, or images highlighting cracks noticed in the place.

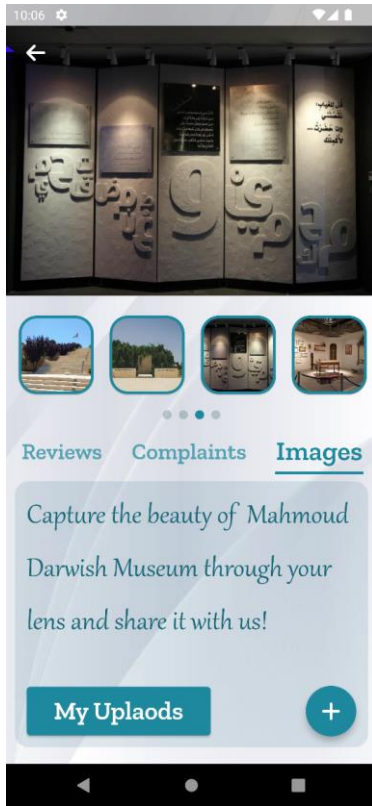


Figure 4.2. 31. User's Uploads Interface.

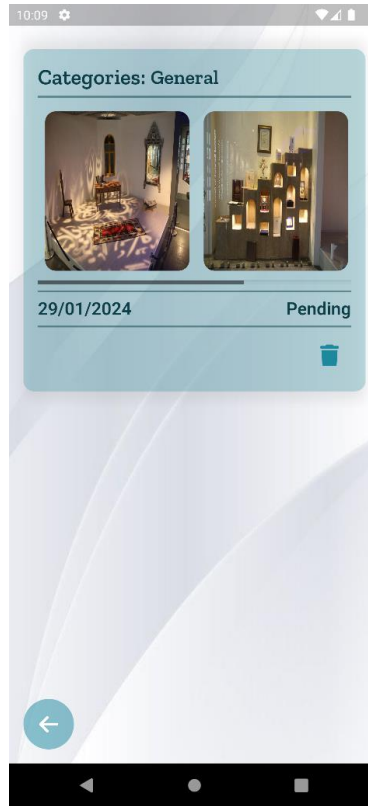


Figure 4.2. 32. Images Upload Tab.

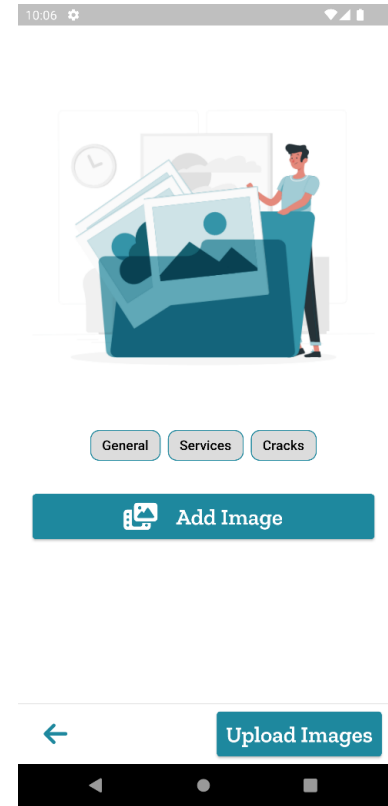


Figure 4.2. 33. Image Upload Interface.

- Plans Section

The plans section is primarily segmented into two main components: the plan maker and the user plans section, designated as "My Plans."

- Plan Maker Tab

Frequently, individuals may have a desire to explore a particular destination but lack sufficient information about its attractions. Consequently, they find themselves uncertain about which places to visit and what activities to engage in upon arrival. Touristine offers a solution to this dilemma through its "Plan Maker" feature. This tool empowers users to input their preferences and customize their itinerary, ensuring they have a comprehensive plan to follow when heading to their chosen destination.

The plan maker interfaces are depicted in Figure (4.2.36). In order to assist users in crafting a comprehensive plan for their upcoming destination, various details are solicited, including: prompting users to optionally specify their interests in terms of preferred places, any special requirements, and other pertinent information; inputting the destination's name, the date of travel, starting and ending times to determine the duration of the trip; specifying the

number of individuals participating and their age groups. Once these details are submitted, Touristine can then begin the process of customizing and generating a tailored plan based on the provided information. The associated interfaces for this functionality are illustrated in Figure (4.2.37) for the mobile application.

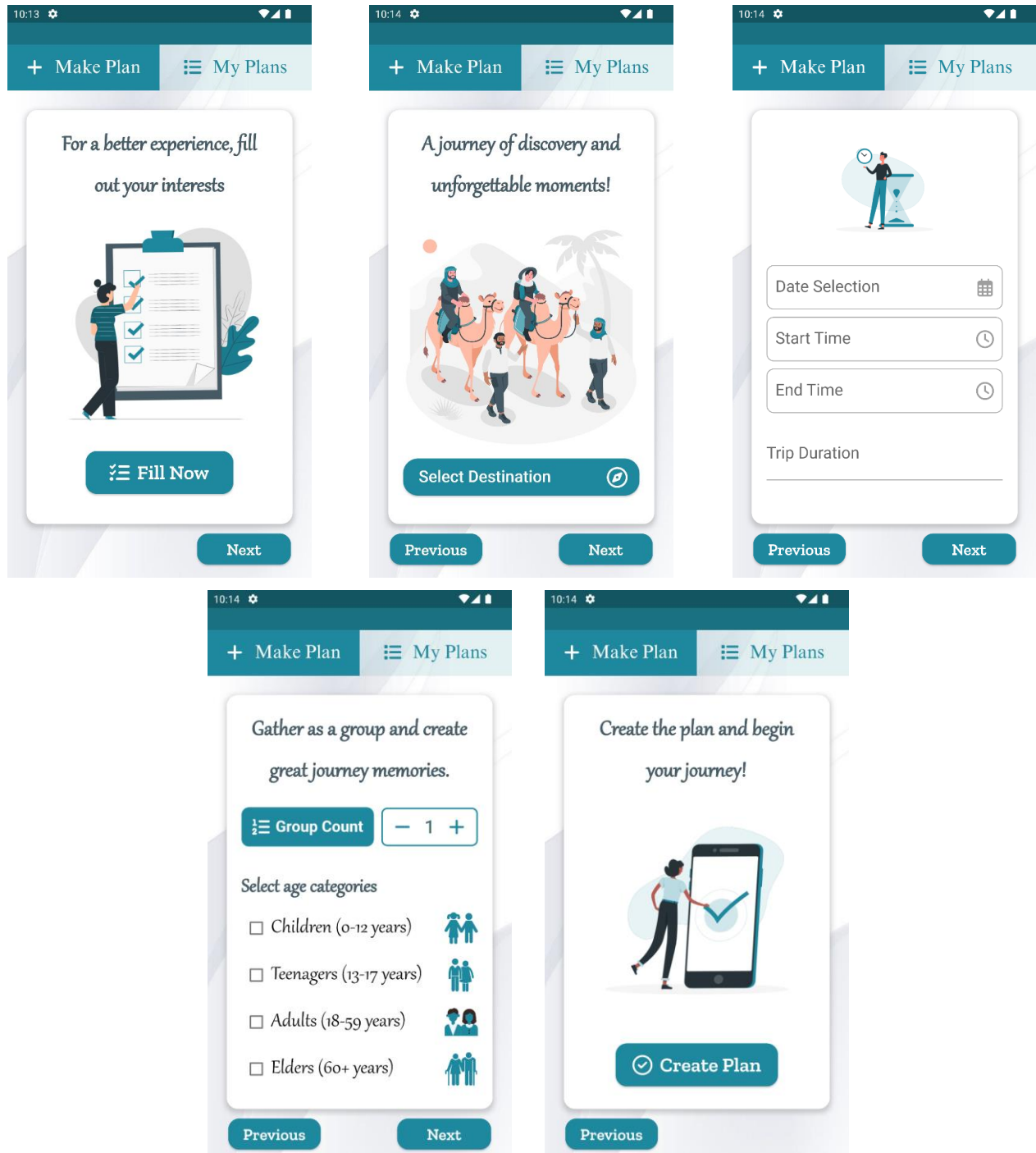


Figure 4.2. 34. Plan Maker Interfaces.

After a while, the created plan interface will be displayed, showing the destinations to be visited along with the activities planned for each destination. Each suggested destination in the plan can be viewed by clicking the "view" button, upon which the destination view interfaces mentioned earlier will be shown. The created plan interfaces are depicted in Figure (4.2.37).

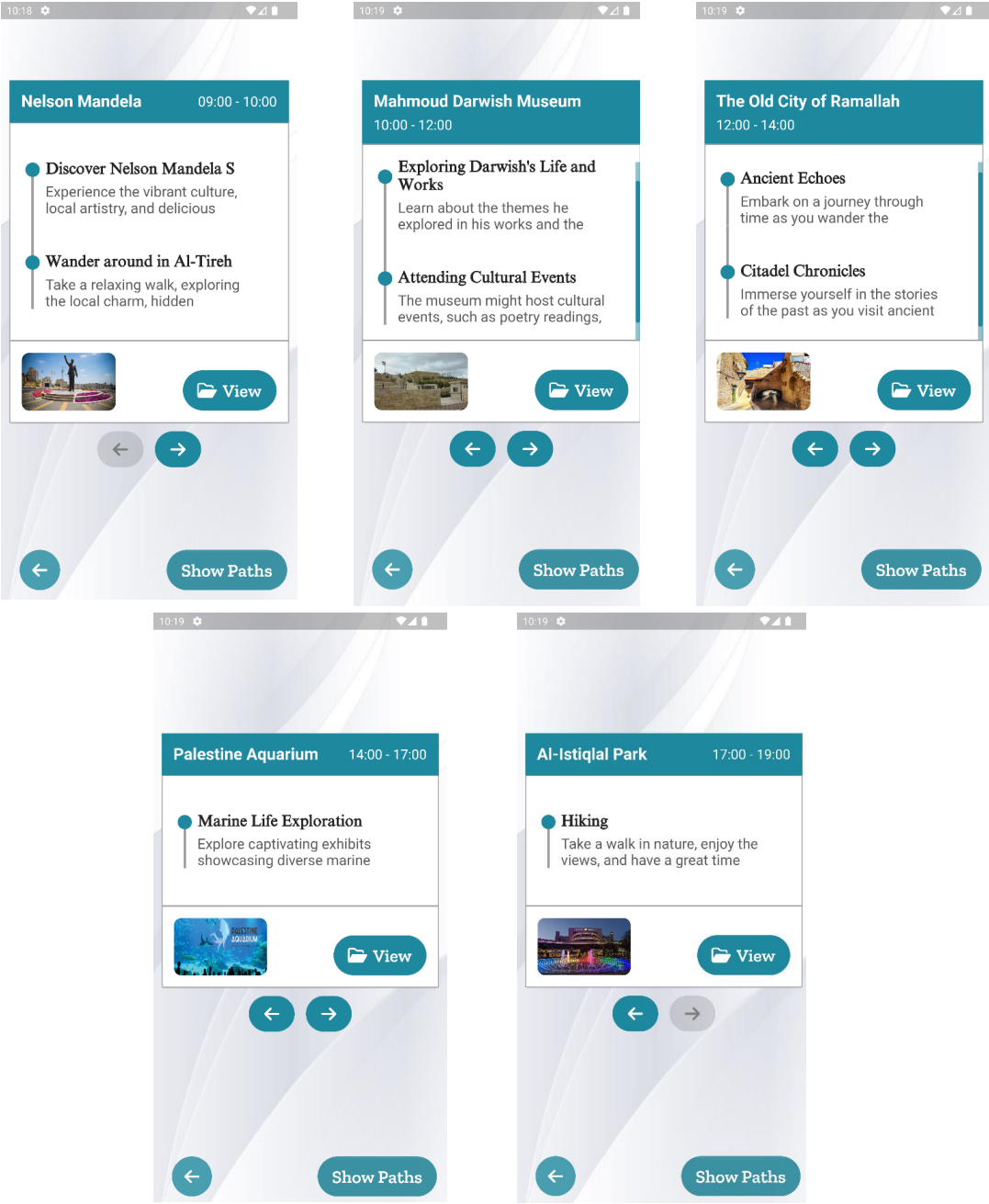


Figure 4.2. 35. The Created Plan Places.

In the mobile application, as evidenced by Figure (4.2.38), an option labeled "Show Paths" is available. This functionality permits users to visualize polyline paths originating from their current location and extending to each designated destination within the itinerary. Distinct colors are employed to differentiate between different paths.

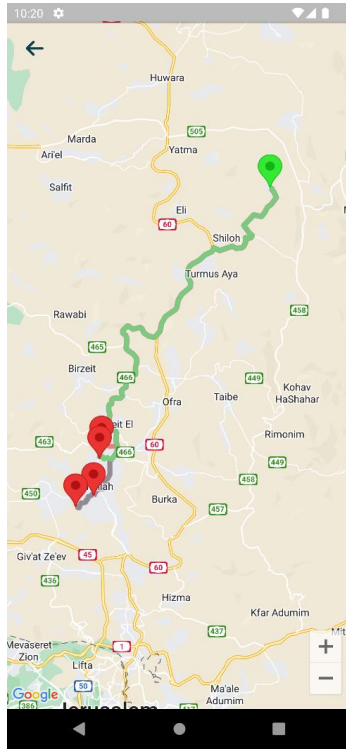


Figure 4.2. 36. The Created Plan Paths.

Figure (4.2.38) displays the routes originating from Israa's home in Qusra-Nablus and extending to four different locations.

- **My Plans Tab**

Users may desire to revisit their previously generated plans, and Touristine accommodates this need by offering a dedicated tab named "My Plans," as illustrated in Figure (4.2.39). This tab conveniently aggregates all of the user's past plans, presenting key details such as the number of destinations included, trip duration, start and end times, as well as dates. By selecting a plan, users can instantly access information about the places and activities included in that specific plan.

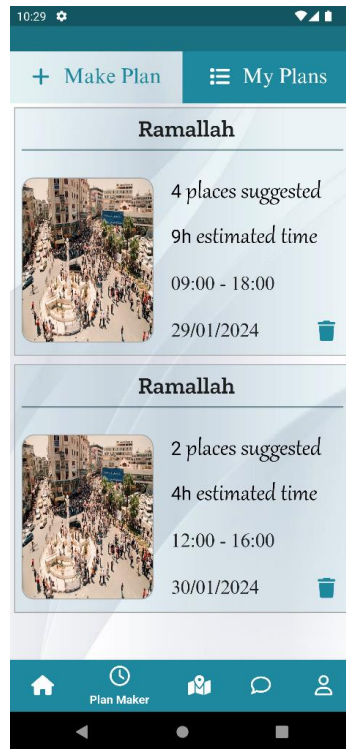


Figure 4.2. 37. User's Plans Tab.

- User Suggestions

Touristine platform is built using many standards. One of these standards is to make it highly interactive with its users, so they feel a sense of belonging and contribute to the growth and success of the platform. To achieve this, users are given the ability to share and suggest places they visit, which helps add more Palestinian locations to Touristine. These suggestions are then reviewed by coordinators who take action on them.

This section primarily consists of two tabs: one for suggesting a place and another for user-suggested places labeled as "My Places."

- Place Suggestion Tab

Through this tab, users can propose new destinations. They will be prompted to provide various details about the suggested location, including its name, city, category (such as coastal areas, mountains, national parks, major cities, countryside, historical sites, religious landmarks, aquariums, zoos, and others), budget, recommended duration of visit, indoor or outdoor nature, along with a descriptive text and images. Upon completion of these fields, users can press the submit button to forward their suggestion to the designated city coordinator. Relevant interfaces associated with this tab are illustrated in Figure (4.2.40).

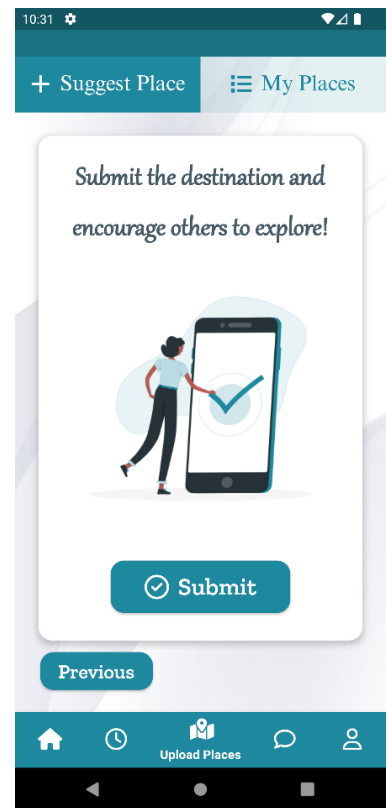
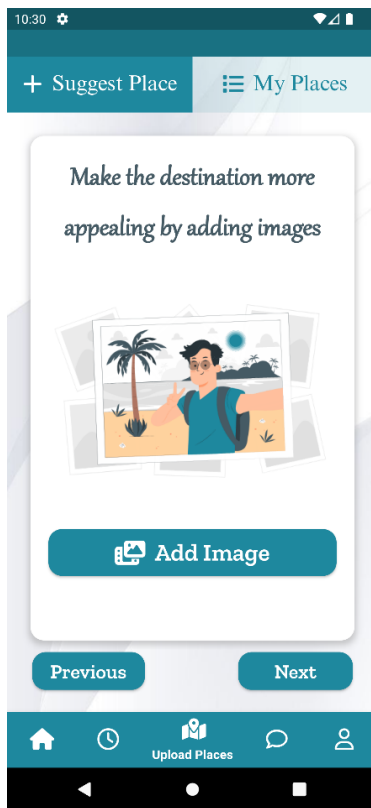
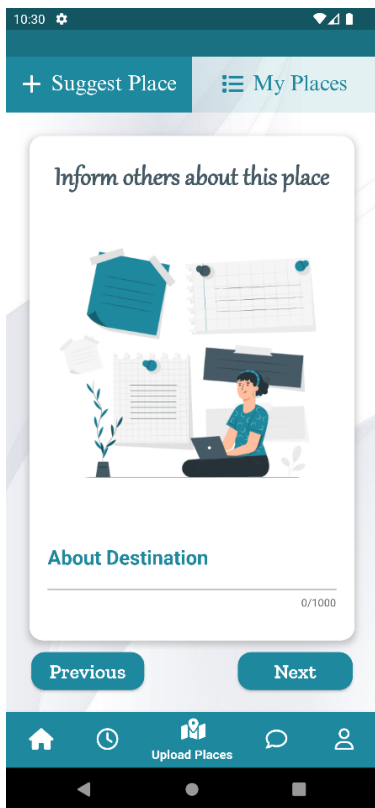
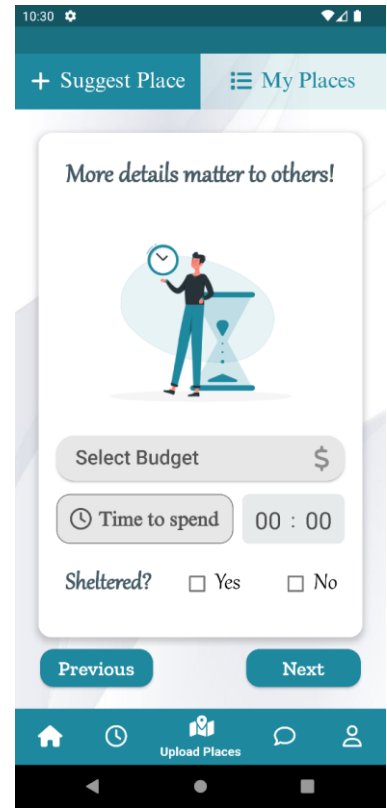
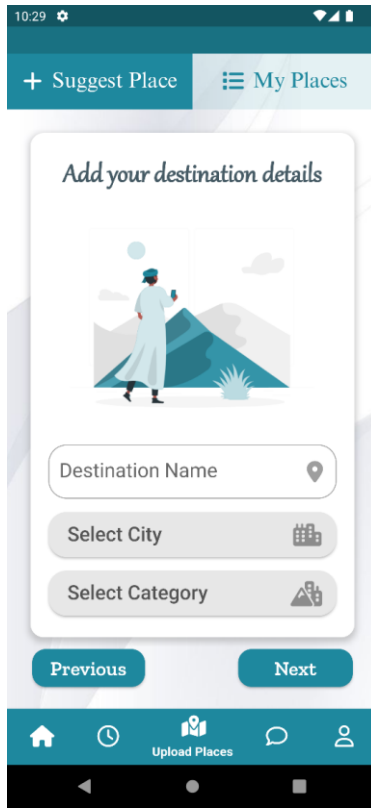
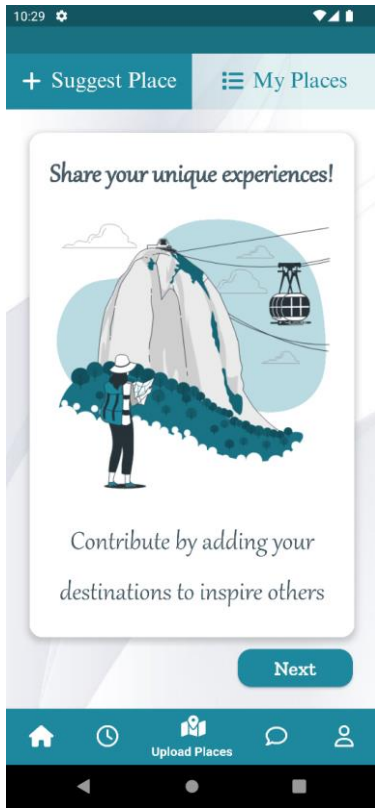


Figure 4.2. 38. Place Suggestion Interfaces.

- Suggested Places Tab

Users can check their suggested destinations using an interface that displays all their proposed places. This interface lets users see if coordinators have provided any comments on their suggestions and allows them to delete them if desired. Detailed interface contents are illustrated in Figure (4.2.41).

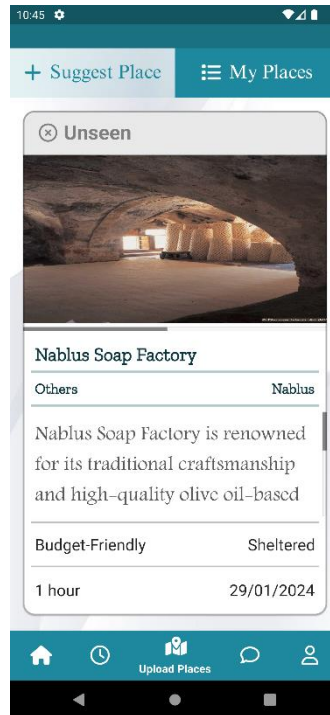


Figure 4.2. 39. User’s Suggested Places Tab.

- Chatting

This system serves as an interactive platform connecting users with city coordinators, enhancing communication efficiency and user satisfaction. Users can easily access a list of available city coordinators and their active status through the chatting list interface depicted in Figure (4.2.42) and send messages directly.

When a user needs to communicate with a specific coordinator, they have the option to either search for the coordinator or immediately click on the messenger icon to access the chat page shown in Figure (4.2.43). This chat page enables users to send messages in various formats, such as text and embedded images, and receive prompt responses from the coordinator, ensuring a seamless live chatting experience.

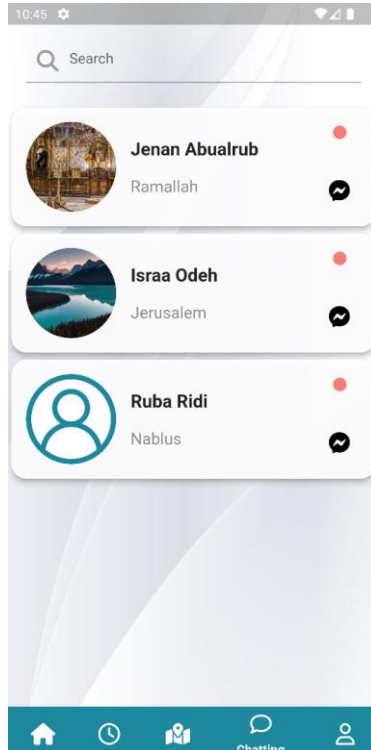


Figure 4.2. 41. Chatting List Interface.

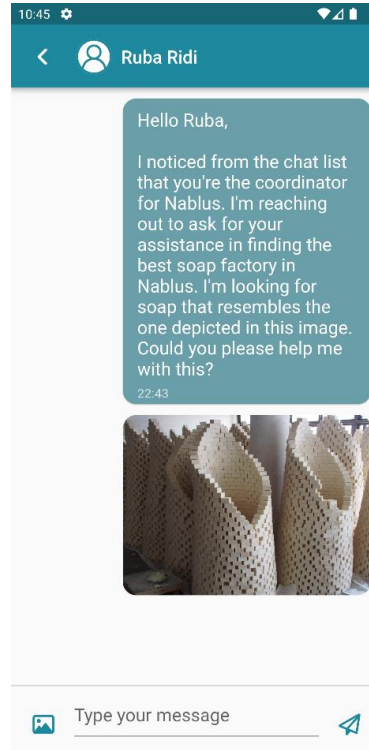


Figure 4.2. 40. Chat Page.

- Profile

The user can access their profile page, as illustrated in Figure (4.2.44), and interact with the different available parts, including account, interest filling, location acquisition, and log out.

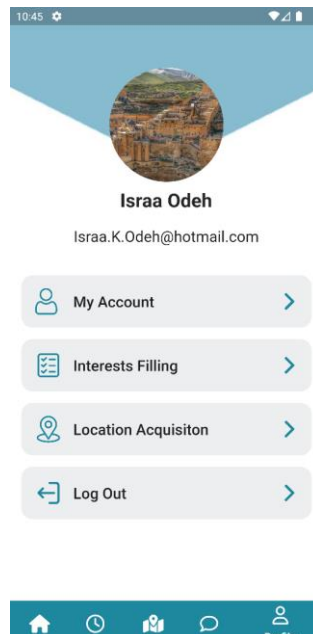


Figure 4.2. 42. User's Profile Page.

- Account Interface

Within this interface, users can view and manage their personal information, encompassing their first and last names, password, and profile image. It offers an editing function, allowing users to modify necessary details and save changes accordingly. This interface is portrayed in Figure (4.2.45).



Figure 4.2. 43. User's Account Interface.

- Interests Filling Interface

As depicted in Figure (4.2.46), this interface facilitates user input regarding their preferences for both personalizing their homepage and formulating their plans. The questionnaire embedded within the interface serves the dual purpose of collecting pertinent user data to optimize their experience. Such inquiries encompass aspects such as allocated travel budget, preferred companionship dynamics (including solo, with friends, or family), specific regions of interest within Palestine, and identification of any specialized needs.

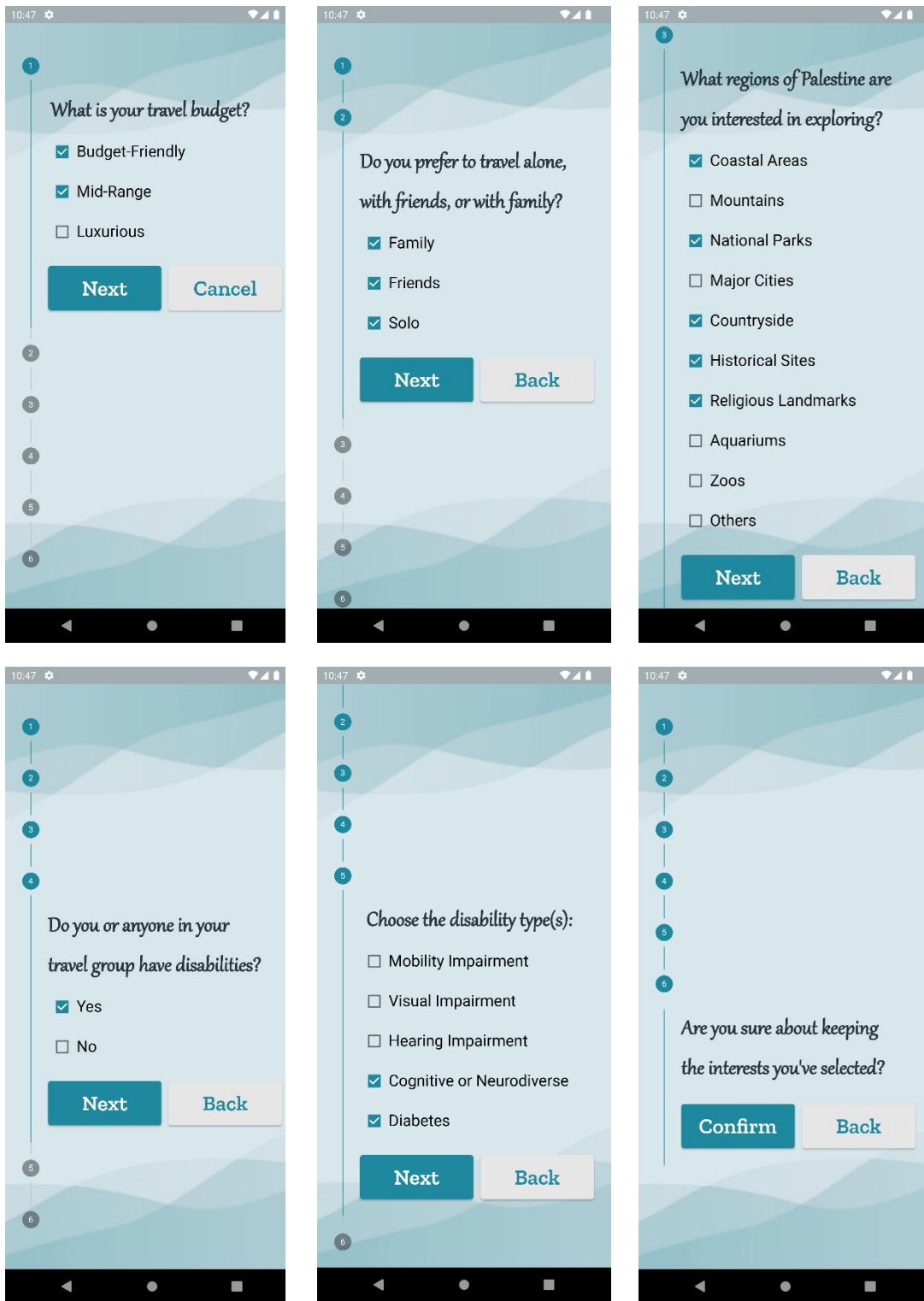


Figure 4.2. 44. Interests Filling Interface.

▪ Location Acquisition Interface

The interface, presented in Figure (53), collects location details from the user, which are then utilized to customize their homepage. However, it is important to

note that this feature is exclusive to the mobile app and is not accessible on the web.

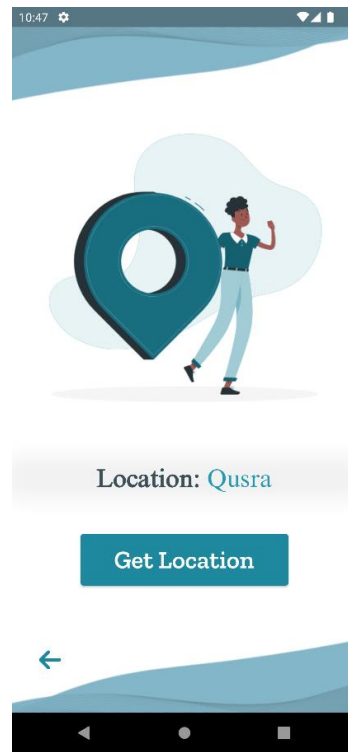


Figure 4.2. 45. Location Acquisition Interface.

- Log Out Tile

The button located within the user's profile provides a convenient method for logging out of their account swiftly. Upon clicking this button, the user is immediately logged out from their current session, thus safeguarding the security and privacy of their account.

- Coordinator-Specific Interfaces

To effectively oversee the various management tasks associated with each city, it is crucial to equip city coordinator with specialized interfaces tailored to their needs. These interfaces should not only aid in their day-to-day duties but also foster interactivity, thereby enhancing the overall efficiency of the platform. Touristine offers a diverse range of interfaces categorized into six main sections: Home, Places Generator and Viewer, User Interactions and Suggestions, Cracks Analysis, Chatting, and Profile. Each section is designed to provide intuitive and engaging tools, ensuring smooth coordination and streamlined processes.

- Home

Each coordinator has access to city-specific statistics, allowing them to monitor various metrics. Before viewing the statistics, coordinators must specify two parameters. Firstly, they select the desired statistic type from options such as visits count, reviews count, complaints count, and ratings count. Secondly, they determine the division criteria for the statistics, choosing from categories such as coastal areas, mountains, national parks, major cities, countryside, historical sites, religious landmarks, aquariums, zoos, and others. Additionally, the statistical result can be divided based on the places categories, ensuring detailed insights. Once these parameters are set, coordinators can view the results using either a bar chart or a pie chart, ensuring flexibility and consistency. Figure (4.2.48) illustrates the home page layout.

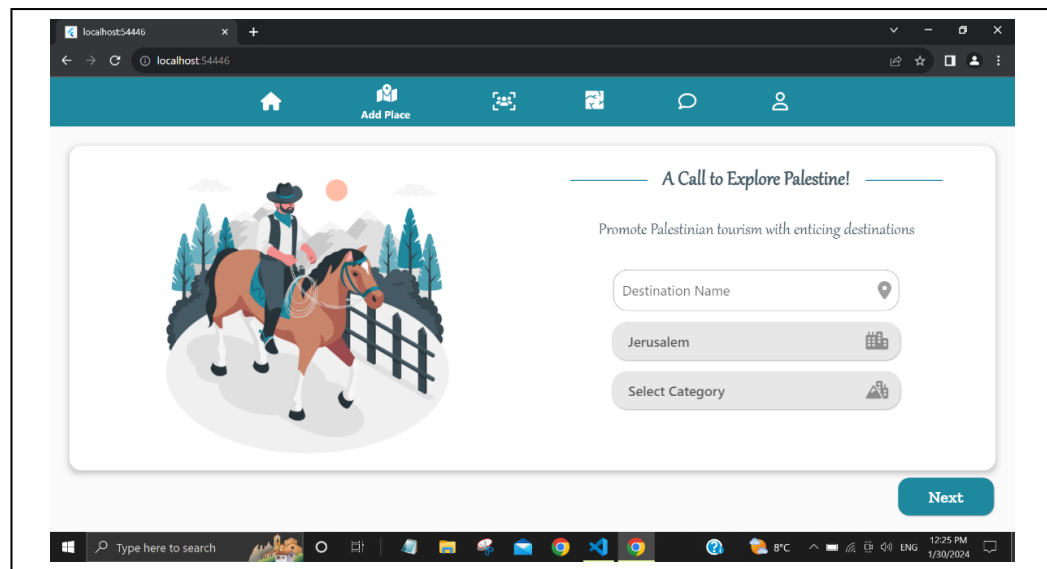


Figure 4.2. 46. Coordinator’s Home Page.

- Place Generator and viewer

- Place Generator Tab

The coordinator is empowered to continually enrich Touristine with fresh destinations within their assigned city, ensuring a diverse range of choices for users. Adding a new place entails providing comprehensive details such as the destination's name, category, geographic coordinates (latitude and longitude), operating hours, days of operation, budget level, recommended duration of visit, indoor/outdoor classification, applicable visitor types (family, friends, solo), allowed age categories to visit the place (children, teenagers, adults, elders), textual description, available services, activities, designated search terms for user queries, destination images, and optionally, a virtual tour link. Once submitted, the destination is integrated into the user feed. The corresponding interfaces for the website are depicted in the set of figures labelled 'Figure (4.2.49)'.




localhost:54446

localhost:54446

Home Add Place

Specify the Destination Location



CURRENT LOCATION

Latitude

Longitude

Previous Next

Type here to search


8°C 12:25 PM 1/30/2024

localhost:54446

localhost:54446

Home Add Place

Set Working Times and Days



FRIDAY

THURSDAY

Opening Time

Closing Time

Select Working Days

Previous Next

Type here to search

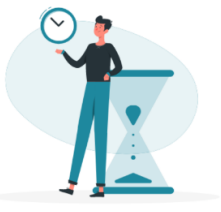
8°C 12:28 PM 1/30/2024

localhost:54446

localhost:54446

Home Add Place

More Details Matter to Others!



Select Budget

Time to spend 00 : 00

Sheltered? Yes No

Previous Next

Type here to search


Earn... 8°C 12:28 PM 1/30/2024

localhost:5446

localhost:5446

Home Add Place

Define Ages and Visitor Types



Select Visitor Types

Select Age Categories

Previous Next


Type here to search 8°C 12:29 PM 1/30/2024

localhost:5446

localhost:5446

Home Add Place

Inform Others About This Place



About Destination

0/1000

Previous Next


Type here to search 8°C 12:30 PM 1/30/2024

localhost:5446

localhost:5446

Home Add Place

Share the Destination Services



Select Services

Other Services

0/43


Previous Next

Type here to search 8°C 12:33 PM 1/30/2024

localhost:54446

localhost:54446

Home Add Place



Highlight Potential Activities

Activity Title 0/25

About Activity 0/500

+


Previous Next

Type here to search 8°C 12:35 PM 1/30/2024

localhost:54446

localhost:54446

Home Add Place



Identify Search Keywords

Search Term 0/30

+


Previous Next

Type here to search 8°C 12:39 PM 1/30/2024

localhost:54446

localhost:54446

Home Add Place



Incorporate a Virtual Tour

Enhance user experience in Toursline by integrating a virtual tour for destination exploration

Virtual Tour Link 0/200

Previous Next

Type here to search 8°C 12:39 PM 1/30/2024

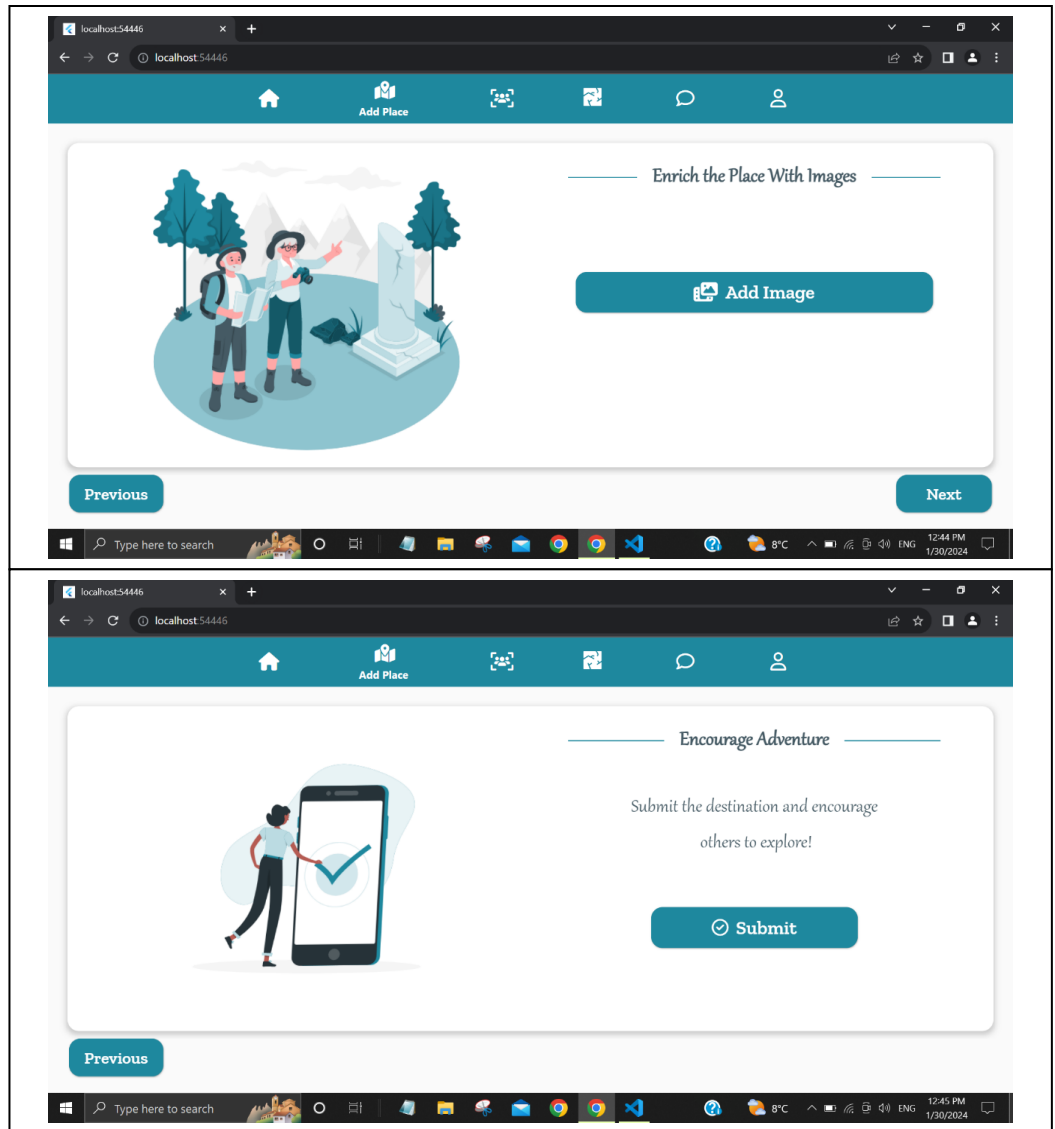


Figure 4.2. 47. Place Generator Interfaces.

- Places Viewer Tab

This interface provides coordinators with the tools to efficiently manage added destinations. It allows for easy filtering by categories including coastal areas, mountains, national parks, major cities, countryside, historical sites, religious landmarks, aquariums, zoos, and others, or to view all entries at once.

Coordinators can perform actions such as editing or deleting destinations as needed. Additionally, they have access to a detailed destination view, involving tabs for general information about the place, descriptions, available services,

and virtual tours if provided. Figure (4.2.50) illustrates the design of this tab interface.

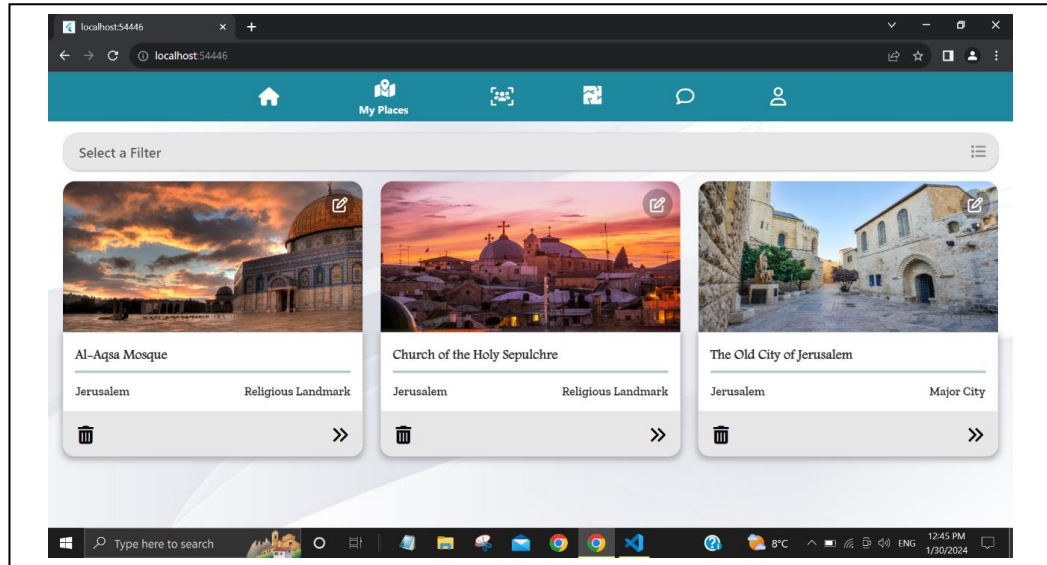


Figure 4.2. 48. Coordinator’s Added Places Tab.

- User Interactions and Suggestions
 - User interactions

The coordinator is authorized to access destinations with registered user interactions, including overseeing and managing complaints, uploads, and reviews for each destination. The interface displaying these destinations is depicted in Figure (4.2.51).

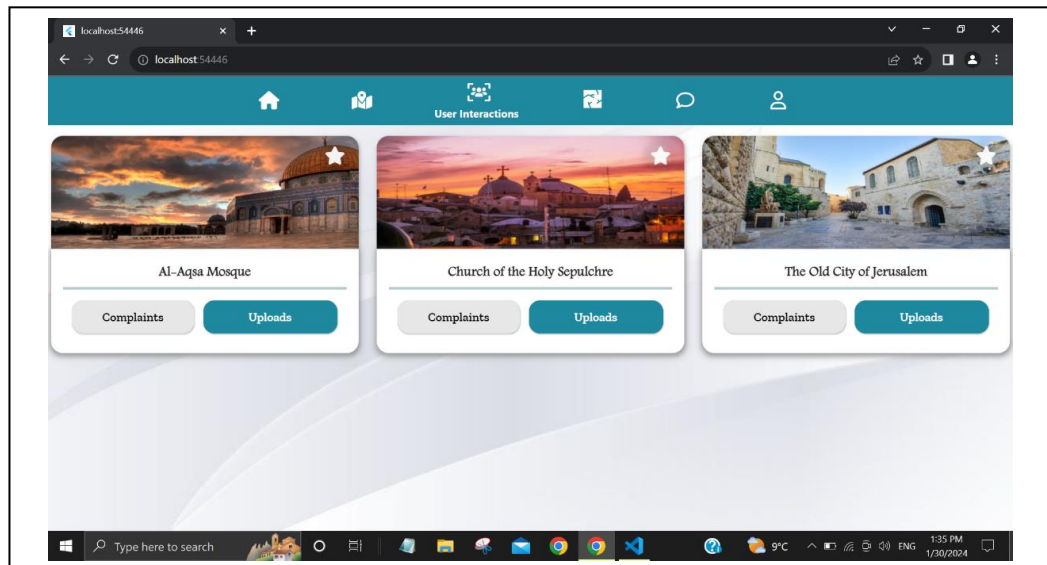


Figure 4.2. 49. User Interactions Interface.

In the complaints interface depicted in Figure (4.2.52), the coordinator can manage complaints by marking them as seen, deleting individual complaints, or deleting them all. Additionally, through the interface shown in Figure (4.2.53), the coordinator can review uploaded images and decide whether to approve the entire submission or selectively approve certain images while rejecting others. They also have the option to reject an entire upload or all uploads. Furthermore, on the reviews interface indicated in Figure (4.2.54), the coordinator can access reviews for a specific destination.

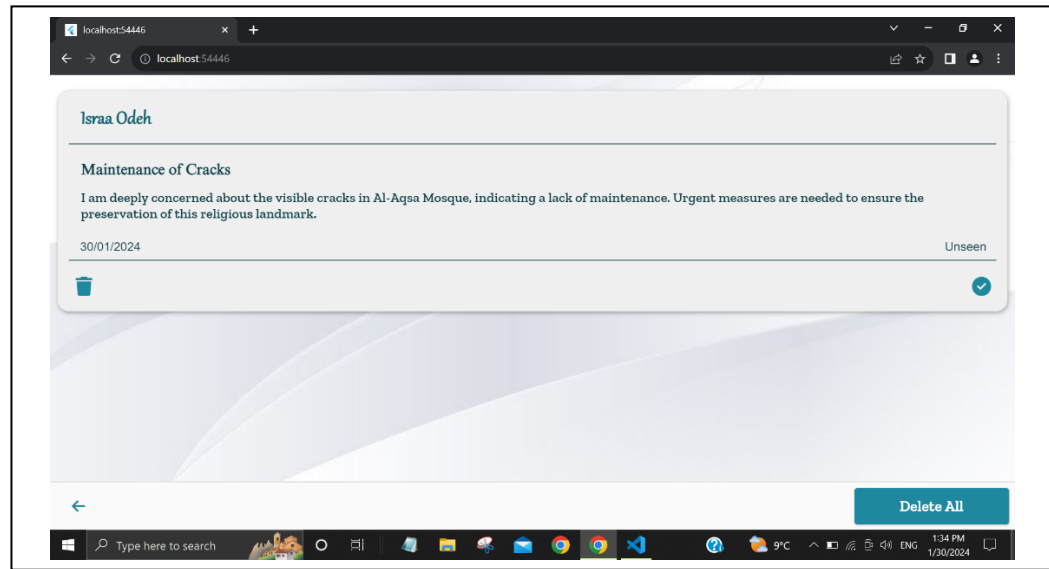


Figure 4.2. 50. AI-Aqsa Mosque Complaints Interface.

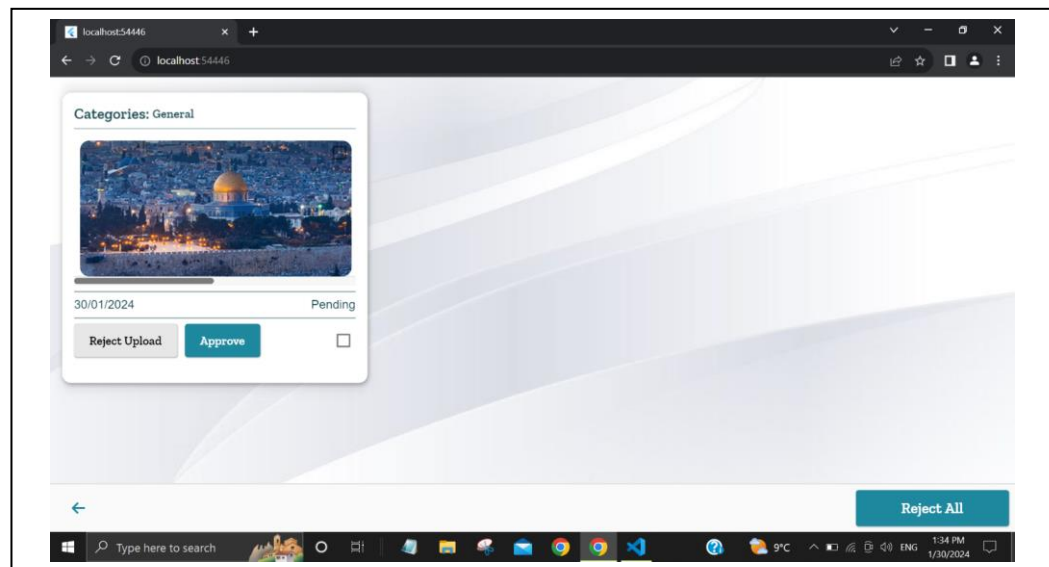


Figure 4.2. 51. AI-Aqsa Mosque Uploads Interface.

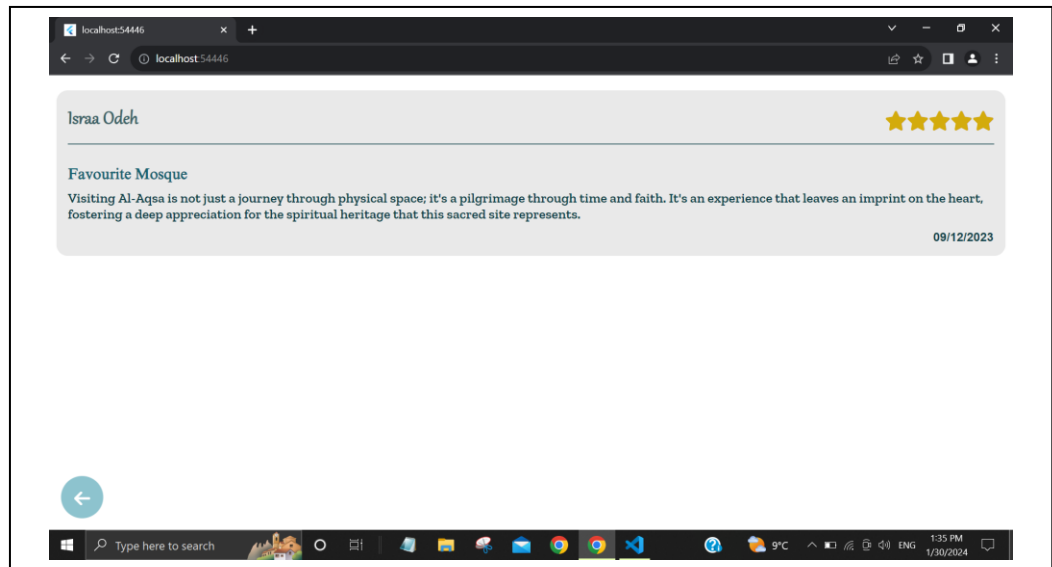


Figure 4.2. 52. AI-Aqsa Mosque Reviews Interface.

- User Suggestions

The coordinator has the ability to view suggested locations within their assigned city through the interface depicted in Figure (4.2.55). This interface allows the coordinator to identify the user who made the suggestion, provide feedback, and make decisions regarding whether to incorporate the suggestion as a new destination. If approved, the suggestion is forwarded to the place generator for the addition of necessary details before inclusion. Alternatively, the coordinator can delete suggested places after providing feedback.

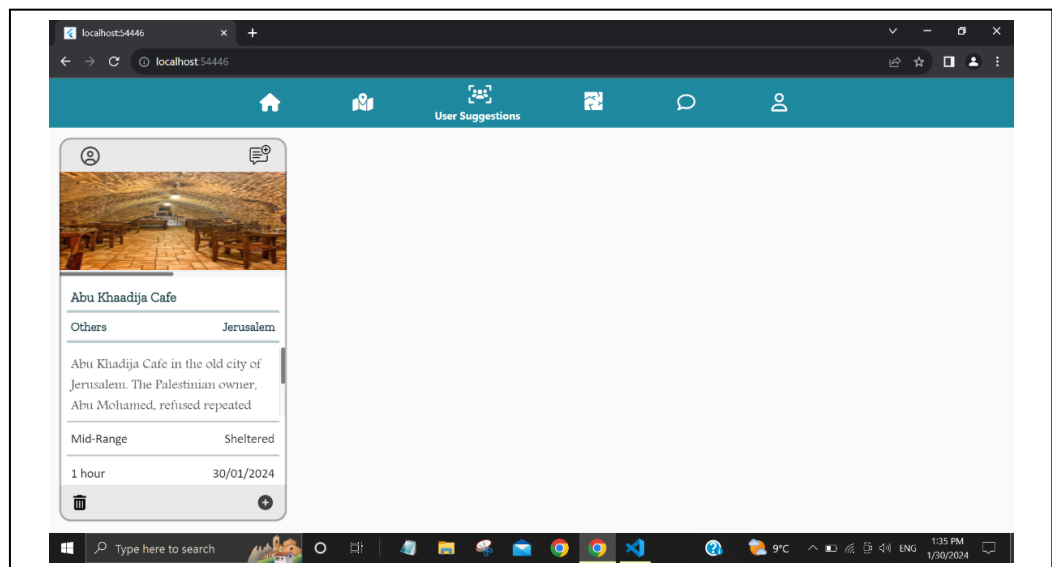


Figure 4.2. 53. User Suggestions Interface.

- Cracks Analysis

When users submit images of destinations containing wall cracks, Touristine backend system employs machine learning algorithms to detect and highlight the positions of these defects. This process aids coordinators in swiftly identifying and monitoring cracks, thereby saving time and ensuring accurate revision of crack-related information.

Cracks images are categorized according to their respective destinations. For every location that falls under the coordinator's supervision and has uploaded images containing cracks, a comprehensive view of that destination is provided, including the destination name and relevant data such as the number of cracks present. Additionally, the option to delete all cracks associated with a particular destination is available. These interface functionalities are illustrated in Figure (4.2.56).

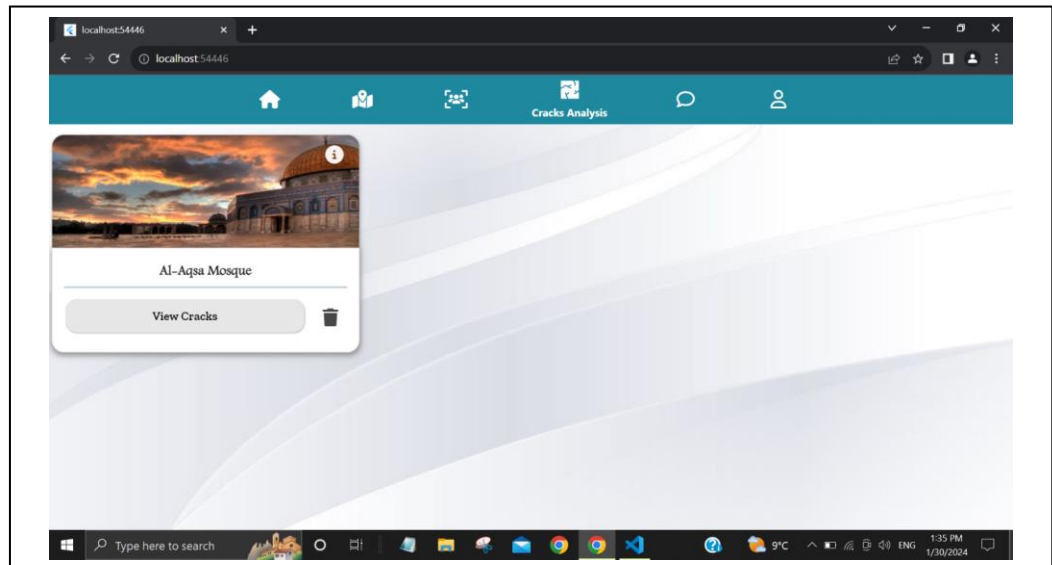


Figure 4.2. 54. Cracks Analysis Interface.

Coordinators can access crack data by clicking the "View Cracks" button, leading them to the interface depicted in Figure (4.2.57). This interface showcases destination flaws, giving coordinators the ability to either approve individual crack uploads, select specific images for approval, or reject either a particular upload or the entire batch of uploads.

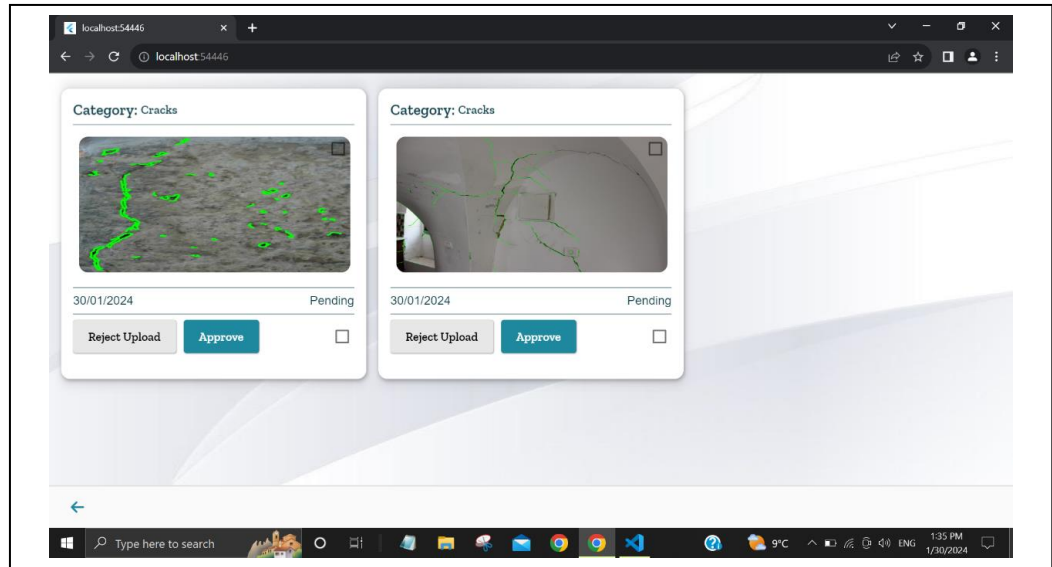


Figure 4.2. 55. Uploaded Cracks Interface.

- Chatting

This feature streamlines communication among city coordinators, users, and Touristine administrator. It offers an efficient interactive experience, providing coordinators with easy access to user messages and allowing for quick responses to inquiries. Coordinators can also alert Touristine administrator to issues promptly by using this chatting feature. With real-time messaging and image-sharing support, the communication process is optimized. Figures (4.2.58) and (4.2.59) depict the chatting list and chat page interfaces, respectively.

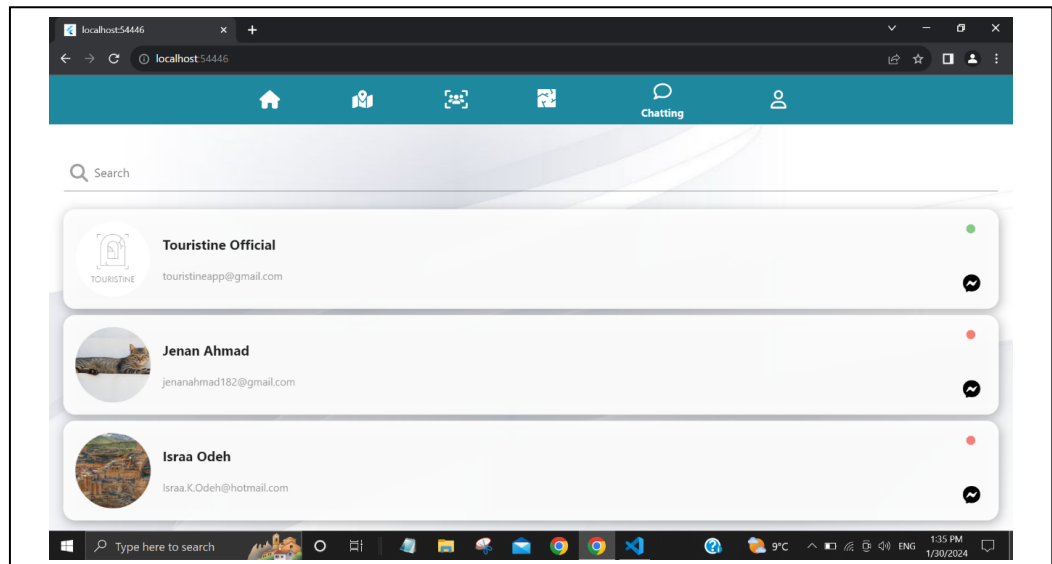


Figure 4.2. 56. Chatting List.

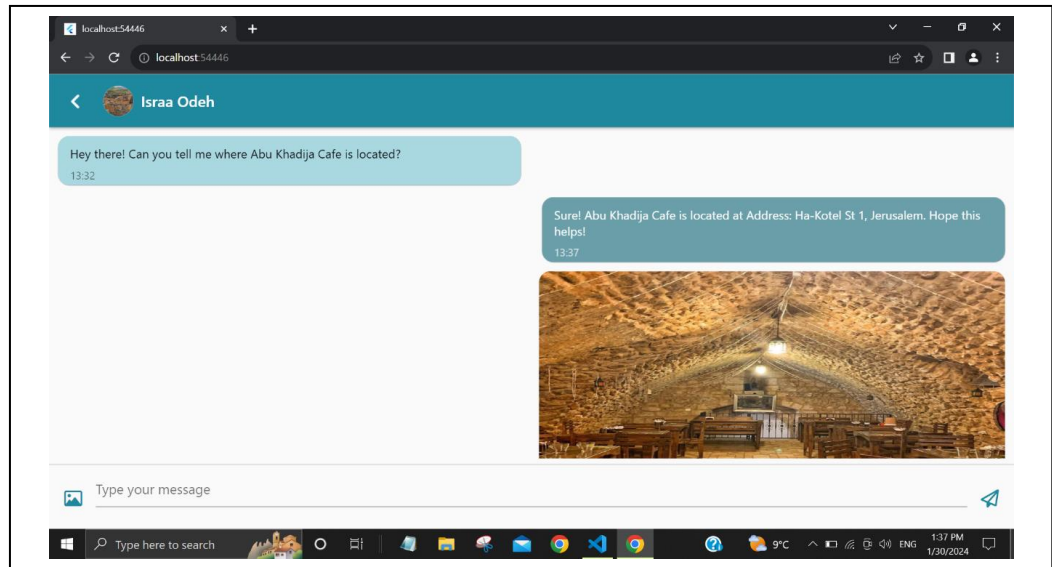


Figure 4.2. 57. Chat Page.

- Profile

The coordinator can access their profile page, where they can engage with the two available sections: account and log out.

- Account Interface

The coordinator can manage their personal information through the account interface depicted in Figure (4.2.60). Within this interface, they have the option to modify their first and last names as well as their password and profile image, facilitating convenient updates to their information.

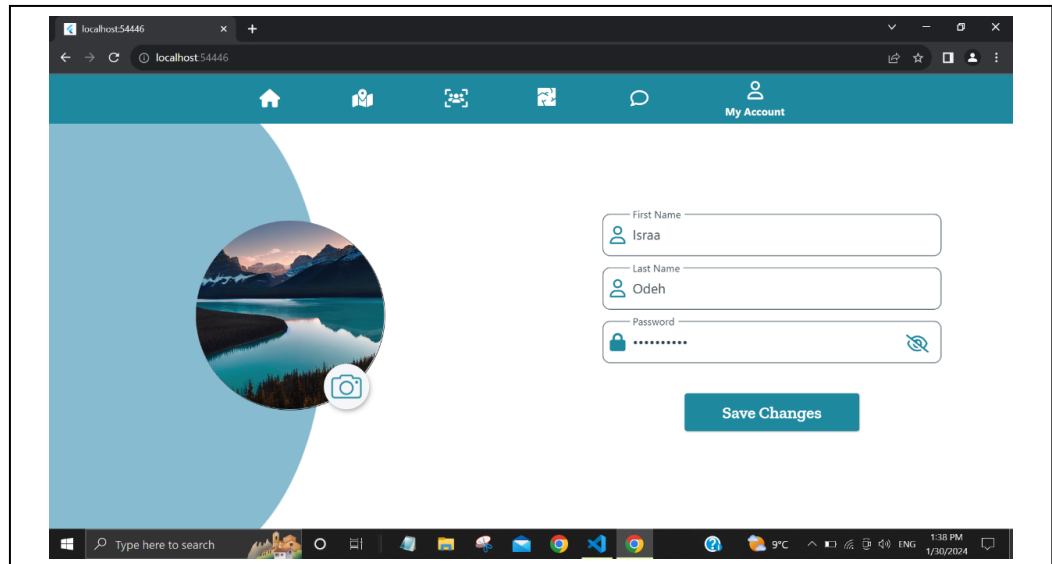


Figure 4.2. 58. Coordinator's Account Page.

- Log Out Tile

The log-out functionality, accessible via the profile page, allows for the termination of the coordinator's session.

- Administrator-Specific Interfaces.

Touristine administrator is equipped with a suite of interconnected interfaces designed to facilitate their management duties. These interfaces are organized into five distinct sections: Home, Touristine Destinations, a map displaying crack analysis results, chatting for communication with different cities' coordinators, and the Profile section.

- Home

The admin has an advantage over the coordinators when it comes to accessing statistics options. They have access to statistics for all cities available in Touristine. Prior to accessing the statistical data, the administrator is required to define three key parameters. These parameters encompass the selection of the preferred statistical category among options such as visits count, reviews count, complaints count, and ratings count. Additionally, the administrator specifies whether they intend to view the selected statistical type across all cities or restrict it to a particular city, including options like Jerusalem, Ramallah, Nablus, and Bethlehem. Finally, the administrator determines the criteria for dividing the statistics, choosing from categories such as coastal areas, mountains, national parks, major cities, countryside, historical sites, religious landmarks, aquariums, zoos, and others.

Additionally, when opting for the "All Cities" option, the statistical outcome can be segmented for each city individually, whereas selecting a specific city allows division by category. After configuring these parameters, the administrator has the option to visualize the results through either bar or pie charts, ensuring adaptability and uniformity. Figure (4.2.61) depicts the interface of the admin's homepage.

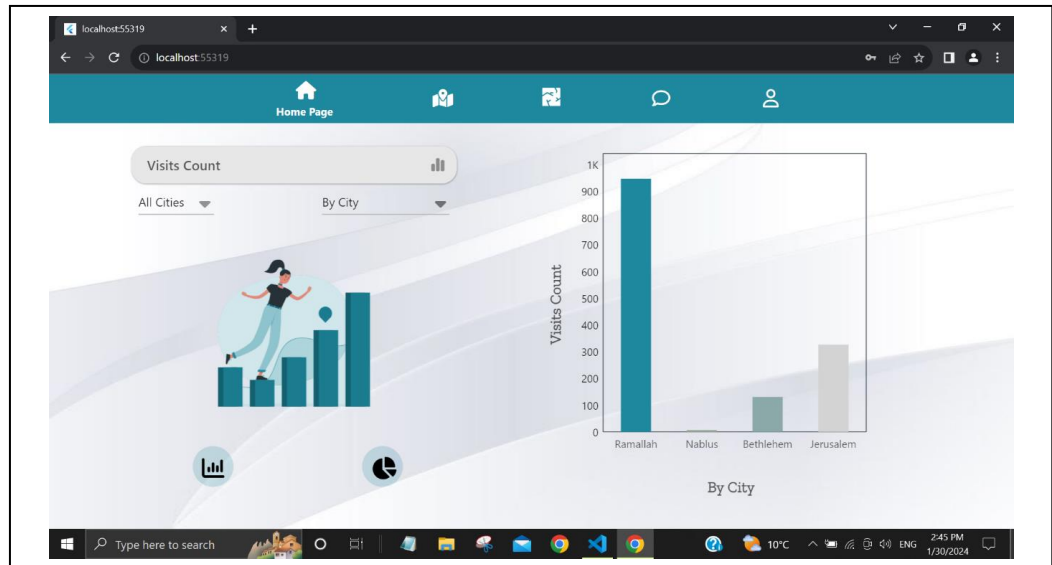


Figure 4.2. 59. Touristine Administrator Homepage.

- Touristine Destinations

On Touristine, the admin can see all available destinations. To help the admin navigate through these destinations more easily, a filtering feature is implemented. This feature allows the admin to filter places by city, category, or view all destinations at once. This described interface can be found in Figure (4.2.62). By clicking on the view icon, the admin can also see specific details about a destination.

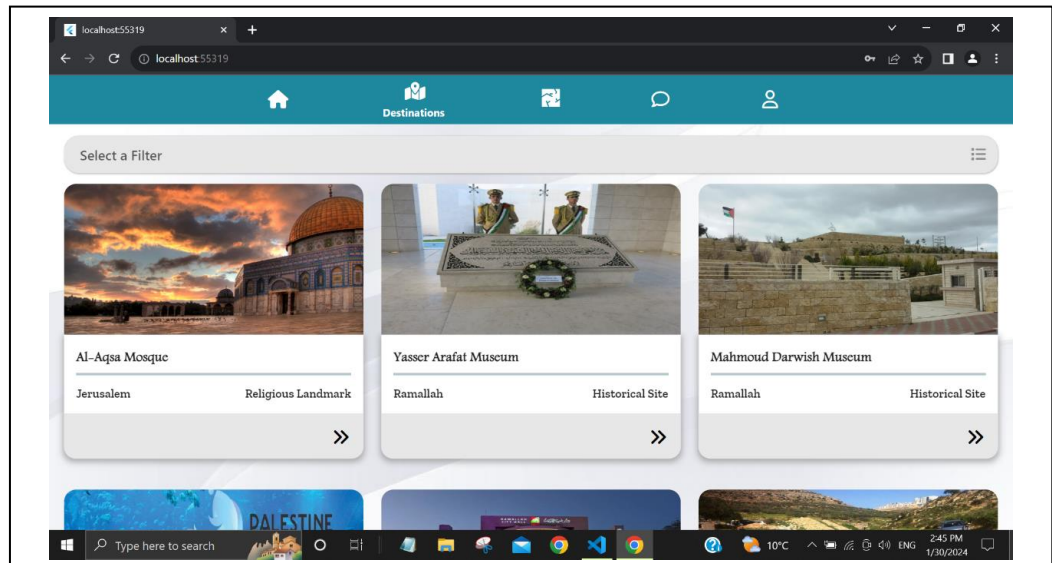
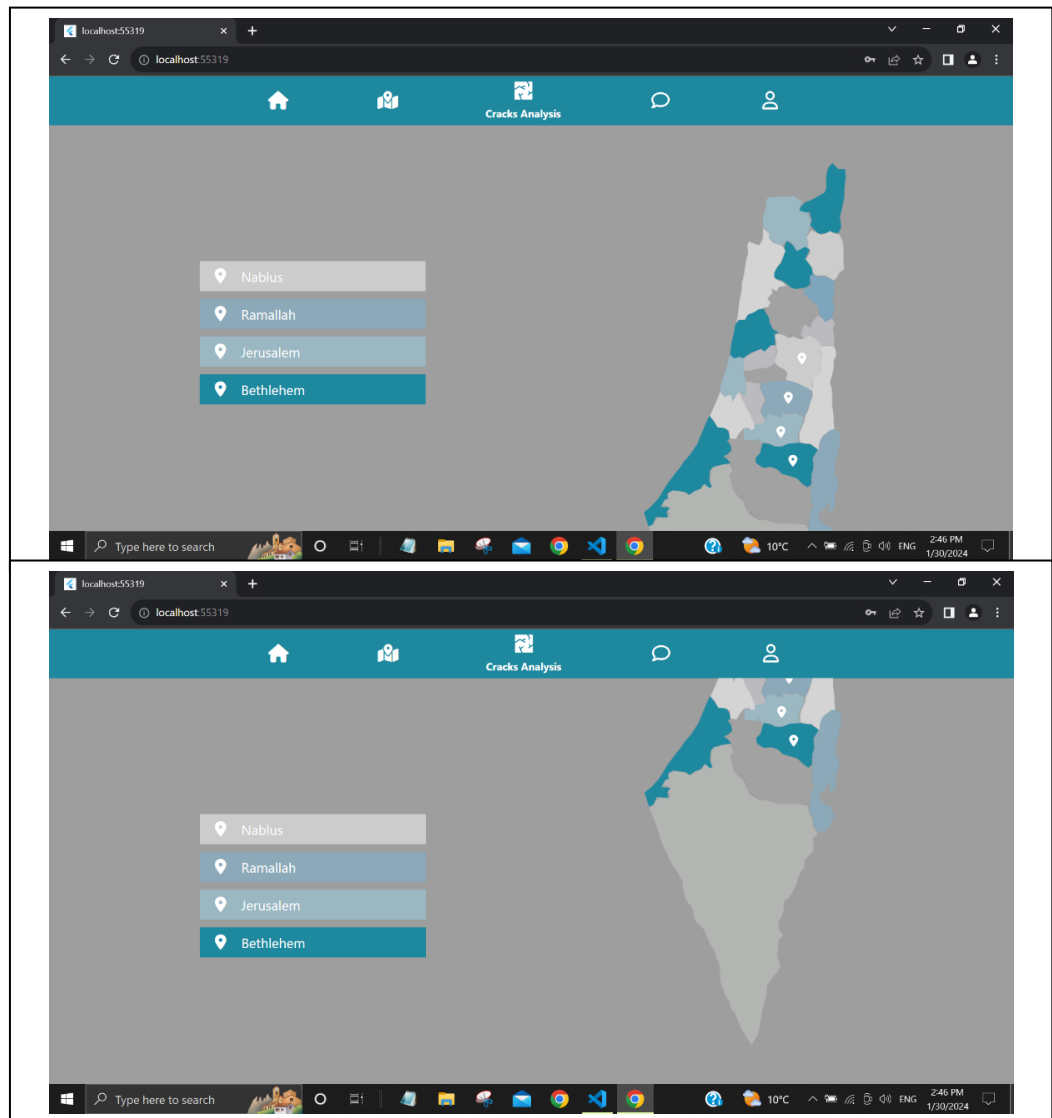


Figure 4.2. 60. Touristine Destinations

- Map View of Cracks Analysis Results.

The Map of Palestine is visualized and crafted to exhibit different Palestinian cities, depicted in Figure (4.2.63). Every city with fractures is indicated on the map with a location marker. Upon clicking the marker, it will reveal the count of uploaded crack images for locations in that specific city. To access the crack images, the "View Cracks" button can be clicked. This action will open an interface viewing all the destinations with uploaded crack images in the city, as illustrated in Figure (4.2.64).



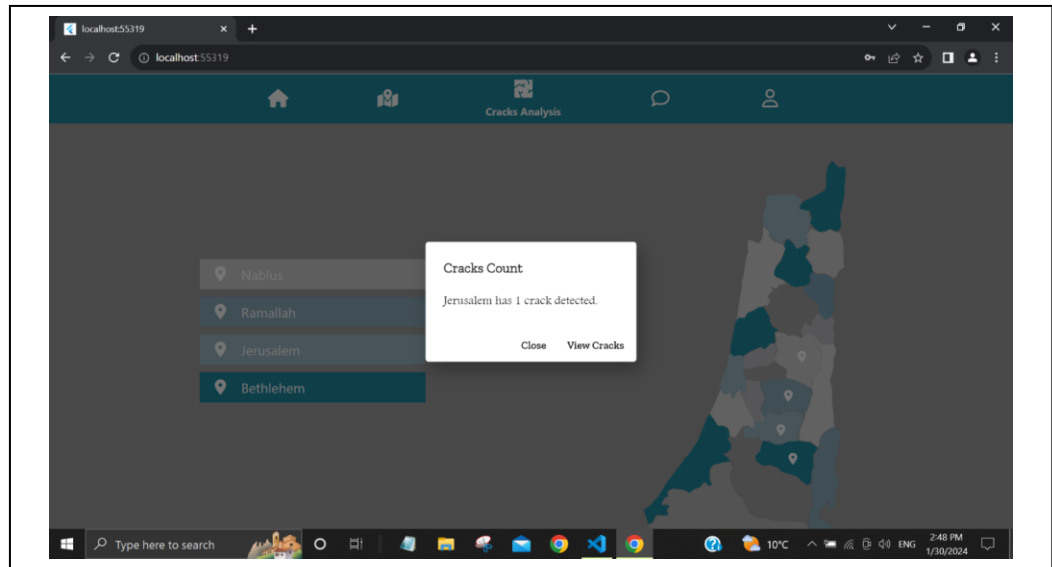


Figure 4.2. 61. Map View of Cracks Analysis Results.

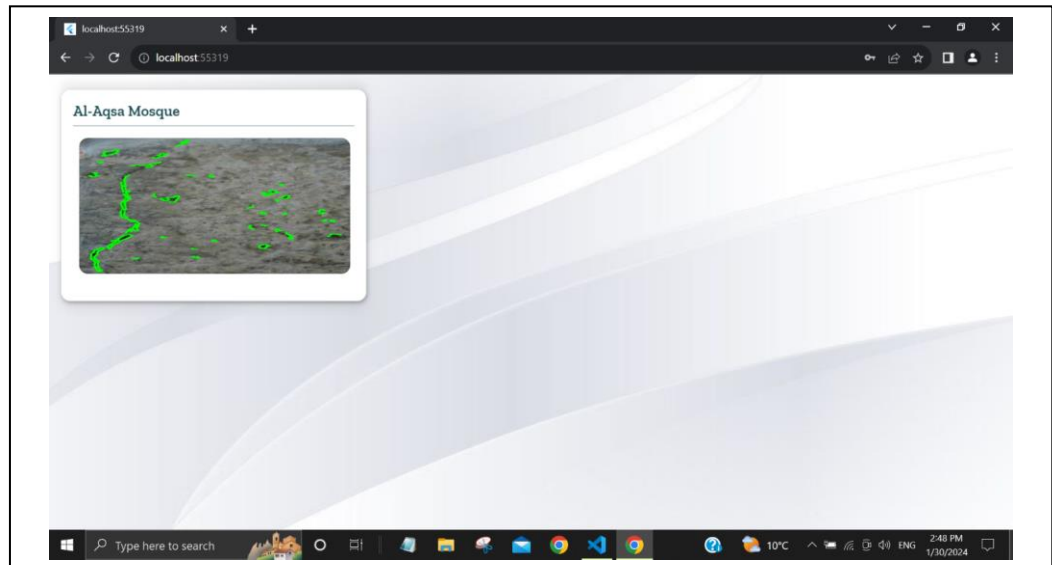


Figure 4.2. 62. Destinations in Jerusalem with Uploaded Crack Images.

- Chatting

Touristine administrator has the ability to view a list of available coordinators for chatting, along with their current active status. The administrator can initiate a chat with any city coordinator in the system, and send and receive messages in real-time. This includes the ability to send images, as demonstrated in Figures (4.2.65) and (4.2.66).

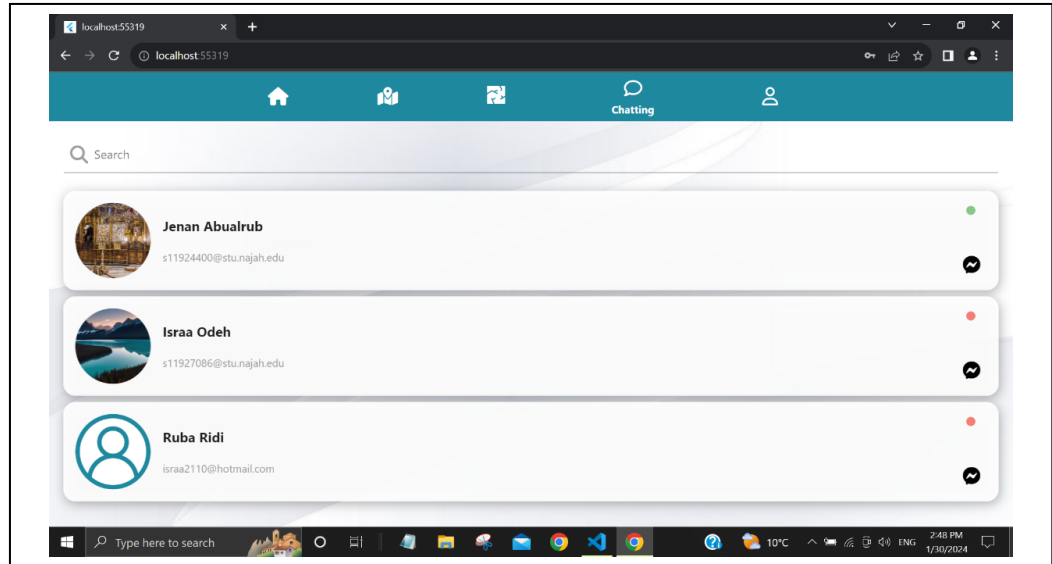


Figure 4.2. 63. Admin's Chatting List.

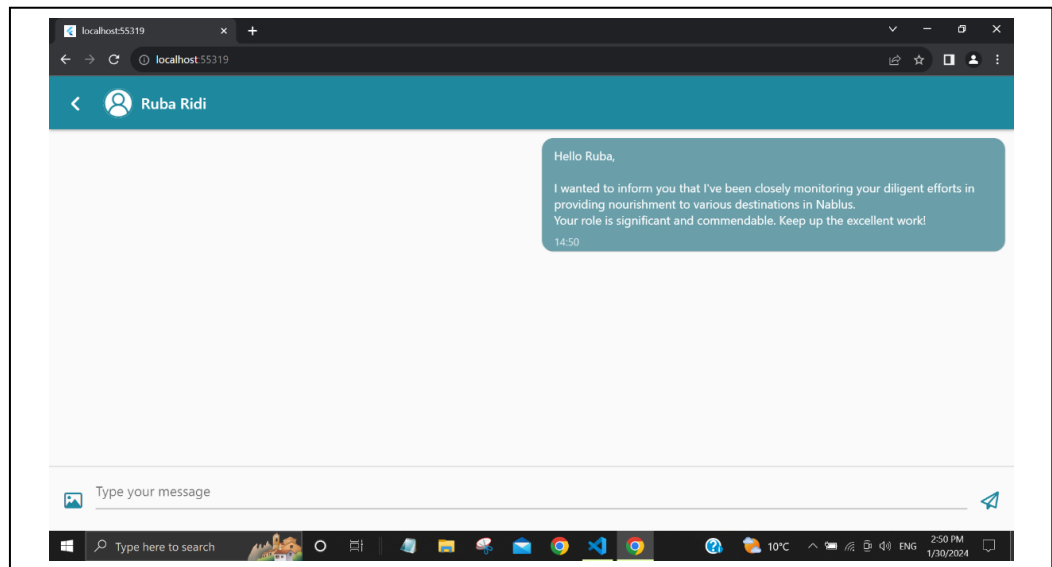


Figure 4.2. 64. Admin's Chat Page.

- Profile

The admin's profile page offers access to various sections, including viewing the admin's account, adding new coordinators, viewing existing ones, and logging out.

- Account Interface

Figure (4.2.67) displays an intuitive interface that allows Touristine admin to manage their personal information. The interface provides options to view and update account details, such as first name, last name, password, and profile image.

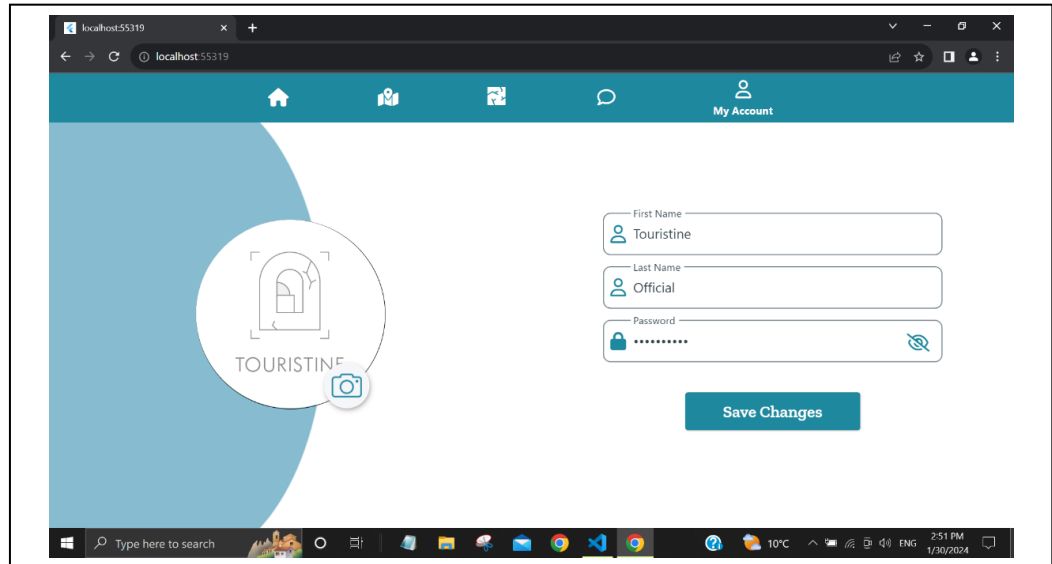


Figure 4.2. 65. Admin’s Account Interface.

- Adding New Coordinators

To streamline destination management, the administrator has the option to assign coordinator roles to individuals. Figure (4.2.68) depicts an interface where new coordinators can be added. The admin is prompted to input essential details about the coordinator, including the city they will oversee, their first and last names, a valid email address for sending them account activation details, and an initial password for the coordinator's use.

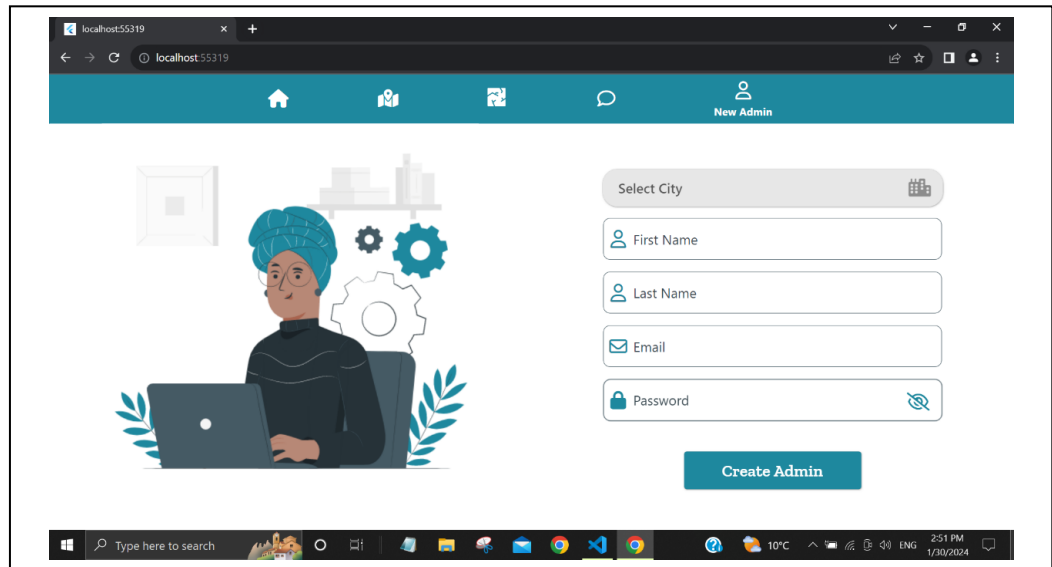


Figure 4.2. 66. The Interface of Adding New Coordinators.

- **Current Coordinators**

Touristine administrator has the capability to access a roster of current coordinators, displaying essential details like their first and last names, assigned cities, and profile images. Furthermore, the administrator maintains the authority to remove coordinators when needed. Figure (4.2.69) illustrates the interface displaying the present coordinators.

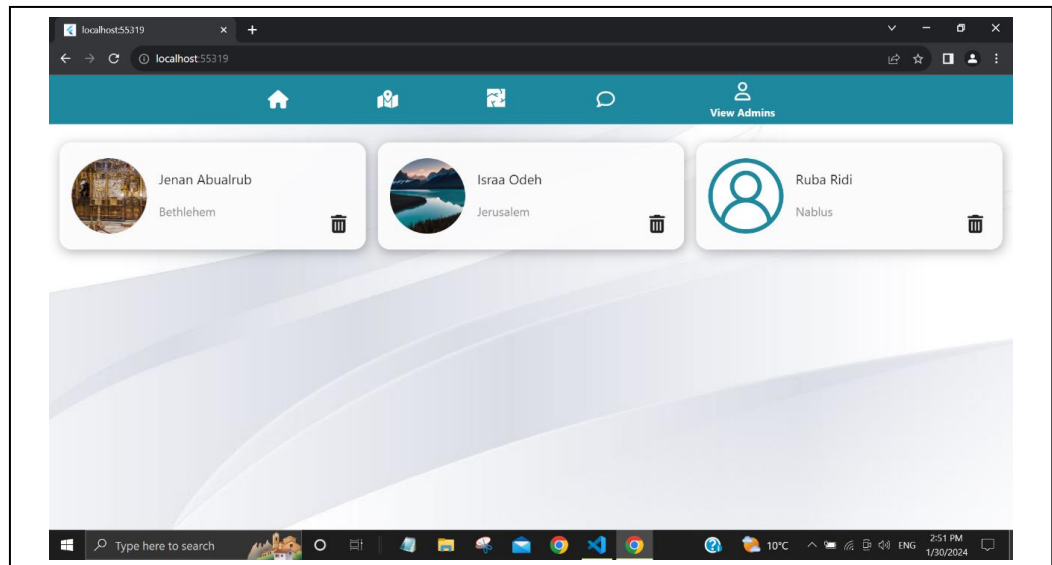


Figure 4.2. 67. Current Coordinators Interface.

4.3 Crack analysis:

Touristine focuses on giving tourists destinations that match or even exceed their expectations. Hence, it considers the physical structure of buildings to prevent any hazards or disappointments which might occur when there is a lack in repairing wall defects.

There is a reliance on regular users in this part as they are the ones that contribute in announcing such defects. When the user uploads a crack, the image is received on the server. Since the server is implemented with Node.js, the execution of the Python script, which represents the crack analyzer, is done through a Node.js call.

There exists a module named 'child-process', it was deployed to run the Python script inside a controlling function written in Node.js. In other words, it allowed the spawn of a child process and interact with it. This approach enabled the integration of Python into the Node.js environment.

The steps taken to detect cracks were as follows:

1. Converting the image into grayscale.
2. Applying an averaging filter with a kernel size (4, 4).
3. Finding the median value to set lower and upper thresholds.
4. Applying Canny edge detection method using the found thresholds.
5. Marking the detected edges to make it visually easy to capture the crack and estimate the severity.

5. Results and Discussion

Touristine is equipped with a variety of functionalities, fulfilling the intended purpose of guiding users through Palestine. The platform was strategically designed to address gaps present in existing solutions while introducing modern, user-friendly features.

During the development process, several technical challenges were encountered and successfully addressed. One notable issue was the dependence on an online weather tool[3], which occasionally faced server downtime. To prevent potential issues, effective solutions were implemented on the backend to ensure a seamless experience for users.

Also, the crack analysis part might sometimes fail to detect a crack or announce an unactual crack. The code was optimized by controlling the blurring kernel size, provided that, it gives more accurate results when the image shows the intended wall in a clear form.

Touristine not only meets the criteria for providing guidance in Palestine but also places a strong emphasis on user-friendliness and simplicity. Additionally, the platform encourages user participation by allowing workers to update destination information and gather feedback, contributing to the preservation of historical sites.

This comprehensive approach ensures that Touristine remains a valuable tool for both visitors and contributors, offering an enhanced and reliable platform for exploring Palestine.

6. Conclusion and Future Work

6.1. Conclusion

In conclusion, Touristine has the potential to effectively benefit the Tourism sector. It is capable of promoting landmarks with respect to multiple factors, all while upholding an accessible and welcoming interaction. Consequently, it could gladly assist in defending our Palestinian monuments.

6.1. Future work

- Enable users to discover more cities.
- Expand the categories of destinations available for user exploration.
- Incorporate virtual reality (VR) features for immersive experiences.
- Expand language support for a more diverse user base.
- Improve the crack detection technique.
- Implement hierarchical layers on the administrators' side to facilitate periodic assessments of all attractions.
- Collaborate with local authorities to obtain real-time data on attractions.

7. References

- [1] Viator. (2019). Book Things to Do, Tickets, Tours & Attractions | 2019 | Viator. Viator.com. <https://www.viator.com>
- [2] Palestine, Tour. “Tour Palestine - استكشف فلسطين.” Tourpalestine.ps, tourpalestine.ps/en.
- [3] “Weather Report: Not Found.” *Wttr.in*, wttr.in/