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Tourpulse

Explore, Plan, and Administer Tours Website

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Abstract

"Tourpulse: Explore, Plan, and Administer Tours" is a Website that acts as an intermediary between travel agencies and travelers, it is designed to give the Agency the ability to offer their Tour packages and to provide the user with a Gallery of all Tours that have been offered, and it allow the user to review his experience which delivers feedback that helps the agency to improve it services, and give the other user a good ideas to know what to choose.

Tourpulse is an intelligent website, we added a recommendation system that provides the user with the most suitable tour picks for him according to his interaction with the website.

Acknowledgement

This project was a great and beautiful opportunity to gain experience and knowledge in complex and large tasks, with the great responsibility to complete this difficult project, we had to learn the necessary skills for that, we learned time management and how to access knowledge by searching on search engines, in addition to the self-learning skills that we benefited to learn technologies which were necessary for us to complete our project, all of this would not have happened without the experience and knowledge that we learned from the college's professors and lecturers over the years of study, especially Dr. Mai Abu Sair, who supervised us in this project and gave us instructions and directions, spared no effort in helping us whenever we needed it, in addition, we would also like to express our gratitude to our family and friends who helped and encouraged us to reach this point.

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CHAPTER ONE

1.1 Introduction

The tourism and travel sector in Palestine faces a weakness in availability and marketing, for example, at the level of tourism and travel agencies, there is a lack of marketing for the tours of agencies, as the vast majority of agencies do not have their website, and many of them do not even have social media pages, this affects the agency's ability on reaching the target group of potential customers, on the other hand, the traveler faces a problem of the lack of potential options in front of him, as his choices are limited to the tours of the agencies he knows, so this is a problem for two parties: the agencies and the travelers.

To solve this problem, we created the "Tourpulse" website for tourism and travel in Palestine, as it allows Palestinian agencies to market and display their tours in addition to organizing, managing, and arranging them, which allows them to reach a larger number of customers and gives them more organization, and allows users to view all the tours available to them and choose the appropriate one from it smoothly.

1.2 Problem Statement

- Difficulty accessing the offered tours

It is difficult for the traveler to access all the tour options available to him, which makes him limited to a smaller number of tour options.

- Weak marketing at agencies

Most tourism and travel agencies do not have a website or social media pages, which is the most important aspect of marketing in this modern age, and this leads to a decline in potential customers.

- Weakness in the feedback system

The lack of a consistent evaluation system for all agencies leads to a weakness in the differentiation of agencies and distinguishing their differences from each other, in addition to weakening an important aspect of communication between the agency and the traveler, The lack of a feedback system reduces the ability of agencies to know the weak points that need to be strengthened and reduces the traveler's ability to express his opinion on the experience he went through.

- Arrangement, organization and preservation

The lack of an electronic system for all agencies that helps in arranging, organizing, and saving the agency's tours and other info.

- Access to tours

The lack of an electronic system may force the user to go in person to inquire about the offered tours and their details.

1.3 Proposed System

"TourPulse" is designed to modernize and simplify the process of discovering and managing tour packages in Palestine. It addresses the fragmented and unreliable nature of tour promotion on social media by providing a centralized website. This website streamlines the connection between tour operators and travelers, facilitating easy management of tours, and offering users efficient search and filtering tools. The aim is to minimize the effort and time spent in finding and organizing tours, enhancing the overall experience for both tour operators and travelers in the tourism industry.

1.4 Project Scope

"TOURPULSE" is developed as a comprehensive web-based platform aimed at enhancing the management and discovery of tour packages in Palestine. The primary objective is to provide tour operators with a centralized, streamlined system for efficiently listing, updating, and promoting their tours. This approach is designed to significantly reduce the dependence on social media for tour promotion, offering a more professional and organized method for tour management.

For travelers, The platform offers travelers advanced search and filtering tools for easy discovery of tours, catering to diverse interests from local culture to global adventures. The platform's review and rating system further enhance trust and transparency between travelers and tour operators, streamlining the tour selection process.

TourPulse's standout feature is its personalized tour recommendation system. Utilizing user data like interests, search history, and ratings, it provides tailored tour suggestions matching individual preferences. This feature enhances the travel experience in Palestine, aiding tourists in discovering unique tours and assisting tour operators in broadening their visibility and reach.

The system emphasizes safety and user accessibility. The platform features a straightforward and user-friendly design, ensuring a secure and effortless experience for all users.

1.5 Goals and Objectives

The "TOURPULSE" platform is designed with specific goals and objectives to enhance the tourism sector includes:

1. Create a single platform that brings together users searching for tours and tour operators.

2. Empower tour operators to manage their tours in one place, facilitating easy modifications, deletions, and categorization.

3. Allow tour operators to create their accounts on the site and add their company information, enhancing their online presence.

4. Enable tour operators to view user interactions and receive feedback on their tour packages.

5. Provide the capability for users interested in traveling to create their own accounts and attach their personal information.

6. Allow users to view a variety of tour packages from different tour operators in one centralized location.

7. Equip users with tools to filter, search, and provide feedback on tours.

8. Offer users personalized tour recommendations based on their interests and interactions on the platform.

CHAPTER TWO

LITERATURE AND METHODOLOGY

2.1 Introduction

Tourplus is set to make a significant impact on the tourism and travel sector in Palestine. In this section, we will outline the platform's key features, while also shedding light on the strengths and weaknesses of the regulations that govern the tourism and travel industry in Palestine. By doing so, customers will gain a comprehensive understanding of the platform's importance in enhancing the tourism and travel sector.

2.2 Current System

In the travel and tourism sector, we've found through our research that tour operators often rely on social media to share and manage their tour packages as we mentioned before. This approach can make it hard to keep things organized and well-managed. Plus, there's no centralized platform where travelers can easily find tours, get contact information for these companies to reach out directly. This shows a clear need for a new solution that can make things smoother and improve the experience for both travel companies and people looking to explore.

Disadvantages of Current Systems

1. Absence of tour package management
2. Information retrieval and modification issues
3. Limited audience reach for new tour operators
4. Ineffective search mechanisms
5. Unsatisfactory filter results
6. Excessive choices causing decision paralysis
7. Time wasted on extensive options
8. Lack of reliability
9. No central hub for travelers and operators
10. Absence of personalized recommendations
11. Uncreative presentation of information
12. Complexity in understanding tour package details

2.3 Feasibility Study

- **Project Description**

TourPulse is a website used by people who want to travel on tourist tours and travel agencies, so this site is considered a link between them and is considered a technological improvement for the tourism and travel sector in Palestine.

Agencies:

Every travel agency that has an account on the site can add a tour with specific descriptive information about the tour, such as the name, price, start date, and end date, last date of registration, an explanatory description, a photo, and other necessary information, Its home page contains the tours for this agency with the ability to search and filter them it can delete and update information for each tour, and it also has a profile page that displays the company data he entered when he subscribed to the site, with the ability to modify it.

Users:

Every user who has an account on the site has a home page that contains an overview of the activities possible in the tours and tourism agencies participating in the site and tours recommended especially for this user according to the interests he added when he registered and according to his interaction with the site and his evaluations of the tours he added, in addition to a description of the site, the user has a page that contains all the tours on the site with the ability to search and filter according to several criteria, in addition to the ability to display full details for each tour offered and add an evaluation with a comment on it. It also has a special page for the Palestinian agencies participating in the site with the ability to search and filter on it in addition to displaying full details About it and adding a rating with a comment on the agency, he also has a profile page that displays the data that he added upon registration, with the ability to change his password and email.

Admins:

Every admin on the site has a main control page that contains a field for tours that have been deleted from the agencies and he has the ability to delete them permanently or restore them. He also has a field for Inactive agencies and he has the ability to activate it if he wants. The admin has a page of all users that contains all the site's users with the ability to search and filter them and the ability to block and unblock every user He also has a page for all admins and can search and filter according to special criteria, He can change the data of each admin and block and unblock him and change his role. He also has a page for all the categories that the tours are classified by, through which he can add them. New categories and modifications to existing ones, he also has a page to display tours.

- **Market Feasibility Study**

With the increasing demand for the use of technology in all areas of daily life to facilitate and reduce effort, the tourism and travel sector in Palestine will need this qualitative transformation to make this sector keep pace with the era of modernity and technology, the main reason for the high possibility of success of this project will be its meeting the needs of both parties, the tourism agencies and the user who He wants to travel, so his solution to basic problems for both parties will make him accepted and welcomed by them.

- **Technical Study of the Project**

Tourpulse requires assembling a range of resources and expertise to bring the platform to life. This includes hiring skilled web developers to build a responsive website, market researchers to tailor the platform to user needs, professional UI/UX designers to ensure an engaging user experience, as well as securing the necessary funding for development and deployment. The project's success hinges on combining these elements to create a seamless, user-friendly interface that stands out in the digital tourism market.

2.4 Methodology

- **Main Work**

We chose the Agile methodology as we saw that ideas and additions to the site do not stop. Team members were coming up with new ideas that would improve the project, for that the agile methodology was the best fit for our project because it is a dynamic approach that adapts to changing environments, In addition, there was a need to produce prototypes (iterations) for evaluation, necessary changes, and suggestions to be added by the project supervisor, The agile methodology gives the ability to deliver work programs in short cycles, as it follows the iterative and incremental method and the process through which The agile methodology helps in working together as a team since each iteration requires collective work from the entire team to complete it.

- **Website’s Languages and API’s used**

Languages Used

1. JavaScript (for MERN: MongoDB, React, Node.js).
2. Python (for the Flask framework).
3. HTML/CSS(Bootstrap).

Applications used

4. VS Code.
5. Postman.
6. MongoDb Compass.

CHAPTER THREE

SYSTEM ANALYSIS AND DESIGN

3.1 Product perspective

Tourpluse is a system in the form of a website, it will be designed to be a link between tourism agencies and their clients, The front end of the website will be designed using HTML, CSS, bootstrap 5, and React for front end, and we will use NodeJS for the back end and MongoDB for the database, for the Recommendation System we will use Flask framework (python).

3.2 System Environment

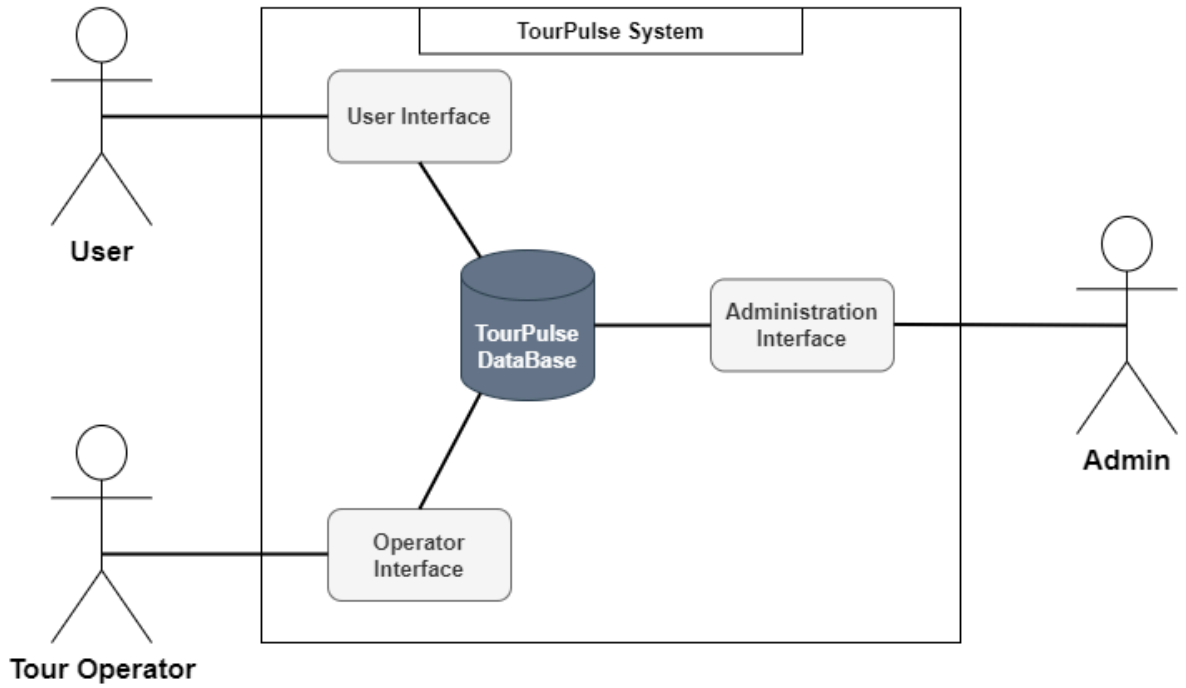


Figure 1 - System Environment

The TourPulse system has three active actors: users, tour operators, and administrators. Users engage with the platform through a dedicated interface designed for them to view, search, and filter through various tour packages, tailored to their preferences. Tour operators have access to an operator interface, which allows them to manage their offerings by adding new tours, updating existing ones, or removing those no longer available. The administrative aspect of the platform is handled through an administration interface, which grants the admin team the ability to oversee and regulate the activities of both the users and tour operators, ensuring a smooth operation of the platform. Central to the system is the TourPulse Database, which securely houses all the data, serving as the essential link between the different interfaces and ensuring that information is consistently up-to-date and accurately reflected across the user and operator experiences.

3.3 Functional Requirements Specification

Here are the detailed use cases for the Tourplus platform:

Use Case 1: User Registration and Account Confirmation
Primary Actor: New User
Secondary Actors: Email System
Preconditions: The user is not already registered with the system.
Main Flow:

1. The user navigates to the sign-up page.
2. The user enters required details such as name, email, and password.
3. The system validates the information and registers the user.
4. The system sends a confirmation email to the user's email address.
5. The user clicks the confirmation link in the email.
6. The system confirms the user's email and activates the account.

Postconditions: The user account is active, and the user can log in.

Use Case 2: User Login
Primary Actor: User
Preconditions: The user is already registered with the system and confirmed to access via Email.
Main Flow:

1. The user opens the login page.
2. The user enters their login credentials.
3. The system verifies the credentials and logs the user in.

Postconditions: The user accesses the homepage with personalized options.
Actor: User (Website visitors)

Use Case 1: User Profile Management
Primary Actor: User
Preconditions: The user is already logged into their account and has access to their profile page within the system.
Main Flow:

1. The user accesses their profile page.
2. The user updates their personal details and preferences.
3. The system saves the updated profile information.

Postconditions: The user’s profile is updated.

Use Case 2: User Password Update via Email Code
Primary Actor: User
Secondary Actors: Email System
Preconditions: The user is already registered with the system, has a valid email address associated with their account, forgotten their password or wants to reset it, and can access the "Forgot Password" functionality on the login page.
Main Flow:

1. The user selects "Forgot Password" on the login page.
2. The user provides their email address.
3. The system sends a reset code to the user's email.
4. The user enters the received code along with a new password.
5. The system updates the user’s password.

Postconditions: The user’s password is reset, and they can log in with the new password.

Use Case 3: Search and Filter Tour Packages
Primary Actor: User
Preconditions: The user is logged into the system or has access to the tour packages page.
Main Flow:

1. The user navigates to the tour packages page.
2. The user selects various filters and sorting options.
3. The system displays the tour packages that match the criteria.

Postconditions: The user can browse through the filtered and sorted tour packages.

Use Case 4: Search and Filter Tour Packages
Primary Actor: User

Preconditions: The user has access to the tour packages page
Main Flow:

1. The user navigates to the tour packages page.
2. The user selects various filters and sorting options.
3. The system retrieves and displays tour packages that match the selected criteria.

Postconditions: The user has a list of tour packages tailored to their preferences, which they can browse and select from.

Use Case 5: User Rates Tour Packages and Tour Operators
Primary Actor: User
Preconditions: The user is registered, and has completed a tour package or interacted with a tour operator.
Main Flow:

1. The user navigates to the completed tour package page or the tour operator's profile page.
2. The user selects the option to rate and review the tour package or tour operator.
3. The user enters a rating on a predefined scale (e.g., 1 to 5 stars) and writes a comment detailing their experience.
4. The system validates the submission to ensure the rating is within the allowed range and the comment meets content guidelines.
5. Upon successful validation, the system posts the user's rating and comment.
6. The system updates the overall rating of the tour package or tour operator based on the new user rating.

Postconditions: The user's rating and comment are publicly visible on the tour package or tour operator's profile page, contributing to the overall rating.

<u>Actor: Tour Operator</u>

Use Case 1: Tour Operator Adds a Tour Package
Primary Actor: Tour Operator
Preconditions: The tour operator is logged into the system with the necessary permissions to add tour packages.
Main Flow:

1. The tour operator navigates to the tour management interface.
2. The tour operator selects the option to create a new tour package.

3. The tour operator enters details for the new tour package, including name, description, price, duration, images, and other pertinent details.
4. The system validates the entered details for completeness and correctness.
5. Upon successful validation, the system adds the new tour package to the platform's listings.

Postconditions: The new tour package is listed on the platform and is available for users to view.

Use Case 2: Tour Operator Deletes a Tour Package

Primary Actor: Tour Operator

Preconditions: The tour operator is logged into the system and has identified a tour package they wish to delete.

Main Flow:

1. The tour operator selects the tour package to be deleted from their management interface.
2. The tour operator requests deletion of the tour package.
3. The system asks for confirmation to proceed with the deletion.
4. Upon confirmation, the system marks the tour package as deleted and removes it from active listings.

Postconditions: The tour package is no longer visible to users on the platform and is queued for permanent deletion or restoration by the admin team.

Use Case 3: Tour Operator Updates a Tour Package

Primary Actor: Tour Operator

Preconditions: The tour operator is logged into the system and has selected a tour package to update.

Main Flow:

1. The tour operator accesses the tour package they wish to update.
2. The tour operator modifies the details of the tour package, such as updating the itinerary, pricing, or availability dates.
3. The system validates the updated details.
4. Upon successful validation, the system updates the tour package information on the platform.

Postconditions: The tour package details are updated on the platform and reflected in the listings viewed by users.

Use Case 4: Tour Operator Updates Profile Information

Primary Actor: Tour Operator
Preconditions: The tour operator is logged into the system and wishes to update their profile information.
Main Flow:

1. The tour operator navigates to their account information page.
2. The tour operator edits their profile details such as the company description, contact information, or logo.
3. The system validates the updated information.
4. Upon successful validation, the system saves the updated profile details.

Postconditions: The tour operator's profile is updated on the platform, and the changes are visible to users.

Use Case 5: Tour Operator Requests Restoration of a Deleted Tour Package
Primary Actor: Tour Operator
Preconditions: The tour operator has previously deleted a tour package and wants it restored.
Main Flow:

1. The tour operator contacts the admin team to request the restoration of a deleted tour package.
2. The tour operator provides the necessary details of the tour package for identification.
3. The admin team reviews the request for restoration.
4. If approved, the admin team restores the tour package to the active listings on the platform.

Postconditions: The previously deleted tour package is restored and visible again to users on the platform.

<u>Actor: Super Admin/Admin</u>

Use Case 1: Create Tour Operator Profiles
Primary Actor: Admin/Super Admin
Preconditions: Logged in with administrative privileges.
Main Flow:

1. Navigate to the tour operator management section.
2. Select the option to create a new tour operator profile.
3. Enter the details for the new tour operator profile, including company name, contact information, and description.
4. Submit the form, and the system validates the entered information.

5. Upon successful validation, the system creates the new tour operator profile.

Postconditions: A new tour operator profile is available on the platform.

Use Case 2: Manage Admin Profiles (Super Admin Exclusive)

Primary Actor: Super Admin

Preconditions: Logged in as Super Admin.

Main Flow:

1. Navigate to the admin management section.
2. For adding a new admin: Select the option to create a new admin profile, enter details, and submit.
3. For changing status: Select an existing admin profile and change their status from active to inactive or vice versa.
4. Submit the changes, and the system updates the admin profiles accordingly.

Postconditions: New admins are added or existing admin statuses are updated.

Use Case 3: Create and Manage Tour Package Categories

Primary Actor: Admin/Super Admin

Preconditions: Logged in with administrative privileges.

Main Flow:

1. Navigate to the category management section.
2. Select to add a new category or update an existing one.
3. Enter or update the category name and logo.
4. Submit the changes, and the system validates and updates the category list.

Postconditions: New categories are added or existing categories are updated.

Use Case 4: Manage Lifecycle of Tour Packages

Primary Actor: Admin/Super Admin

Preconditions: Logged in with administrative privileges.

Main Flow:

1. Navigate to the tour package management section.
2. Select a tour package to restore or delete permanently.
3. Confirm the action, and the system updates the tour package status accordingly.

Postconditions: Tour packages are restored or deleted permanently.

Use Case 5: Change Status of Users and Tour Operators
Primary Actor: Admin/Super Admin
Preconditions: Logged in with administrative privileges.
Main Flow:

1. Navigate to the user or tour operator management section.
2. Select a user or tour operator and change their status from active to inactive or vice versa.
3. Confirm the change, and the system updates their status accordingly.

Postconditions: The status of users or tour operators is updated.

Use Case 6: Publish Tourism Blogs
Primary Actor: Admin/Super Admin
Preconditions: Logged in with administrative privileges.
Main Flow:

1. Navigate to the blog management section.
2. Select the option to create a new blog post.
3. Enter the blog content, including title, body.
4. Submit the blog post, and the system publishes it after validation.

Postconditions: New tourism blogs are added to the platform.

Use Case 7: Update Admin/Super Admin Profile Information
Primary Actor: Admin/Super Admin
Preconditions: Logged in with administrative privileges.
Main Flow:

1. Access the profile settings page.
2. Update personal information such as contact details or password.
3. Submit the updates, and the system saves the changes.

Postconditions: The admin or super admin profile is updated.

Use Case 8: Search, Sort, and Filter Tour Packages and Operators
Primary Actor: Admin/Super Admin
Preconditions: Logged in with administrative privileges.
Main Flow:

1. Navigate to the tours or tour operators management section.
2. Apply search criteria, filters, and sorting options.
3. The system displays the results based on the selected criteria.

Postconditions: Admins can view and interact with a curated list of tour packages or operators.

3.4 User Characteristics

1. **Users (Travelers)**

Description: Users are individuals looking for travel opportunities and tour packages. They are expected to be Internet literate, with the ability to navigate and interact with web platforms. Users should be comfortable using both desktop and mobile devices to access the website, reflecting a wide range of ages and interests in travel.

Expectations: Users should be able to create and manage their accounts, search and filter tour packages based on various criteria, view detailed tour and tour operator information, and receive personalized recommendations. They are anticipated to engage with content, including reading blogs and exploring tour categories.

2. **Agencies**

Description: Tour Operators are businesses or individuals offering travel and tour services on the Tourplus platform. They are expected to have a moderate level of Internet and computer literacy, capable of managing their tour listings, updating company information. Tour operators should be familiar with using web-based management interfaces on both desktop and mobile devices.

Expectations: Tour operators are expected to create and update tour packages, and interact with potential travelers through the platform. They should be able to use the platform's tools for adding, updating, or deleting tour packages and requesting the restoration of removed packages.

3. **Admins/Super Admins**

Description: Admins and Super Admins are responsible for the overall management and operation of the Tourplus platform. They are expected to have a high level of computer and Internet literacy, with proficiency in using complex web-based platforms. Super Admins have additional responsibilities and capabilities compared to Admins, including managing admin roles.

Expectations: Admins and Super Admins should manage user and tour operator accounts, create and manage content (such as blogs and tour categories), handle the lifecycle of tour packages, and ensure the platform runs smoothly. They are expected to be proficient in using backend systems, conducting searches, applying filters, and generating reports to monitor the platform's activity.

3.5 Non-Functional Requirements

- Performance:
  - Speed in performance.
  - Accuracy in performance.
  - Speed in retrieving information.
  - Accuracy in Search.

- Responsive:
  The system will be adaptive to all sizes of screens Regardless of the type of device used.

- Availability:
  The system will be available to all active actors on the internet browser as a website.

- Portability:
  It can be run in all internet browsers on computers and smartphones and every device which has internet browsers.

- Usability:
  Tourpulse system is designed to be user-friendly, it's simple, clear, and easy to use.

- Maintainability:
  We divided the project in the back-end and front-end into components so that each component represents a part of the site and thus it is easy to know in which part the modification will take place.
- Security & Safety:
  We added protection for the API's coming from the Backend so that anyone who accesses the API links cannot modify anything on the site, and we used a protected method to prevent every user from going to pages that he is not authorized to access, we used the DotEnve library in React and Nodejs to hide sensitive data in the code, and we used tokens and password encryption technology for greater security.

3.6 Detailed Functional Requirements

There are three types of system users, and each one has its requirements:

Agency

Each agency that has an account on the site has a home page, This page displays the tours for this agency, and through the home page, the agency can delete tours and modify its data, in addition to reviewing the full details of the tour with reviews on it, and through this page, you can also search for a tour from the list of tours and sort its results appear according to specific criteria, in addition to filtering the results according to special criteria.

There is also a page for adding the agency's tours, in which a form appears for entering information about the tour you want to add.

There is a profile page for the agency, in which the data for this agency appears, and the agency can also edit its email on this page.

User

Each user who logs into the site has a home page, this page displays an overview of the site, in addition to recommended tours specifically for this user according to the interests he entered, his interactions with the site, and his similarity to other users through the Recommendation system.

There is also a page for tours, this page displays the added tours from all agencies registered on the site, and the user can search for a tour among the list of tours, he can also sort the offered tours or filter them according to specific and appropriate criteria, the user can also view the full details of a specific tour with the rest of the users reviews on it, In addition to his ability to add his review to it.

There is also a page for the list of agencies, This page displays all the agencies registered on the site, and the user can search for an agency among the list of agencies, He can also sort the displayed agencies or filter them according to specific and appropriate criteria, The user can also view the full details of a specific agency with the reviews of the rest of the users on it, in addition to his ability to add his review to it.

There is a profile page for the user, this page displays the user’s data that he entered when registering and gives him the ability to change his password and email.

Admin

Each admin has a home page, this page serves as a control panel that shows some of the main tasks that the admin can perform, It contains a field for deleted tours that displays the tours that were deleted by the agencies, and the admin can permanently delete them or restore them from deletion, there is also A field for agencies that have been deactivated, the admin can reactivate these agencies in addition to updating their data and viewing their tours, he also can add blogs from the home page.

The admin also has a page that shows a list of users on the site, the admin can search for a specific user on it, and in addition to sorting and filtering the displayed users according to special criteria, he can view the data of a specific user and block or unblock him from the site.

It also has a page to display the list of admins, where it can search for a specific admin, in addition to sorting and filtering the list of admins according to special criteria, It can also display the data of a specific admin and change its role and data.

It also has a page for categories. This page displays the categories for tours, and the admin can modify its data and add new categories.

The admin also has a page that shows a list of agencies on the site, the admin can search for a specific agency there, in addition to arranging and filtering the agencies displayed according to special criteria, and he can view the data of a specific agency, modify its data, and show its tours.

The admin also has a page that shows a list of tours on the site, the admin can search for a specific tour on it, in addition to sorting and filtering the tours offered according to special criteria, and he can display the data of a specific tour, reviews on it, and display the agency that owns it.

He has a profile page, this page displays his information and through it, he can change his password and email.

3.7 Algorithm

The recommender system for Tourplus is designed to provide personalized tour recommendations to users by employing a hybrid approach that combines content-based filtering and collaborative filtering techniques. The algorithm integrates user preferences and behaviors with tour information to generate a curated list of tour suggestions. Here is a breakdown of the algorithm and its implementation:

User Preferences Retrieval

Fetch User Preferences: Given a user_id, the system attempts to retrieve the user's preferences, which include interests and recent search keywords.

It converts the user_id to MongoDB's ObjectId format and fetches the corresponding user document.

It then extracts and combines the user's interests and the last five search keywords into a single string to capture the user's current interests.

```
def get_user_preferences(user_id):
    try:
        oid = ObjectId(user_id)
    except:
        return None

    user = db.users.find_one({'_id': oid})
    if not user:
        return None

    interests = user.get('interests', [])
    search_keywords = user.get('searchKeywords', [])[-5:]
    combined_prefs = ' '.join(interests + search_keywords).lower()
    return combined_prefs
```

Tour Descriptions Assembly

Compile Tour Descriptions: The algorithm collects all tours from the database. For each tour, it concatenates the tour's name, description, and tour plan into a single string.

These strings are stored in a dictionary keyed by the tour's ObjectId converted to a string, ensuring easy reference.

```
def get_tour_descriptions():
```

```
    tours = db.tours.find()
    return {
        str(tour['_id']): (tour['name'] + " " + tour['description'] + " " + tour.get('tourPlan',
"")).lower()
        for tour in tours
    }
```

Collaborative Filtering

Ratings Matrix Construction: The system constructs a ratings matrix based on user reviews.

Unique user IDs and tour IDs are identified.

A zero-filled matrix is created with dimensions corresponding to the number of users and tours.

Ratings are filled into the matrix based on the index positions of the user and tour IDs.

```
        def build_ratings_matrix():
    ratings_data = list(db.reviews.find({}))
    df = pd.DataFrame(ratings_data)
    user_ids = df['createdBy'].unique()
    tour_ids = df['tourId'].unique()
    user_idx = {str(id): idx for idx, id in enumerate(user_ids)}
    tour_idx = {str(id): idx for idx, id in enumerate(tour_ids)}
    matrix_data = np.zeros((len(user_ids), len(tour_ids)))

    for row in df.itertuples():
        u_idx = user_idx[str(row.createdBy)]
        t_idx = tour_idx[str(row.tourId)]
        matrix_data[u_idx, t_idx] = row.rating

    return matrix_data, user_idx, tour_idx
```

Matrix Factorization: Singular Value Decomposition (SVD) is applied to the matrix to reduce its dimensionality, capturing the latent factors in the data.

Similarity Computation: The cosine similarity is calculated between the target user's ratings vector and all other users' vectors.

Recommendation Generation: The algorithm predicts scores for all tours based on similar users' ratings and selects the top tours.

```
def get_collaborative_recommendations(user_id):
    matrix, user_idx, tour_idx = build_ratings_matrix()
    if str(user_id) not in user_idx:
        return []

    user_index = user_idx[str(user_id)]
    svd = TruncatedSVD(n_components=50)
    matrix_reduced = svd.fit_transform(matrix)
    user_ratings = matrix_reduced[user_index, :]
    similar_users = cosine_similarity([user_ratings], matrix_reduced)[0]

    tour_scores = np.dot(similar_users, matrix)
    tour_scores[user_index] = 0  # Ignore already rated tours by the user

    top_tour_indices = np.argsort(tour_scores)[::-1][:4]
    top_tour_ids = [list(tour_idx.keys())[i] for i in top_tour_indices]

    return top_tour_ids
```

Content-Based Filtering

TF-IDF Vectorization: User preferences and tour descriptions are transformed into a TF-IDF matrix to compute the importance of words in the description texts.

Cosine Similarity: The similarity between the user's preferences (as a query vector) and each tour description is calculated.

Selection of Top Tours: Tours are ranked based on their similarity scores, and the top-ranking tours are selected.

```
def get_content_based_recommendations(user_prefs):
    tfidf_vectorizer = TfidfVectorizer()
    documents = [user_prefs] + list(get_tour_descriptions().values())
    tfidf_matrix = tfidf_vectorizer.fit_transform(documents)
    cosine_similarities = cosine_similarity(tfidf_matrix[0:1], tfidf_matrix[1:]).flatten()
    top_indices = cosine_similarities.argsort()[-10:][::-1]
    tour_descs = get_tour_descriptions()
    top_tour_ids = [list(tour_descs.keys())[i] for i in top_indices]

    return top_tour_ids
```

Recommendation Aggregation

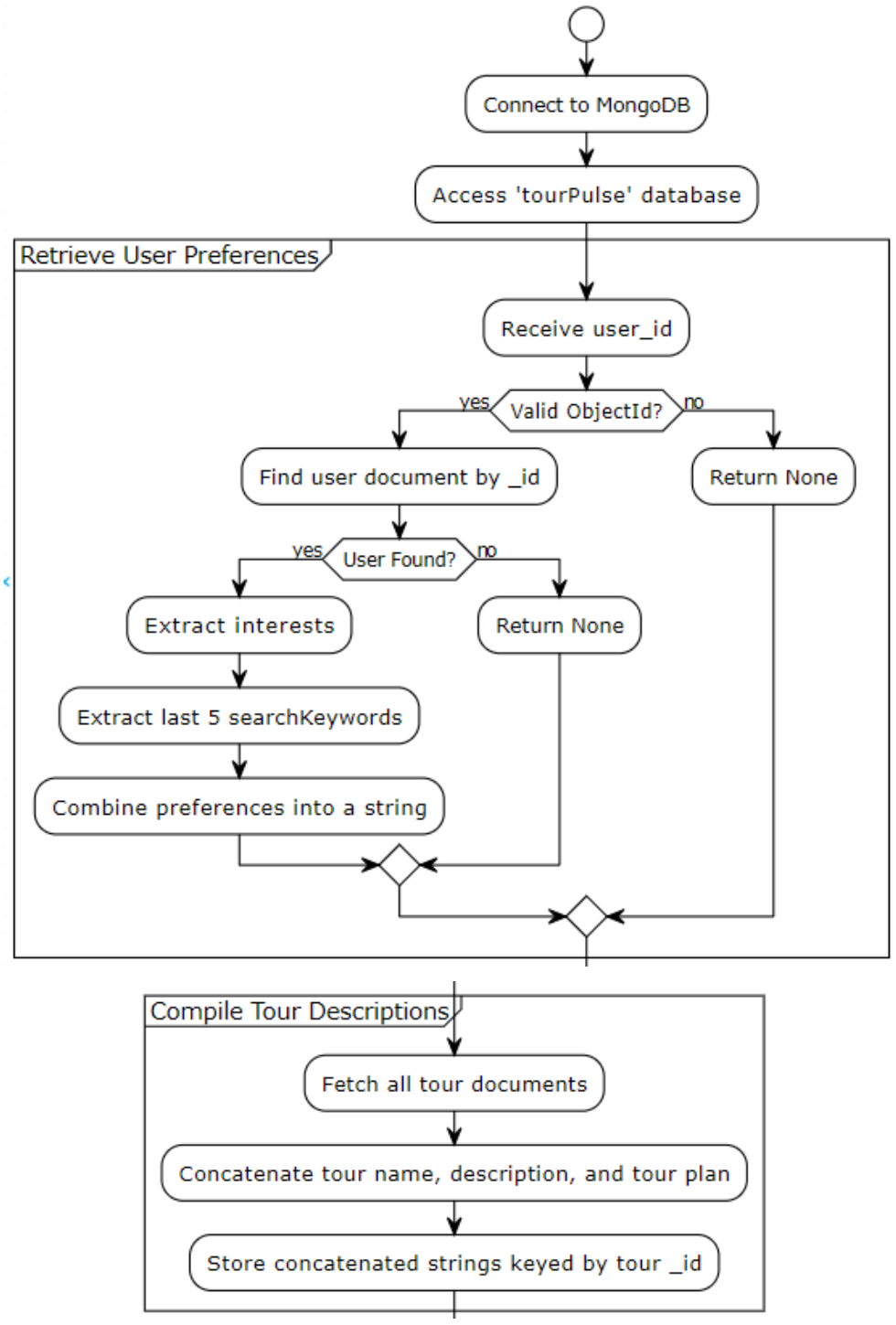
Merge Recommendations: The top recommendations from both content-based and collaborative filtering methods are combined into a single list, removing any duplicates.

```
    def get_recommendations(user_id):
  user_prefs = get_user_preferences(user_id)
  if user_prefs is None:
    return jsonify({'error': 'User not found'}), 404

  content_based_ids = get_content_based_recommendations(user_prefs)
  collaborative_ids = get_collaborative_recommendations(user_id)
  combined_ids = list(set(content_based_ids + collaborative_ids))
  combined_object_ids = [str(ObjectId(tid)) for tid in combined_ids]

  return jsonify(combined_object_ids)
```

Error Handling

The algorithm includes error handling to deal with cases such as invalid user IDs and the absence of user preferences or tours.

Tourplus Recommendation System Flowchart



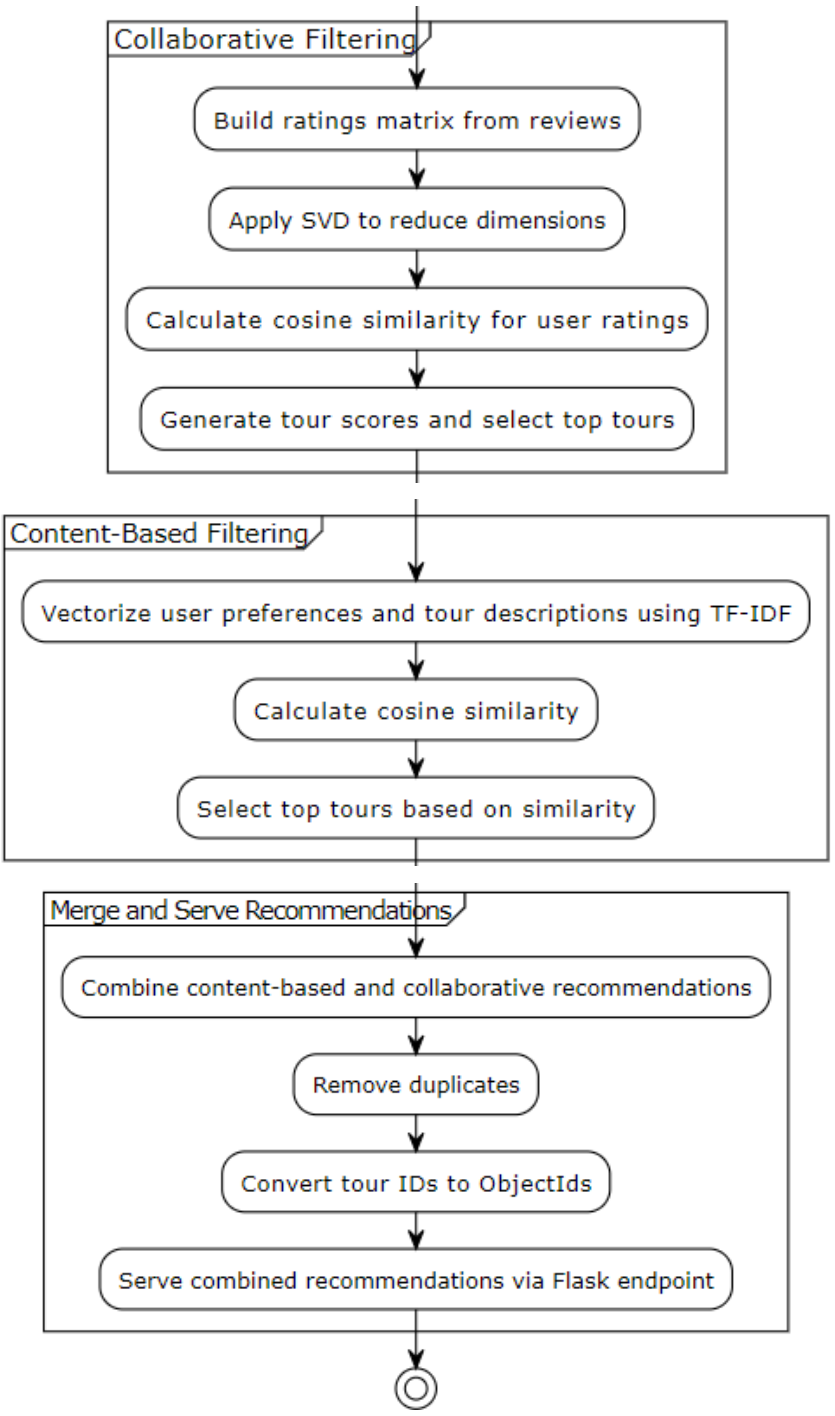


Figure 2 - Recommender Flowchart

3.8 System Design

3.8.1 Use Case Diagram

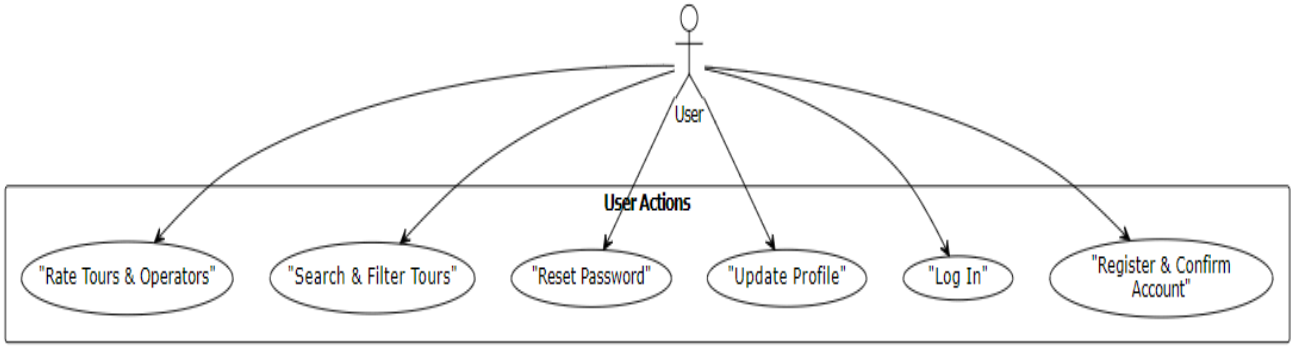


Figure 3 - User Use Case Diagram

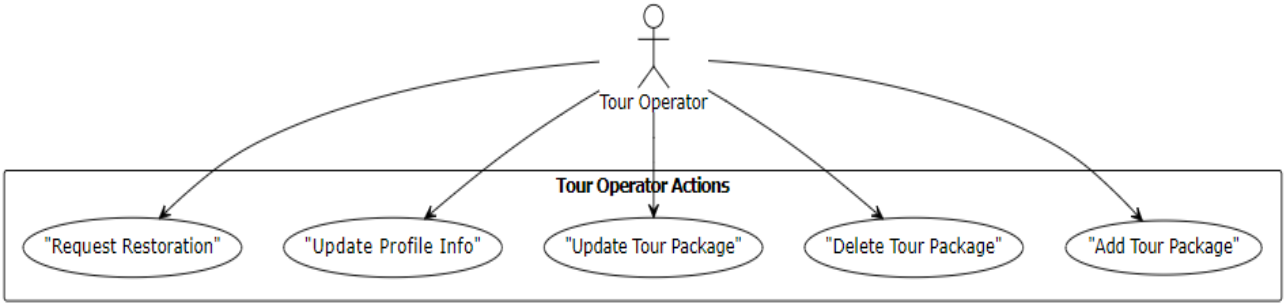


Figure 4 - Tour Operator Use Case Diagram

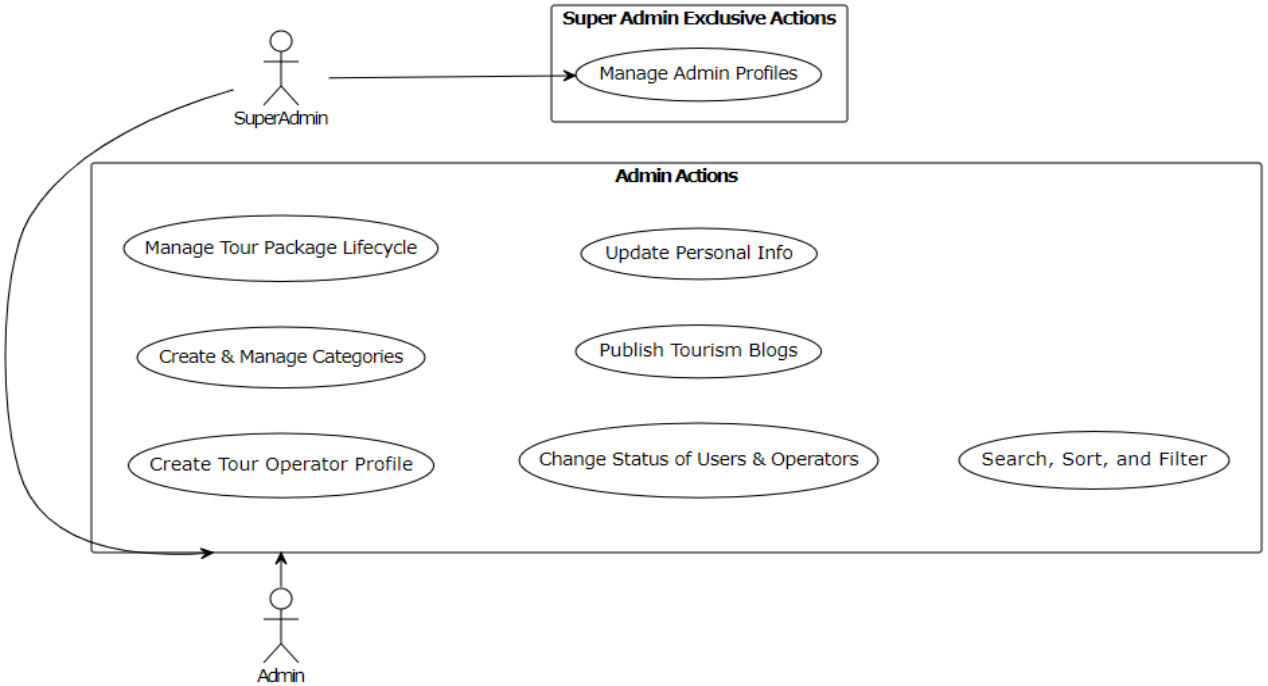


Figure 5 - Super Admin/Admin Use Case Diagram

3.8.2 Sequence Diagram

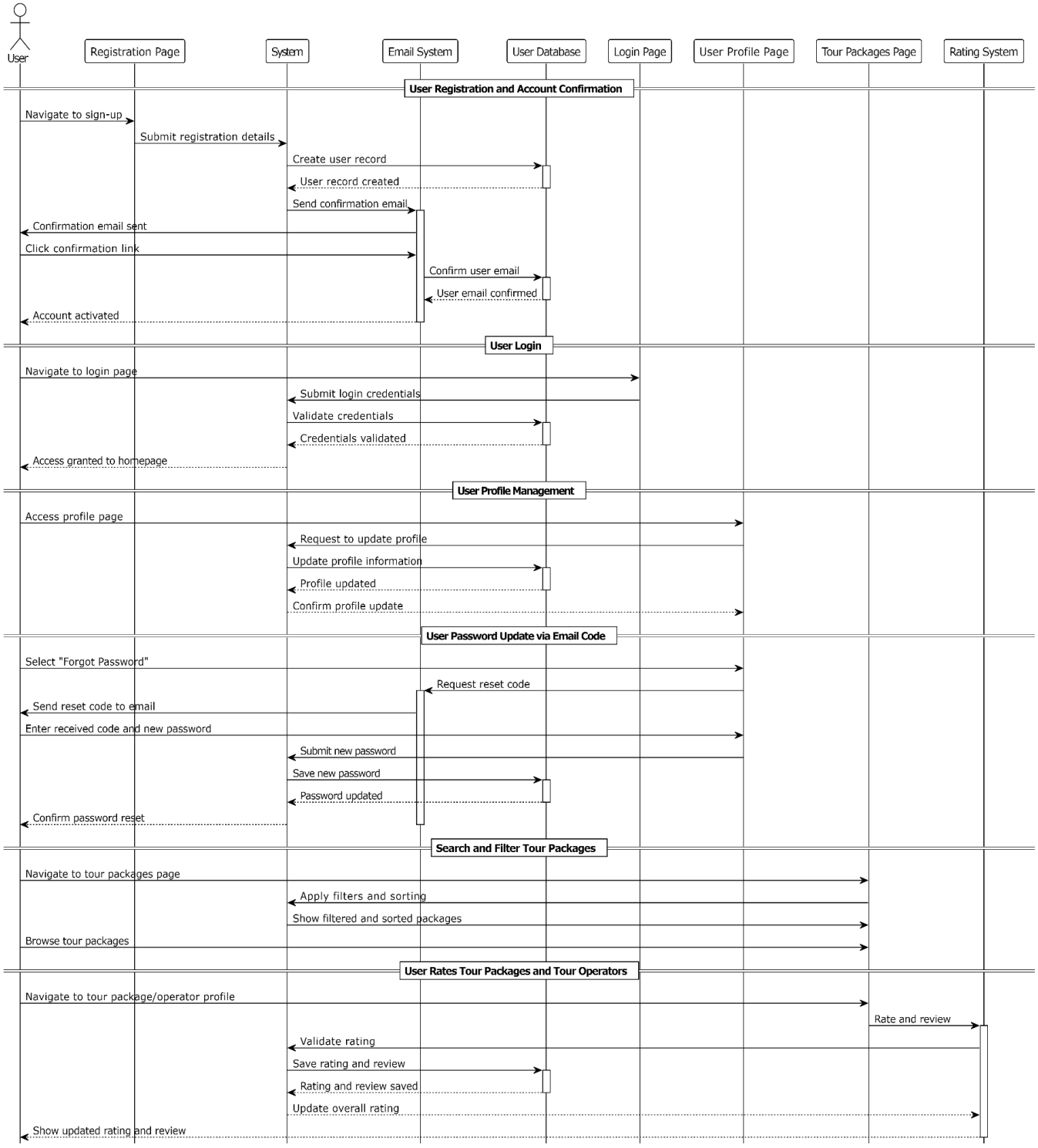


Figure 6 - User Sequence Diagram

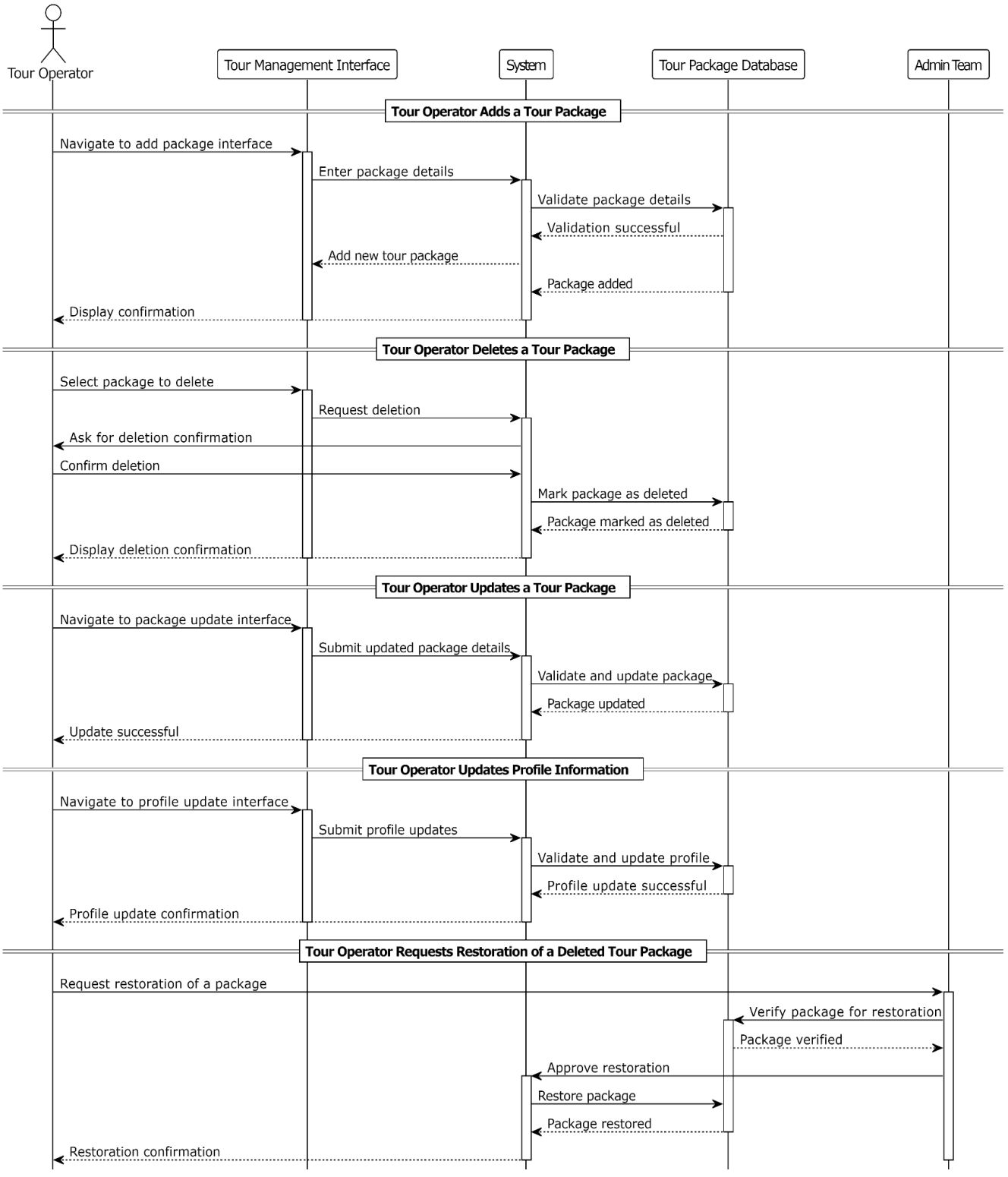


Figure 7 - Tour Operator Sequence Diagram

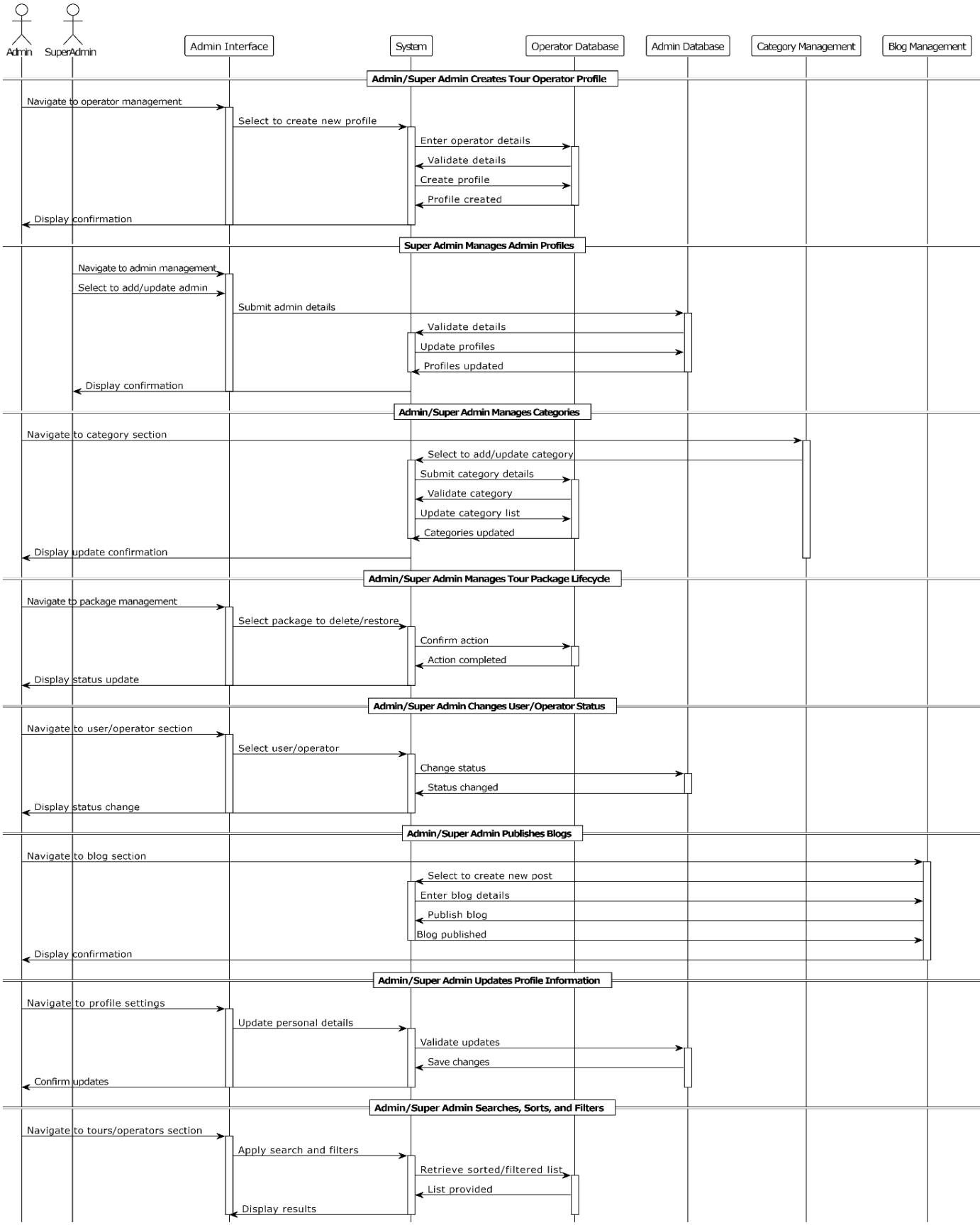


Figure 8 - Admin/Super Admin Sequence Diagram

3.8.3 Collection-Relationship Diagram(Database)

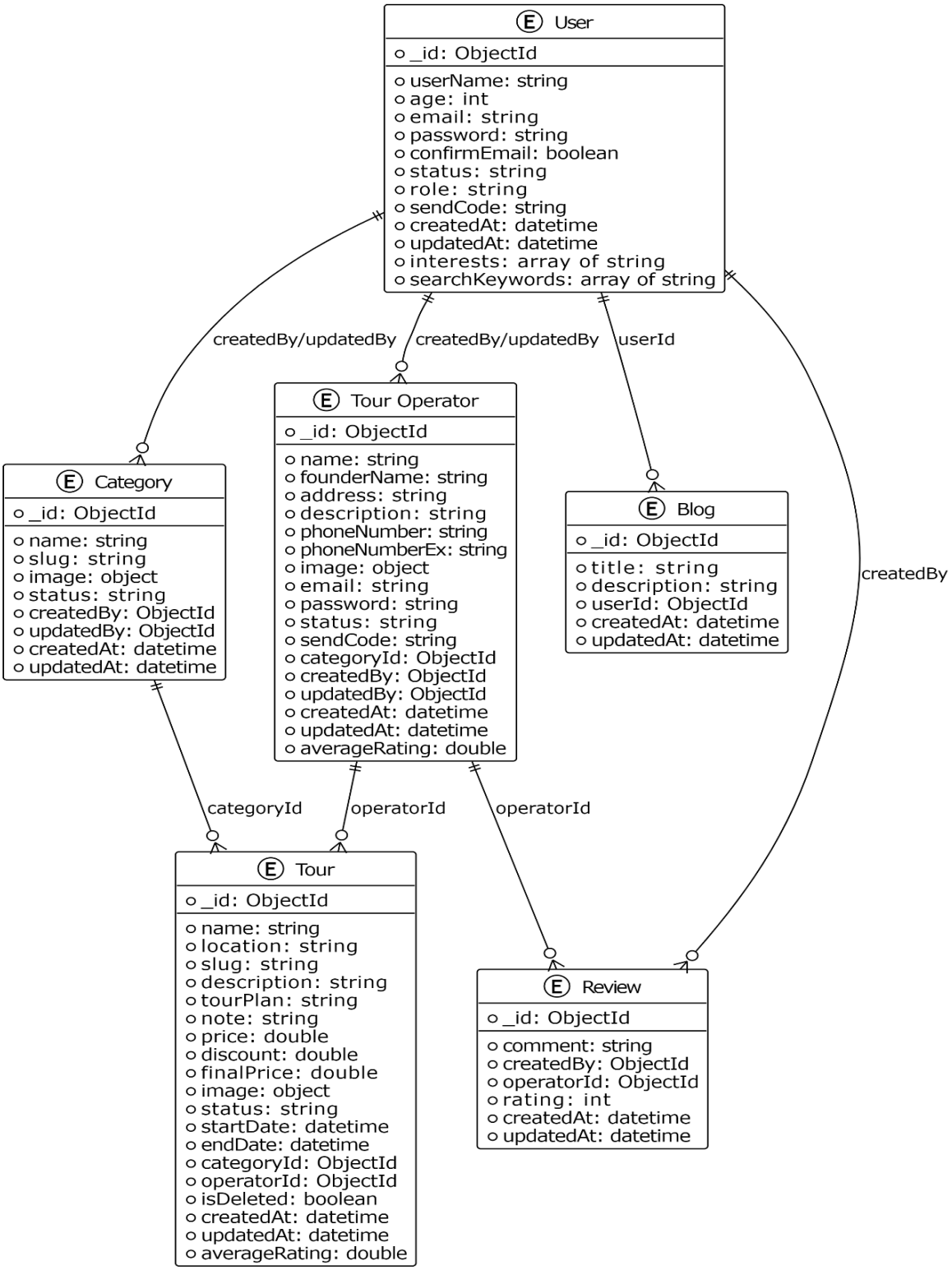


Figure 9 - Collection-Relationship Diagrams

CHAPTER FOUR

SYSTEM ARCHITECTURE

4.1 Software Architecture

The system will be for the main end user as a website that will give the user a list of all the available options for tours offered by tourism and travel agencies, where the user will be shown a complete description of this tour with other users' comments and ratings on it and he also can add a comment and rating to it, and the user can also search on the tour he wants, and displaying the tours according to a specific order he chooses or filtering them according to specific criteria, the site will also study the user's interactions, ratings, and interests that he added when registering on the site to display to the user in the main interface a package of recommended tours specifically for him, the site will also enable the user to identify Agencies that add tours on the site through a special interface for these agencies, this interface displays a list of agencies with the ability to search in them and arrange the displayed list in addition to filtering the displayed results using special criteria, the user can also view the information of these agencies and know their contact information in addition to reviewing them and displaying the tours that they have provided.

4.2 Hardware Architecture

There are no complex hardware engineering needs, this is because the system is designed as a website, which makes it work on all devices that run Internet browsers, this also reduces the need for a high-performance device, In addition to all of this, the website is designed to be responsive, which makes it compatible with all screens, such as computers, phones, and tablets.

CHAPTER FIVE

SYSTEM EVOLUTION

5.1 Conclusion

In this modern age in which technology is used to increase the efficiency of human life and reduce time and effort, it was necessary for the tourism and travel sector in Palestine to keep pace with this progress, we tried to define the problems facing travel agencies and people who want to travel, and we found that agencies face main problems at the level of marketing and access for customers, we found that the user faces problems with the number of tours offered and available to him, as he is forced to go himself to find out the offers and tours available, Also, the lack of an evaluation system that gives users the ability to review their experience and gives agencies feedback, has made the tourism sector lose an important part of the factors in its progress and development.

In our project, we have solved these problems by allowing agencies to display their tours in one place accessible to targeted users, providing a gallery of these tours to users, and creating a review and evaluation system that benefits both parties, and this will make it easier for all parties.

Due to the presence of a large vacuum in this sector and the lack of solutions to the existing problems, our project will be the first solution of its kind in this field, and we expect it to meet with great success and welcome from the targeted parties.

5.2 Future Work

1. We aspire for our website to become the official website for all Palestinian tourism and travel agencies, bringing together all Palestinian tourism and travel companies, in addition to all the people who want to go on tours with these agencies.

2. After the spread of the site and the feasibility study with clients and agencies, we aspire to add a reservation and payment system to the site so that users who want to go on a tour can book it and pay for it directly from the site.

3. If this project meets with great success in Palestine, we aspire to begin expanding it to include the tourism sector in other countries, starting with the neighboring Arab countries, in addition to integrating neighboring countries, so that the residents of neighboring countries inform each other about the tours available in the neighboring country, since moving from a country Going to a neighboring country will be easy, and it is possible that this will cause some tourism companies to allocate starting points for the tour in neighboring countries, and this will expand and influence the field very significantly.

THE END