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المملكة العربية السعودية
وزارة التعليم
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كلية علوم و هندسة الحاسبات – قسم نظم معلومات (قسم الطالبات)

Saudi Rowa'a

Mobile Application for Foreign Tourists

SAUDI ROWA'A | رُواء السعودية

Graduation Project (1)

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A project submitted in partial fulfilment of the requirements for the degree of Bachelor of Science (Information System)

Supervised by

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Abstract

Our project is an Android mobile-based application for foreign tourists named Saudi Rowa'a which means the beautiful view of Saudi Arabia. The purpose of our project it to provide an entire Saudi experience by using the most attracted sites, tasting some popular Saudi dishes, and living in traditional Saudi house.

This application serves several groups of the community, such as tour guides, property owners, and productive families. The tour guides can use our app to provide his/her programs for trips and share them with foreign tourists. Furthermore, property owners can display photos and descriptions of their property in the app for tourists to see and rent one of them if they prefer. Finally, productive families can offer traditional and popular Saudi dishes.

Keywords Saudi Arabia; Tourism; Application; Saudi Rowa'a; Social aspects; Cultural aspects; Tour guide; Productive families; Property owners.

Acknowledgement

At the end of this project, we would like first to thank God Almighty for his blessing and the strength that gave to us to complete this project, challenge the difficulties, and increase our knowledge and experience while working on it. Then we thank our families who were the greatest supporter and encouraging us in good and bad times their satisfaction is a reason for our success and our distinction. As well as we would like to thank our dear supervisor Dr. Reem Kateb for her guidance and assistance and her feedback that helps us to complete the requirements of our project properly during this semester. Finally, a lot of thanks to the team members who gave their best and patience for the success of this project.

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List of Abbreviations

ERD	Entity Relationship Diagram
UML	Unified Modeling Language
UI	User Interface
API	Application Program Interface
KSA	Kingdom of Saudi Arabia
IT	Information Technology
IDE	Integrated Development Environment
JSON	JavaScript Object Notation
XML	Extensible Markup Language

Chapter 1: Introduction

1.1 Introduction

Tourism is a multifaceted, fragmented and pervasive industry, intertwined between several actors, groups and individuals, all the institutions and individuals of society participate in this industry. However, the tourism industry in Saudi Arabia lacks a unified and harmonious structure, this led to the work of the various tourism sectors in isolation from each other in light of a set of regulations and instructions issued by the authorities supervising this industry.

This situation confirms the need for the tourism industry for leadership and strategic planning, as a result of the absence of this, the potential of this large industry remained virtually unexploited on the ground (الاستراتيجية العامة لتنمية قطاع السياحة وتطويره).

We realize the great impact of information technology in all fields, especially tourism. After the vision Saudi Arabia take the advantage of IT to improve its competitiveness and adopt a lot of strategics to be the one of the international tourism countries. (Buhalis, 1998) In addition to information technology the e-management enhance the industry of tourism in Saudi Arabia to raise the abilities and capacities of the organizations. (Al-Thoblany & Alyuosef, 2021)

A big part of the success of the tourism industry is related to mobile apps, it has an important role in every area of business as well as in personal life. Gone are the days of paper maps, guidebooks and others, they have been replaced by amazing interactive mobile apps for the travel and tourism industry that come with many functions (MALHOTRA, 2018).

From this standpoint, the team decided to design and prepare an Android mobile based application that helps the development of national tourism through organized and systematic work and in coordination with many service groups from the community.

This application will be a national act to promote tourism in our beloved country in line with the vision of the Kingdom of Saudi Arabia 2030. Also, to help create and develop new jobs that did not exist before.

1.2 Problem Definition

According to the statistics, the travel and tourism industry is expected to generate 17.3 billion US dollars in revenue soon. It is one of the largest industries in the world. Almost all travelers carry smartphones with them and prefer applications for various tasks such as booking flights, booking hotel rooms, etc. Therefore, these mobile applications bring happiness with multiple benefits for both their users as well as for the company that owns these applications (Graft, 2020). In addition, they are easy and accessible way for everyone to plan a trip in the future, and statistics show approximately a percentage of 15% use apps in tourism. In their spare time, 85% use smartphones to plan their travels. Travel and tourism industry apps are ranked seventh among the most downloaded apps category, and 30% of people use mobile apps to search for flight deals, best hotels, etc.

Tourism in the Kingdom of Saudi Arabia is one of the most developing sectors, which have constituted a great development in recent years, and within the National Vision 2030, the Kingdom of Saudi Arabia decided to direct investment in the tourism sector and make it one of the most important pillars on which the vision is based to overcome obstacles and change the concept of tourism and make the traditional interior compete with foreign tourism (well, 2017).

The tourism industry relies heavily on information; the process of collecting, analyzing, classifying and disseminating information is a matter of great importance for tourism development and planning. Planning for tourism, development, marketing and day-to-day operations requires the availability of correct and up-to-date relevant information and data. The need for such a thing is urgent in KSA. Despite the tourism potential in the Saudi market, basic information about Saudi tourism is still very limited (الاستراتيجية العامة لتنمية قطاع السياحة وتطويره).

Some people want to travel but do not have the sufficient amount for travel requirements, due to the high cost of travel and the rise in hotel prices, and transportation.

For the reasons mentioned above, we propose an application that has many benefits. The first benefit is to provide the required information about everything the tourists need on their trip, such as tourist places and services in Saudi Arabia in easy and attractive ways. Moreover, confidentiality of tourists' data and guarantee of their bookings just by capturing

the screen. This is to serve certain tourism companies or tour guides, as well as serve many visitors, and to stimulate tourism in the Kingdom.

The second benefit is to provide explanations, presentations and tips about cultural and natural heritage areas, and tourist sites in the Kingdom of Saudi Arabia.

The third benefit enables many groups to provide additional source of income. For example, someone who has a suitable place wants to rent to visitors and tourists, and who finds himself able to accompany a tourist on his/her trip to visit tourist places. Also, someone who has services such as preparing and delivering food to the tourist in his/her place of residence.

The fourth benefit is that tourist can write and read the feedback based on his/her country. For instance, if the tourist from China, she/he can read the feedback only from Chinese tourist, because usually tourist prefer to take advantage of experiences from people who have the same nationality. However, this does not prevent them from reading comments from all over the world.

Finally, all users of Saudi Rowa'a application can register. Also, enables the participants (tour guides, productive families and property owners) to display the services they provide. The tourists can select services and create customize trip by defining their budget.

1.3 Project Objectives

This section presents the objectives that the proposed project is going to achieve:

- supporting tourism investment in the Kingdom by shedding light on some of the tourist areas, reaching unknown tourist places and creating multiple destinations, whether for religious tourism or spatial tourism.
- meet the individual tourist's desires, his\her actual requirements, and easy and continuous access to a wide variety of tourist attractions, facilities and services in an atmosphere of security, fun and excitement.
- providing links to flights, hotels, restaurants and transportations companies and tourists who use the Saudi Rowa'a app.

- it serves some segments of society (productive families) in providing their services and increasing their income, offers to university youth and recent graduates job opportunity, giving them experience. In addition, offers an opportunity for property owners to rent out their property.
- Help users to read and type feedback based on the country to get a clear expectation of the trip or tour guide and all services.
- Facilitate payment by enabling the electronic payment service.

1.4 Project Scope

Saudi Rowa'a app targets to stimulate and promote tourism in the Kingdom of Saudi Arabia, also aims to support tourism investment in Saudi Arabia. In addition to promoting multiple destinations, whether for religious or spatial tourism, shedding light on some tourist areas and scenic views in the Kingdom while creating a distinctive tourism image and a distinctive brand for tourism in the Kingdom.

This app creates an integrated experience for foreign tourists by allowing the owners of the area to become tour guides. Furthermore, provide an opportunity for productive families and real estate owners to provide their services to foreign tourists and increase their income.

This app enables users to review, see and learn much information about tourist places in KSA. Also, a review of the events that will be held shortly in the Kingdom of Saudi Arabia, the app allows the visitor to view trip systems that are compatible with their capabilities and budget. It has many options available at different prices.

The app will initially work on Android platform, with an English interface.

1.5 Methodology

The app contains a brilliant idea that aligns with the Kingdom’s 2030 vision, which aims to transform the Kingdom into a tourist destination because of the picturesque areas and facilities for tourists, as well as the Kingdom’s commitment to all the religious status of Muslims all over the world.

This application depends on four main users:

- **tourists:** he is considered the main representative in the system, and the App created for him.
- **tour guides:** provide travel plans and information about the kingdom with price.
- **property owners:** provide tourists with cheap housing at a price lower than the price of the hotel.
- **productive families:** provide tourists with traditional food menus at lower prices than restaurants.

When users (tour guide-property owner-productive family) login, each user will have a different interface, for example, show the tourist guide an interface that enables him to provide services, and the property owner enables him to mention detailed information about his property, upload a picture of the property and enter the price. A productive family enable them to provide food services and set prices. As for tourists, his main interface is different because he can see information about the kingdom and know the price. Tourists do not provide the services of the application but can benefit from the services provided.

when a tourist login the application, an interface with four categories appears:

- **Articles:** through it, he can view information and pictures about the various places in the Kingdom
- **Cities:** the cities of the Kingdom are presented, and when you click on them, we move to another interface that displays the services provided by the application users (tour guides - property owners - productive families)
- **Events:** new events in the Kingdom, for example, festivals, match dates, fishing dates.
- **Links:** provides us with links about hotels and airlines. Upon the tourist login, he sees the services offered by the application users (tour guides - property owners - productive families), and he chooses the service, whether it is an apartment, a menu, or a tour guide with a means of transportation.

When the service owner accesses his services, the services that have been booked by tourists are shown to him, and he can communicate with the tourist to receive him, and he can also cancel the reservation for the service.

1.6 Project Timeline

A timeline is the presentation of a chronological sequence of events along a drawn line that enables a viewer to understand temporal relationships quickly (Rouse, September 2016).

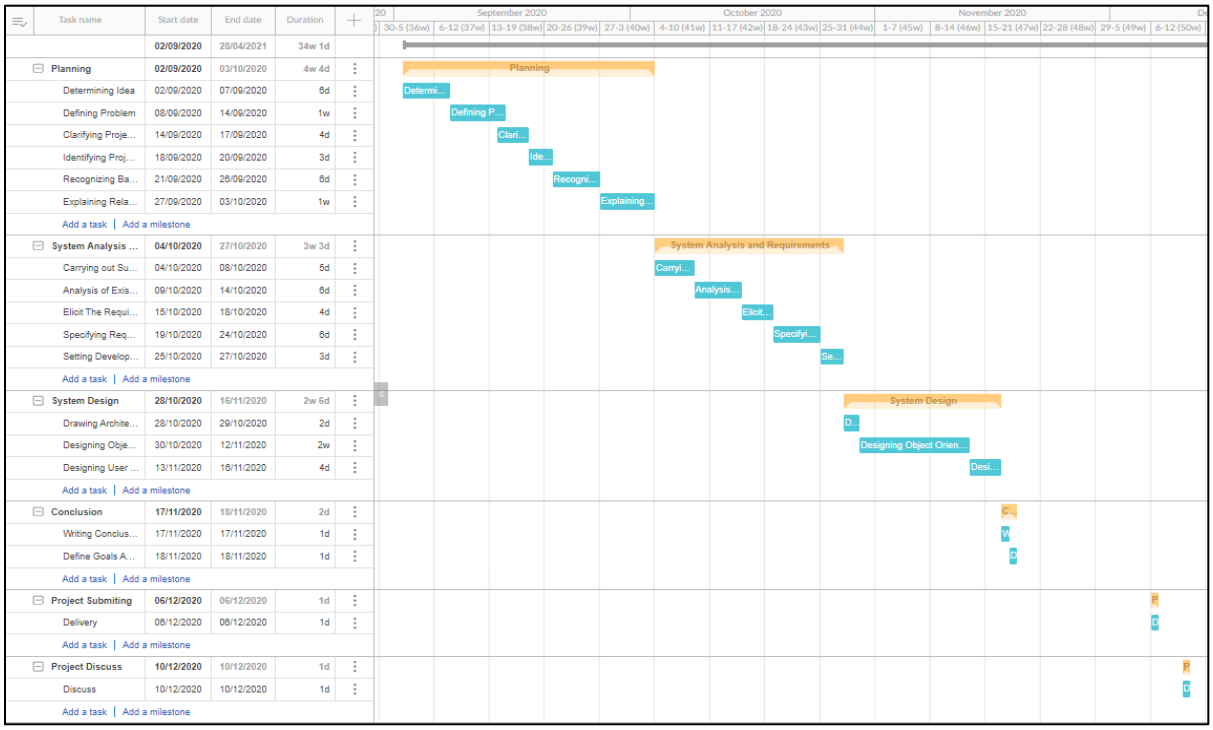


Figure 1-1: timeline for term 1

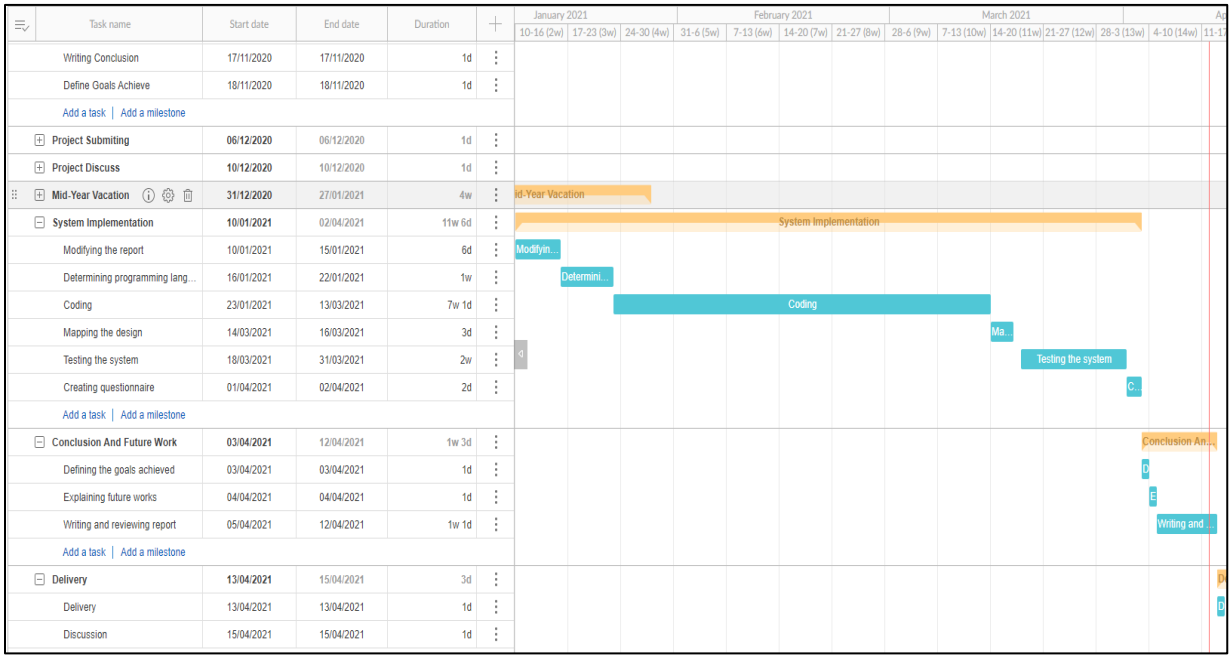


Figure 1-2: timeline for term 2

1.7 Document Organization

This project consists of six chapters in addition to 4 appendixes. These chapters are organized to reflect the scientific steps toward our main objective. A brief description of the contents of each chapter is given in the following paragraphs.

Chapter 1: introduction - contains problem definition, project objective, project scope, project timeline and document organization.

Chapter 2: literature review - provides contains background and related work.

Chapter 3: system analysis - contains introduction, analysis of existing systems, requirements elicitation, requirements specification, developmental methodology and summary.

Chapter 4: system Design - contains introduction, architectural design, object-oriented design, structural static models, dynamic models, data modeling, user interface design and summary.

Chapter 5: system Implementation- contains introduction, tools and languages, mapping design to implementation, main important codes and system testing.

Chapter 6: conclusion and future work - contains conclusion, goals achieved, and future work.

Chapter 2: Literature Review

2.1 Background

Saudi Arabia is one of the most countries that export petroleum, thus make the economy of Saudi Arabia based on it. On April 25th, 2016, many strategies have been developed by crown prince Mohammed Bin Salman Al-Saud to diverse the sources of economic income. Those strategies are gathered on the so-called " The kingdom's vision 2030". Vision 2030 is a blueprint to achieve long-term goals of Saudi Arabia and reduce dependence on oil. Tourism is one of the sectors supported by vision 2030. In the past, tourism in Saudi Arabia means going to Medina and Mecca, the two holy cities of Islam, that attract millions of pilgrims every year. However, vision 2030 aims to cover a lot of tourist cities in Saudi Arabia. Therefore, the Saudi government provides efforts in developing and upgrading tourism sites and services. Under this vision, Saudi Arabia will accept tourists from all the world not only through Umrah visas as well as by tourist visas to increase the revenue from tourism.

For these reasons, we proposed an android mobile based application to provide the required information about everything that a tourist needs on his trip. For example, it provides information about cultural areas, and tourist sites in the Kingdom of Saudi Arabia. Moreover, it provides a source of income for some groups of society. For instance, property owners can rent their apartments, productive families prepare and deliver food, and tour guides provide information about tourism places in Saudi Arabia.

Saudi Rowa'a application targets foreign tourists and displays all tourist sites such as restaurants, museums, places of entertainment, and events that are held in these sites and linking these places to their locations in Google Maps. We conducted a search looking for applications and websites related to tourism in Saudi Arabia. We found many applications such as **Saudi visit, Wafy and KSA direction website** that will be discussed in the following section.

2.2 Related work

2.2.1 Review of Relevant Work

In recent years, Saudi Arabia has turned to tourism, and due to the great demand for it, several applications and websites have been proposed in this field, the most famous of which are the Visit Saudi, Trip Advisor, Wafy apps and KSA direction website that have been seen to find out what they contain in terms of advantages and what is missing from them.

2.2.1.1 Directions KSA

Is a Website that provides detailed information with pictures, and most cities have their hotels, restaurants, and events defined and displayed, in addition to the best time to visit. Moreover, this website has many tabs and sub-tabs that includes news, adventure and exploration, shopping, entertainment, cuisine, hotels and resorts, destination, and print edition.

This site contains a set of services that are presented in different tabs as shown in figure 2-1 (https://directionsksa.com/en, 2020).

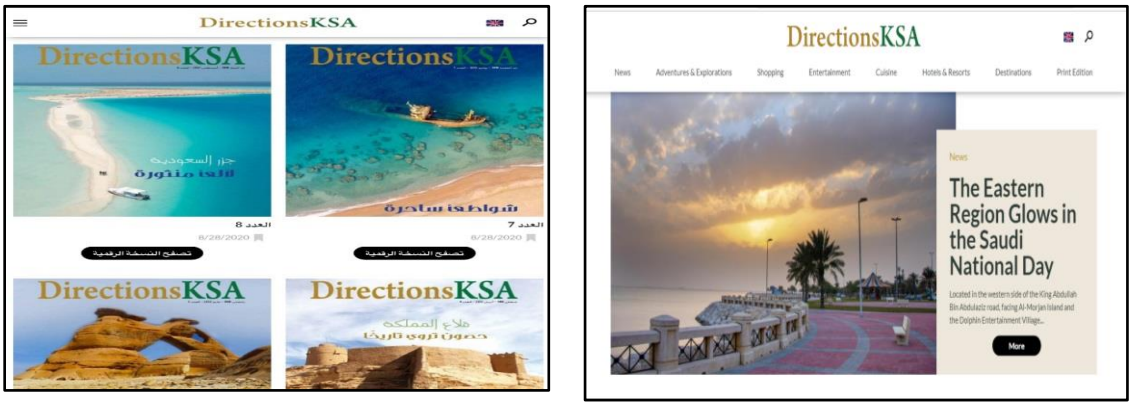


Figure 2-1: snapshots of the direction KSA website

Our Findings

- The user interface is in Arabic and English.
- Attractive design, easy navigation, and relevant content.
- It displays the places that the tourist needs.
- Displays the latest events in the Kingdom of Saudi Arabia.

- The website has many functions to help tourists and visitors to discover relevant content.
- Trendy, intuitive design and user experience.
- Relevant, authoritative website content.

Table 2-1: characteristics of directions KSA website

Website name	Directions KSA
Website URL	https://directionsksa.com/en
Platform	Website
Language	Arabic/English
Author	-
Year	2020

2.2.1.2 Wafy Application

Wafy application is a very interesting app that contains articles for tourist areas and attractions. It is characterized by displaying places and locating cities. However, it does not provide a reservation service in restaurants or hotels, just providing the geographical location. This app also provides recommended events, and it is also possible to book these events (Wafy Networks for Information Technology Travel & Local, 2019).

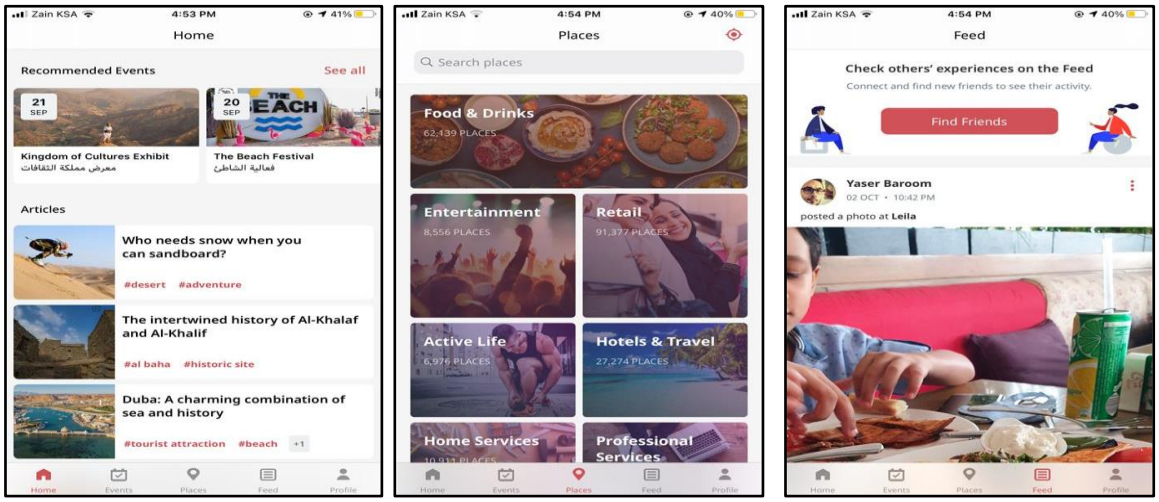


Figure 2-2: snapshots of the wafy application

Our Findings

- More wonderful application easy to use and highly efficient.
- Easy to use.
- Flexibility (three main mobile operating systems – IOS, Android, and Windows).

- App speed against functionality and resolution.
- The events are well organized according to cities in Saudi Arabia.

Table 2-2: characteristics of wafy application

App name	Wafy Networks for Information Technology Travel & Local
Platform	Android App – IOS – Windows
Language	Arabic/English
Author	-
Year	2019

2.2.1.3 TripAdvisor app

As for the TripAdvisor app, it also contains several benefits that serve the tourist. For example, it contains reservations of airlines, hotels and etc. at different prices. Additionally, it can provide the ability to view the menu by clicking on the restaurant's website, and car rental service with accurate vehicle details.

It also contains the idea of creating a trip for the user in which the places he wants to visit are identified, and it is also possible during the search that he can filter places according to his trip, for example as entertainment and games, shopping, restaurants and drinks, nature and parks, heritage places, boat trips, and water sports. (TripAdvisor app, 2020)

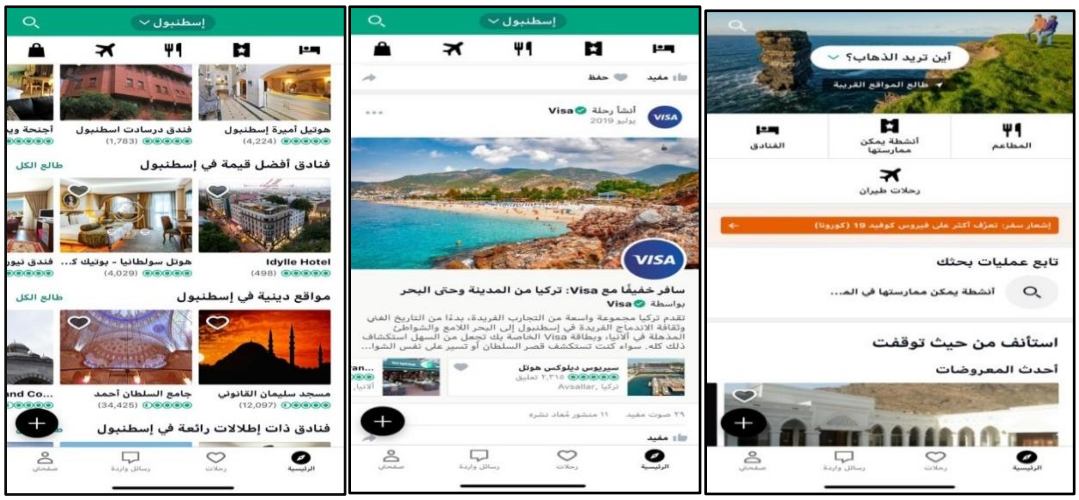


Figure 2-3: snapshots of the TripAdvisor application.

Our Findings

- Fast loading screens are vital.
- Easy to navigate.

- App has eye-grabbing color schemes are going to pull visitors.
- Contains reservations (airline tickets, hotels, restaurants, sea trips).
- Contains a car rental service with accurate details such as the size of the car or its price and does it include the warranty and other details.
- Contains the idea of creating a trip for the user in which the places he wants to visit are identified, and it is also possible during the search that he can filter places according to his trip.

Table 2-3: characteristics of Trip Advisor application

App name	**TripAdvisor app**
Platform	Android App – IOS – Windows
Language	English / Arabic
Author	-
Year	September 23, 2020

2.2.1.4 Visit Saudi

"Saudi Tourism App for Mobile phones and Smart Devices" is the official interactive platform, which is supervised by the Saudi Commission for Tourism and National Heritage (SCTNH). The App works as a tourist guide for all the tourism sites, restaurants, shopping malls, theme parks, hotels, beaches, museums, and gardens supported by photos. This guide offers a lot of features that are of interest to tourists and contains many tourist services such as hotel booking, flight reservation, an updated event guide, and offers maps of tourism places to be accessed easily (google play app, 2020).

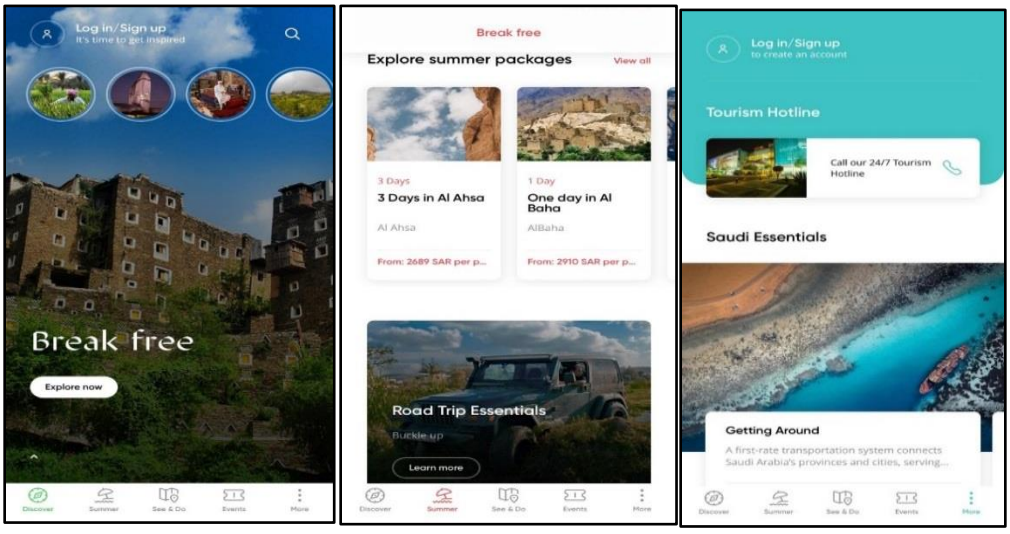


Figure 2-4: snapshots of the Visit Saudi application

Our Findings

- It enables the tourist to create a personal account. All information and preferences of the tourist are synchronized across all application platforms.
- The App works as a tourist guide for all the tourism sites, restaurants, shopping malls, theme parks, hotels, beaches, museums, and gardens.
- Provide updated event guide.
- Offers maps of tourism places to be accessed easily.

Table 2-4: characteristics of Visit Saudi application.

App name	Ministry of Tourism of Saudi Arabia Travel & Local(Visit Saudi)
URL	https://www.visitsaudi.com/ar
Platform	Android App – IOS – Windows
Language	English /Arabic
Author	The Saudi Commission for Tourism and National Heritage (SCTNH).
Year	October 6, 2020

2.2.2 Relationship between the Relevant Work and Our Own Work

In this section we will Highlight the uniqueness of our project and its relation to others, as shown in a Table 2-5.

Table 2-5: comparison between the Relevant Work and our Application

Features	Directions KSA	Wafy APP	Trip Advisor	Visit Saudi	Saudi Rowa'a
Stimulate and promote tourism	Yes	Yes	Yes	Yes	**Yes**
Supporting tourism investment	Yes	Yes	Yes	Yes	**Yes**
Creating a trip	No	No	Yes	Yes	**Yes**
The possibility of reservation	No	No	Yes	Yes	**Yes**
Tourist guide for all the tourism sites	Yes	Yes	Yes	Yes	**Yes**
Providing explanations, presentations, and instructions	No	No	No	No	**Yes**
Providing tourism facilities	Yes	Yes	Yes	Yes	**Yes**
Meet the individual tourist's desires	No	No	No	No	**Yes**
Access to productive families	No	No	No	No	**Yes**
The possibility of renting	No	No	No	No	**Yes**
job opportunities	No	No	No	No	**Yes**

The terms below explain the features used in the comparison Table 2.5 above:

Stimulate and promote tourism in the Kingdom: this feature provides information detailed with pictures about hotels, restaurants, and events.

Supporting tourism investment in the Kingdom: provide discoveries, events and provides recommended events.

Create a trip: this feature provides the ability to create a custom trip for the tourist in which the places he wants to visit are specified, and the application can filter places according to his desire.

The possibility of reservation: this feature contains reservations (airline tickets, hotels, restaurants, sea trips) at different prices according to the tourist, including expensive, medium and cheap.

Tourist guide for all the tourism sites: that contains articles for tourist areas and attractions.

Providing explanations, presentations, and instructions: the application provides explanations, presentations, and instructions about the cultural and natural heritage areas in the Kingdom of Saudi Arabia.

Providing tourist facilities: the application contains reservations (airline tickets, hotels, restaurants, cruises) at different prices, including expensive, medium and cheap, as well as restaurants.

Meet the individual tourist's desires: communicate with a lot of tour guides easily and continuously to access a wide variety of tourist attractions, facilities and services by meet the tourists' requirements in an atmosphere of security, fun and excitement. Additionally, the tourists can create a customized trip according to their budget.

Access to productive families: it serves some group of society (productive families) to increase their income by providing Saudi popular dishes to foreign tourists to spread the culture of Saudi food.

The possibility of renting: it provides an opportunity for real estate owners to rent out their homes. The application also contains a car rental service with accurate details such as the size of the car and its price and does it include the warranty and other details. Additionally, it provides information about car rental stores.

Job opportunities: it is offered to university youth and recent graduates. A job opportunity that giving them experience and material benefit.

2.3 Summary

In conclusion, in this chapter, we reviewed a summary of four studies, consisting of a website entitled Directions KSA, and three applications with the following titles Wafy Application, Trip Advisor, Visit Saudi. We found that most of these studies have few services and features, while Saudi Rowa'a application provides quick access to tourism information and serve foreign tourists. Moreover, it provides opportunities for some groups of society, such as productive families, tour guides and property owners to increase their income and benefit from tourism in the kingdom of Saudi Arabia.

Chapter 3: System Analysis

3.1 Introduction

In this chapter, we review the requirements of the proposed system. To this extend, we conduct a poll to collect information about users' opinions.

Next, we discuss the functional and non-functional requirements of the proposed system. We define them in the requirement description section. Then, we describe the behavior of system functions by designing the use case. At the end of this chapter, we discuss development methods for the system development.

3.2 Analysis of Existing Systems

Before designing and implementing the system, the requirements have to be specified in detail to make the analysis and design phase possible (Requirements Specification, 2020).

We can use various methods to gather information and opinions about the user on a topic, such as interviews and surveys. In this project, we made a questionnaire for foreign tourists to determine their suggestions for developing the application and making it better. Also, we conducted three types of interviews for a tour guide, productive families, and property owners.

A. <u>The questionnaire was presented to foreign tourists.</u>

We received 19 responses to this questionnaire.

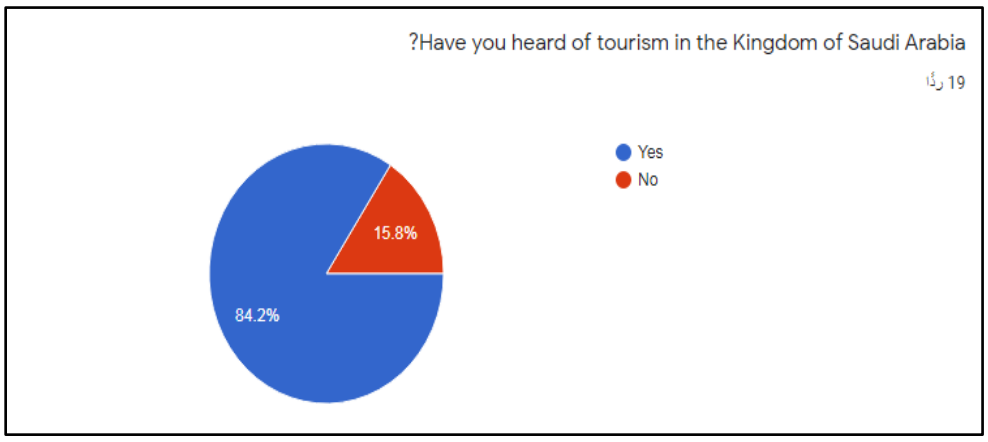


Figure 3–1: survey of foreign tourists (Question 1)

Figure 3-1 indicates that 84.2% of the participants heard about tourism in the kingdom of Saudi Arabia.

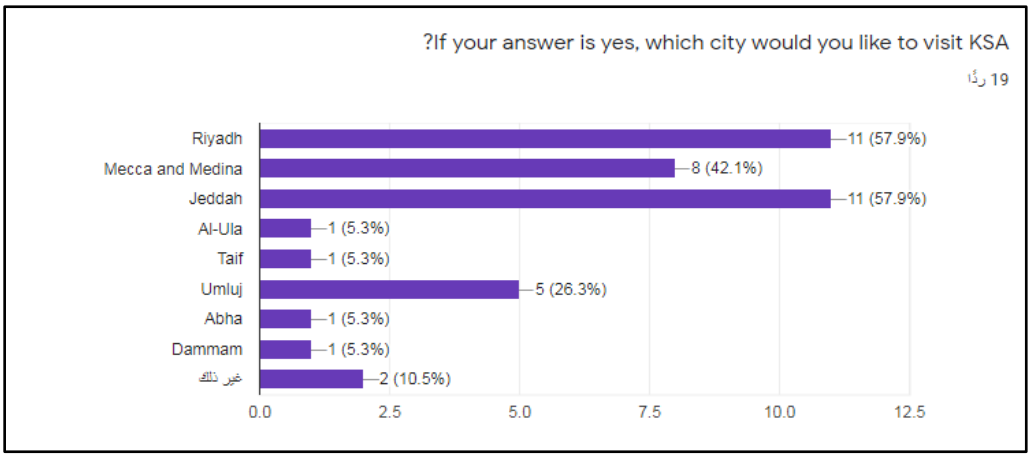


Figure 3–2: survey of foreign tourists (Question 2)

Figure 3–2, indicates that the percentage of participants who desire to visit Riyadh and Jeddah is the highest, at 57.9%.

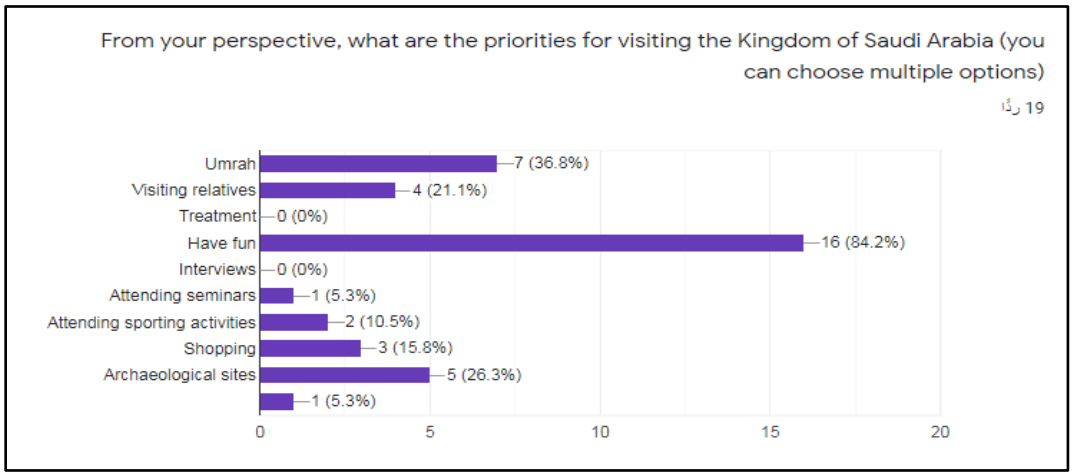


Figure 3–3: survey of foreign tourists (Question 3)

In Figure (3-3), the result shows that the percentage of participants willing to visit the Kingdom for leisure travel is the highest, at 84.2%.

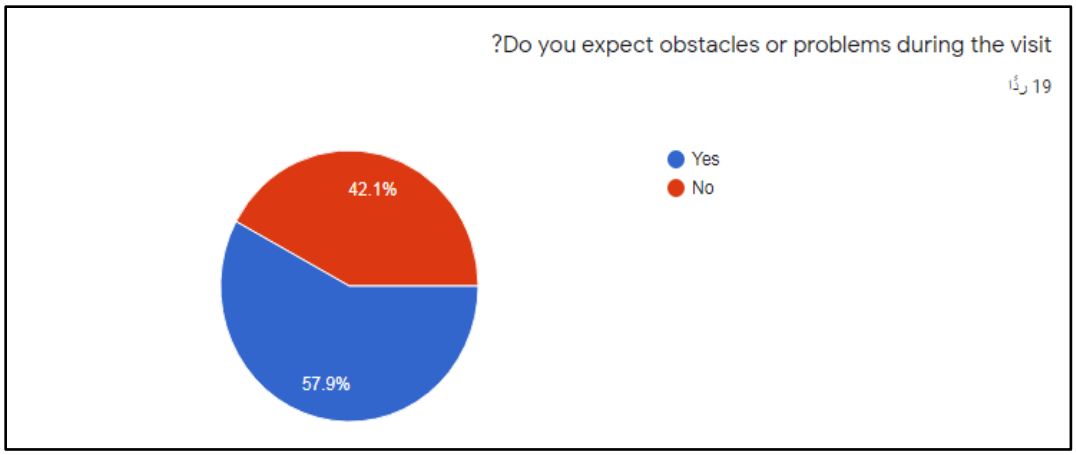


Figure 3–4: survey of foreign tourists (Question 4)

The result in figure (3-4) shows that 57.9% of participants expect difficulties when visiting the Kingdom for tourism.

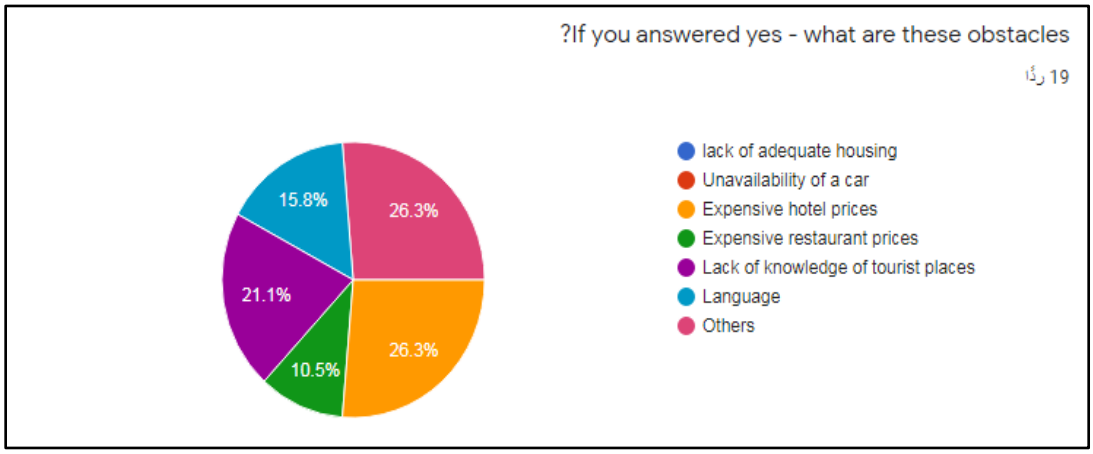


Figure 3–5: survey of foreign tourists (Question 5)

The result shown in figure (3-5), shows that the higher percentage of participating expect difficulties represented by the rise in hotel prices and lack of knowledge of information about tourist places in the Kingdom of 26.3%.

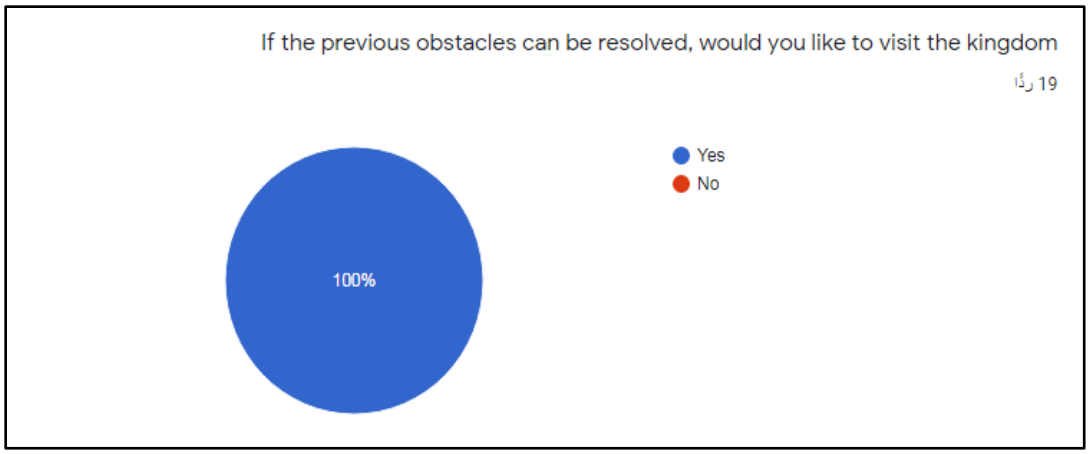


Figure 3–6: survey of foreign tourists (Question 6)

The result in figure (3-6) shows that if the difficulties presented in Figure (3-9) are solved, the highest percentage of participants decided to visit the Kingdom of Saudi Arabia at 100%.

B. <u>The first interview questions for property owners in Saudi Arabia.</u>

Figure 3–7: interview of property owners (Question 1)

When asking property owners about the opportunities that they can offer to tourists, the answer was to provide comfortable transportation, upscale restaurants, and tourist places, as well as the possibility of providing breakfast for tourists, in addition to the possibility of accompanying them to the ancient sites.

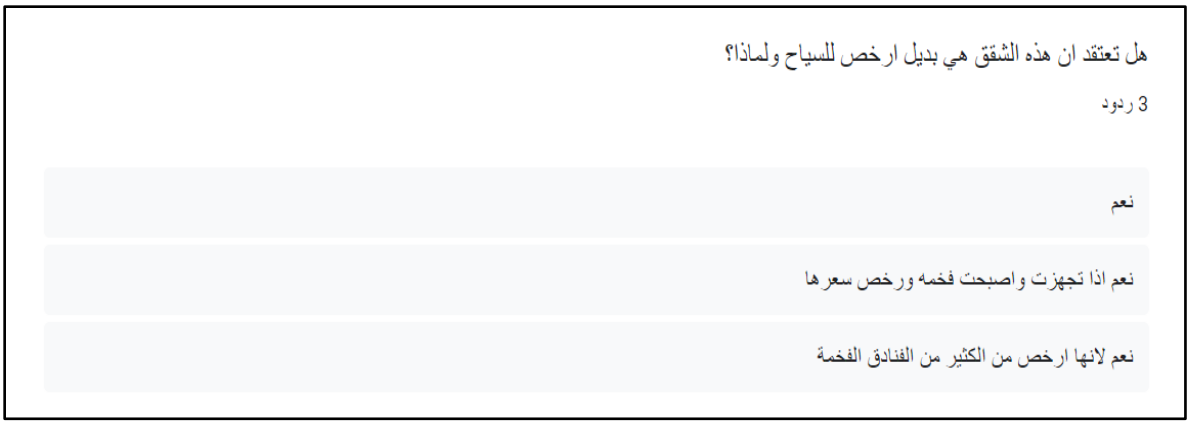


Figure 3–8: interview of property owners (Question 2)

When asked about the properties they own and how they can become a cheap alternative to hotels, they welcome the ideas that were put forward with the premise of preparing an apartment.

Figure 3–9: interview of property owners (Question 3)

When we asked the property owners about the possibility of preparing apartments and presenting them to tourists, they answered yes.

Figure 3–10: interview of property owners (Question 4)

When asked about the amount of surplus in apartments in Figure (3-10), they replied that there are currently many apartments available due to foreigners' travel from Saudi Arabia.

C. <u>The second interview questions for tour guides.</u>

Figure 3–11: interview of tour guides (Question 1)

We meet with tour guides and we asked them about the services they would provide to the tourists, they answered that can they provide comprehensive tourism trips, accommodation, meals, and archaeological sites.

Figure 3–12: interview of tour guides (Question 2)

When asking the tour guides for the tourist areas in the Kingdom, they mentioned some sites, such as (The Jazan Mountains, Aseer, Farasan Island, Al-Wajh, Umluj, Alula, Duba, and Magna).

Figure 3–13: interview of tour guides (Question 3)

When we asked the tour guides about the obstacles they face, they said that they find it difficult to move around and provide housing in isolated tourist places and the lack of cooperation of some concerned authorities.

Figure 3–14: interview of tour guides (Question 4)

We asked tour guides about the most attractive tourist areas, and they said that the most attractive places are archaeological sites and Sea islands in winter and high places in summer.

D. the third interview questions for productive families.

Figure 3–15: interview of productive families (Question 1)

When we asked the productive families about the extent to which their wanted to support tourism, they answered that many families want to support tourism and they support the idea.

Figure 3–16: interview of productive families (Question 2)

When we asked productive families embody the Saudi culture and spread it to foreign tourists through food, they answered by implementing and displaying the traditional food for which the regions of the Kingdom are famous by offering breakfast, lunch or dinner meals.

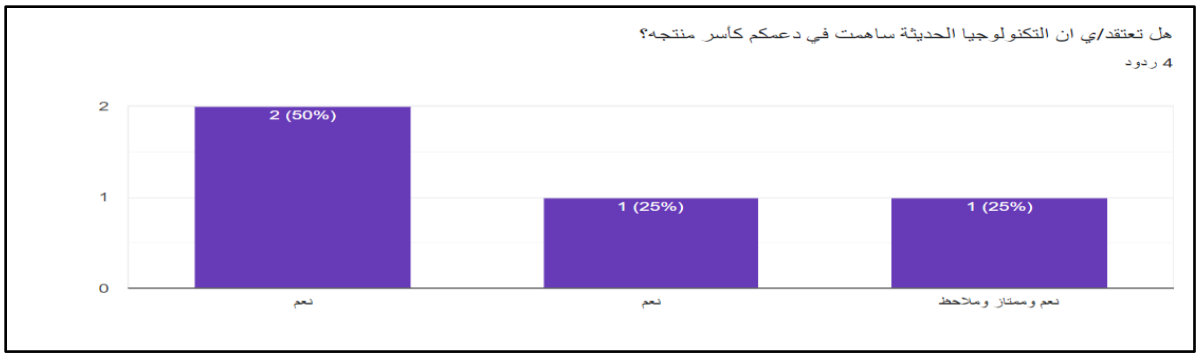


Figure 3–17: interview of productive families (Question 3)

When we asked productive families did technology contribute to their support. So, the largest percentage of those agree that modern technology helped in supporting them as productive families.

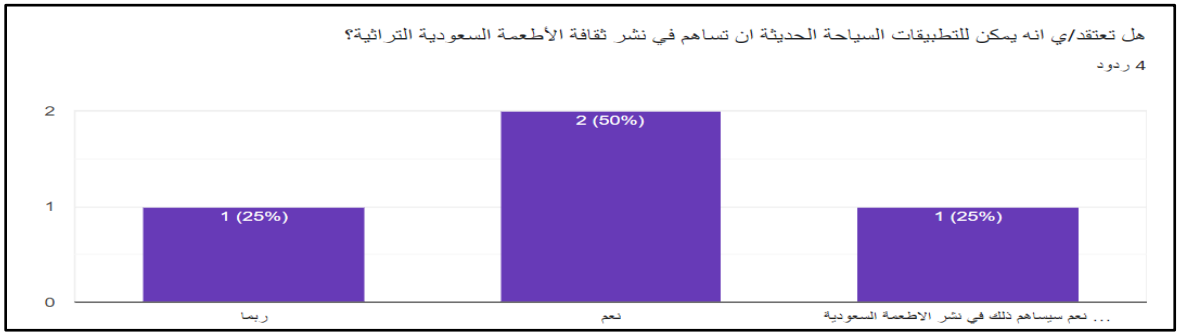


Figure 3–18: interview of productive families (Question 4)

When productive families in the Figure (3-18) were asked whether tourism applications could contribute to the spread of Saudi food, 50% said yes.

Figure 3–19: interview of productive families (Question 5)

If the opportunity we are given to productive families, they would provide, based on what they mentioned in Figure (3-19), many traditional foods for each region in the Kingdom of Saudi Arabia.

Summary of the first survey results submitted to foreign tourists.

The percentage of women in this questionnaire is 89.5%, so it is necessary to consider female interest while collecting information about tourist attractions, such as beauty and shopping centers. It accounts for 63.2% of the age group (20–30). This means we need to focus on tourist attractions suitable for this age group, such as cinemas and restaurants. The results show that most attendees are university graduates accounted for 57.9%. moreover, 84.2% are aware of Saudi Arabia's tourism industry, while 57.9% want to visit Riyadh and Jeddah.

We noticed through the questionnaire that 84.2% of people want to travel to the Kingdom for leisure and tourism. 57.9% of people hope that they will encounter difficulties when visiting the kingdom. Therefore, these difficulties must be understood and overcome. 26.3% of people think that the lack of adequate housing will encounter difficulties. Therefore, our project provides a set of solutions that can overcome these difficulties for foreign tourists.

Summary of the personal interview of the property owners

From the interview, it became clear to the teamwork that the real estate owners agreed to provide services to tourists, in addition to providing and equipping apartments for rent.

Summary of the personal interview for the tour guides

From the interview, it became clear to the teamwork that the tour guides agreed to provide services to tourists, in addition to choosing some interesting attractions in the Kingdom and advise tourists to visit them.

Summary of the personal interview for Productive families

From the interview, it became clear to the teamwork that the productive families agreed to provide services to tourists, in addition to embody the Saudi culture and spread it to foreign tourists through food, by providing and selling the traditional products for which the regions of the Kingdom are famous by offering breakfast or lunch meals or serving traditional folk dishes.

3.3 Requirements Elicitation

The requirements are the descriptions of the system services and constraints.

3.3.1 Functional Requirements

Functional requirements are the functions or features that must be included in any system to satisfy the business needs and be acceptable to the users. Based on this, the functional requirements that the system requires are as follows:

A. The application should provide **The Tourist** with the following functions:

- Register in the system.
- System login & logout
- View detailed information in pictures or video about tourism places in Saudi Arabia.
- The possibility of creating a customized trip for the tourist in which the places he wants to visit are determined and the application can filter places according to his\her desire.
- The possibility of reservation by providing links and this feature contains (transportations, hotels, restaurants, events).
- access to a tour guide for all tourist sites, which contains information about areas and attractions. In addition, guidance on cultural and natural heritage areas in the Kingdom of Saudi Arabia.

B. The application should provide **Property Owners** with the following features:

- register in the system.
- view detailed information about the Kingdom of Saudi Arabia with pictures or videos.
- participate in Saudi Rowa'a by providing services.
- view details of the information about the apartment in pictures with its location.
- possibility of renting out real estate.

C. The application should provide **Productive Families** with the following features:

- register in the system.
- view detailed information about the Kingdom of Saudi Arabia with pictures or videos.

- participate in Saudi Rowa'a by providing services.
- offer a menu of foods.

D. The application should offer **Tour Guides** the following features:

- register in the system.
- view detailed information about the Kingdom of Saudi Arabia with pictures or videos.
- participate in Saudi Rowa'a by providing services.
- offer services as a tour guide.

3.3.2 Non-Functional Requirements

Non-functional requirements define system behavior, features, and general characteristics that affect the user experience. How well non-functional requirements are defined and executed determines how easy the system is to use and is used to judge system performance. Non-functional requirements are product properties and focus on user expectations (Ian, 2015).

- User friendly.
- System should provide better accuracy.
- To perform with efficient throughput and response time.
- The system must respond quickly in real-time.
- The app should run on all Android-based devices.
- System must be always updated.
- The system should encrypt all the data inside the database.

3.3.3 User Requirements or Domain requirements

Domain requirements are important because they often reflect the fundamentals of the application domain. If these requirements are not satisfied, it may be impossible to make the system work satisfactorily (Ian Sommerville , 2008).

Users should have: Smart phone with Android system, online Wi-Fi connection and installed application.

3.4 Requirements Specification

Use-cases are a scenario-based technique in the UML which identify the actors in an interaction and describe the interaction itself. A set of use cases should describe all possible interactions with the system.

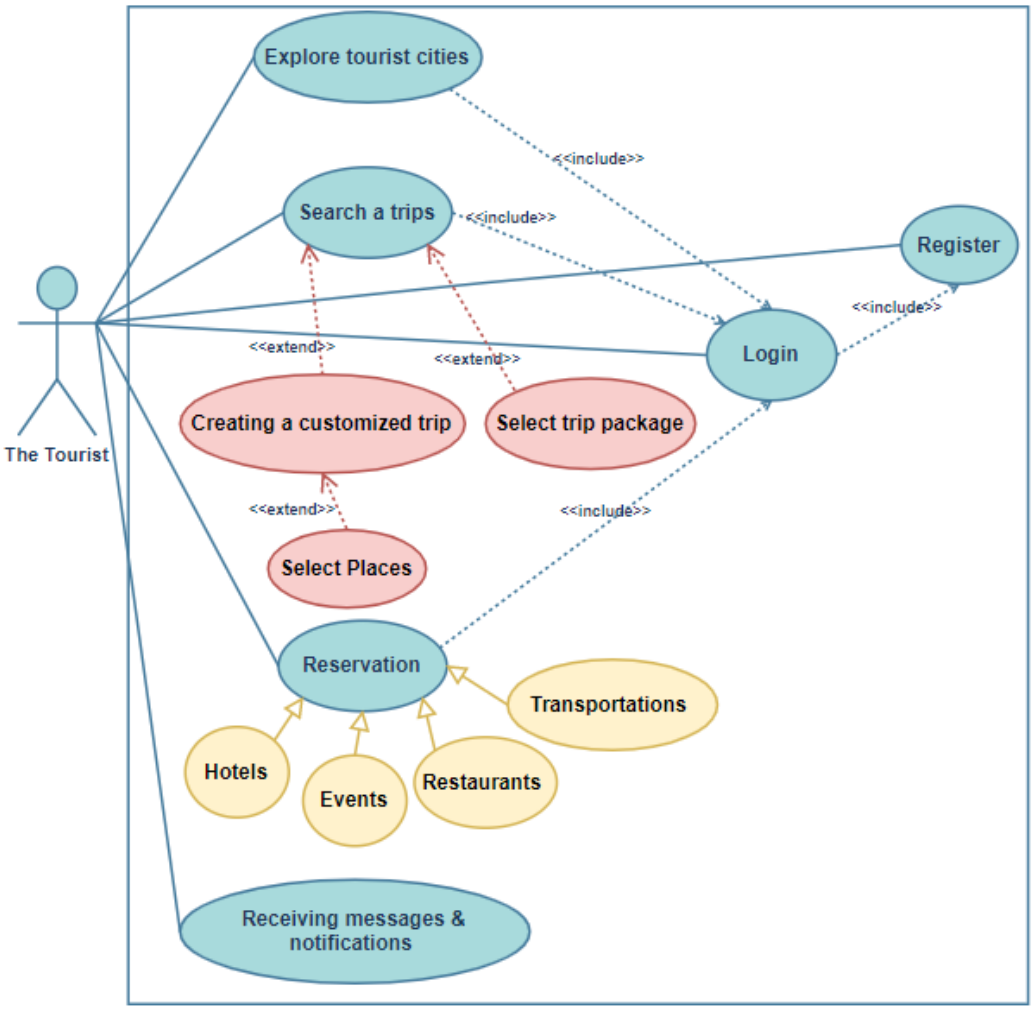


Figure 3–20: tourist use case diagram.

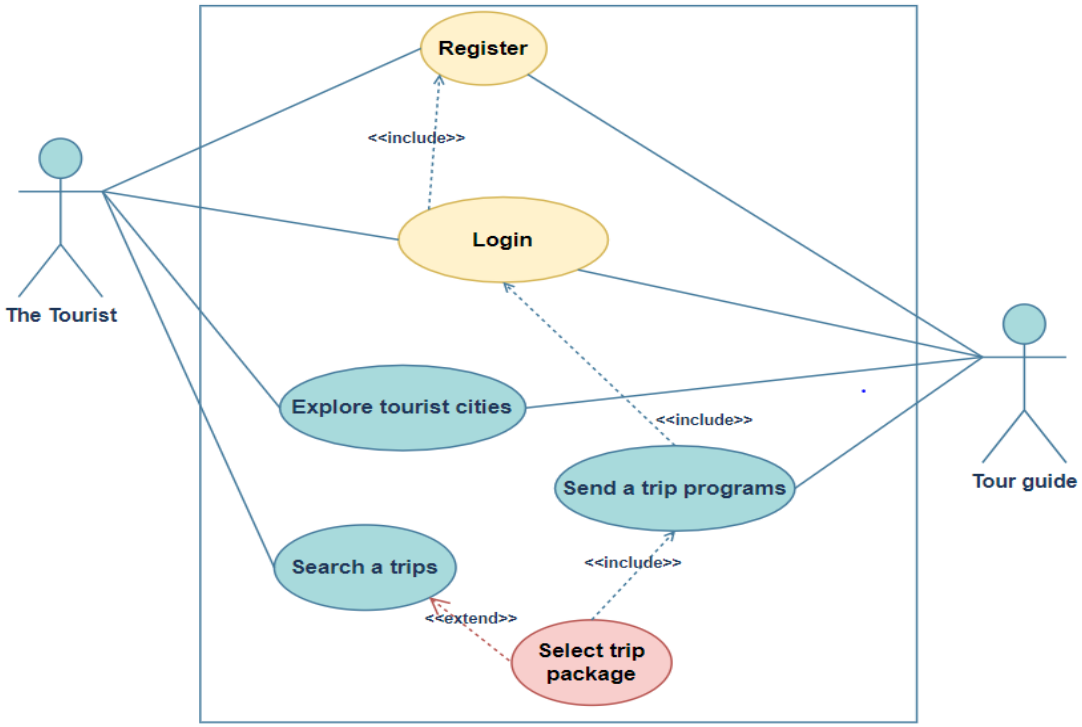


Figure 3–21: tourist with tour guide use case diagram

Figure (3-21) shows how tourists interact with tour guides and how to use the system to follow up their operations.

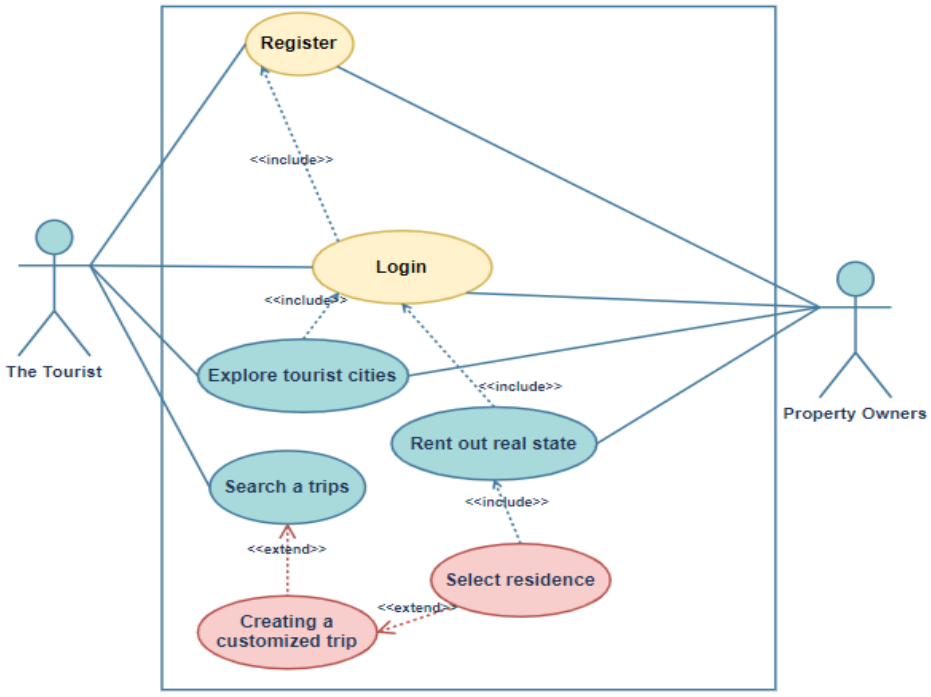


Figure 3–22: tourist with property owner use case diagram

Figure (3-22) shows how tourists interact with property Owner and how to use the system to follow up their operations.

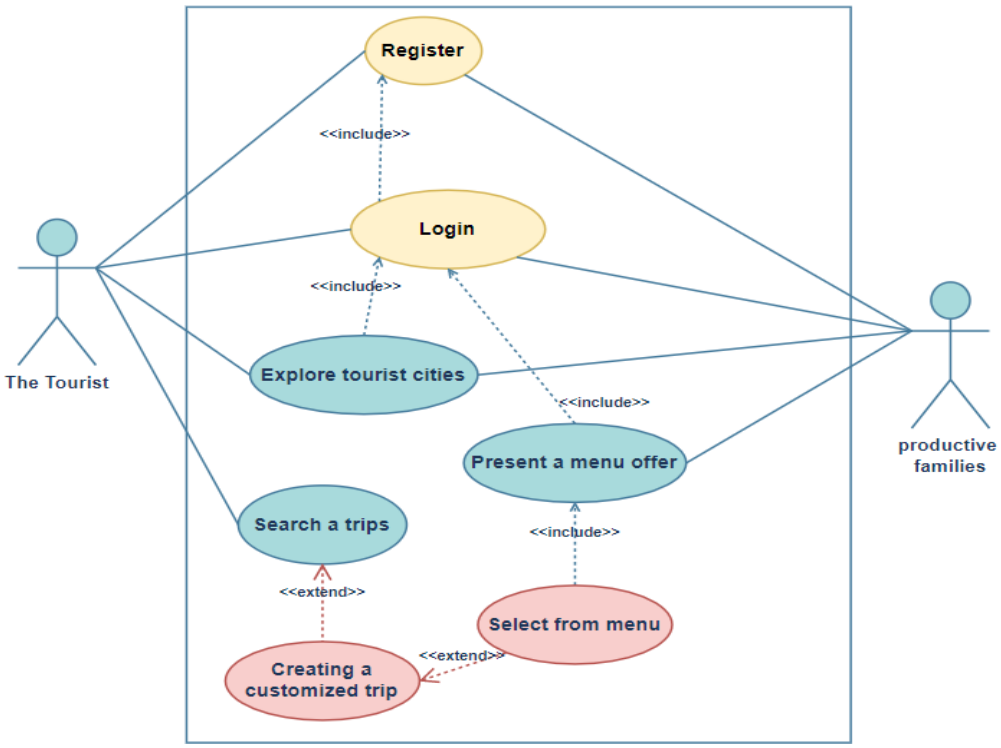


Figure 3–23: tourist with productive family use case diagram

Figure (3-23) shows how tourists interact with productive families and how to use the system to follow up their operations.

Table 3-1: login use case description.

Use case name	Login
Actor	The Tourist, The Property Owners, Productive Families, Tour Guides.
Scope	When login to the system.
Description	This use case describes how users (The Tourist, The Property Owners, Productive Families, Tour Guides) log into the app which makes them authorized to use their privileges.
Precondition	(The Tourist, The Property Owners, Productive Families, Tour Guides) must be registered.
Basic Flow	The use case begins when the system requests the username and password of the actor. The user submits username and password on the login screen. The system validates entered username and password and logs the user into system. End of use case.
Exceptions	If the user enters wrong data, the system will send a message to correct the

	wrong input.

Table 3-2: register use case description.

Use case name	Sign up
Actor	The Tourist, The Property Owners, Productive Families, Tour Guides.
Scope	User's register to the system.
Description	This use case describes how users (The Tourist, Property Owners, Productive Families, Tour Guides) can create account.
Precondition	None.
Basic Flow	1. The new user press (sign up) button. 2. System replies with an interface for submitting all necessary data. 3. The user's inputs all necessary data and press (save) button. 4. The system sends registered data to database. 5. System responds with message “successfully registered”. 6. End of use case.
Exceptions	If the user enters wrong data, the system will send a message to correct the wrong input.

Table 3-3: search a trip use case description.

Use case name	Search a trip
Actor	The Tourist
Scope	User's register to the system and login the system.
Description	This use case describes how users (The Tourist) can search a trip.
Precondition	Users must be login.
Basic Flow	The user (The Tourist) press (login) button. If the user enters the username and password correctly, the system will display a new screen with the functions available in the app. The user clicks (search a trip) button. The user inputs all necessary data and press (save) button. End of use case.
Exceptions	If the user enters wrong data, the system will send a message to correct the wrong input.

Table 3-4: Explore tourist cities use case description.

Use case name	Explore tourists' places
Actor	The Tourist, The Property Owners, Productive Families, Tour Guides
Scope	User's register to the system and login the system.
Description	This use case describes how users (The Tourist, The Property Owners, Productive Families, Tour Guides) can Browse tourist places.
Precondition	Users must be login.

Basic Flow	The user press (login) button. If the user enters the username and password correctly, the system will display a new screen with the functions available in the program. The user clicks (Browse tourist places) button. The system will display Videos, presentations and written information. End of use case.
Exceptions	The system does not allow display of information without login.

Table 3-5: reservation use case description.

Use case name	**Reservation**
Actor	The Tourist.
Scope	User login the system.
Description	This use case describes how users (The Tourist) can make reservations for (Flights, Hotels, Cruises, Restaurants).
Precondition	User must be login.
Basic Flow	The user (The Tourist) press (login) button. If the user enters the username and password correctly, the system will display a new screen with the functions available in the program. The user clicks (Reservation) button. The user inputs all necessary data and press (save) button. System responds with message “successfully reservation”. End of use case.
Exceptions	If the user enters wrong data, the system will send a message to correct the wrong input.

Table 3-8: creating a customized trip use case description.

Use case name	**Creating a customized trip**
Actor	The Tourist.
Scope	User login the system.
Description	This use case describes how users (The Tourist) can customized trip.
Precondition	Users must be login.
Basic Flow	The user (Tour Guides) press (login) button. If the user enters the username and password correctly, the system will display a new screen with the functions available in the program. The user clicks (creating a customized trip) button. The user inputs all necessary data and press (save) button. System responds with message “successfully”. End of use case.
Exceptions	If the user enters wrong data, the system will send a message to

	correct the wrong input.

Table 3-9: renting out property use case description.

Use case name	Renting out property
Actor	Property Owner.
Scope	User login the system.
Description	This use case describes how users (Property Owner) submit a request to rent the property.
Precondition	User must be login.
Basic Flow	The user (Property Owner) press **(login)** button. If the user enters the username and password correctly, the system will display a new screen with the functions available in the program. The user's inputs all necessary data and press **(save)** button. System responds with “successfully message”. End of use case.
Exceptions	If the user enters wrong data, the system will send a message to correct the wrong input.

Table 3-11: send a trip program use case description.

Use case name	Send a trip program
Actor	**The tour guide**
Scope	User's register to the system and login the system.
Description	This use case describes how users (The tour guide) create a trip program and save it in database.
Precondition	Users must be login.
Basic Flow	The user (The tour guide) press **(login)** button. If the user enters the username and password correctly, the system will display a new screen with the functions available in the program. The user clicks **(create a trip program)** button. The user inputs all necessary data and press **(save)** button. End of use case.
Exceptions	If the user enters wrong data, the system will send a message to correct the wrong input

Table 3-12: present a menu offer use case description.

Use case name	Present a menu offer
Actor	Productive Families
Scope	User's register to the system and login the system.

Description	This use case describes how users (Productive Families) create a menu offer for The Tourist and save it in database.
Precondition	Users must be login and submit request.
Basic Flow	The user (Productive Families) press (login) button. If the user enters the username and password correctly, the system will display a new screen with the functions available in the program. The user clicks (create a menu offer) button. The user inputs all necessary data and press (save) button. End of use case.
Exceptions	If the user enters wrong data, the system will send a message to correct the wrong input.

3.5 Developmental Methodology

Agile methodology is a project management process that is mainly used for software development. In this process, requirements and solutions are developed through the joint efforts of self-organizing and cross-functional teams and their customers (Thesing , Feldmann, & Burchardt, 2021).

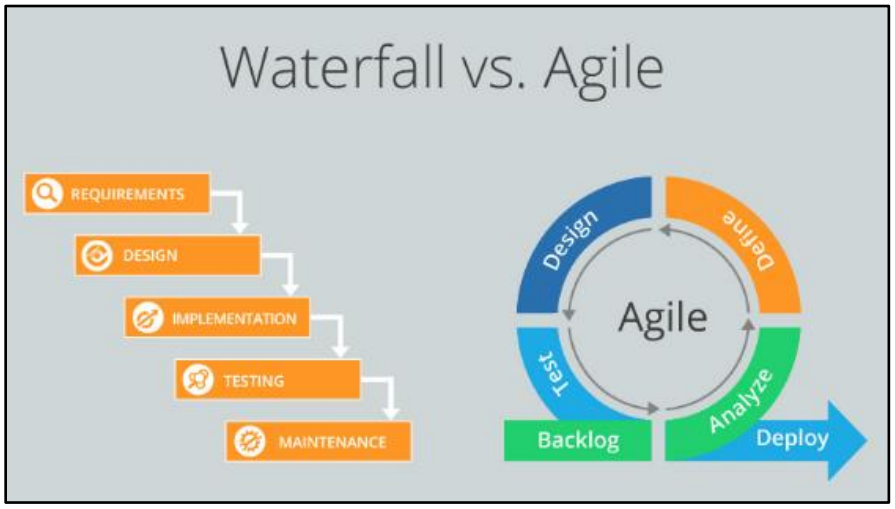


Figure 3–24: agile methodology

Agile methodology feature (mendix, 2014)

More visibility: it allows the key stakeholders involved in the project to have better visibility to ensure effective management of everyone's expectations.

High transparency: it enables various stakeholders to participate and fully participate in the entire project.

Allow early detection of problems and easy resolution: agile development focuses on clear visibility to ensure early decision-making, which is an important aspect of defining the success of any software development project.

Excellent quality: in agile and Scrum, this methodology ensures that all changes are supported and integrated into the current project, resulting in superior quality. Implementing agile and Scrum can bring huge results, thereby significantly improving product quality.

Cheap continuous integration and iterative release: by implementing this powerful method, companies will surely save money by participating with stakeholders, reducing risks, embracing and quickly entering the market.

Due to its adaptability, agile methodology is used to deliver more complex projects. It has established itself as a methodology that emphasizes collaboration, flexibility, continuous improvement and high-quality results.

Project constraints:

- fast internet connection.
- provide enough mobile storage space.
- availability of updated versions of mobile phones.

Describe the processing of data collected:

- emphasis on successful and integrated steps taken in order to ensure the achievement of the previously set goals.

Let's explore the steps we must take:

1. identify tourist attractions in the Kingdom of Saudi Arabia and collect data about them (Picture, video or spatial information).
2. communicate with hotels, restaurants and travel companies to facilitate tourist booking.
3. communicate with "productive family" members and determine what services they can provide tourists.
4. communicate with "property owners" who want to rent out houses to tourists.
5. prepare film materials to attract tourists.
6. prepare a series of courses and information about KSA historical and cultural relics and existing tourist areas and provide them to students to familiarize them with the information they need to help tourists.

3.6 Summary

Through this chapter, we introduced the results of the questionnaire to obtain detailed requirements of the new system because the data include functional and non-functional requirements as well as use case diagrams to help define the interaction between users and the system to implement new functions. Finally, we discussed the use methodology, agile method.

Chapter 4: System Design

4.1 Introduction

System design is an overview of all system-related peripherals to meet system requirements. In this chapter, we show the system architecture and structural static model. In addition, we show the dynamic model, which is a sequence diagram to show how participants interact with the system, and the data model shows the database design. Finally, design the user interface.

4.2 Architectural design

The system architecture is a small model of the entire system.

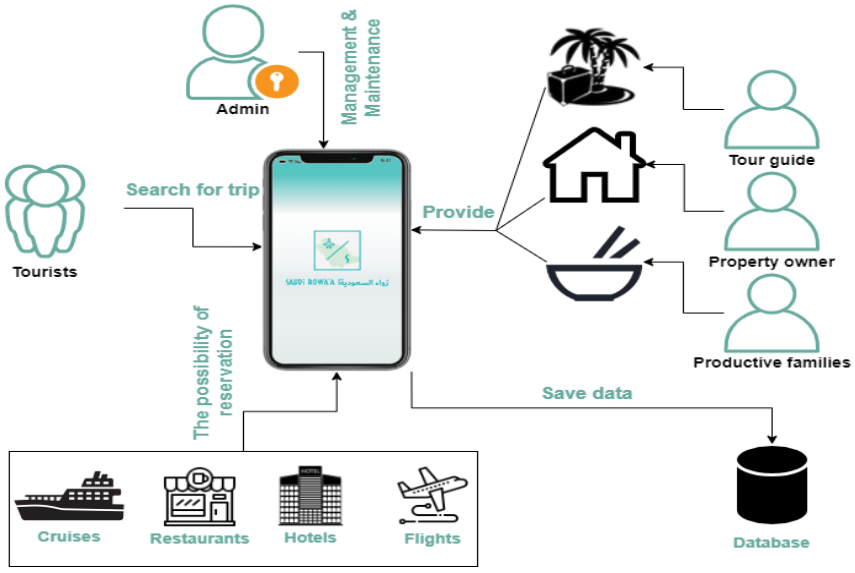


Figure 4–1: architectural design

4.3 Object Oriented Design

4.3.1 Structural Static Models

4.3.1.1 Class diagram

The class diagram is a static diagram. It represents a static view of the application. Class diagrams are not only used to visualize, describe, and document different aspects of the

system, but also to construct the executable code of the software application (Tutorialspoint,Purpose of Class Diagrams , 2020) .

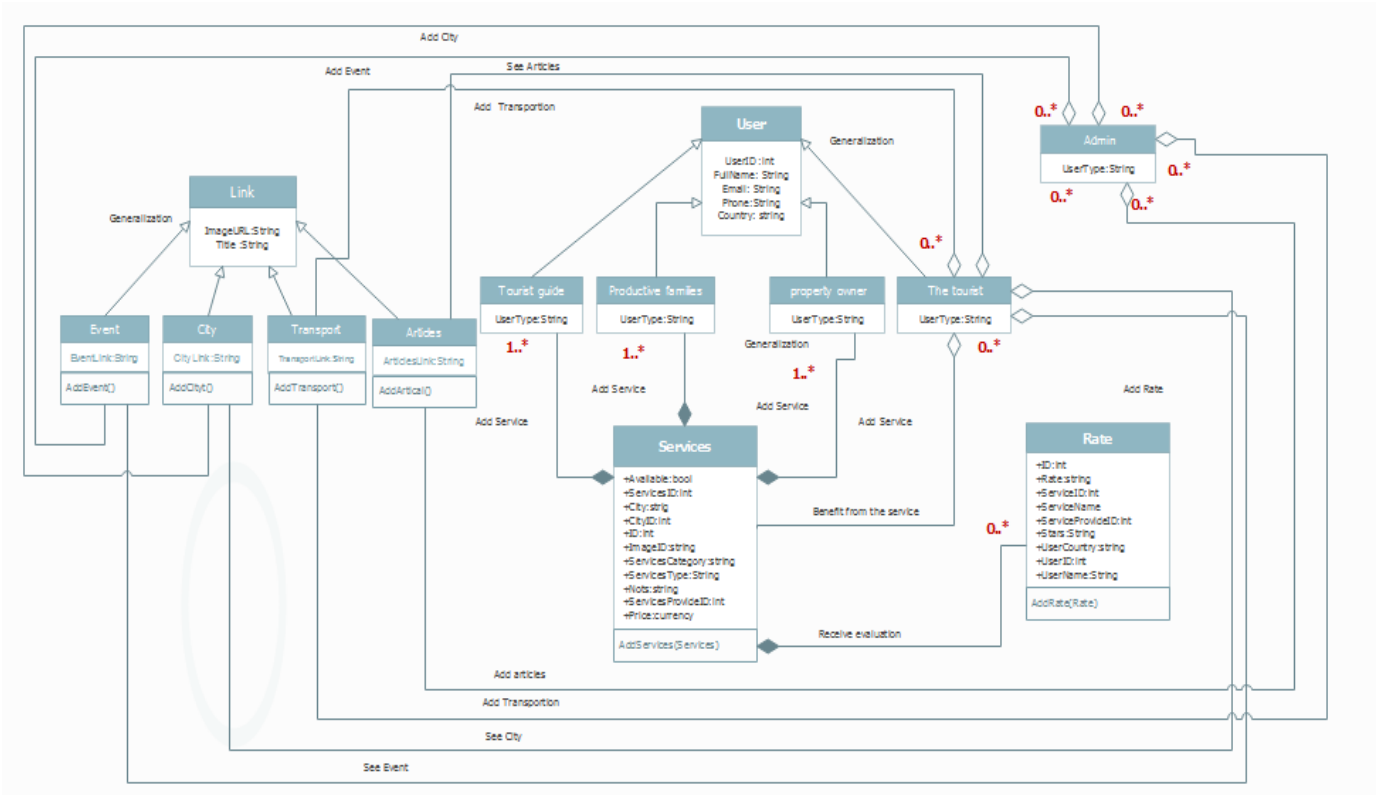


Figure 4–2: class diagram

An Entity-Relationship diagram (ERD) Graph could be a sort of flowchart that outlines how “entities” such as individuals, objects or concepts relate to each other inside a framework. ER Graphs are most regularly used to plan or investigate Relation databases within the areas of program building, commerce data frameworks, instruction and investigate. (lucidchart, 2015)

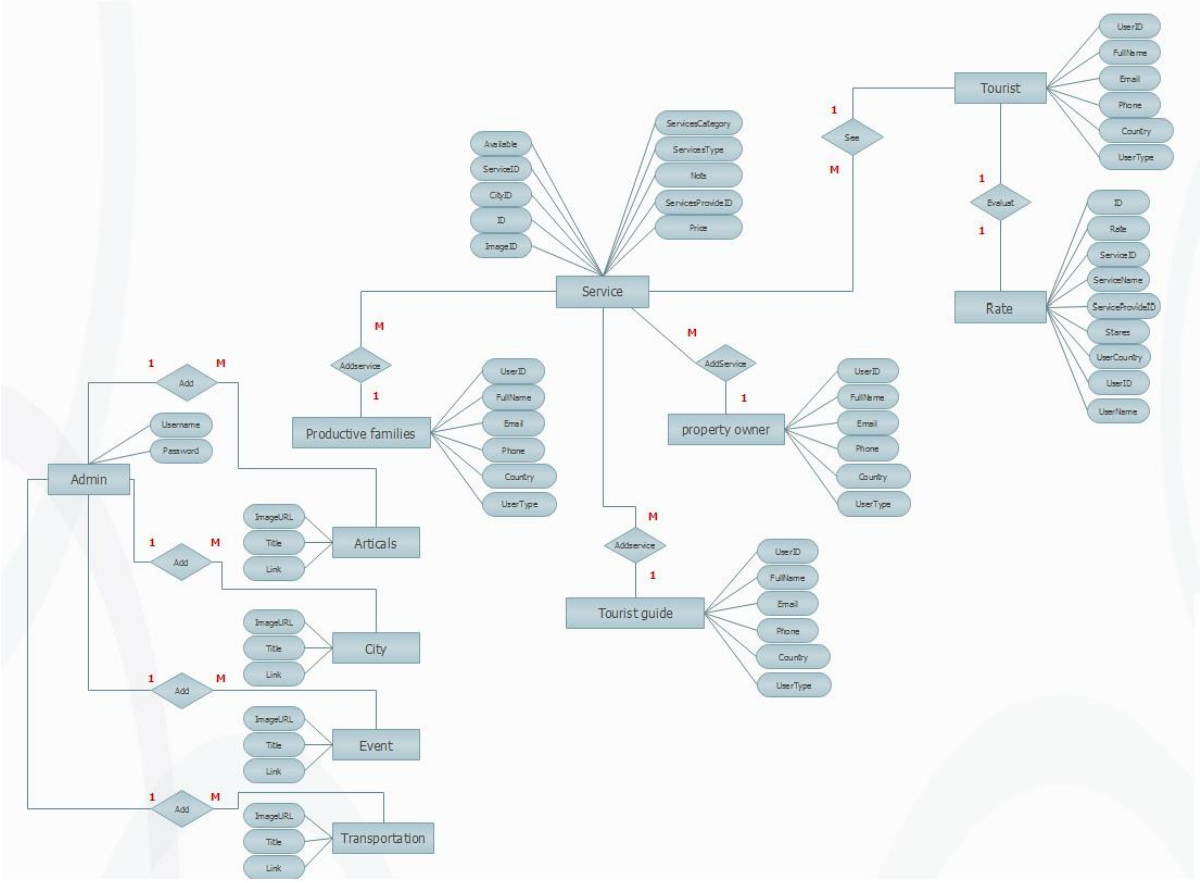


Figure 4–3: Entity Relationship Diagram ERD

4.3.2 Dynamic Models

4.3.2.1 Sequence diagrams

UML Sequence Diagrams are interaction charts that detail how operations are carried out. They capture the interaction between objects within the setting of a collaboration. Show how actors communicate and the order of their interaction represent by the time in details. (Paradigm, 2017).

For all users Sequence Diagrams

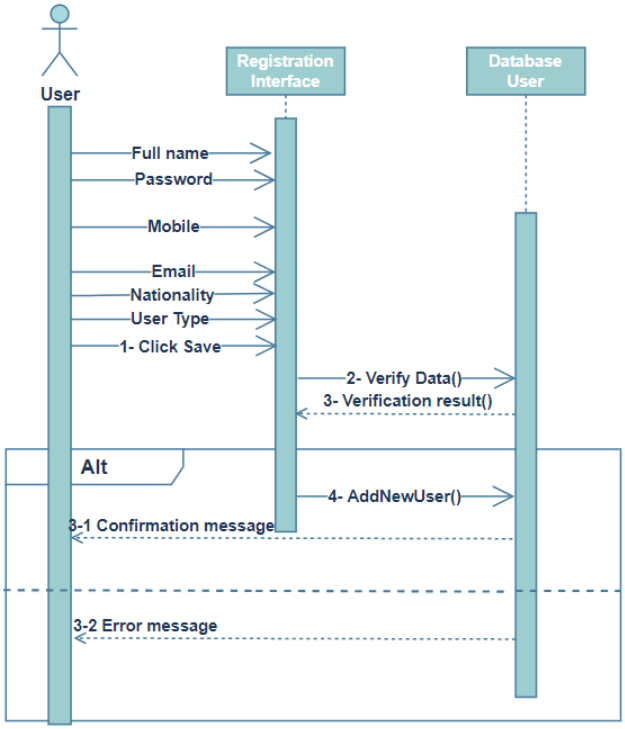


Figure 4–4: user register sequence diagram

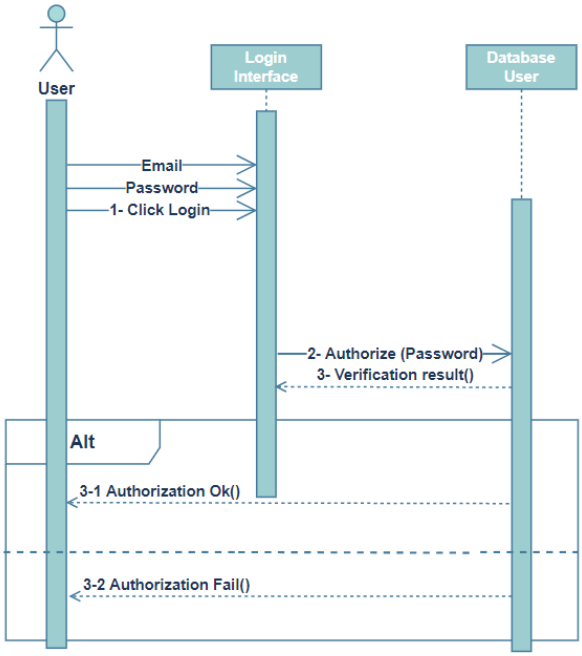


Figure 4–5: login sequence diagram

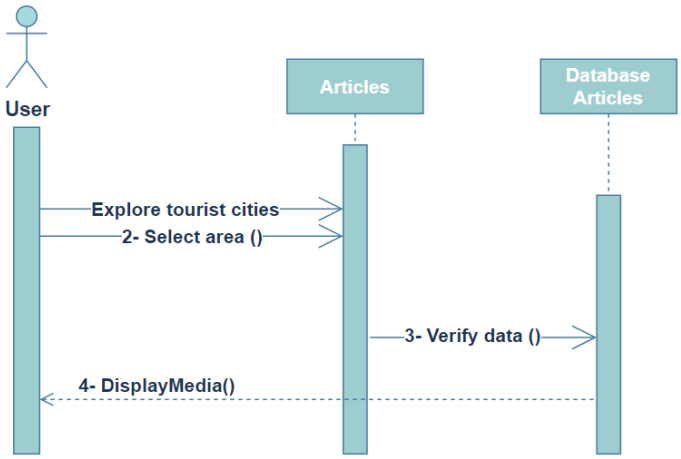


Figure 4–6: user explore cities sequence diagram

1. The Tourist Sequence Diagrams

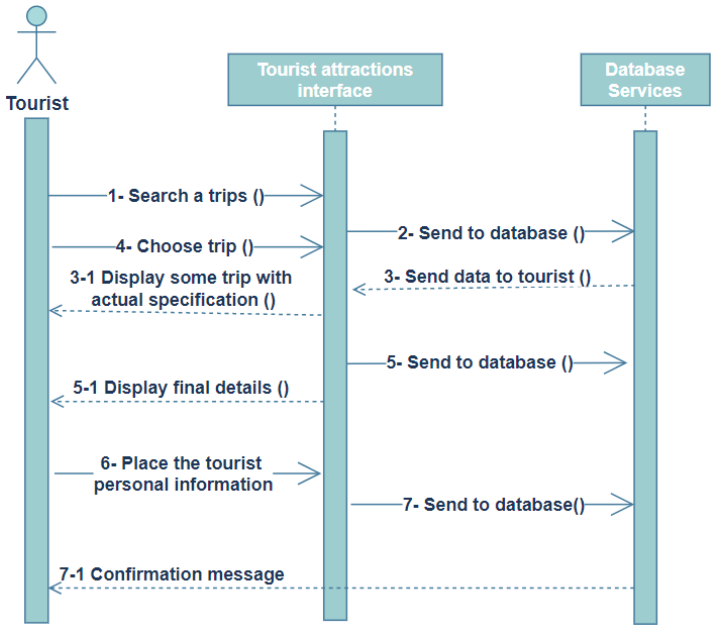


Figure 4–7: tourist searches a trip sequence diagram

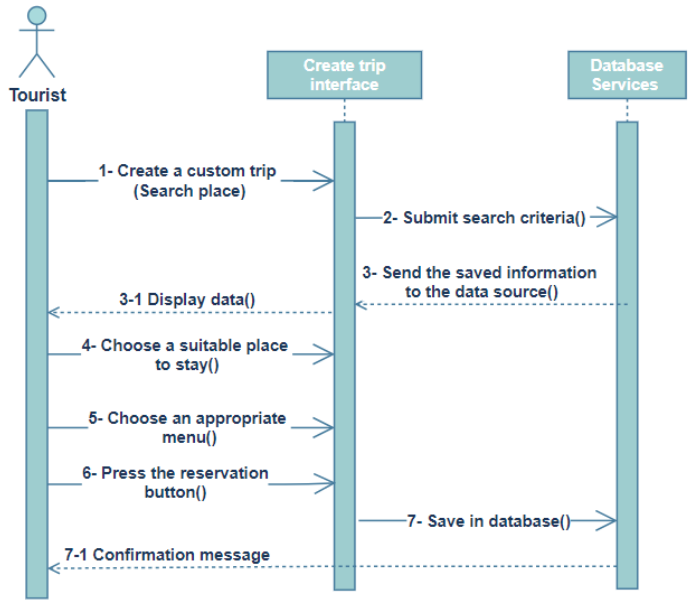


Figure 4–8: tourist create a custom trip sequence diagram

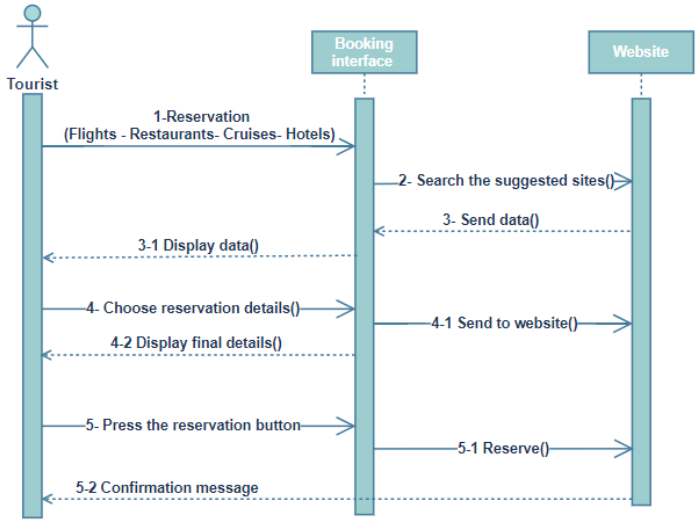


Figure 4–9: tourist reservations sequence diagram

2. Property owners

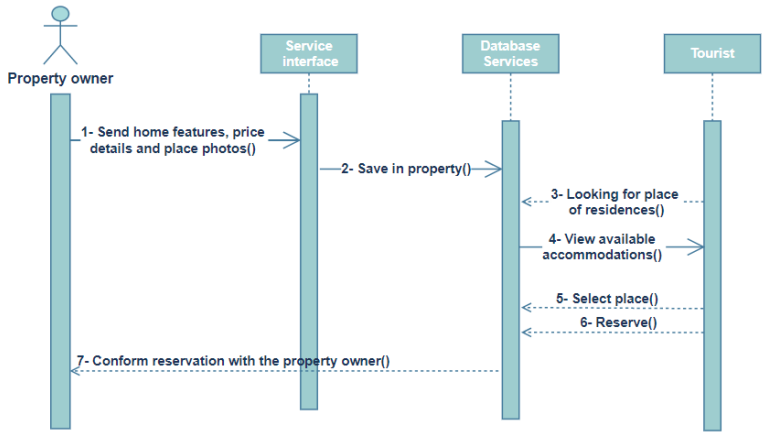


Figure 4–10: the property owner sends the property information to the database

3. Productive families

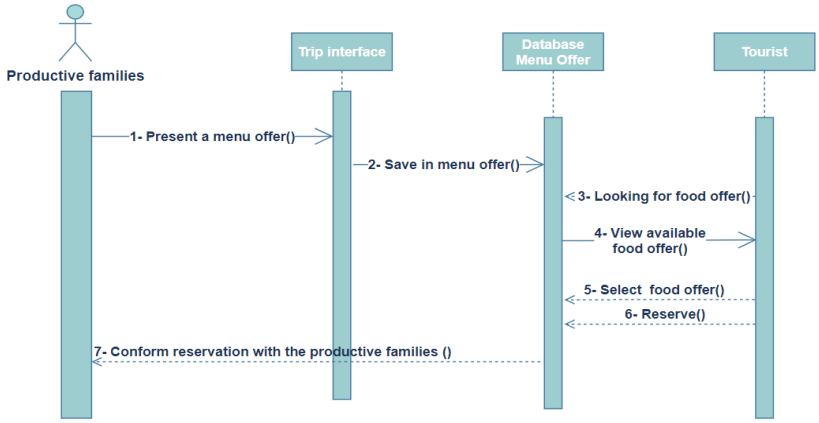


Figure 4–11: productive families presented a menu offer and tourist customized trip sequence diagram

4. **Tour guide**

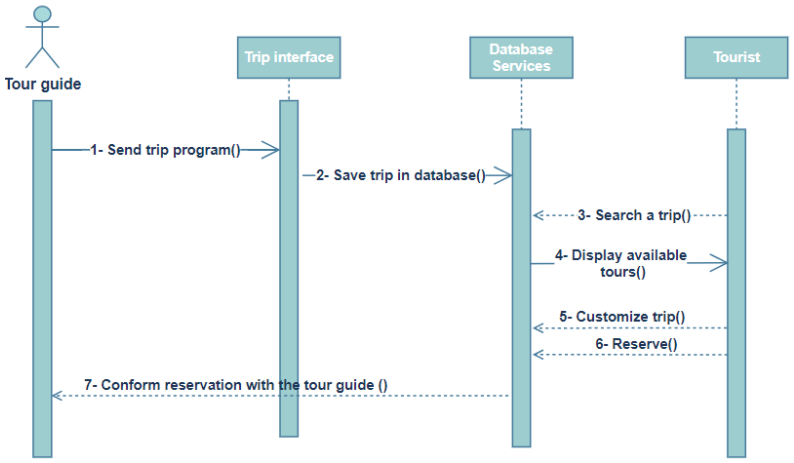


Figure 4–12: tour guide designs the itinerary sequence diagram

4.4 Data Modeling

Data modeling is the process of recording complex software system designs as easy-to-understand diagrams, using text and symbols to indicate how data needs to flow. This diagram can be used to ensure the effective use of data, as a blueprint for building new software or redesigning legacy applications (Teore, 2005).

Table 4-1: User table

Field	Type	constraint	Description
UserID	Int	PK	Unique ID for each user
FullName	String		The Full Name of the user
Email	String		The Email of the user
Phone	String		The mobile of the user
Usertype	String		The type of the user
Country	String		The nationality of the user

Table 4-2: Transport table

Field	Type	constraint	Description
ImageURL	String		Image link
Link	String		Link for Transportation website
Title	string		Title which appear on app

Table 4-3: Services table

Field	Type	Constraint	Description
Available	bool		Display if service available or not
ServicesID	int	PK	Unique ID for each service.
City	String		Display city name for service
CityID	int		Display city number for service
ID	int	FK	FK references user table in UserID field
ImgUrl			Link of image url
ServicesCategory	String		The Category of the service
ServicesType	string		The type of the service
Nots	string		The description of the service
ServicesProvideID	int		To get services Provide ID
ServicesProviderPhone	string		To get services Provide phone
Price	Currency		Service price

Table 4-4: Rating table

Field	Type	constraint	Description
ID	int	PK	Unique ID for each rate
Rate	String		Display Rate for each service
ServiceID	String		Display service ID
ServiceName	String		Display service name
ServiceProvideID	Int	FK	FK references service table in service ID field
Stars	String		Displays the service rating
UserCountry	String		Display user nationality
UserID	int	FK	FK references user table in UserID field
UserName	String		Display username

Table 4-5: Links table

Field	Type	constraint	Description
ImageURL	String		Image link
Link	String		Link for Transportation website
Title	string		Title which appear on app

Table 4-6: Events table

Field	Type	constraint	Description
ImageURL	String		Image link
Link	String		Link for Event website
Title	string		Title which appear on app

Table 4-7: City table

Field	Type	constraint	Description
ImageURL	String		Image link
id	int	PK	Id of city
name	string		Title which appear on app

Table 4-8: Articles table

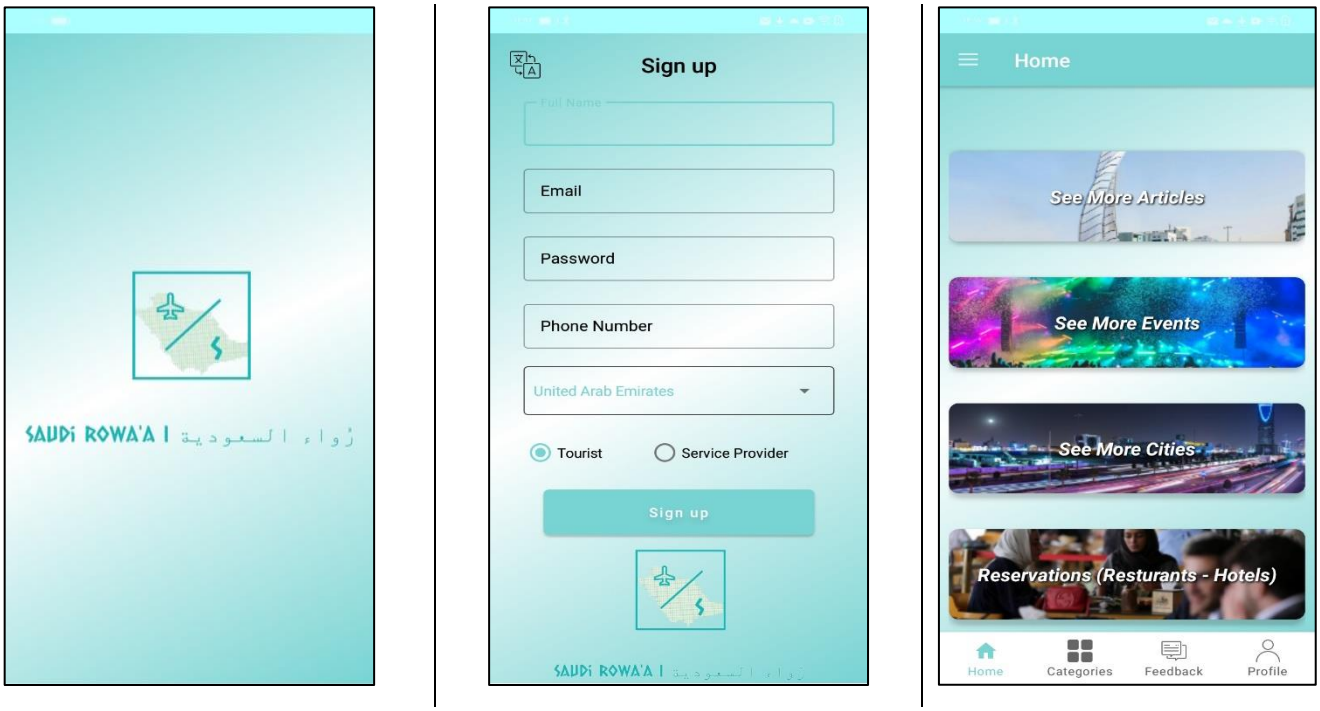
Field	Type	constraint	Description
ImageURL	String		Image link
Link	String		Link for articles files
Title	string		Title which appear on app

Table 4-9: countries table

Field	Type	constraint	Description
Countryabbreviation	String		Display Country abbreviation
Country name	String		Display Country name

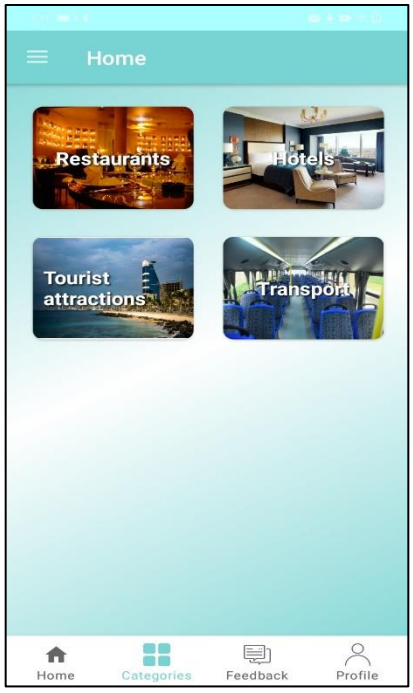
4.5 User Interface Design

The next section presents the most important interfaces of the project.

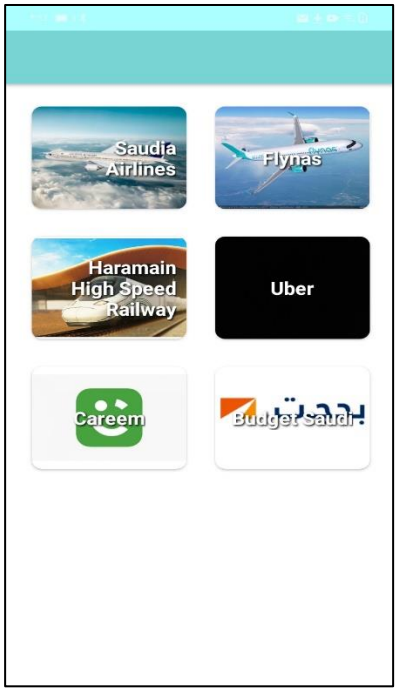


Logo screen | Registration interface | Home interface

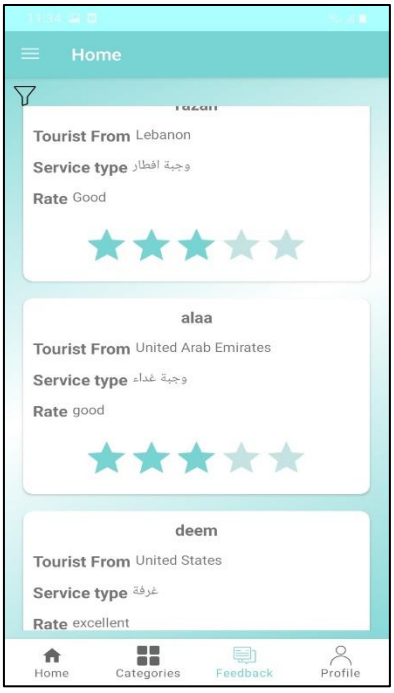
Figure 4–13: logo screen, registration interface, home interface.



Categories interface



Transfer reservation interface



Feedback interface

Figure 4–13: categories, transfer reservation interface, feedback interface.

4.6 Summary

In this chapter, we have completed the analysis phase of the proposed system, which includes architectural design that define the components of our application and how it communicates. Then, we finished structural static models (class diagrams, ERD) to describe the simulation of the project in right way. After that, through data modelling (data dictionary) we have identified dynamic models (sequence diagrams) to explain the interactions between the actors and the objects within a system. Finally, we showed the user interface design.

Chapter 5: Implementation

5.1 Introduction

In this chapter, we will show the important steps to implement the (Saudi Rowa'a - Mobile Application for Foreign Tourists) application, and we will also review the problems and the challenges we faced during the implementation of our project. Moreover, we will mention the techniques and tools used in our project. Also, explain how we designed our project, designed interfaces and how they were linked with databases. Our project is developed using the Android studio. The following is a brief description of the entire process. Creating the database by using Firebase, then processing data, after that handling the database with the Firebase website.

5.2 Tools and Languages

5.2.1 program used.

Table 5-1: Programs used in propose App.

Program	Description	Used to
Firebase Database 	"The Firebase Realtime Database is a cloud-hosted database. Data is stored as JSON and synchronized in real time to every connected client". (Firebase, n.d.)	Used to create Application database
Android Studio 	"Android Studio platform is the official IDE for Android app development, based on IntelliJ IDEA". Android Studio platform supports many programming languages. For the application, java for coding and xml to visual part (design). (Android Studio , n.d.)	Used to program the application.
Photoshop 	Is one of Adobe's famous programs, which is specific to the work of graphics and the creation of images, designs and project logo.	Used to design app interface and logo.
Draw io 	Website for drawing diagrams.	Used to drawing diagrams easily

Microsoft word 	An application program in Microsoft Office that is used to edit text, create documents, and draw tables.	Used to create documents of our project

Android studio features

- The program's interface facilitates the programming process for the user, even if the programmer is junior.
- Open-source program, therefore a lot of references to obtain the codes from internet.
- It depends heavily on the Java language, so we decided to choose it as a programming language to implement our application.
- It also supports Google services such as Google Maps and Google Drive. Provides translation for more than one language if the programmer needs multiple languages in the application.
- Undo modification and deletion, automatic saving, copying from computer and easy pasting into the platform.
- Allows the possibility to test the application on various types of screens and devices.
- It is characterized by the presence of an APK, which allows you to display the application on devices that support Android in an easy and fast way

5.3 Mapping Design to Implementation

In the implementation phase, use an easy-to-use interface to implement all the functions mentioned in the previous chapters. However, since the environment we are studying is not considered in the analysis and design process, it is normal to face some differences in the implementation process. We will discuss this topic for the following changes.

Table 5-2: All function Requirements that has been mentioned in the previous chapters.

Functional requirements	Achieved Present	User	
Register in the system.	Achieved 100%	The Tourist -Property Owners-	

System login & logout	Achieved 100%	Productive Families-Tour Guides	
View detailed information in pictures or video about tourism places in Saudi Arabia.	Achieved 100%		
The possibility of creating a customized trip.	Achieved 100%	The Tourist	
The possibility of reservation by providing links and this feature contains (transportations, hotels, restaurants, events).	Achieved 100%	The Tourist	
Access to a tour guide for all tourist sites (tourist attraction) in Saudi Arabia.	Achieved 100%	The Tourist	
participate in Saudi Rowa'a to provide services.	Achieved 100%	(Property Owners-Productive Families-Tour Guides)	
View details of the information about the apartment in pictures with its location and nearby facilities.	Achieved 100%	Property Owners	
Possibility of renting out real estate.	Achieved 100%	Property Owners	
Offer a menu of foods	Achieved 100%	Productive Families	
Offer services as a tour guide	Achieved 100%	Tour Guides	

Non-Functional Requirements

Table 5-3: All Non function Requirements that has been mentioned in the previous chapters.

User friendly.	
System should provide better accuracy.	

To perform with efficient throughput and response time.	✓
The system must respond quickly in real-time	✓
The app should run on all Android-based devices.	✓
System must be always updated.	✓
The system should encrypt all the data inside the database.	✓

5.4 Main/Most Important Codes

a) "Register" Code.

```
private void registerNewUser() {
    mBinding.pbLoading.setVisibility(View.VISIBLE);
    String email, password, fullName, phoneNumber;
    fullName = mBinding.etFullName.getText().toString().trim();
    email = mBinding.etEmail.getText().toString().trim();
    password = mBinding.etPassword.getText().toString().trim();
    phoneNumber = mBinding.etPhoneNumber.getText().toString().trim();
```

Figure 5–1: Define variables

```
    if (TextUtils.isEmpty(fullName)) {
        Toast.makeText(getApplicationContext(), "Complete Name", Toast.LENGTH_LONG).show();
        mBinding.pbLoading.setVisibility(View.GONE);
        return;
    }
    if (TextUtils.isEmpty(email)) {
        Toast.makeText(getApplicationContext(), "Complete Email", Toast.LENGTH_LONG).show();
        mBinding.pbLoading.setVisibility(View.GONE);
        return;
    }
    if (TextUtils.isEmpty(password)) {
        Toast.makeText(getApplicationContext(), "Complete Password", Toast.LENGTH_LONG).show();
        mBinding.pbLoading.setVisibility(View.GONE);
        return;
    }
```

Figure 5–2: Data entry restrictions1

```
if (TextUtils.isEmpty(phoneNumber)) {
    Toast.makeText(getApplicationContext(), "Complete Phone Number", Toast.LENGTH_LONG).show();
    mBinding.pbLoading.setVisibility(View.GONE);
    return;
}
if (TextUtils.isEmpty(mSelectedCountry)) {
    Toast.makeText(getApplicationContext(), "Select Country", Toast.LENGTH_LONG).show();
    mBinding.pbLoading.setVisibility(View.GONE);
    return;
}
if (rbType.getId() == R.id.rb_service_provider && TextUtils.isEmpty(mSelectedUser)) {
    Toast.makeText(getApplicationContext(), "Select user type", Toast.LENGTH_LONG).show();
    mBinding.pbLoading.setVisibility(View.GONE);
    return;
}
```

Figure 5–3: Data entry restrictions2

Figure 5-2 and Figure 5-3 show code of restrictions to not leave spaces for the required values during registration.

```
mAuth.createUserWithEmailAndPassword(email, password)
        .addOnCompleteListener(task -> {
            if (task.isSuccessful()) {
                Toast.makeText(getApplicationContext(), text: "Registration successful!", Toast.LENGTH_LONG).show();
                mBinding.pbLoading.setVisibility(View.GONE);
                FirebaseUser current_user = FirebaseAuth.getInstance().getCurrentUser();
                String uid = current_user.getUid();
                mDatabase = FirebaseDatabase.getInstance().getReference().child("Users").child(uid);

                UserModel mUserModel = new UserModel(fullName, email, mSelectedCountry, phoneNumber, mSelectedUser);
                mUserModel.setId(uid);

                mDatabase.setValue(mUserModel).addOnCompleteListener(task1 -> {

                    startActivity(new Intent( packageContext: RegisterActivity.this, MainActivity.class));
                    finish();

                }).addOnFailureListener(e -> {
                    Log.w(TAG,  msg: "Error adding document", e);
                });

            } else {
                Toast.makeText(getApplicationContext(), task.getException().getLocalizedMessage(), Toast.LENGTH_LONG).show();
                mBinding.pbLoading.setVisibility(View.GONE);
            }
        });
```

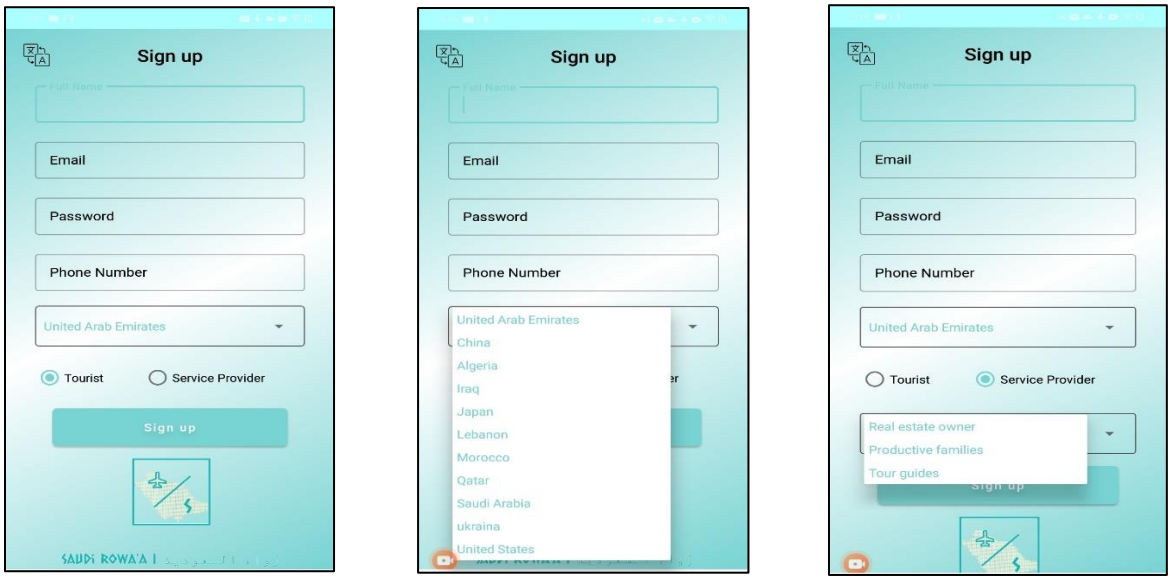
Figure 5–4: Registration in the database code

```
@Override
public void onClick(View view) {
    switch (view.getId()) {
        case R.id.btn_sign_up:
            registerNewUser();
            break;
        case R.id.ll_have_account:
            openLoginScreen();
            break;
    }
}
```

Figure 5–5: Determine if the user is already registered code.

To register successfully in Saudi Rowa'a app it should check if the email exists or not in database. Also, there are constraints to fill all the fields of data and the password must to be more than 6 characters.

As a result, here is the design interface Register.



Register interface Select country Select user

Figure 5–6: Sign-up interface

b) "Login" code.

```
private void loginUserAccount() {
    mBinding.pbLoading.setVisibility(View.VISIBLE);
    String email, password;
    email = mBinding.etEmail.getText().toString();
    password = mBinding.etPassword.getText().toString();
    if (TextUtils.isEmpty(email)) {
        Toast.makeText(getApplicationContext(), "Complete Email", Toast.LENGTH_LONG).show();
        mBinding.pbLoading.setVisibility(View.GONE);
        return;
    }
    if (TextUtils.isEmpty(password)) {
        Toast.makeText(getApplicationContext(), "Complete Password", Toast.LENGTH_LONG).show();
        mBinding.pbLoading.setVisibility(View.GONE);
        return;
    }
    mAuth.signInWithEmailAndPassword(email, password)
            .addOnCompleteListener(task -> {
                if (task.isSuccessful()) {
                    Toast.makeText(getApplicationContext(), "Successful", Toast.LENGTH_LONG).show();
                    mBinding.pbLoading.setVisibility(View.GONE);
                    mDatabase.child("Users").child(task.getResult().getUser().getUid());
                    startActivity(new Intent( packageContext: LoginActivity.this, MainActivity.class));
                    finish();
                } else {
                    Toast.makeText(getApplicationContext(),  text: "Login failed! Please try again later", Toast.LENGTH_LONG).show();
                    mBinding.pbLoading.setVisibility(View.GONE);
                }
            });
}
```

Figure 5–7: user login code

As a result, here is the design interface login page.

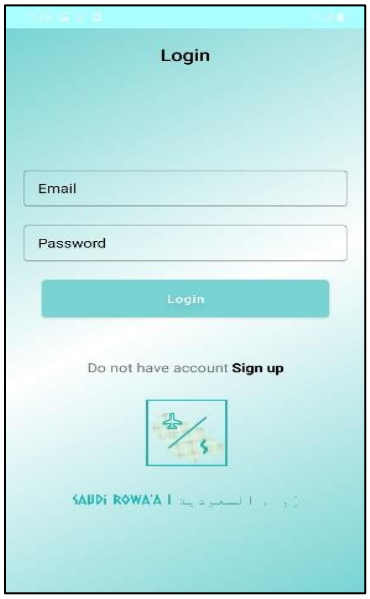


Figure 5–8: login interface

c) Import "menu".

This code used to import city menu from database.

```
private void getServicesList() {
    FirebaseDatabase.getInstance().getReference().child("Cities")
            .addValueEventListener(new ValueEventListener() {
                @Override
                public void onDataChange(@NonNull DataSnapshot dataSnapshot) {
                    for (DataSnapshot mResponse : dataSnapshot.getChildren()) {
                        CitiesHomeModel mServiceResponse = mResponse.getValue(CitiesHomeModel.class);
                        mCitiesList.add(mServiceResponse);
                    }
                    Log.d(TAG, mCitiesList.toString());
                    mAdapter.addItems(mCitiesList);
                }

                @Override
                public void onCancelled(@NonNull DatabaseError databaseError) {
                    Log.d(TAG,  msg: "onCancelled: " + databaseError.getMessage());
                }
            });
}
```

Figure 5–9: Display Pictures of cities code

d) getCurrentUser

```
private void getCurrentUser() {
    DatabaseReference mUserDatabase = FirebaseDatabase.getInstance().getReference().child("Users").child(FirebaseAuth.getInstance().getUid())

    mUserDatabase.addValueEventListener(new ValueEventListener() {
        @Override
        public void onDataChange(@NonNull DataSnapshot snapshot) {
            mUserModel = snapshot.getValue(UserModel.class);
            mBinding.navView.getMenu().findItem(R.id.nav_add_service)
                    .setVisible(!(mUserModel.getUserType() == null));
        }

        @Override
        public void onCancelled(@NonNull DatabaseError error) {
            Log.d(TAG,  msg: "onCancelled: " + error.getMessage());
        }
    });
}
```

Figure 5–10: know user type code.

Figure 5-10: shows code about knowing the type of user and the main menu appears for each user.

e) Import menu(setupNavMenu)

```
void setupNavMenu() {
    headerView = mBinding.navView.getHeaderView( index: 0);
    ivUserProfile = headerView.findViewById(R.id.iv_header_profile);
    tvUserName = headerView.findViewById(R.id.tv_header_user_name);
    tvUserEmail = headerView.findViewById(R.id.tv_header_email);
    if (mAuth.getCurrentUser() == null)
        return;
    mBinding.navView.setNavigationItemSelectedListener(item -> {
        mBinding.drawerLayout.closeDrawer(GravityCompat.START);
        switch (item.getItemId()) {
            case R.id.nav_home:
                break;
            case R.id.nav_language:
                showLanguageDialog();
                break;
            case R.id.nav_add_service:
                openAddServiceActivity();
                break;
            case R.id.nav_reserved_service:
                openReservedServiceActivity();
                break;
            case R.id.nav_LogOut:
                mAuth.signOut();
                openLogin();
                break;
            default:
                break;
        }
```

Figure 5–11: viewing menu-based id number code.

f) getCitiesList

```
private void getCitiesList() {
    ArrayAdapter<String> mListAdapter =
            new ArrayAdapter<>(
                    context: this,
                    R.layout.item_spinner,
                    getResources().getStringArray(R.array.cities));
    mBinding.spCity.setAdapter(mListAdapter);

    mBinding.spCity.setOnItemSelectedListener(new AdapterView.OnItemSelectedListener() {
        @Override
        public void onItemSelected(AdapterView<?> adapterView, View view, int position, long l) {
            mSelectedCity = getResources().getStringArray(R.array.cities)[position];
            Log.d(TAG, mSelectedCity);
        }

        @Override
        public void onNothingSelected(AdapterView<?> adapterView) {
        }
    });
}
```

Figure 5–12: viewing city code.

```
private void getUserServices() {
    String[] services = {};
    if (mUserModel.getUserType().equalsIgnoreCase( anotherString: "صاحب عقار"))
        services = getResources().getStringArray(R.array.hotels_services);
    else if (mUserModel.getUserType().equalsIgnoreCase( anotherString: "الاسر المنتجة"))
        services = getResources().getStringArray(R.array.food_services);
    else if (mUserModel.getUserType().equalsIgnoreCase( anotherString: "المرشدين السياحيين"))
        services = getResources().getStringArray(R.array.tour_gide_services);

    ArrayAdapter<String> mListAdapter =
            new ArrayAdapter<>(
                    context: this,
                    R.layout.item_spinner,
                    services);

    mBinding.spUserServices.setAdapter(mListAdapter);
    String[] finalServices = services;
    mBinding.spUserServices.setOnItemSelectedListener(new AdapterView.OnItemSelectedListener() {
        @Override
        public void onItemSelected(AdapterView<?> adapterView, View view, int position, long l) {
            mSelectedService = finalServices[position];
        }
```

Figure 5–13: viewing services code.

```
private void showLanguageDialog() {
    MaterialDialog mMaterialDialog = new MaterialDialog.Builder( context: this)
            .customView(R.layout.dialog_language, wrapInScrollView: true)
            .cancelable(true).build();
    mMaterialDialog.getWindow().setBackgroundDrawable(new ColorDrawable(Color.TRANSPARENT));
    LinearLayout card_arabic = (LinearLayout) mMaterialDialog.findViewById(R.id.card_arabic);
    LinearLayout card_english = (LinearLayout) mMaterialDialog.findViewById(R.id.card_english);
    card_arabic.setOnClickListener(view1 -> {
        LanguageHelper.setLanguage(getBaseContext(), language: "ar");
        mMaterialDialog.dismiss();
        reStartActivity();
    });
    card_english.setOnClickListener(view1 -> {
        LanguageHelper.setLanguage(getBaseContext(), language: "en");
        mMaterialDialog.dismiss();
        reStartActivity();
    });
    mMaterialDialog.show();
}
```

Figure 5–14: change the languages code.

5.5 System Testing

Once open the application, tourism video about Saudi Arabia will appear. However, if the user not interested to watch the video the user can skip it. The propose system start with next interface, as shown below:

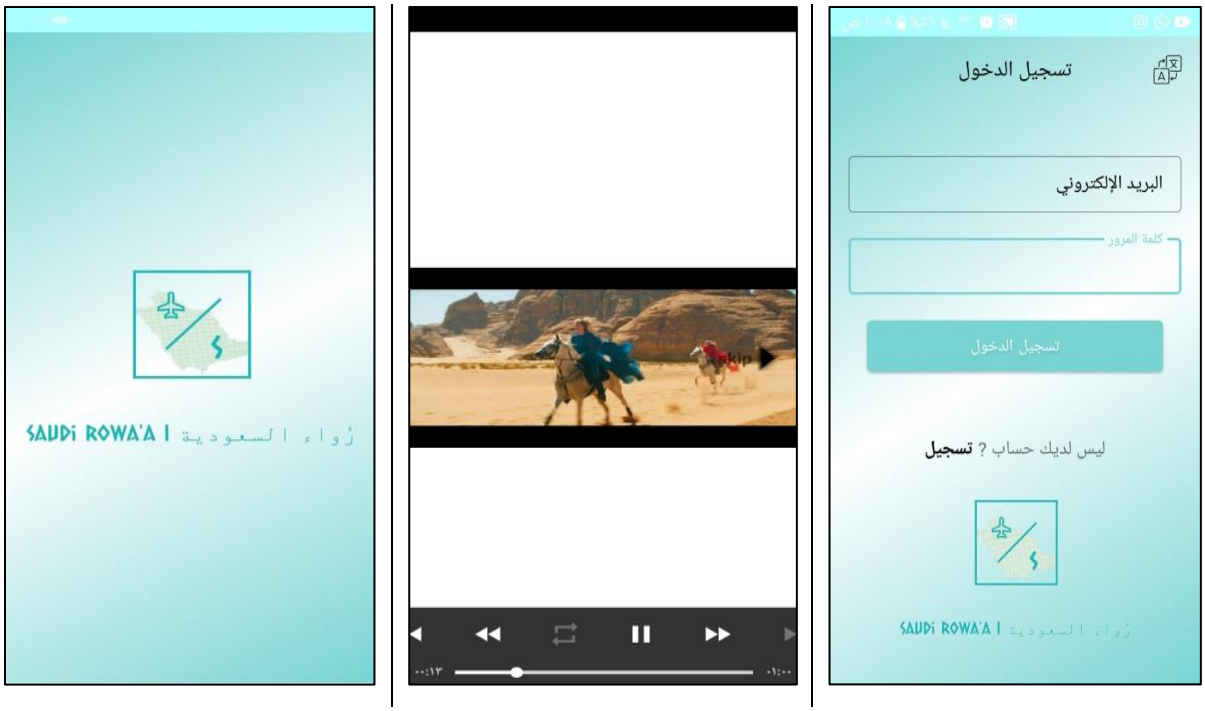


Figure 5–15: The opening interfaces of the application

All application interfaces appear in both languages' Arabic and English. As show bellow:

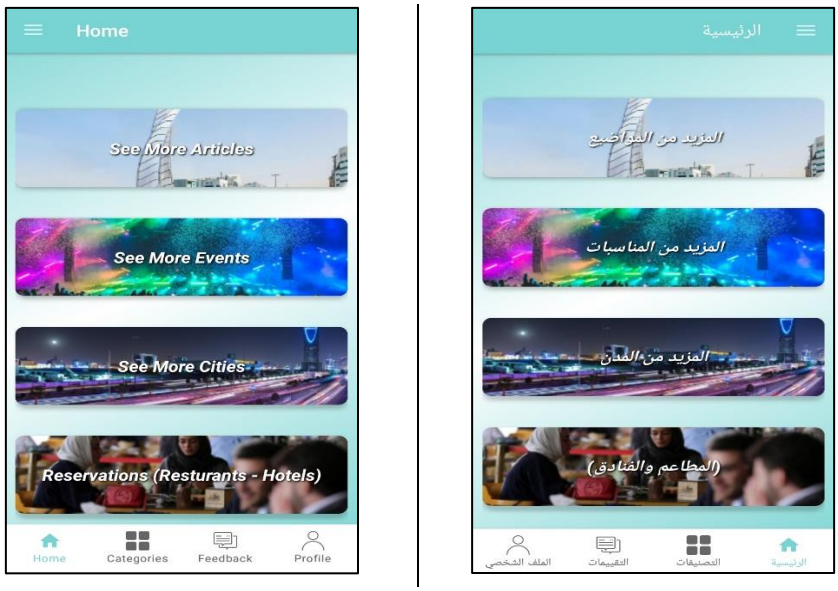
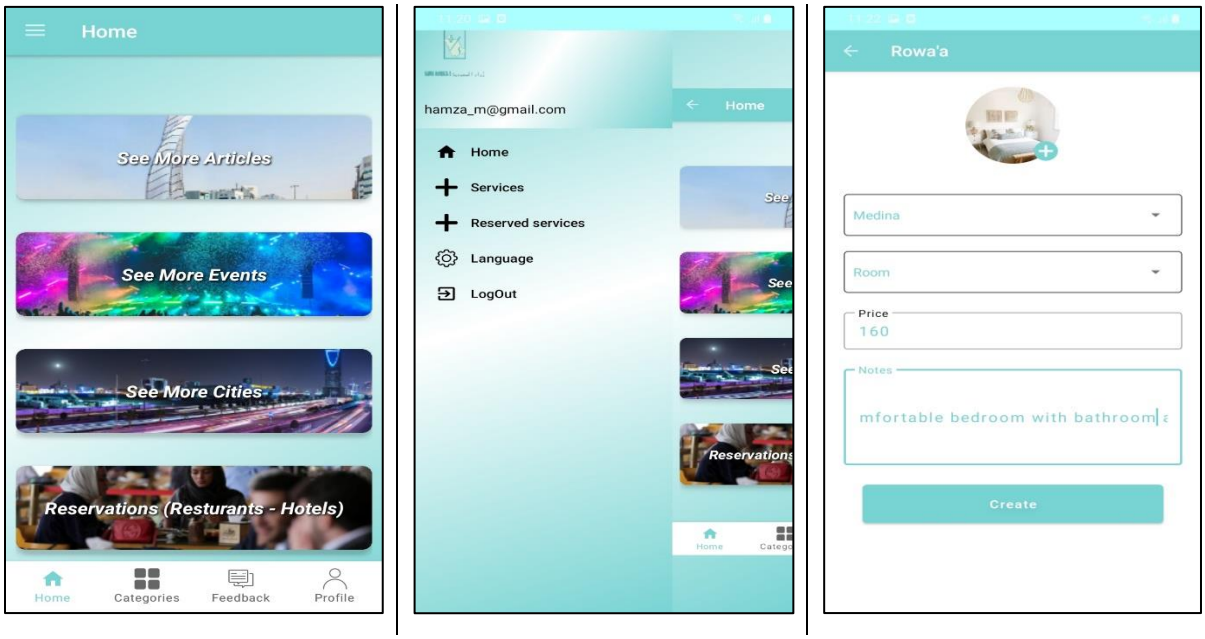


Figure 5–16: Home with English and Arabic interface

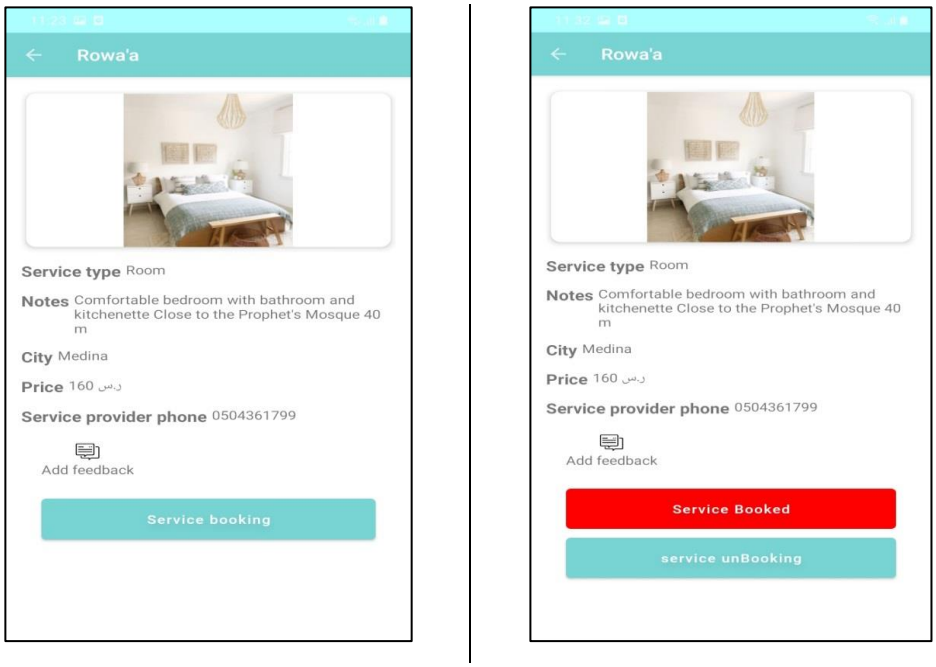
Case 1 (property owner)



Home page Navigation bar Add new service screen

Figure 5–17: Main interface and add service interface for property owner.

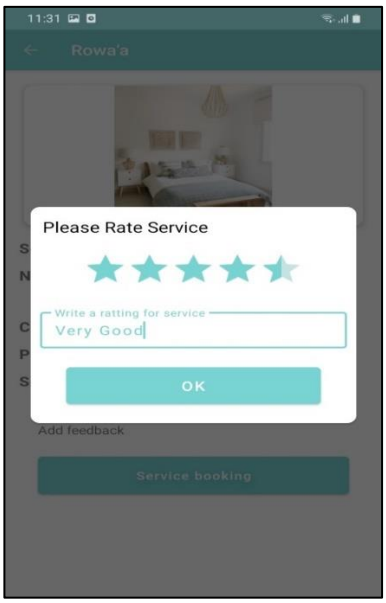
The service appears as follows if this service is booked by a tourist like figure 5-18:



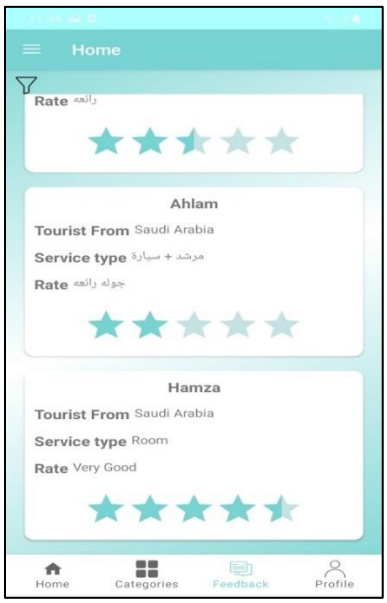
Service Details Service after booking

Figure 5–18: Service interface

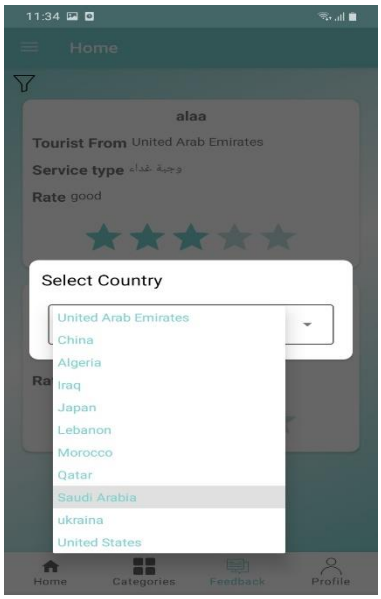
Type feedback and filter all the existing comments according his/her desire.



Adding feedback



Evaluation of services



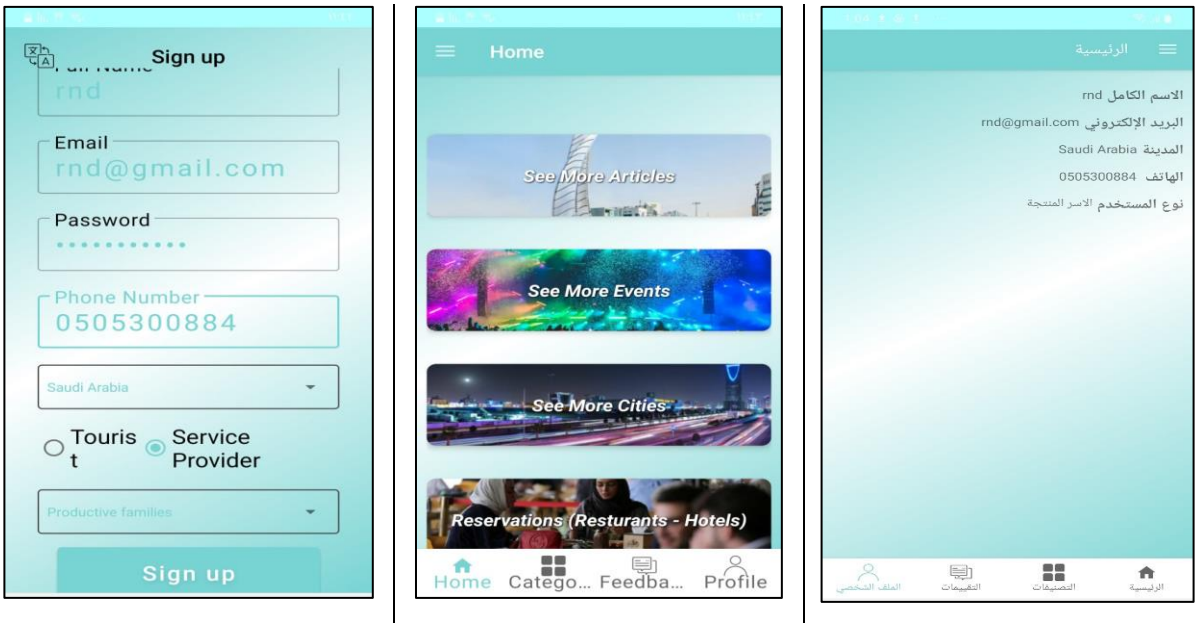
Filtering comment

Figure 5–19: Service evaluation interface

The profile of the property owner, in which all his information appears.

Figure 5–20: Displaying the data of the property owner.

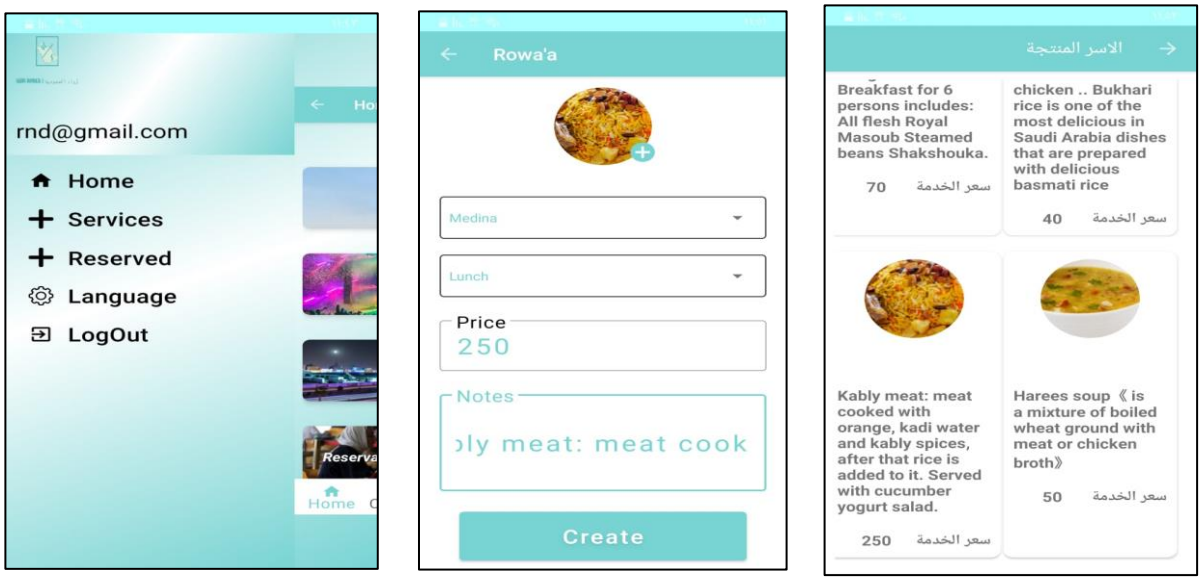
Case 2 (Productive families)



New user registration Home page Productive families profile

Figure 5–21: Displaying the interfaces of the property owner.

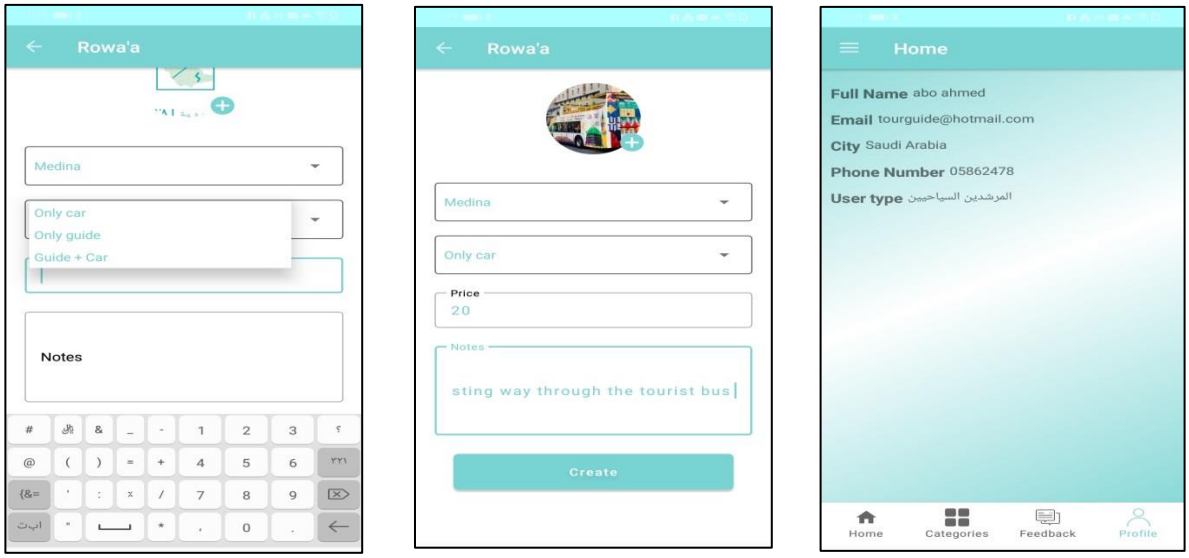
Add new services by the productive families user, as shown below:



Add new service(step1) Add new service(step2) Add new service(step3)

Figure 5–22: Property owner main menu and service menu

Case 3 (Tour Guide)



Service menu Add new service Profile page

Figure 5–23: Add new service for tour guide and profile page.

The Home page which is the default appear on the application after signing up/ logging in where the all the users can see it. This page contains different type of navigation buttons such as articles, cities, events and reservations help the user access to other pages in the app.

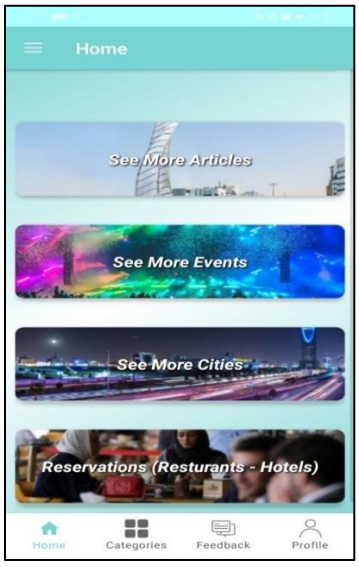


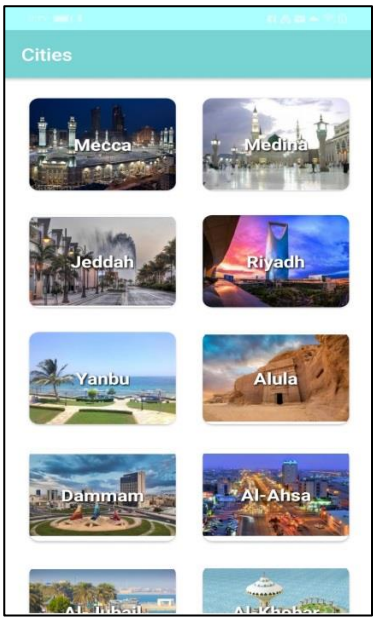
Figure 5-24: Home contains (articles, events, cities, and links to reserve)

Articles: When you click on it, a new interface with information about each city, after clicking on any title you want, a text file or video for this title will appear.

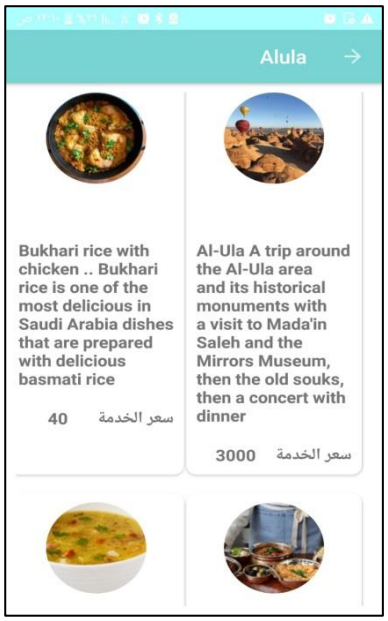
Cities: When clicking on it, a new interface with the names of the cities is displayed. When clicking on any city, the services data for that city appears.

Reservations: Clicking on it will show an interface with links to book flights, hotels and trains, etc.

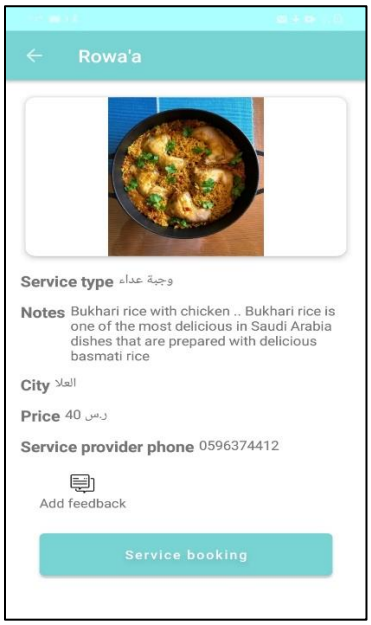
Events: When you click on it, links to reserve different type of events appear like cinema, fishing and football matches, etc.



Cities interface

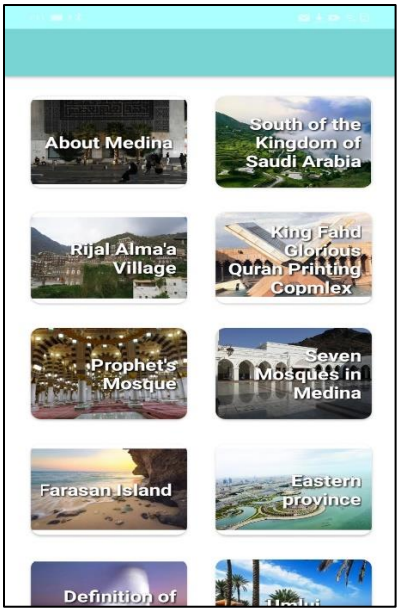


After selecting the city, all the services available in it will appear

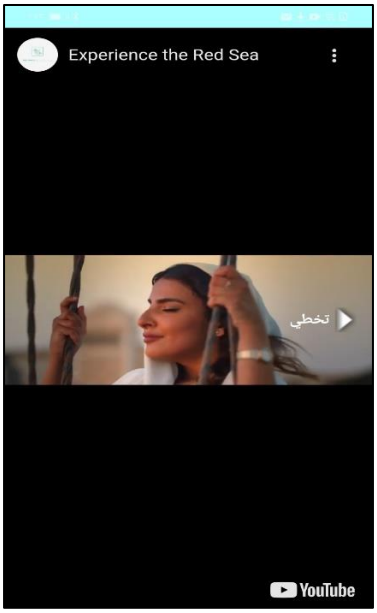


Reserve service

Figure 5-25: Cities interface, list of services, reserve service interface



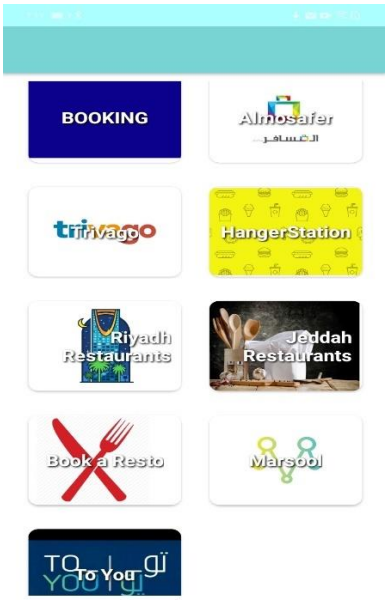
Articles interface



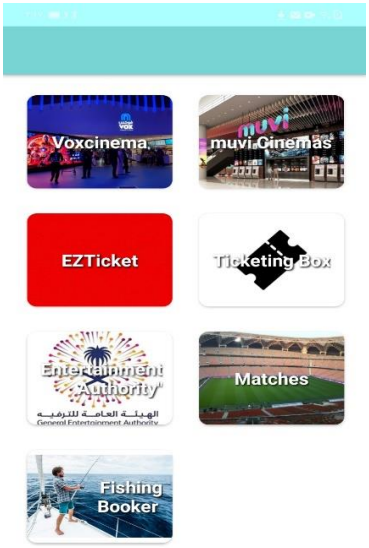
Article – video

Rules of KSA

Figure 5-26: Articles interface



Hotels & Restaurants



Events

Figure 5-27: reservations & events interface

5.6 Results and Discussion

We designed and distributed a survey to the participants to get their views on our application, including questions for their opinions. The test results were based on the following issues:

1- Users find the site easy to use.

2- They can add services easily.

3- Reflecting the Saudi tourism industry in an attractive and beautiful way.

4- Quality of application.

The results of the questionnaire can be summarized as follows:

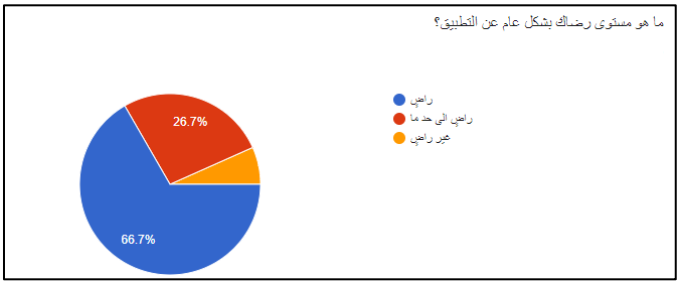


Figure 5-28: user satisfaction.

Figure 5-28 shows that 66.7% of the participants are generally satisfied with the application, while 26.7% of the participants are somewhat satisfied, only 6.6% they were dissatisfied.

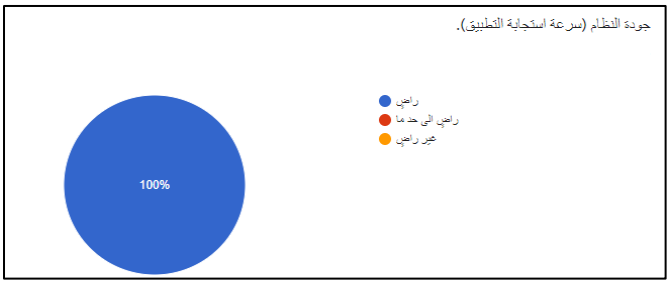


Figure 5-29: quality of the system.

Figure 5-29 indicates that 100% of the participants are satisfied with the speed of the system's response.

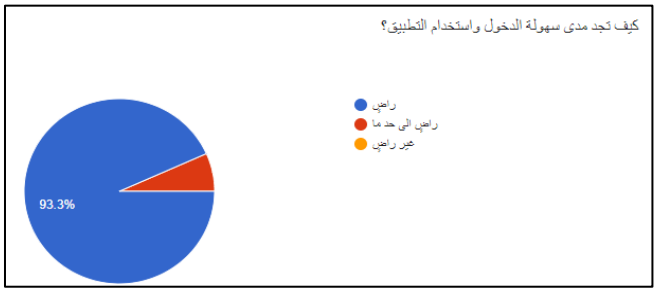


Figure 5-30: ease of use of the application.

The figure 5-30 that shows 93.3% of the users they find the application easy to use.

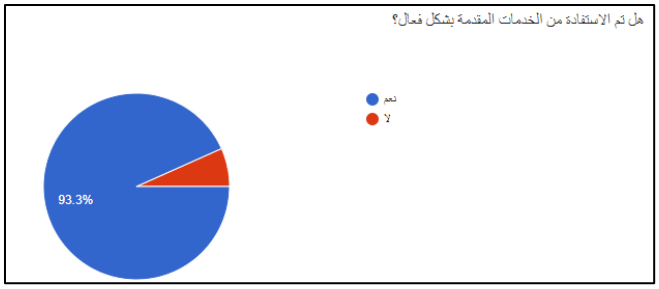


Figure 5-31: effectiveness of system services.

Figure 5-31 shows 93.3% of the users have effectively benefited from the services provided.

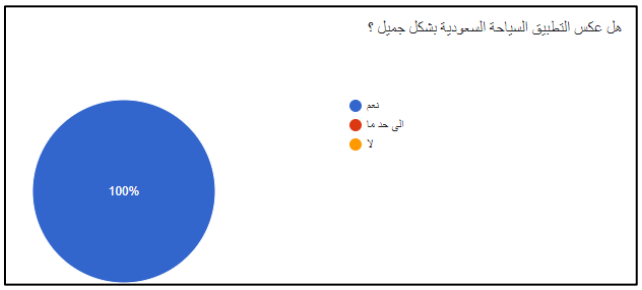


Figure 5-32: demonstrate of Saudi attractively.

In Figure 5-32, the result shows that 100% of the participants saw that the app beautifully reflects tourism in the Kingdom.

5.7 Summary

In this chapter, we reviewed the objectives of the project and presented the implementation of the Saudi Rowa'a application, including the programs and languages that we used in implementing the application, then we moved to present the opinions of users of Saudi Rowa'a app, and finally we presented the project interfaces with a simple explanation about it.

Chapter 6: Conclusion and Future Work

6.1 Conclusion

Android mobile-based application for foreign tourists the main purpose it to provide an entire Saudi experience by using the most attracted sites, tasting some popular Saudi dishes, and living in traditional Saudi house.

This application serves several groups of the community, such as tour guides, property owners, and productive families. The application allows tour guides to add the trips they provide to the tourists with the details of the trip and price. Also, allows to property owners provide their apartments that they want to rent to tourists with pictures of this apartment, its price, and additional services. Finally, productive families can add the traditional foods that they provide to foreign tourists, with their price and a detailed explanation of the dish. The application was tested by users and found it interesting and beautifully reflected Saudi tourism, and it was found very easy to use.

6.2 Goals Achieved

Our application achieved all the basic objectives which by providing detailed information to the tourist using pictures, video or small brief of the cities and creating new job opportunity and providing additional income to (property owners, productive families and tour gaudies). In addition, the application is easy to use and will help a lot the foreign tourist.

We have defined the basic objectives and functions in the system such as functional requirements, non-functional requirements and field requirements of the system. Next, use the use case diagram to analyze the requirements.

Then we designed the initial APIs and used ERD diagrams to display the contents of the data store. Then we wrote the code and test the system

6.3 Future Work.

We seek in the future to develop our application better, and add new and some important features such as electronic payment mode it is one of the important objectives,

because the database of it is very large and the reason for the lack of time we cannot achieve it in short time , we also work towards to make the application in all languages of the all world, make it has more expansion by connecting it to the iOS system . Finally, add security protocols to protect the application from data leakage or prevent hackers from exploiting vulnerabilities of the app.

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8. Appendix

Questionnaire for foreign tourists about tourism in Saudi Arabia.

Link https://forms.gle/CQ4UPf83QigbjkSSA .

Interview for tour guides.

Link https://forms.gle/hJ1mJ4Y2M3PkiCgv7 .

Interview for property owners.

Link https://forms.gle/SNwJ6aG2g933mK9A9 .

Interview for productive families.

Link https://forms.gle/Uir4HALtMfcxKnHUA .