WEB BASED NATIONAL PARK MANAGEMENT SYSTEM
FOR
YALA NATIONAL PARK

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ABSTRACT

YALA National Park is an enchanting sanctuary located in the southeastern corner of Sri Lanka, which had been designated in 1938. It is Sri Lanka's biodiversity hotspot and it's a natural wonder that attract adventurers, wildlife enthusiasts, and nature lovers. Yala has been a home for remarkable assortment of mammals, birds and reptiles. Yala National Park is being worked in the ecotourism and animal conservation industries. In Sri Lanka National Park Service (NPS) has safari vehicle bookings, bungalow reservation, tour reservation. A national park management system's primary goal is to guarantee the efficient preservation and long-term administration of a nation's national parks and is to offer a sustainable and pleasurable visitor experience, especially from the standpoint of tourism. The organization has been faced a number of challenges in managing the above operations due to manual process. The nonfunctional drawbacks of the manual process are usability, availability, fault tolerance, security and so on. Hence in order for the organization to stay at the top, it needs to increase its efficiency. So, vendors came up with a web-based system instead of the manual process.

The models of this system are Staff Management, Visitor Management, Driver Management, Vehicle Management, Reservation Management, Payment Management, Tracking Management, Feedback /Review Management

The Yala National park management system is designed using the open-source structured programming language PHP and other web technologies such as HTML, jQuery, CSS, Bootstrap, Java Script and MYSQL. MYSQL is an open-source, logical database management system, and Apache web servers both employ PHP, a general-purpose scripting language. The NetBeans IDE 8.2 is being used as the IDE.

The national park management system is being developed using RUP development process.

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Chapter 01: INTRODUCTION

1.1 Introduction

Web-based Yala National Park Management System is a digital platform designed to enhance the operations of the national park through web browser. It performs as a centralized system for administrator, staff and tourists. In this system tourists can access park information and also it provides online tour booking and hotel reservation capabilities. This system consists automated systems like calculating the number of seats according to the number of visitors inserted to the system. Administrator and staff can use the system to handle operations like keeping track of staff attendance, staff scheduling, vehicle maintenance and so on. This system provides interactive maps to visitors to navigate the park so due to that reason can reduce the disturbance from tourists to animals. This system has immersive range of operations beyond manual process.

1.2 Motivation of the project

Currently, the organization handles the processes mentioned above manually and paper-based approaches. A manual National Park Management System, relying on traditional, paper-based processes and limited technology, can have several drawbacks that may impact efficiency, accuracy, and overall effectiveness of the system.

The following is a list of some of the problems the organization has encountered

- Errors might happen and duplicate data entering can happen with paper records.
- Staff members often find it difficult to obtain information instantly because physical records.
- Paperwork and manual processes can be time-consuming and inefficient.
- Delays and miscommunications may occur.
- Physical records are vulnerable to loss and damage.
- Difficulties in managing visitor information, reservation, and providing up-to-date information.

- Cannot control the disturbance from visitors to animals by arriving to the same hotspot since there is no tracking method.
- Difficulties regarding real-time availability checking of vehicles and bungalows.
- It is not feasible to track the real-time location of vehicles designated for trips.
- Difficulty in scheduling a vehicle to tour and assigning a driver and guide.
- There is no automated process to indicate the number of vehicles needed according to the number of seats available in a vehicle when the visitor inserts the number of visitors.
- Difficulties in doing additional payment if the time exceeds of a tour than the visitor has mentioned to the management.

The success of the organization has been limited by the factors listed above, therefore the author has suggested employing a web-based approach for dealing with these problems. So, a web-based National Park Management System provides numerous advantages offers over traditional manual system. And also using a web-based application is much easier to users and staff.

1.3 Objectives of the project

The objectives that follow are expected to be accomplished when the proposed project is executed.

- Improves the efficiency of day-to-day park operations.

- Enable real-time access to data for staff.

- Manage visitor activities effectively. (Interactive maps and online vehicle booking and bungalow reservation systems enhance the enjoyable and interesting guest experience)

- Enhance wildlife observation and promote effective conservation initiatives since there is a tracking method.

- Implements secure data storage.

- Avoids the disturbance from visitors to animals by embedding a tracking method which is a map provided along the system.

- Allows for easy expansion and updates.

- Improves communication.

- Reduce costs associated with manual processes.

1.4 Scope of the project

The following modules need to be undertaken to achieve the above project objectives.

- **Staff Management**

    Employee Information Database, Attendance Tracking, Employee Feedback.

- **Visitor Management**

    Visitor Registration, Check-in and Check-out, Interactive Maps, Visitor Feedback.

- **Driver Management**

    Driver Information Database, Assign for a visit.

- **Guide Management**

    Guide Information Database, Assign for a visit.

- **Vehicle Management**

    Vehicle Information Database.

- **Maintenance Management**

    1. Maintenance History Tracking
    2. Automated Maintenance Alerts
    3. Driver Assignment

- **Reservation Management**

    User Registration and Profiles, Reservation and Booking System, Availability Updates,

Reservation Confirmation, Cancellation and Refund Policy.

- **Payment Management**

    Payment Methods, Payment Confirmation.

- **Tracking Management**

    GPS Integration, Mobile App Tracking.

- **Feedback / Review Management**

    Visitor Feedback, Rating and Review, Photo and Video Uploads

Chapter 02: ANALYSIS

2.1 Introduction

The objective of software analysis, which is essentially a requirement analysis, is to identify the tasks required for developing fully functional software. Stakeholder requires, documentation, and validation of software and system requirements constitute each component of this analysis process [1]. A review of the project is given in this chapter, detailing the existing manual process of managing project operations, the functional and non-functional requirements of the proposed system and at last a literature review of existing software in the industry.

2.2 Existing manual process of National Park Management System

In analysis phase fact gathering is a crucial aspect which should be done throughout the process. So, there are several techniques that can be used for fact gathering. In here three fact gathering techniques are being used which are interviews with the project manager to clearly define the overall objectives of the project, strategic goals and how the project fits into the organizational context, online observations and documentations.

The below functionalities are being carried out in the existing manual process which are manual tour booking and hotel reservations, manual data entering process of staff and tourists, manual checking availability process, manual scheduling process of vehicles, manual payment process, manual vehicle maintenance tracking.

The organization's current manual national park approach can be represented by the use-case diagram shown in Figure 2.1.
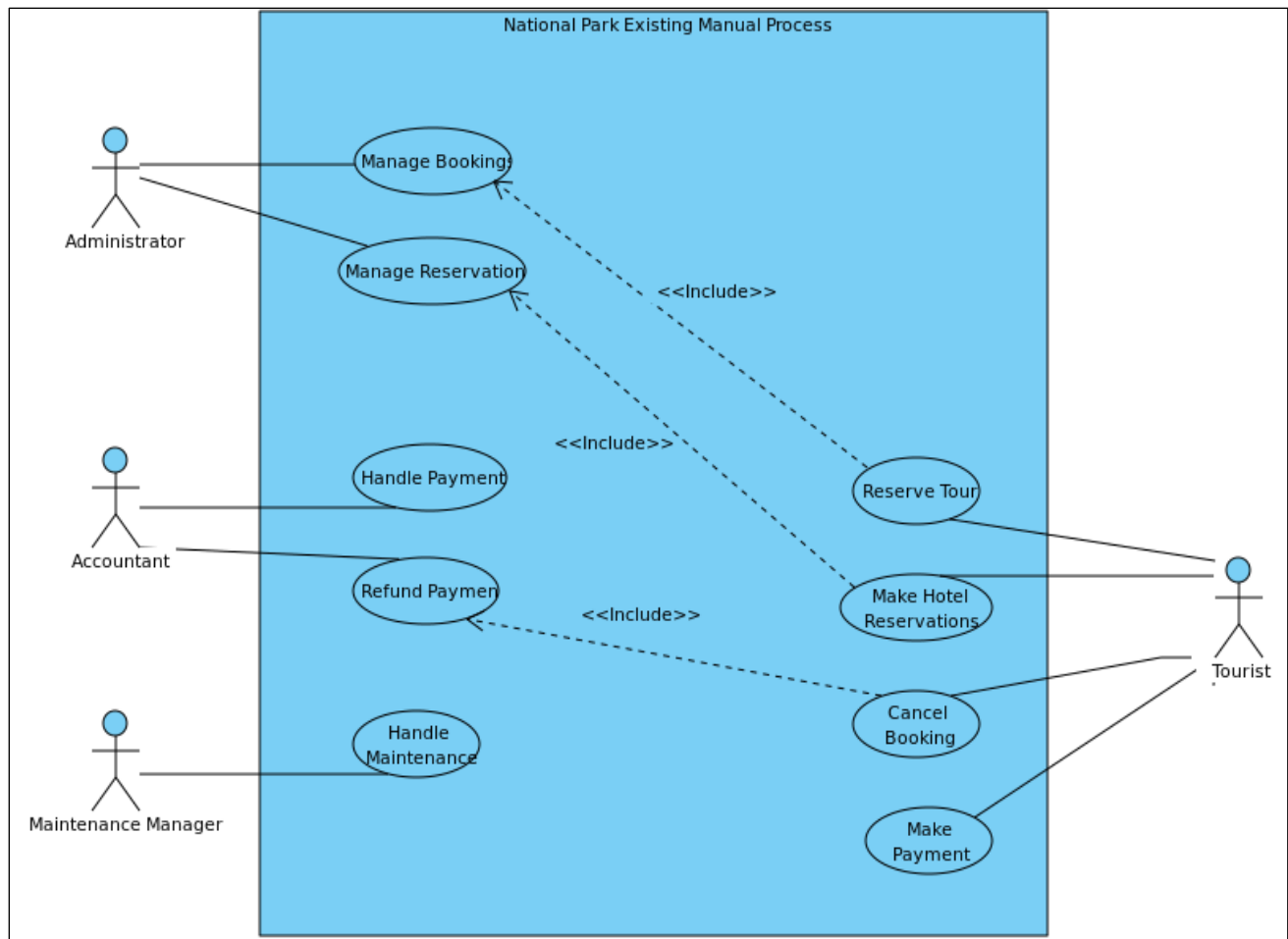
Figure 2.1: Use Case Diagram for Existing Manual Process

The following are the problems which are encountered in the existing system.

- Errors might happen and duplicate data entering can happen with paper records.
- Staff members often find it difficult to obtain information instantly because physical records are frequently restricted to particular areas.
- Paperwork and manual processes can be time-consuming and inefficient.
- Delays and miscommunications may occur.
- Physical records are vulnerable to loss and damage.
- Difficulties in managing visitor information, reservation, and providing up-to-date information.
- Cannot control the disturbance from visitors to animals by arriving to the same hotspot since there is no tracking method.
- Difficulties regarding real-time availability checking of vehicles and bungalows.
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- Difficulties in doing additional payment if the time exceeds of a tour than the visitor has mentioned to the management.

2.3 Requirements for the New System

2.3.1 Functional Requirements

Functional Requirements of the system are as follows:

The roles that system users belong into for their daily tasks are as follows:

1. Administrator.
2. Tourist.
3. Employee.
4. Accountant.
5. Maintenance manager.

- Staff Management

  - Any employee of the national park service has the capability to create their own user profiles.
  - Once the employees create their profiles the administrator is able to view and update their user profiles.
  - The administrator can monitor staff attendance after an employee is registered to the service.
  - Every employee has the ability to provide feedback, suggestions and complaints through the system and also the administrator can view them.

- Visitor Management

  - New tourists enable to register to the system and registered tourists enable to login to the system.
  - Administrator tracks the entry and exit of visitors to the park.
  - Tourists enable to navigate the park through interactive maps.
  - Any tourist has the ability to send feedbacks and administrator have the capability to view them.

- Driver Management

  - Administrator stores and manages drivers' personal details.
  - Administrator assigns drivers to specific tours.

- Guide Management

  - Administrator stores and manages guides' personal details.
  - Administrator assigns guides to specific tours.

- Vehicle Management

  - o Administrator maintain a comprehensive database of all park vehicles.
  - o Maintenance manager track maintenance history.

- Reservation Management

  - o Allow tourists to register and build their profiles so they enable to handle their reservations and bookings.
  - o Tourists able to make reservations for tours and bungalows.
  - o Administrator updates real time availability for bungalows and vehicles.
  - o Administrator sends confirmation emails to visitors upon successful reservation.
  - o Tourists able to cancel reservations or tours and initiate refunds when applicable.

- Payment Management

  - o Tourists have the ability to do their payments through any payment portals.
  - o Once the payment is proceeded the automated confirmation emails will be sent to the tourist.
  - o All the payments of the system are being handled by the accountant.

- Tracking Management

  - o Tourists able to explore the park through the system.

- Feedback / Review Management

  - o Provides a user-friendly interface for visitors to submit feedback and reviews about their experience.
  - o Implement a rating and review system to tourists to know their experience and expectations.
  - o Allow tourists to upload photos or videos as part of their feedback

2.3.2. Non-Functional Requirements

Non-functional requirements specify the attributes and features of the system instead of particular behaviors or functionalities.

Non-functional requirements of the system are as follows:

- Performance

  - When interacting with users, the system should react in a reasonable amount of time with no delays and slow response time.
  - The system should be scalable since it should have the ability to handle many numbers of users and data without decreasing its performance.

- Usability

  - The system must be a user-friendly interface since the non-IT users also expect to use the software.

- Availability

  - The system should be available 24/7 all the time with minimal unexpected failures.

- Data Integrity

  - To ensure information integrity, the system must precisely store and retrieve data without any loss or corruption.

- Security

  - Before being able to access the system, users should be required to authenticate themselves using secure login credentials.
  - Sensitive data such as personal information should be stored in a secure manner.

2.4 Literature Review of Existing Software in the Industry

In this competitive and high technological industry most of the organizations are used to do their operations manually which mainly depends on human labor, without no use of automated tools or technology. And later all users used to interact with automated processes which has minimal human intervention and which exists technology on operations. Now many vendors have come up with web-

based software in order to enhance their efficiency and effectiveness. The following software is such a software which is being described as above.

2.4.1 Kawanti Adventures

The goal of Kawanti Adventures is to give outdoor fanatic an entire adventure travel and exploring experience. Employees can apply careers and customers can book tours through this site [2].

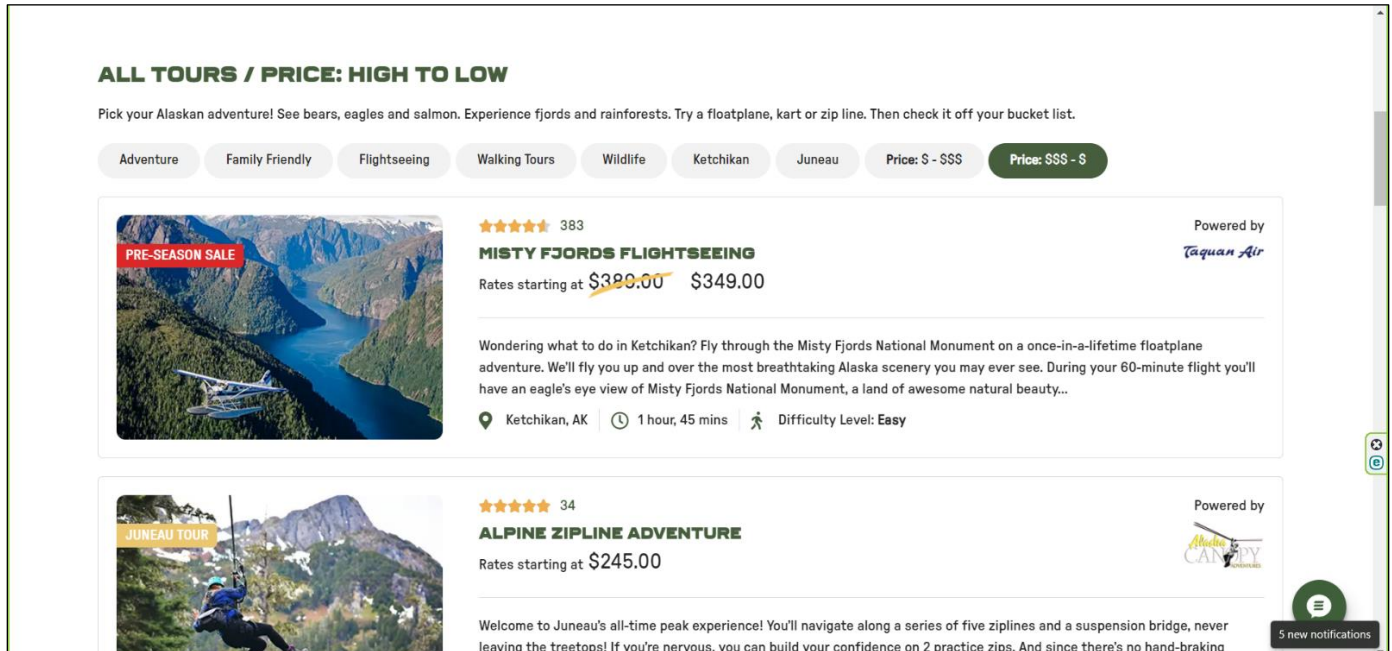The below Figure 2.2 is a user interface of Kawanti Adventures.

Figure 2.2: Kawanti Adventures

Kawanti Adventures offers best range of services such as;
- Providing adventure travel packages of popular destinations around the whole world
  These packages give large range of experiences in activities which includes mountain biking, hiking, rock climbing, whitewater rafting, wildlife safaris, adventure tours, family friendly tours, sightseeing tours, walking tours, Ketchikan tours, Juneau tours.
- Travelers can customize their trip according their preferences, budget and their needs.
- Allow users to book large scale of preferred adventure activities.

When considering the above factors Kawanti Adventures is committed to offering tourists unique adventure opportunities.

Chapter 03: DESIGN

3.1 Introduction

The process of defining software methods, functions, objects, and the general structure and interaction of your code in order to ensure that the functionality that results will meet the needs of your users is known as software design. Design enables you to meet requirements more effectively and to achieve the best abstraction possible. Redundancy is avoided and reusability is increased through design. Additionally, the best way to reduce unknown risk is through design [3].

This chapter coverup the following areas, such as describing the alternate solutions, explaining the methods and data structures, the UML diagrams for the proposed system which are high level use case diagram, class diagram and ER diagram. And also shows the user interfaces of the system.

3.2 Alternate Solutions

When it comes to developing a web-based system, there are various alternate solutions to consider beyond the traditional web application approach. These alternate solutions offer different advantages and disadvantages. Stand-alone, network based and web based alternate solutions will be described below.

3.2.1 Stand-Alone Software Solutions

Stand-alone software solution refers to a piece of software that runs on a user's PC or other device independently without requiring a network connection.

Advantages:

- Since stand-alone software operates without an internet connection it will be beneficial for users in rural areas where have less internet connection.

Disadvantages:

- It is difficult for multiple users to cooperate on the same project or set of data at once.
- Stand-alone software may not be as accessible as web-based or network-based solutions. Since users may encounter difficulties accessing the software on various devices or at remote locations.

3.2.2 Network-Based Software Solutions

Network-based software solutions are programs that depend on network connectivity in order to provide services to users.

Advantages:

- Network-based software solutions enable users to access applications and data from anywhere with an internet connection.
- Network-based software solutions reduce infrastructure expenses.

Disadvantages:
- Users may have limitations in accessing the software in areas with poor or unstable internet access.
- Since network-based software solutions store data on cloud-based platforms the organization may face many issues related to data security.

3.2.3 Web-Based Software Solutions

A web-based software solution is an application that runs entirely within a web browser by enabling users to access with the software through a web interface.

Advantages:

- Web-based software solutions enable to access from any device with an internet connection and a web browser.
- Web-based software solutions runs on different operating systems such as Windows, MacOS and Linux.

Disadvantages:

- Requires a stable internet connection if not users may have limitations to access the software in areas with poor internet connectivity.
- Web-based software solutions may occur performance issues.

When considering the above facts interacting with a web-based software is a better solution for software vendors.

3.3 Methods and Data Structures used

A software design pattern called Model-View-Controller (MVC) architecture divides an application in to three components. So, these three separate components allow developers to concentrate on particular areas of the program.

The reason to use Object Orientated Programming is OOP enable programmers to abstract complex real-world entities into simplified models represented by objects.

3.4 Proposed System

3.4.1 High-Level Use-Case Diagram for the Proposed System
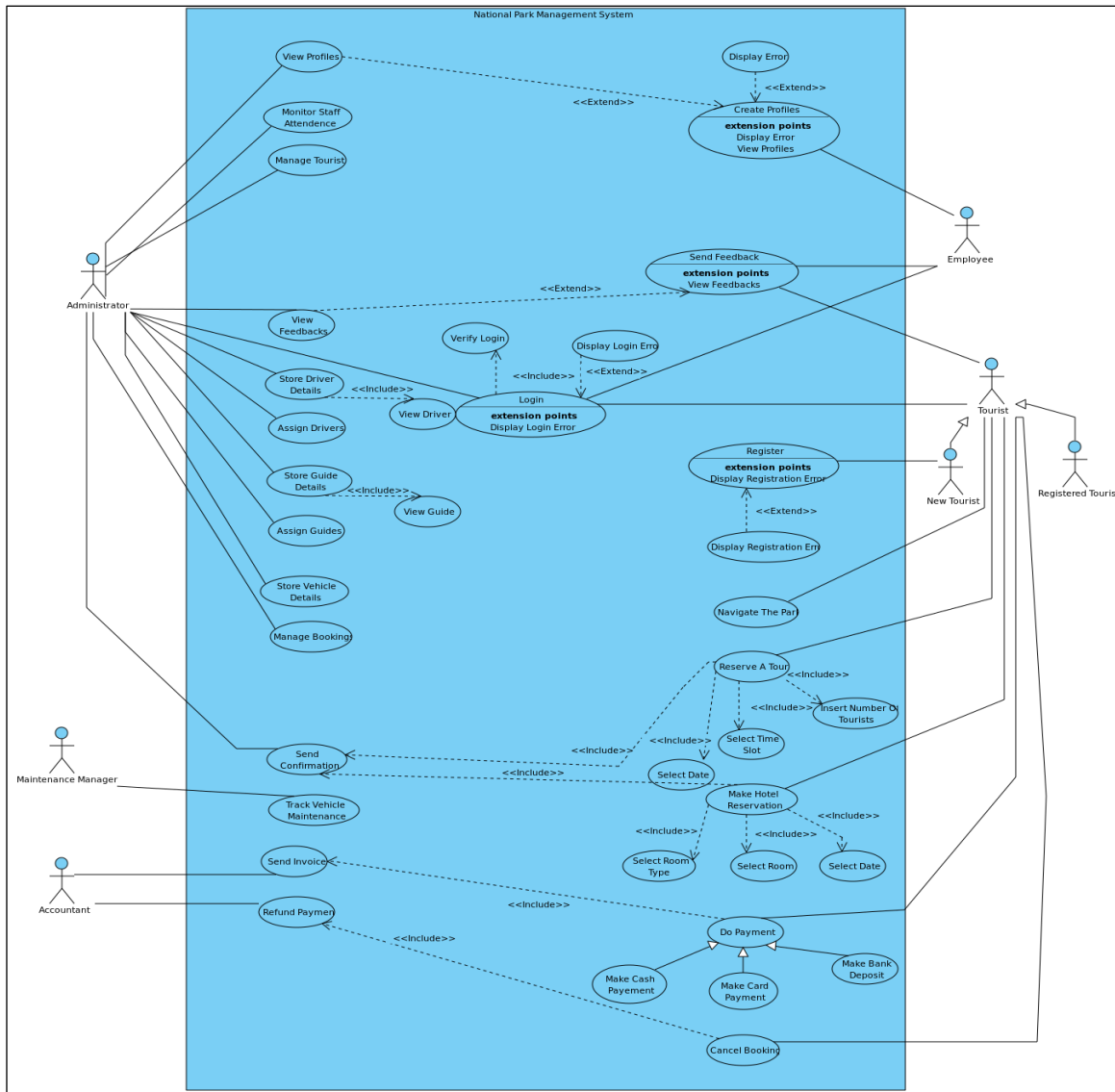
Figure 3.1: High level Use case for the Overall System

3.4.2 The Class Diagram

A class diagram is a UML diagram that depicts the relationships of classes within a system. There are 15 classes in the below class diagram which represents in Figure 3.2.
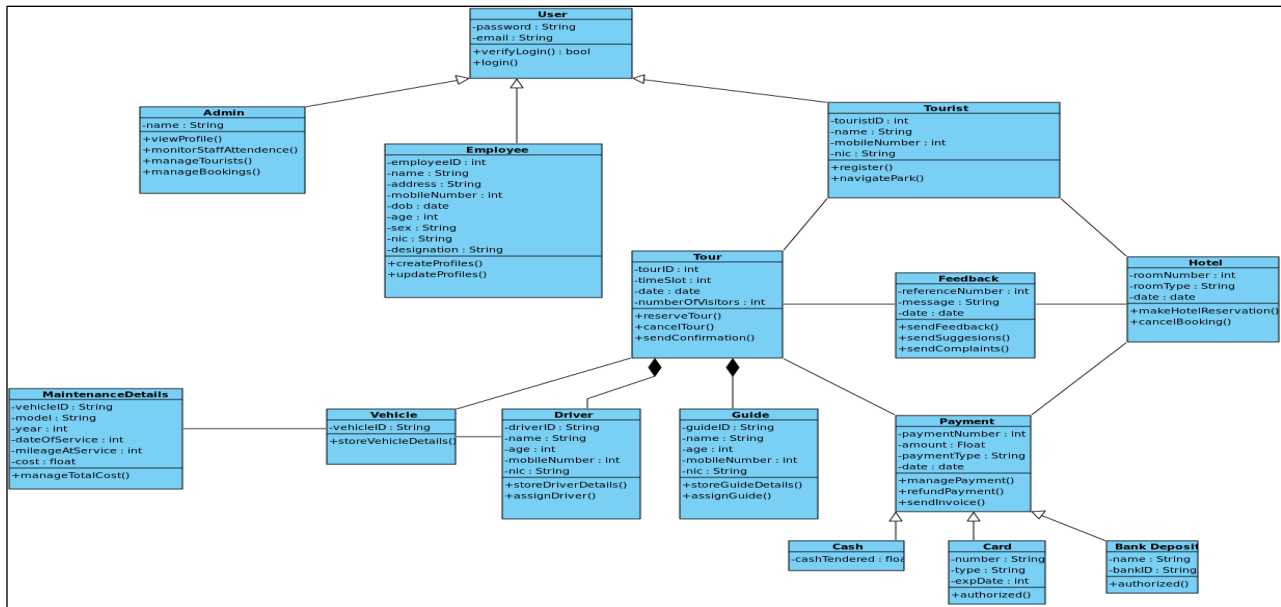
Figure 3.2: The Class Diagram for the proposed System

3.4.3 Entity Relationship Diagram
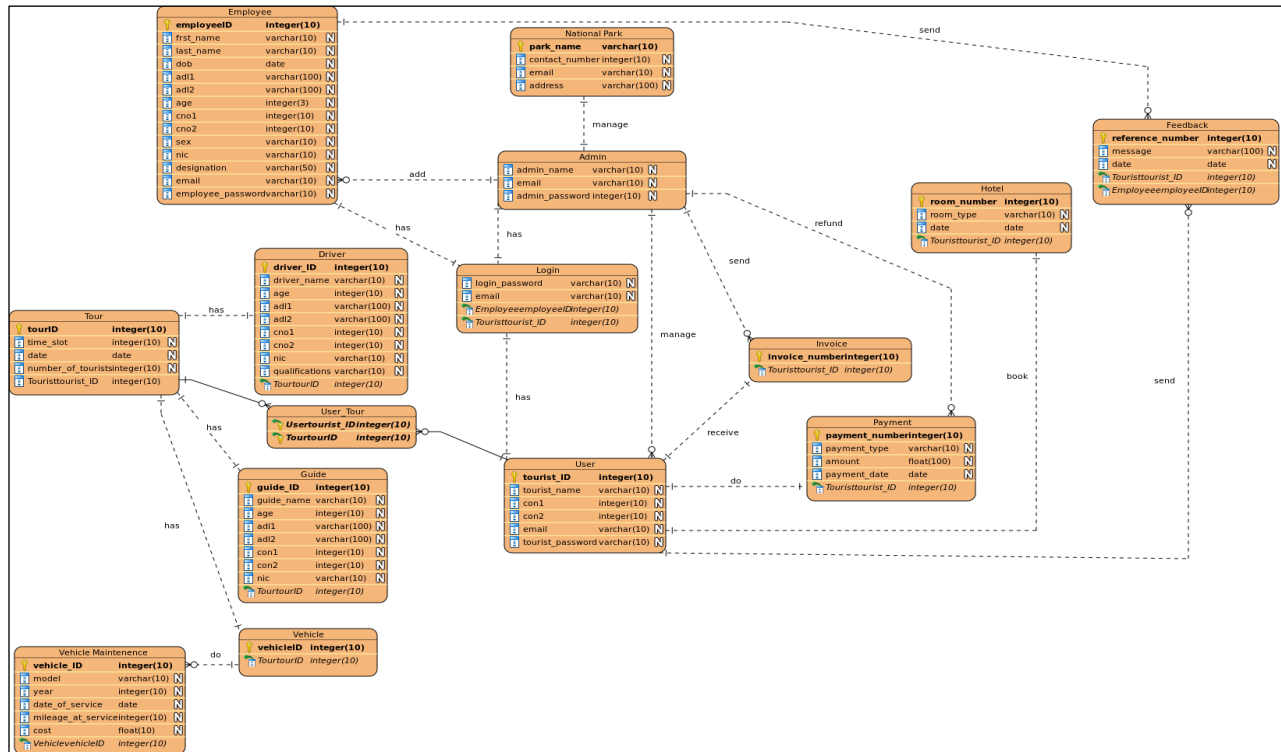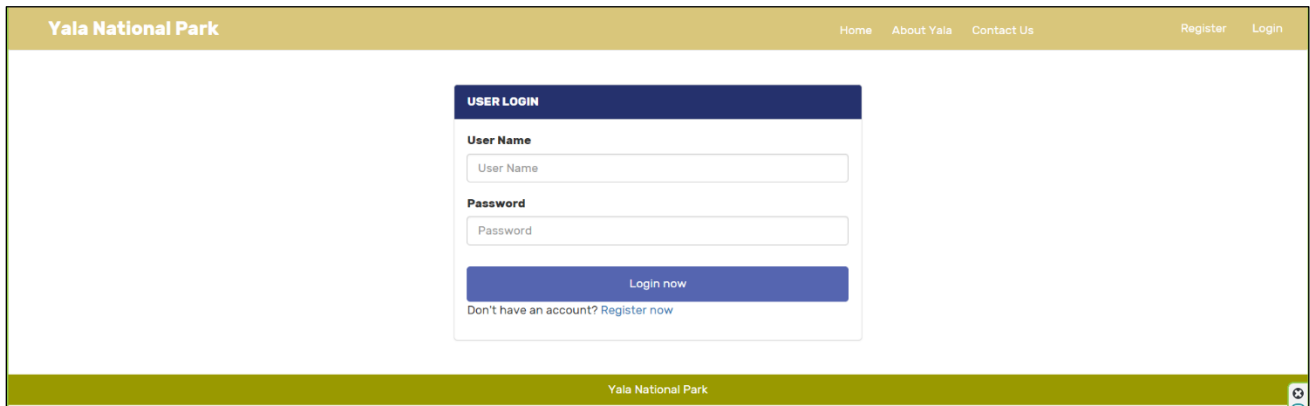
Figure 3.3: Entity Relationship Diagram for the System
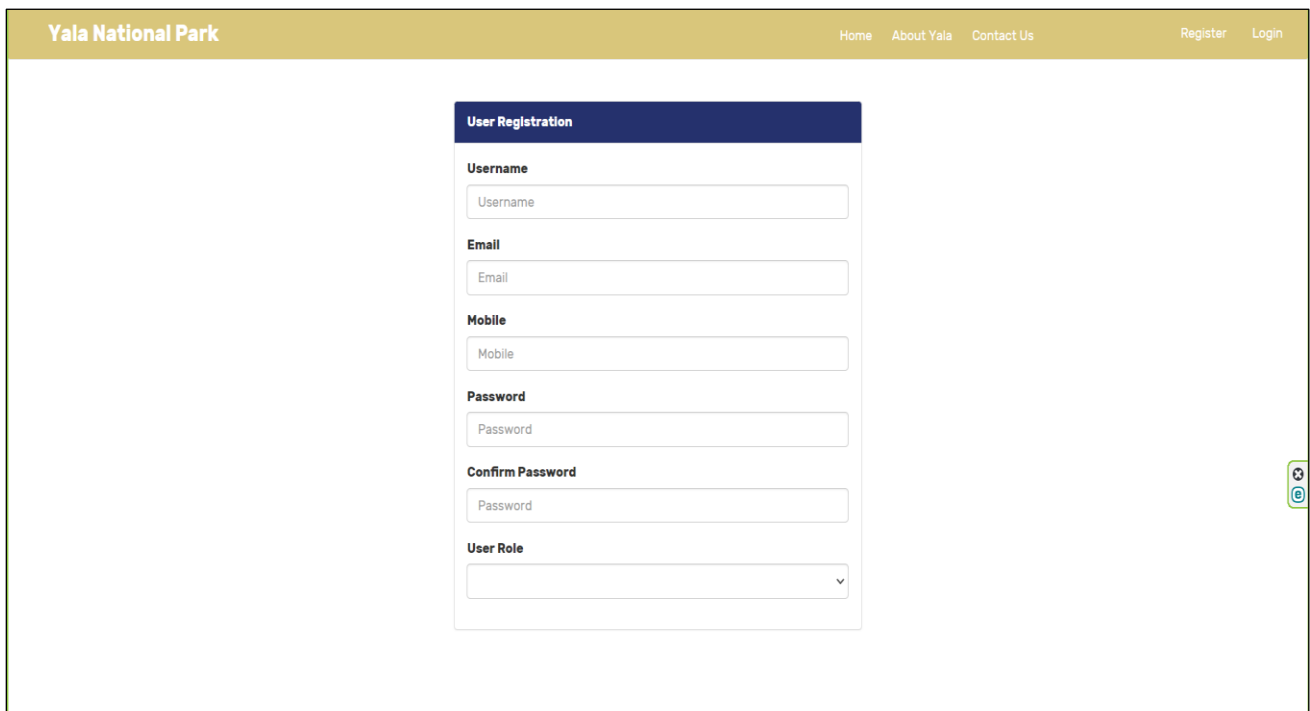
3.4.4 User Interface Design

The process of creating software or electronic device interfaces with an emphasis on aesthetics is known as user interface (UI) design. The goal of interface designers is to make things that are enjoyable and simple for users to use. [4]

Figure 3.4: User Interface Design for Login Page

Figure 3.5: User Interface Design for Registration Page
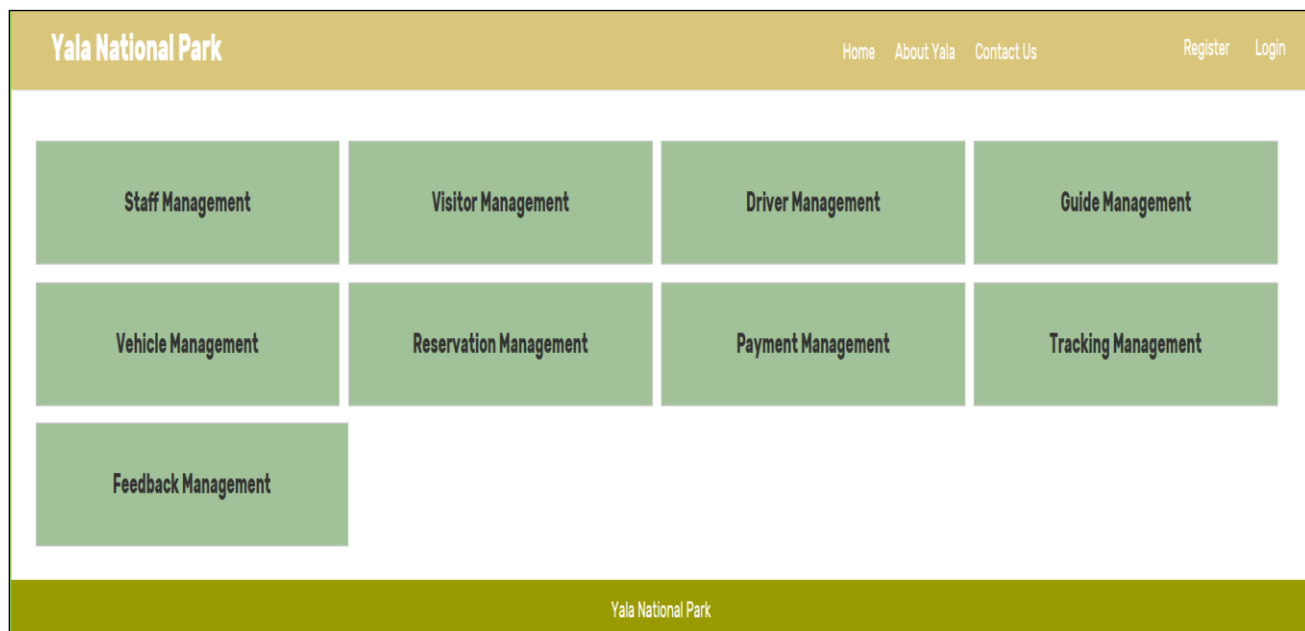
Figure 3.4: User Interface Design for Admin Dashboard

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