

# Developing and Implementing WEB-based Online Destination Information Management System for Tourism

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## Abstract

Providing accurate and relevant information about the tourism places is considered as the best way to encourage and increase the number of tourists in any country. Nowadays; the internet plays an important role in providing this information to the tourists through the uploaded information about the tourism places using the World Wide Web. The Kingdom of Saudi Arabia is characterized by the presence of many places of tourism, whether religious tourism or eco-tourism, as religious tourism in the Kingdom is one of the most important sources of income and one of the largest pillars of the economy in the Kingdom, and environmental tourism is an important element of the tourist's attractions. The aim of this work is to design and implement an intelligent platform that will help the tourists to get accurate and relevant information about the tourism places such as location, restaurants and events. The proposed work was designed and implemented using the Unified Modeling Language (UML), Microsoft Access 2010 and Visual Studio programming languages. The proposed tourism system will be able to provide accurate and relevant information to the tourists about tourism places at the Kingdom of Saudi Arabia, and provide the tourists with recommendations for places to visit based on their preferences.

**Keywords:** Information System; Destination Management System and Unified Modeling Language

## INTRODUCTION

Recently, the extensive proliferation of the Web led organizations and companies to employ the Web in many different applications. Over the years, tourism has gained huge interest as an application of e-commerce. Many chief tourism actors and new comers (mainly the information technology companies) have a recognized Web presence, and have thousands of visitors daily, which offer opportunities for business to customer (tourist) or business to business transactions [1-4].

In the Web, one of the most important tourism applications is Destination Management Systems (DMS) or Destination Information Systems (DIS) [5]. These systems usually provide information about the tourism offerings at the given destination and may possibly encourage e-commerce activities to the potential tourist [1-3]. Tourism is considered as stimulator for new economic activities and it is a mechanism

for regional development, it has a positive impact on the balance of payments, on gross income and production, and on employment. Additionally, information explosion given rise to the development of intelligent systems or mechanisms that aid quick access to related content found in the Internet and help in the process of decision making [1-3].

Today, the use of Artificial Intelligence (AI) algorithms is expansive, particularly in providing solution to challenging problems including image segmentation [6-14], analysis of medical image [15-19], nurse rostering problem [20], Healthcare Monitoring system [21, 22], patterns recognition and retrieval of information [23-34], Learning Management System [35], as well as prediction of river flow [36-38]. Accordingly, utilizing the AI algorithms and web technology, countless scholars have created as well as implemented tourism information systems and travel recommender systems to solve tourism management problems [39, 40].

The Kingdom of Saudi Arabia is characterized by the presence of many places of tourism, whether religious tourism or eco-tourism, as religious tourism in the Kingdom is one of the most important sources of income and one of the largest pillars of the economy in the Kingdom, and environmental tourism is an important element of the tourist's attractions [41-43].

For countries like Saudi Arabia, tourism (other than the religious tourism) is one of the unexploited but potentially is a big income generator [43]. There are more than 150 tourist destinations that spread across the 13 region of the Kingdom Saudi Arabia. Whereas some exist naturally, others are manmade [3].

The reset of the paper is organize as follow; related work will be described in section 2, methodology of the proposed work will be illustrated in section 3. Database Construction and Testing will be illustrated in section 4. Interface Design will be illustrated in section 5. Results will be discussed in section 6. Finally, the conclusion is presented in section 7.

## RELATED WORK

The Saudi Commission for Tourism and National Heritage (SCTH) launched the "Tourism Navigator" application which offers information about the tourism in the Kingdom of Saudi Arabia and shows it spatially. The geographic information system (GIS) which is compatible with iPhone and iPad is

provided by the app which lets the tourist to explore the nearest tourism places and shows the services available, offers virtual tours of selected sites, and finds the path of driving directions between two points on the map. The application has bilingual interface (Arabic & English) [44].

• **TripAdvisor**

This site was founded by Langley Steinert and Stephen Kaufer in 2000, it is a travel website which provides information and reviews for customers about destinations of travellers around the world. It also includes reviews of restaurants, hotels, booking of accommodation and interactive tourism forums. In addition, TripAdvisor compares prices in more than 200 hotel reservation sites, so travelers can find the lowest price for their perfect hotel. TripAdvisor branded sites are available in 49 markets and have the largest traveling community in the world, attracting an average of 390 million unique visitors per month, all looking to make the most benefit of every trip [45].

• **TravelerPedia**

TravelerPedia is the first Arabic website that deals with travel and tourism news and offers it to the visitor quickly through modern means of communication from e-mail and social networks. The site provides comprehensive reports of hotels around the world with real pictures and important information and addresses of these hotels. TravelerPedia won the Tourism Information Award as the best Arabic website specializing in tourism media for 2012, and was awarded the Sheikh Salem Al Ali Al Sabah Award for Informatics for 2014 for the best Arab bloggers in the field of tourism culture. About 15,000 visitors (average) visit the TravelerPedia every day, read the news and reports, and follow up on social networks more than 200,000 subscribers interested in everything related to tourism and travel [46].

• **Tourist guide in Azerbaijan**

It is a website that provides an overview of Azerbaijan, its cities and major tourist attractions. The site is rich in pictures that add beauty and vitality to the site and give the visitor a first impression of the places he/she wishes to visit. The site provides information and pictures about the most famous hotels in the country of Azerbaijan and it also linked to the famous booking sites of hotel reservations, about the most famous restaurants in Azerbaijan and have comprehensive information about the restaurant such as: restaurant pictures, dishes and restaurant evaluation. It also provides information about the most famous places and sights in the cities of Azerbaijan such as historical landmarks, health resorts, fitness centers, shopping centers, parks, gardens, museums and also contains a tourist program [47].

**METHODOLOGY**

The process of system analysis aims to study an existing system to entirely design a new system. System analysis is performed to achieve mainly two aims namely:

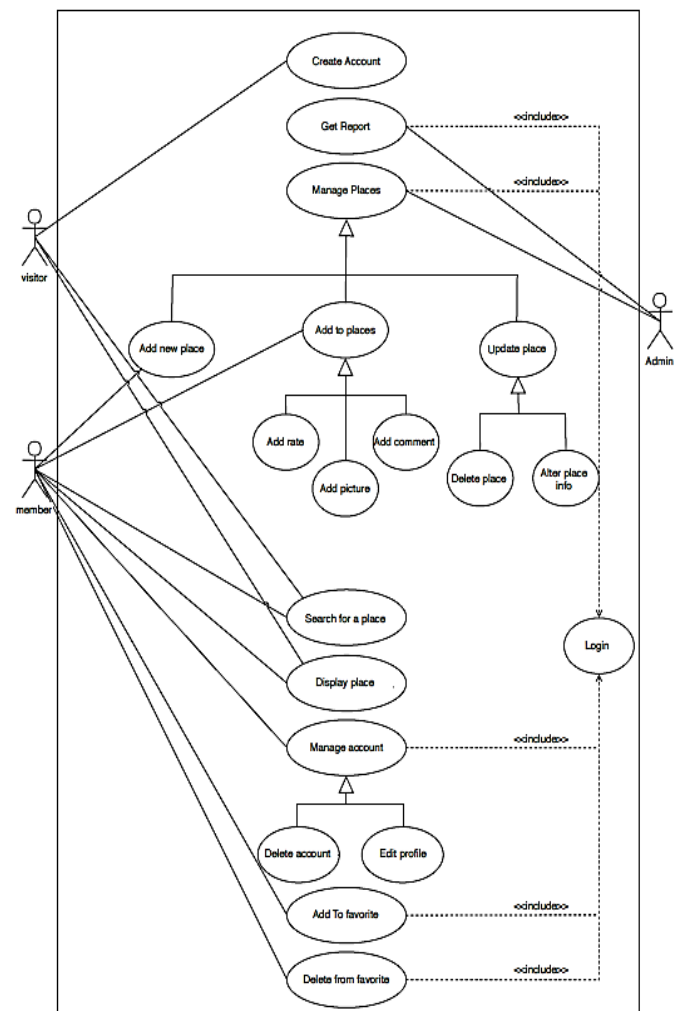
- To understand the process or the system clearly. This will assist in the new system design.

- System analysis will help to identify the problems in the existing system; therefore this will help to know the inefficiency reasons.

The Unified Modeling Language (UML) is visualization for the system design, it represents graphical notations which help to describe and design software systems, principally software systems constructed utilizing the object-oriented style [48-52]. The UML was utilized mainly to design the proposed system. The Use-Case diagram and the Class diagram are addressed below.

**Use Case Diagram :**

The Use-Case Model depicts system requirements. Use-case captures the communication between system, users and other stakeholders in order to achieve the intended goal of the system. It shows the interaction between the system and external entities [51, 53-55]. The Actors are external entities who represent roles. They could be external hardware, human users or other systems. In this case the actors are the visitor, member and admin. Figure 1 shows the use case diagram for the proposed system.



**Figure 1:** Use case diagram for the proposed system.

The use case starts when the user selects to register in the system; after that the system offers the user a form for login and the user has to enter the information required. If the information is found correct by the system search in the database, displays to the user the system homepage and allows the user to make use of the system. However, if not valid, the user will be redirected to the login page.

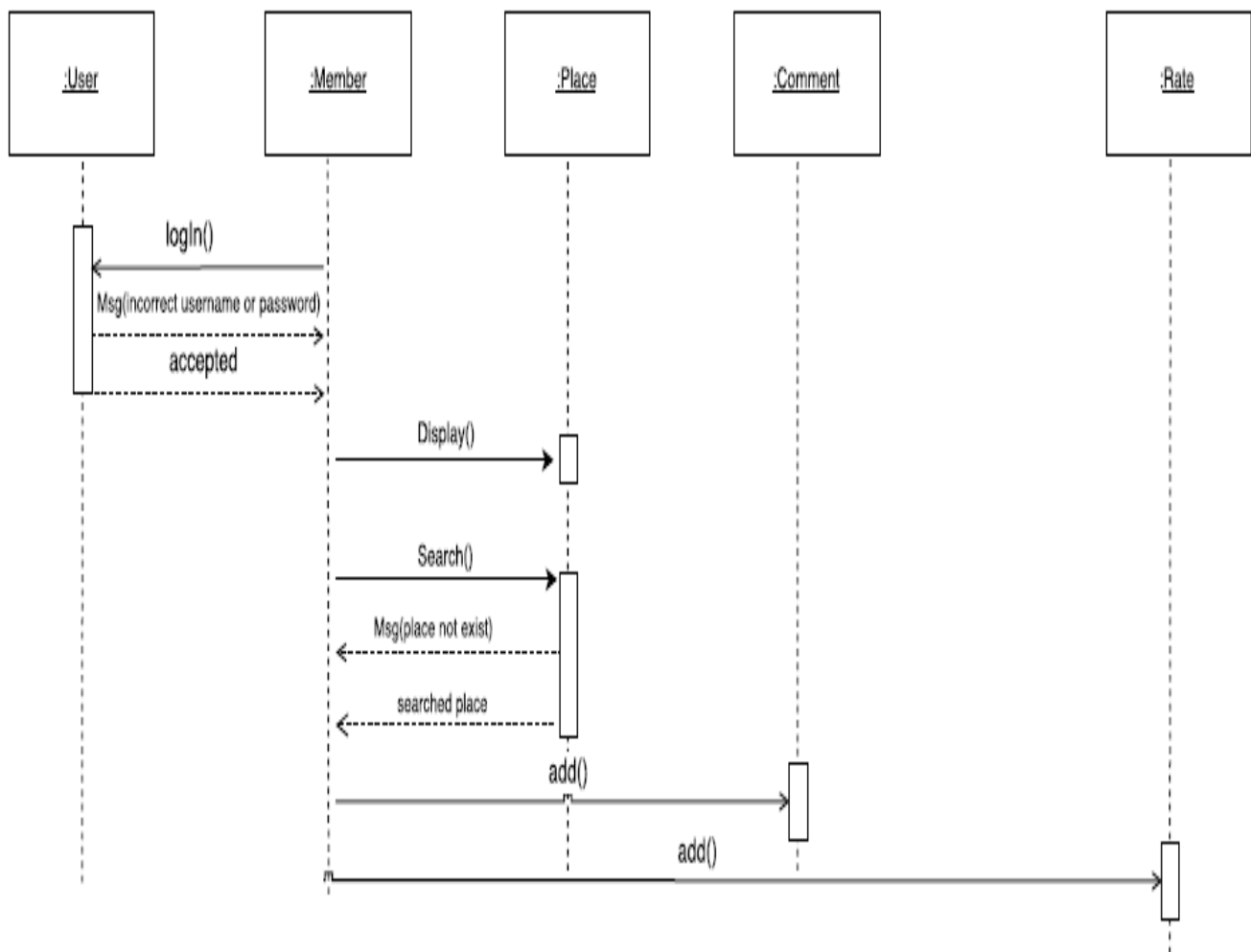
**Sequence Diagram:**

A sequence diagram demonstrates the interaction of objects and how operation of process is done and the order of operation. It illustrates how exchanging messages between

objects are done [56, 57]. The system sequence diagram is shown in Figure 2, it indicates the following:

- i. The use case actor
- ii. The messages sent to the system from the actor
- iii. The messages order
- iv. The external system which sends the message to system
- v. The system itself (in a block format)

In addition, Figure 2 represents the sequence diagram for adding a new place in Kingdom of Saudi Arabia.



**Figure 2:** The sequence diagram for adding a new place in Kingdom of Saudi Arabia.

**Class Diagram:**

Class diagram is considered as one of the best and most helpful types of UML diagrams as they delineate the system

structure clearly by modeling the system operations, classes, objects relationships and attributes. Figure 3 demonstrates the class diagram for the proposed system.

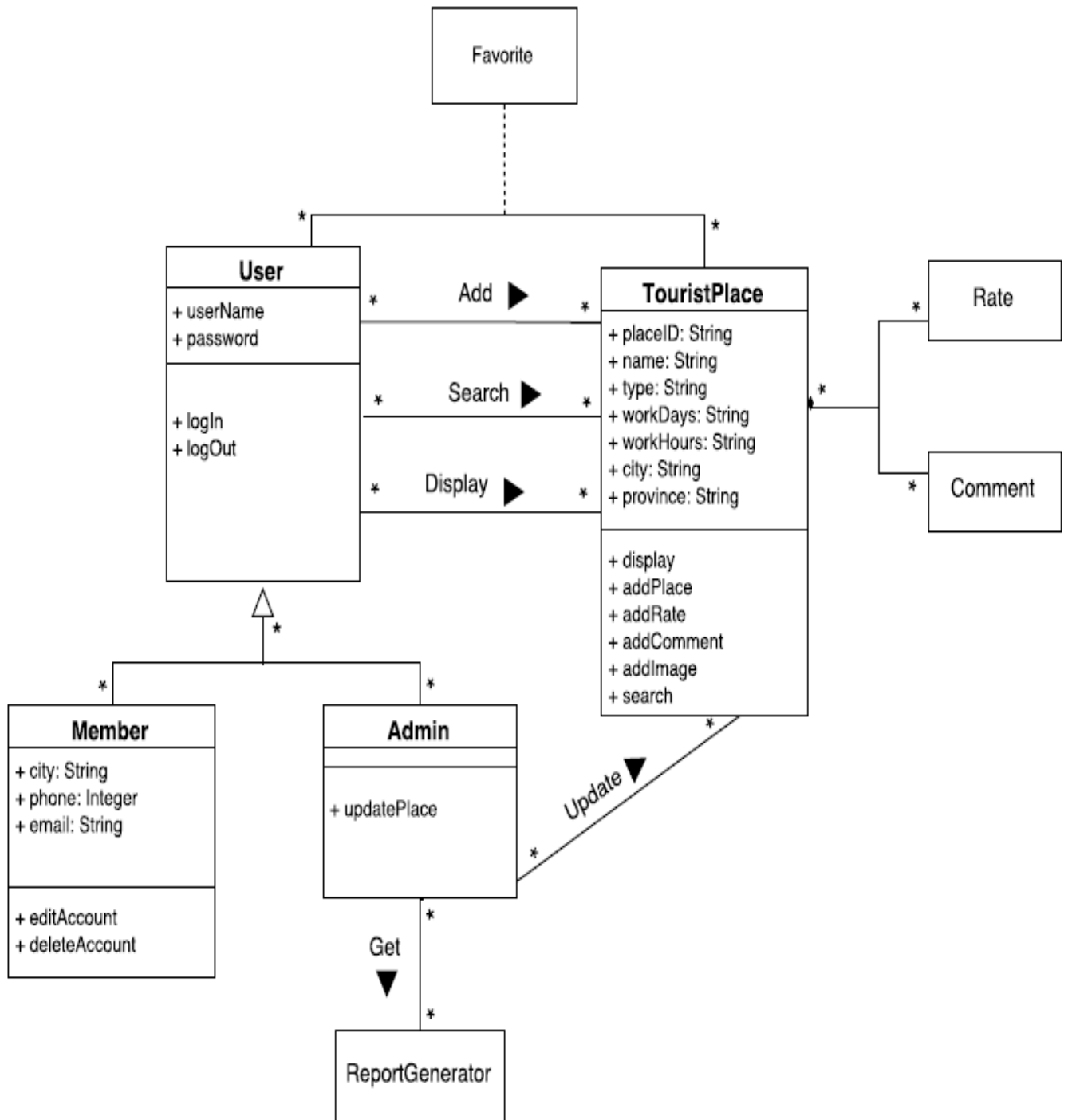


Figure 3: Class diagram for the proposed system.

**Entity Relationship (ER) Diagram :**

The ER Diagram, a kind of flowchart demonstrates the way that entities such as concepts, objects, or people are related within a system to each other. ER Diagrams are commonly utilized to debug or design relational databases in the education and research, business information systems and software engineering.

ER diagrams are associated to Data Structure Diagrams (DSDs), which concentrates on the elements relationships within entities rather than the relationships between entities themselves. In addition, ER diagrams are commonly employed along with data flow diagrams (DFDs), which delineate the information flow for systems or processes. Figure 4 shows the ER diagram for the proposed system.

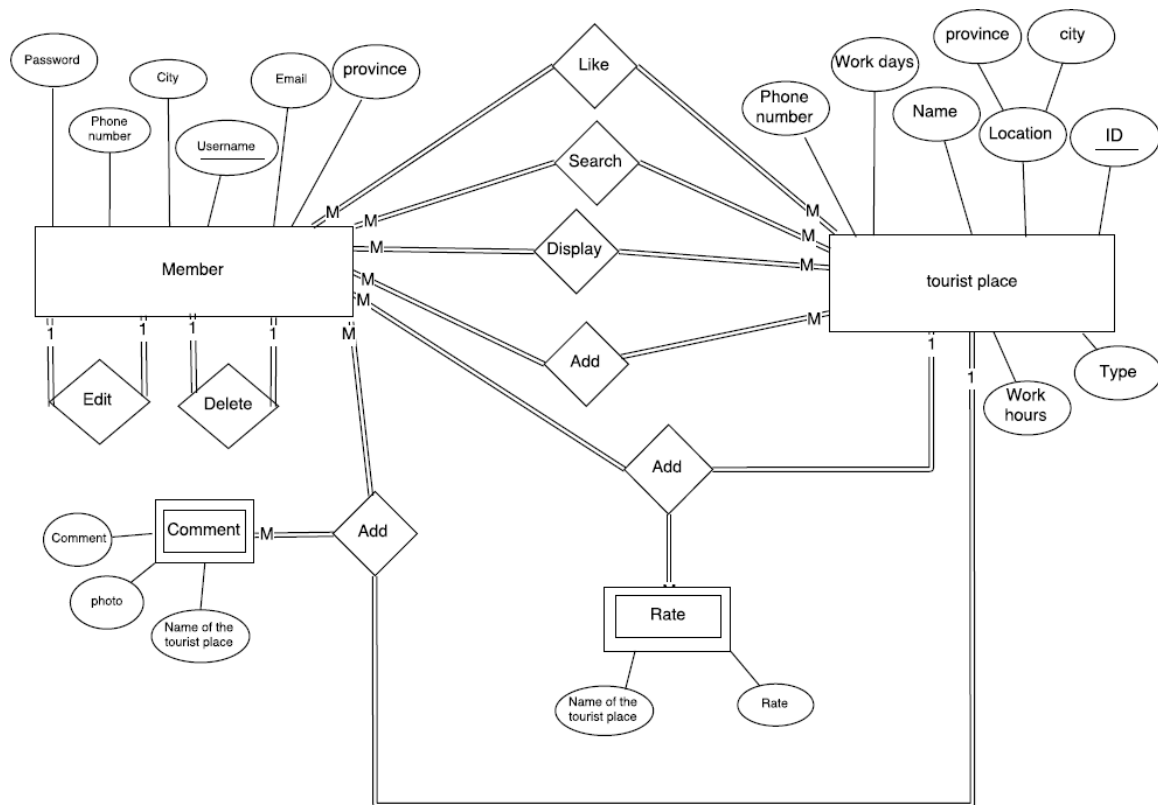


Figure 4: ER diagram for the proposed system.

### DATABASE TESTING AND CONSTRUCTION

Testing the database is important in order to find errors which might affect the system reliability, consistency, performance

and security. It also assists to validate the system against the requirements specified by the user [58, 59]. The proposed system used Microsoft Access 2010 to implement the database. Several tables have been created as following:

Table 1: Members table.

username	pswd	city	phone	email	province
abdullah-57	*****	albaha	0538897990	abdu2009@outlook.com	المنطقة الجنوبية
ahmed-11	*****	alkhobar	009938475	alqahtania@outlook.com	المنطقة الشرقية
alaa	*****	abha	00328899	alaa-sa@outlook.com	المنطقة الجنوبية
alzahrani-a	*****	dammam	009987887	aamer-asl@gmail.com	المنطقة الشرقية
au1	*****	tabouk		au100@gmail.com	المنطقة الشمالية
basem	*****	riyadh	009988787	balghamdi@gmail.com	المنطقة الوسطى
danah	*****	jeddah	0567786647	aldanah74@gmail.com	المنطقة الغربية
haJar	*****	jubail	00998977jj	hajar.8080@gmail.com	المنطقة الشرقية
huda-az	*****	dammam	0567483746	hudabdulaziz@gmail.com	المنطقة الشرقية
mohammed	*****	abha	0599485778	almutairy@outlook.com	المنطقة الجنوبية
rawan	*****	dammam	0584759867	roni149@hotmail.com	المنطقة الشرقية
salharbi	*****	qassim	0598837465	sara-moh@gmail.com	المنطقة الوسطى
sha71	*****	makkah	0598837465	1414sh@yahoo.com	المنطقة الغربية
turki-alsh	*****	riyadh	0509938593	turki2018@yahoo.com	المنطقة الوسطى
waleed90	*****	jeddah	045458420	alwaleeed@yahoo.com	المنطقة الغربية

**Table 2:** Users rating table.

placeid	username	rating	placename
3	ahmed-11	9	مادلين
5	ahmed-11	10	باركرز
7	alaa	10	قوستو
1	alzahrani-a	9	اورينت
6	haJar	6	سنشريكوزين
4	waleed90	8	سنروم

**Table 3:** Places table.

placeid	placename	type	city	area	workdays	workhours	phonenumber
1	اورينت	مطعم	الخبر	الشرقية	طوال ايام الاسبوع	من 8 صباحا الى منتصف الليل	0504437655
3	مادلين	مطعم	الخبر	الشرقية	5 ايام	من 8 صباحا الى منتصف الليل	0138492211
4	سنروم	مطعم	الخبر	الشرقية	طوال ايام الاسبوع	من 8 صباحا الى منتصف الليل	0138814777
5	باركرز	مطعم	الخبر	الشرقية	طوال ايام الاسبوع	من 8 صباحا الى منتصف الليل	0138820260
6	سنشريكوزين	مطعم	الخبر	الشرقية	طوال ايام الاسبوع	من 8 صباحا الى منتصف الليل	0561333445
7	قوستو	مطعم	الخبر	الشرقية	طوال ايام الاسبوع	من 8 صباحا الى منتصف الليل	0138444111
11	لاسكالا	مطعم او مقهى	الخبر	المنطقة الشرقية	طوال ايام الاسبوع	من 8 صباحا الى 11 مساء	0553365233
12	ساينك	مكان لتقافي	الخبر	المنطقة الشرقية	من الاحد الى الخميس	من 8 صباحا الى 11 مساء	0138992883
13	قصر المصمك	مكان تراثي	الرياض	المنطقة الوسطى	طوال ايام الاسبوع	من 8 صباحا الى 9 مساء	0112458762
14	معرض ارامكوا	مكان لتقافي	الظهران	المنطقة الشرقية	طوال ايام الاسبوع	من 8 صباحا الى 6 مساء	0138722222
15	مكان ترفيحي منتزه الملك عبدالله	مكان ترفيحي	الاحساء	المنطقة الشرقية	طوال ايام الاسبوع	من 10 صباحا الى 11 مساء	0133547954
16	الجبل الاخضر	مكان ترفيحي	ابها	المنطقة الجنوبية	طوال ايام الاسبوع	من 8 صباحا الى 12 مساء	0172778954

## INTERFACE DESIGN

The programming languages utilized in this work are HTML, Visual Studio programming languages. The programming languages are chosen relying on the languages features which make them more suitable for this work. In the proposed system, the user starts with the registration in the system (as shown in figure 5); after that the system offers the user a form for login and the user has to enter the information required as

shown figure 6. If the information is found correct by the system search in the database, it displays to the user the system homepage and allows the user to make use of the proposed system. However, if it's not valid, the user will be redirected to the login page. An interface shows four tourism places in Al Khobar is represented in figure 7.

**Figure 5:** User registration interface.



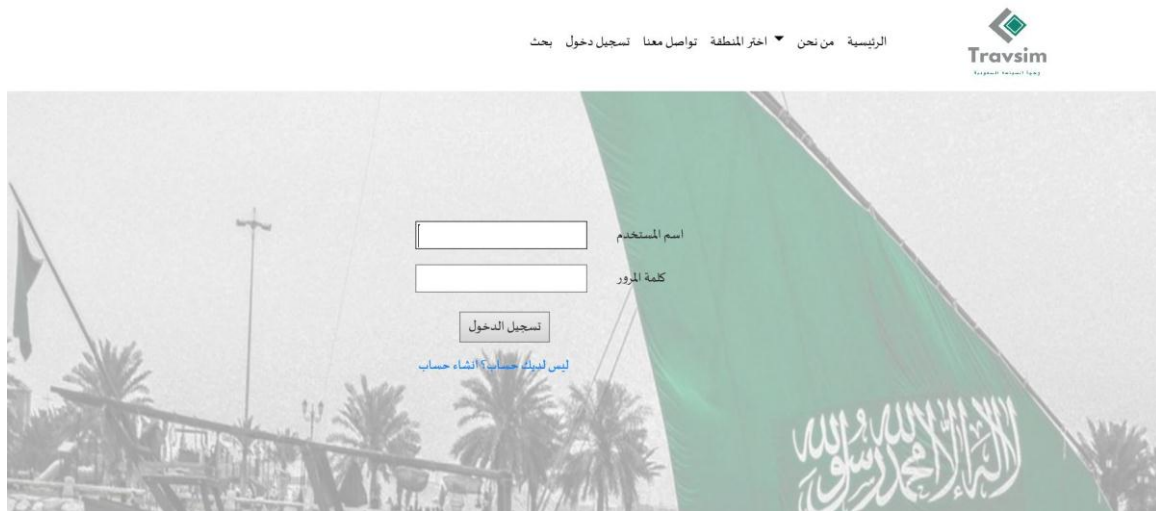


Figure 6: Log in interface.

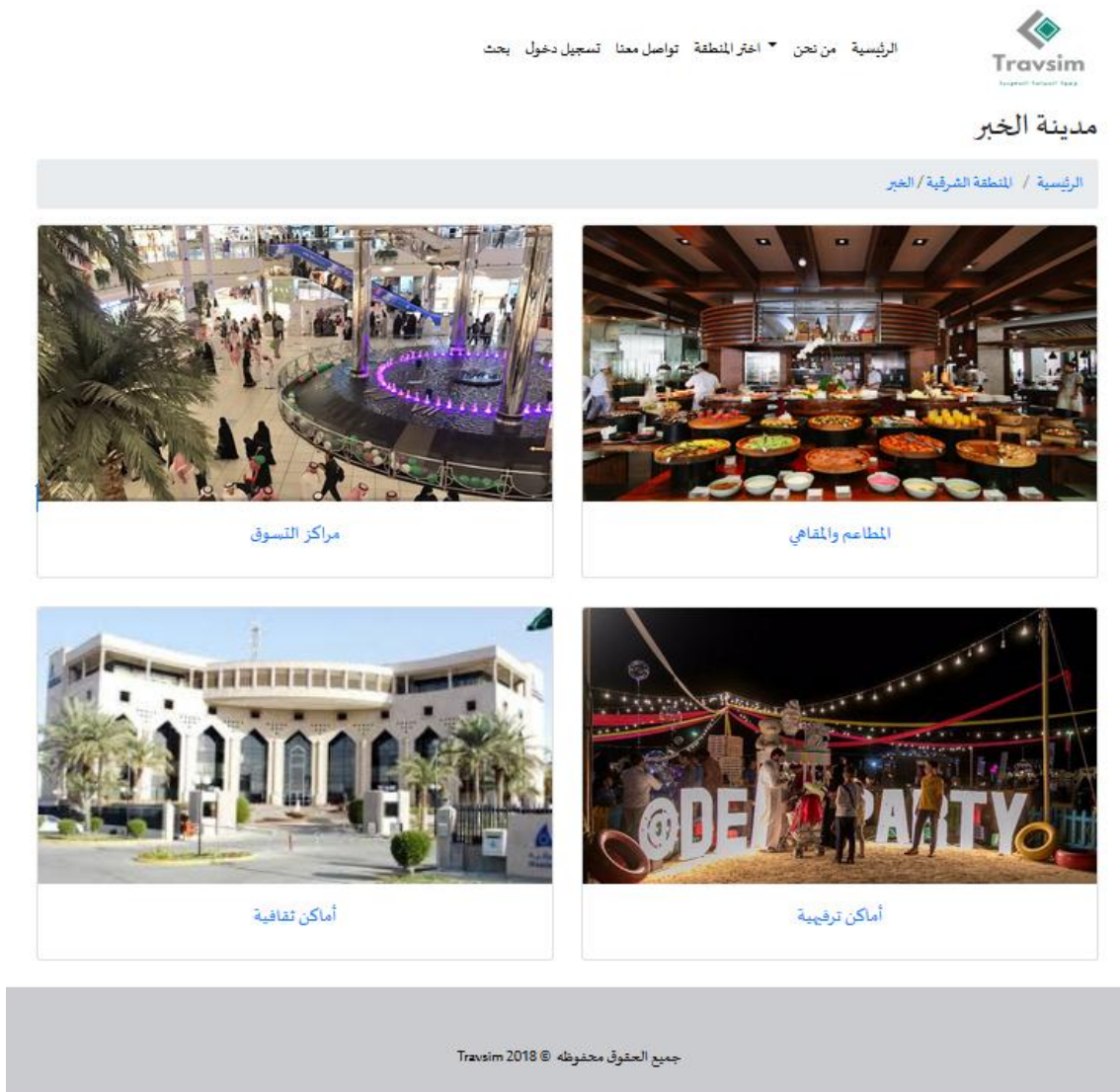


Figure 7: Tourism places in Al Khobar

## DISCUSSION

This stage highlights the usability of the proposed system. During this stage, the system is evaluated while user satisfaction is ensured. Test was executed on the proposed system by running it on Mozilla Firefox and Internet Explorer using the local host server. For evaluation purpose, 20 students from College of Applied Studies and Community Service at Imam Abdurrahman Bin Faisal University (IAU) were invited to use the prototype. The students were first briefed on the prototype's usage and the user interface. Then, the students tested the system, and answered the survey questionnaire consisting of 10 items formulated to gauge the level of user satisfaction. The usability of the proposed system was also determined. The result as well as the level of usability of the system according to the feedback provided by 20 students can be referred in table 4. As can be construed by the result, a significant amount of users agrees that system is practical, useful and fulfill the project's primary objective.

**Table 4:** collected data results from the 20 students.

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
<b>Strongly disagree</b>										
<b>Disagree</b>										
<b>Neutral</b>	6	5	7	3				3	1	
<b>Agree</b>	4	7	5	7	9	9	20	14	15	15
<b>Strongly agree</b>	10	8	7	10	11	11		3	4	5

## CONCLUSION

The information technology revolution extremely influenced the development in tourism. Poor analysis results from insufficient information, which causes to mistaken policies on tourism management. The Kingdom of Saudi Arabia is characterized by the presence of many places of tourism, whether religious tourism or eco-tourism, as religious tourism in the Kingdom is one of the most important sources of income and one of the largest pillars of the economy in the Kingdom, and environmental tourism is an important element of the tourist's attractions. This work designed and implemented an intelligent platform that will help the tourists to get accurate and relevant information about the tourism places such as location, restaurants and events. The proposed work was designed and implemented using the Unified Modeling Language (UML), Microsoft Access 2010 and Visual Studio programming languages. The proposed tourism system was able to provide accurate and relevant information to the tourists about tourism places at the Kingdom of Saudi Arabia, and provide the tourists with recommendations for places to visit based on their preferences.

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