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Affiliated to ANNA UNIVERSITY, Chennai

# PULLVELI

# A PERSONALIZED TURF BOOKING WEBSITE

***Submitted by***

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# ABSTRACT

The turf booking platform streamlines facility reservations for individuals and groups through an intuitive interface, allowing users to find available turfs, compare prices, and book time slots securely. It offers features such as booking confirmations, reminders, and flexible cancellations for added convenience. Turf owners gain valuable management tools like occupancy tracking and revenue analytics to maximize utilization. Additionally, the platform encourages sports participation with community engagement, group bookings, and loyalty rewards. By making sports facilities more accessible, it promotes healthier lifestyles and fosters a more active community. The platform integrates a robust review system, enabling users to share feedback and rate their experiences, fostering trust and quality assurance. It supports multiple payment options, including digital wallets, ensuring a seamless and secure transaction process. With a mobile-friendly design, users can access the platform on the go, enhancing accessibility and convenience for busy schedules.

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# CHAPTER 1

# INTRODUCTION

## 1.1 GENERAL

In today's health-conscious era, the demand for sports and recreational facilities has seen significant growth, with more people prioritizing fitness and well-being. Our project focuses on developing a dynamic turf booking platform that provides a streamlined, user-friendly experience for users to find and book available turfs effortlessly. This centralized solution simplifies the booking process while fostering community engagement and supporting local sports initiatives.

Our platform features a secure login system, ensuring that users begin their experience with data privacy in mind. Upon logging in, users can access a seamless interface where they can browse available turfs based on preferences such as location, time, and type of sport. This intuitive system provides an efficient way to reserve facilities, with real-time updates on availability and booking status to prevent double-bookings or conflicts.

The platform enhances communication by connecting users directly with facility managers, improving responsiveness and allowing users to receive instant notifications about bookings, cancellations, and changes in availability. To further promote a sense of community, we've included features for user reviews, ratings, and discussions, encouraging active engagement and feedback sharing.

## 1.2 NEED FOR THE STUDY

The rising demand for accessible sports facilities, fueled by a focus on health and fitness, highlights the need for a seamless booking experience. Traditional booking methods can be complex, with limited availability, unclear schedules, and inefficient communication, leaving users wanting a more intuitive process.This project aims to address these issues by creating an all-in-one turf booking platform that connects facility managers and users through an intuitive interface. Users can easily search and reserve turfs by location, time, and amenities, while managers benefit from streamlined scheduling and payment systems. Real-time updates provide instant booking confirmations and cancellations, enhancing user satisfaction.The platform also

promotes community engagement through user reviews, ratings, and a forum. Prioritizing data security, it employs encrypted storage to protect user information, aligning with high privacy standards. This project modernizes the sports booking process, supporting local sports, promoting physical activity, and fostering healthier communities.

## 1.3 OBJECTIVES OF THE STUDY

This study aims to create a personalised turf booking website that will enhance the booking process by incorporating secure, user friendly technology.

1. **Simplify the Booking Process**: To create an intuitive interface that allows users to easily search for and reserve available turfs based on their preferences.

2. **Enhance Communication**: To facilitate seamless interaction between users and facility managers, improving responsiveness and service quality.

3. **Promote Community Engagement**: To incorporate features that encourage user reviews, ratings, and community discussions, fostering a sense of belonging among users.

4. **Support Local Sports Initiatives**: To provide a platform that not only meets the needs of users but also contributes to the promotion of local sports and healthy lifestyles.

5. **Integrate Real-Time Updates**: To implement features that provide instant notifications regarding bookings, cancellations, and changes in availability

## 1.4 OVERVIEW OF THE PROJECT

The aim of this project is to develop a comprehensive and user-friendly turf booking platform that enhances accessibility and efficiency in reserving sports facilities. By leveraging modern technology, this platform simplifies what is often a complex and time-consuming process, making it easy for users to find, book, and engage with local sports facilities. The platform includes several key components that enhance the user experience, promote community engagement, and streamline booking management for facility owners.

1. User Authentication and Management: A secure user registration and login module initiates each user's journey, allowing them to create and manage their accounts. This module ensures that personal data is securely stored and provides each user with a personalized, protected session.

2. Facility and Booking Management: This module enables facility managers to list available turfs, manage bookings, and update facility details such as amenities and pricing. For users, an intuitive booking system allows them to search for turfs by location, date, and available features. Real-time availability and an integrated payment system make the booking process seamless and efficient.

3. Community Engagement Features: To foster a sense of community, the platform includes a Review and Rating Module where users can rate and review facilities based on their experiences. Additionally, a Community Forum enables users to share tips, discuss sports topics, and connect with others, building trust and engagement within the platform.

4. Real-Time Notifications and Updates: A notification system keeps users informed of booking confirmations, cancellations, and other important updates. This feature provides instant visibility into any changes and ensures that users and facility managers remain up-to-date, enhancing reliability and user satisfaction.

5. Analytics and Reporting: The platform’s Analytics and Reporting Module provides valuable insights into user behavior, booking trends, and facility usage patterns. These

analytics allow facility managers to make data-driven decisions to optimize operations and improve service quality.

### 1.5 WORKFLOW

The turf booking platform is designed to provide a seamless and intuitive experience, from user registration to booking confirmation. Each module works cohesively to simplify the process of booking sports facilities while ensuring security and fostering community engagement.

1. User Registration and Login: The journey begins with the registration process for new users, who create an account by providing basic information (e.g., name, email, and password). Returning users simply log in with their credentials, which are securely stored and encrypted to protect user access. This authentication step provides a personalized and secure entry point for users.

2. Searching and Selecting Facilities: After logging in, users can search for nearby turfs based on location, date, time, and preferred amenities. The platform provides a range of filter options, allowing users to refine their search results and select turfs that meet their specific needs. Real-time availability ensures that users can see open time slots immediately, improving the efficiency of the booking process.

3. Booking and Confirmation: Once users have selected their desired turf and time slot, they proceed to enter personal information and review booking details. A confirmation screen provides a summary of the booking, allowing users to verify their choices before proceeding. Payment processing is seamlessly integrated, enabling users to complete transactions through a secure payment gateway.

4. Review and Engagement Features: Following the booking confirmation, users are encouraged to rate and review their experience. They can also participate in a community forum, where they can share tips, ask questions, and engage with other users. These features build trust, foster community engagement, and help others make informed decisions.

# CHAPTER 2

# REVIEW OF LITERATURE

## 2.1 INTRODUCTION

The Review of Literature for the Turf Booking Platform explores existing research and solutions related to the reservation and management of sports facilities. It begins by examining the challenges faced by individuals and groups in accessing sports facilities, including the lack of centralized booking systems and limited visibility into availability and pricing. The review highlights the benefits of digital platforms in simplifying the booking process, offering user-friendly interfaces for finding available turfs, comparing prices, and reserving preferred time slots.

Additionally, it explores features like secure payment systems, flexible booking options, and real-time notifications, emphasizing how these functionalities enhance user convenience. For turf owners, the review discusses tools provided by such platforms to optimize resource management, track bookings, and maximize usage. Studies on the impact of streamlined booking processes in encouraging active lifestyles and increasing sports facility utilization are also examined.

Furthermore, the literature review considers the role of technology in bridging the gap between users and facility providers, identifying barriers to adoption and factors that drive user engagement. The sustainability and scalability of these platforms are also analyzed, with a focus on financial viability and long-term usability. This comprehensive review aims to provide valuable insights for the design and development of the proposed platform, ensuring it meets the needs of both users and turf owners while promoting broader access to sports facilities.

## 2.2 LITERATURE REVIEW

| S.No | Author Name | Paper Title | Description | Journal | Year |
|---|---|---|---|---|---|
| 1. | Choudhury, P., & Singh, R. | Dynamic Pricing and Slot Allocation in Turf Booking Systems | This paper explores dynamic pricing strategies and efficient slot allocation mechanisms in turf booking systems, focusing on maximizing revenue and enhancing user satisfaction. | International Journal of Leisure and Recreation Studies | 2018 |
| 2. | Patel, N., & Reddy, S. | Applying Machine Learning Models for Predictive Analysis in Turf Booking Platforms | This research applies machine learning models to predict user demand, optimize resource allocation, and improve decision-making for turf booking platforms. | Journal of Sports and Recreation Management | 2020 |
| 3. | Kumar, V., & Sharma, A. | An Empirical Analysis of Reservation System Optimization for Sports Facilities | This empirical study examines various optimization techniques for reservation systems in sports facilities. | Procedia Computer Science | 2019 |
| 4. | Ramachandran, L., & Pillai, A. (2019) | User Behavior Analysis in Sports Facility Reservations Using Predictive Analytics | The paper investigates user behavior patterns in sports facility reservations, employing predictive analytics to understand trends and provide actionable insights for management. | Journal of Leisure and Recreation Research | 2019 |

# CHAPTER 3

# SYSTEM OVERVIEW

## 3.1 EXISTING SYSTEM

### User Experience

The Turf Town app offers a comprehensive and user-friendly interface for booking sports venues. Users can book facilities for multiple sports such as football, basketball, cricket, and badminton. The app's design focuses on ease of navigation, allowing users to quickly find and reserve available sports turfs in their locality.

### Social Features

Turf Town integrates social networking features, enabling users to connect with friends, form sports groups, create events, and join clubs. This aspect of the app enhances user engagement by allowing players to build and interact within a sports community

### Performance and Updates

Turf Town is regularly updated with new features and sports options, ensuring it remains relevant and appealing to users. Recent updates have added support for new sports like tennis, padel, and squash, expanding its reach.

## 3.2 PROPOSED SYSTEM

Pullveli is a cutting-edge turf booking platform, purposefully crafted to provide an intuitive and personalized experience for users. Designed to accommodate the unique needs of each individual, Pullveli simplifies the booking process, allowing users to select nearby turfs based on their preferred dates, times, and locations. By prioritizing ease of use and customization, Pullveli ensures that users can efficiently find and book their ideal turf with minimal hassle, making it a convenient choice for sports enthusiasts, teams, and casual players alike.

To further enhance the booking experience, Pullveli offers valuable integrated features such as user reviews and tailored recommendations. User reviews foster a transparent environment where individuals can make informed decisions based on previous experiences, while the platform’s recommendation engine curates options that align

with users' booking history and preferences. This personalized approach helps users discover turfs that suit their unique requirements and provides an added layer of trust and satisfaction.

With its seamless functionality and attention to user preferences, Pullveli sets a new standard for the turf booking industry. The platform's flexible design, combined with a commitment to a smooth, user-centric experience, creates an optimal environment for users looking to book with ease and confidence. Pullveli's dedication to quality, convenience, and adaptability makes it a valuable tool for anyone seeking a streamlined and enjoyable turf booking experience.

### 3.3 FEASIBILITY STUDY

The feasibility study for the event management system examines three main aspects: operational feasibility, economic feasibility, and technical feasibility.

A series of factors are evaluated to determine whether or not development and implementation of the proposed system are viable and practical.

1. Technical Feasibility: The available current technology and development tools make the proposed system technically feasible. This can be developed with the widely available frameworks for Web development: HTML, CSS, JavaScript etc, and backend programming with Node.js as it's server. If you store secure user data, a robust, scalable database that encrypts is exactly what MongoDB gives you. Integrated with existing AI libraries and APIs, high quality, real time chatbots, which offer guidance and support to users, can be built with AI. Thus, all the project's requirements (safe authentication, interactive chatbot, encrypted data management, automated confirmation emails) can be accomplished using the available resources and technology.
2. Operational Feasibility: The system is operationally viable, as it addresses a major need amongst event management companies for a simple, functional, and secure web-based platform. Features such as chatbot guided planning,

# CHAPTER 4

# REQUIREMENTS AND ANALYSIS

## 4.1 FUNCTIONAL REQUIREMENTS

The following are the key functional requirements for the development and successful deployment of the turf booking website:

### 1.USER REGISTRATION AND AUTHENTICATION:

The website requires User Registration & Authentication, allowing users to register with an email and password, and recover passwords if needed. Social login options enhance ease of access, and two-factor authentication can add security.

### 2.BOOKING MANAGEMENT:

The Booking Management system features an interactive calendar where users can view turf availability, select slots, and see peak-hour pricing. Multi-slot bookings support events, and users can cancel or modify reservations based on policy.

### 3.ADMIN PANEL:

An Admin Panel will provide a comprehensive dashboard to manage bookings, pricing, and turf availability. Admins can add locations, adjust pricing, and access reports, with role-based access for multiple admin levels.

### 4.PAYMENT INTEGRATION :

Includes options like credit cards and UPI, processed through secure gateways like Stripe. Users receive confirmation emails or SMS notifications post-payment, and the system handles refunds per the cancellation policy.

### 5.BOOKING HISTORY:

The Booking History feature lets users view past and upcoming reservations, providing downloadable receipts. Notifications remind users of upcoming bookings or changes,

## 4.2 NON - FUNCTIONAL REQUIREMENTS

The following are the key non-functional requirements for the development and successful deployment of the turf booking website:

**1.Usability:** Ensures a consistent, accessible layout across devices, with feedback forms for reporting issues.

**2.Security** : Involves HTTPS, CSRF protection, and encrypted data for safeguarding user information.

**3.Scalability** : Allows easy feature expansion and a CDN or caching system to handle increased traffic. As the website grows, it can migrate to more robust databases like MySQL.

## 4.3 SOFTWARE REQUIREMENTS

**1. Operating System**: Any OS (Windows, macOS, Linux) for development; Linux (e.g., Ubuntu) is recommended for deployment.

**2. Languages & Frameworks:**

- >Python 3.x: For backend development with Flask.
- >Flask: Web framework for request handling and session management.
- >HTML, CSS, JavaScript>: For creating responsive and interactive UI.
- >Jinja2: Flask's templating engine for dynamic HTML.

**3. Database:**

- >SQLite: Used initially for development.
- >MySQL or PostgreSQL: Recommended for production for scalability.

**4. Libraries & Extensions:**

- >Flask-Login: For user authentication.
- >Flask-WTF: For form validation.
- >SQLAlchemy: ORM for database operations.
- >Bootstrap: For responsive design.
- >AJAX: Enables asynchronous updates.

- >JSON: For storing dynamic configurations.

**5. Development Tools:**

- >IDE/Text Editor: VS Code, PyCharm, or similar.
- >Version Control: Git for code management.
- >Browser: Chrome or Firefox for testing and debugging.

**6. Deployment:**

- >Web Server: Nginx or Apache.
- >WSGI Server: Gunicorn for running Flask on the server.
- >SSL/TLS: For HTTPS security.

# CHAPTER 5

# SYSTEM DESIGN

## 5.1 SYSTEM ARCHITECTURE

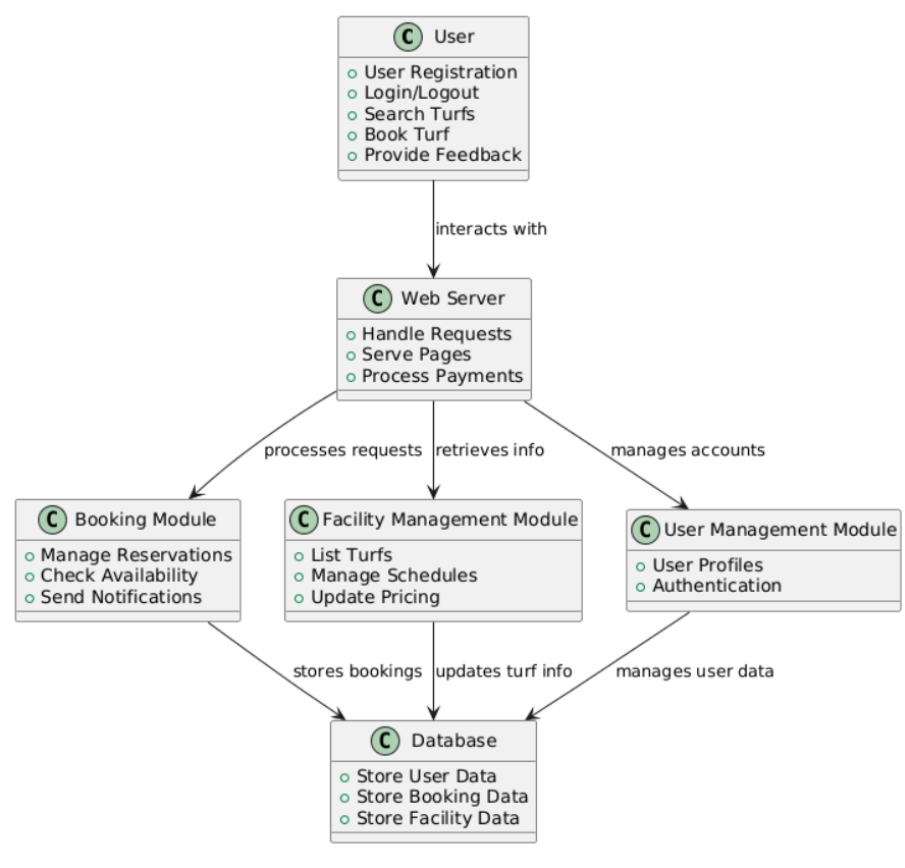


**Fig 1. Architecture Diagram of Pullveli**

This architecture diagram represents the high-level structure of a Turf Booking System. Here's an overview of each component and how they interact:

1. User:

- Represents the end-users who interact with the system.

- Users can perform actions such as User Registration, Login/Logout, Search Turfs, Book Turf, and Provide Feedback.

2. Web Server:

- Acts as the central hub for handling requests from users.

- Responsibilities include Handling Requests, Serving Pages, and Processing Payments.

- It interacts with other modules to fulfill user requests.

3. Booking Module:

- Manages the booking-related functionalities.

- Key operations include Manage Reservations, Check Availability, and Send Notifications.

- Receives booking requests from the Web Server and updates the Database.

4. Facility Management Module:

- Manages information related to turfs and schedules.

- Performs tasks such as List Turfs, Manage Schedules, and Update Pricing.

- Provides data to the Web Server and updates the Database with turf information.

5. User Management Module:

- Manages user profiles and authentication.

- Key functions include User Profiles and Authentication.

- This module ensures secure access to the system by verifying user credentials.

6. Database:

- Stores essential data for the system, including User Data, Booking Data, and Facility Data.

- Supports the persistence of information needed by other modules and provides access to stored data as required.

Interactions:

- User → Web Server: Users interact with the Web Server to perform actions.

- Web Server ↔ Booking Module: The Web Server forwards booking-related requests to the Booking Module, which manages reservations.

- Web Server ↔ Facility Management Module

## 5.2 MODULES DESCRIPTION:

### 5.2.1 USER AUTHENTICATION MODULE:

**1. User Registration Process**

**Step 1:** User submits a registration form with details such as username, password, and email.

**Step 2:** System validates input data (e.g., ensuring password security criteria and correct email format).

**Step 3:** Encrypt the password using a secure hashing algorithm (e.g., bcrypt).

**Step 4:** Store the hashed password and other user details in the MongoDB database.

**Step 5:** Send a confirmation email with a verification link (optional).

**Step 6:** Upon clicking the verification link, update the user's status in the database to "verified."

**2. User Login Process**

**Step 1:** User submits a login form with username and password.

**Step 2:** System retrieves user details based on the submitted username.

**Step 3:** Compare the submitted password (after hashing) with the stored hashed password in the database.

**Step 4:** If passwords match, generate a secure session token or JSON Web Token (JWT).

**Step 5:** Send the session token to the user's browser for accessing protected pages.

**Step 6:** If the password does not match, display an error message indicating incorrect credentials.

**3. Session Management**

**Step 1:** For each request to access a protected route, check for a valid session token (or JWT).

**Step 2:** If the token is valid, allow access to the requested resource.

**Step 3:** If the token is invalid or expired, redirect the user to the login page.

**4. Logout Process**

**Step 1:** When the user clicks "Logout," invalidate the session token on the server.

**Step 2:** Remove the session token from the user's browser (e.g., by clearing cookies or local storage).

**Step 3**: Redirect the user to the login page.

### 5.2.2 FACILITY MANAGEMENT MODULE:

**1. Listing Available Turfs**

**Step 1:** Facility manager accesses the dashboard to add new turf listings.

**Step 2:** Input details such as turf name, location, available time slots, pricing, and amenities.

**Step 3:** Save the listing, making it visible to users searching for turfs.

**2. Managing Bookings**

**Step 1:** View all bookings through a centralized booking dashboard.

**Step 2:** Update booking status as needed (e.g., confirm, cancel, or reschedule).

**Step 3:** Notify users of any booking changes (e.g., cancellations or reschedules) via automated notifications.

**3. Updating Facility Details**

**Step 1**: Access facility management settings to edit information.

**Step 2:** Update details such as pricing, available time slots, and amenities as needed.

**Step 3:** Save updates to reflect changes on the user interface, ensuring users see the latest facility information.

### 5.2.3 BOOKING SYSTEM MODULE:

**1. Search for Available Turfs**

**Step 1:** User inputs search criteria such as location, date, and preferred time slot.

**Step 2:** System retrieves available turfs matching the criteria from the database.

**Step 3:** Display search results, showing availability and details for each turf.

**2. Select Time Slots**

**Step 1:** User selects a preferred time slot from the available options for the chosen turf.

**Step 2:** System checks real-time availability to ensure the slot is still open.

**Step 3:** If available, proceed to booking confirmation; if unavailable, notify the user and suggest alternative slots.

**3. Confirm Booking**

**Step 1:** User reviews booking details and proceeds to confirmation.

**Step 2:** System prompts for payment and provides payment options.

**Step 3:** Upon successful payment, system confirms the booking and generates a confirmation receipt.

**Step 4:** Send a confirmation email to the user with booking details and a digital receipt.

**4. Real-Time Availability Integration**

**Step 1:** System continuously updates availability status as bookings are made.

**Step 2:** Ensure real-time synchronization between user interface and database to avoid double bookings.

**5. Payment Processing**

**Step 1**: After booking confirmation, redirect user to a secure payment gateway.

**Step 2:** Process payment and confirm transaction status.

**Step 3:** Update booking status in the database and notify the user of payment success or failure.

### 5.2.4 REVIEW AND RATING MODULE:

**1. Submit Feedback**

**Step 1:** User navigates to the review section after their booking experience.

**Step 2:** Fill out a feedback form, including a rating and optional written review.

**Step 3:** Submit the review, which is then stored in the database.

**2. Display Ratings and Reviews**

**Step 1:** Retrieve and display all reviews and ratings for each facility on its profile page.

**Step 2:** Sort reviews by date or rating to help users find relevant feedback.

**Step 3:** Show average rating for each facility based on all submitted reviews.

**3. Maintain Service Quality**

**Step 1:** Facility managers can view feedback to identify areas for improvement.

**Step 2**: Admins monitor reviews for inappropriate content to ensure quality and transparency.

**Step 3:** Respond to reviews if necessary to address user concerns and improve user trust.

### 5.2.5 COMMUNITY FORUM MODULE:

**1. Facilitating Engaging Discussions**

**Step 1:** User selects or creates a relevant discussion topic in the community forum.

**Step 2:** Users post their comment or question, contributing to the conversation.

**Step 3:** Other members engage by responding, providing insights, or asking questions.

**Step 4:** Forum moderators ensure discussions remain respectful, while active participants are recognized.

**2. Sharing Personal Experiences**

**Step 1**: Users select the "Share Your Experience" option and writes a post detailing their experience.

**Step 2:** User includes relevant multimedia (e.g., images or videos) to enhance their post.

**Step 3:** Post is displayed on the forum for community engagement and feedback.

**Step 4:** User responds to comments and continues the conversation with other members.

**3. Building Connections with Like-Minded Members**

**Step 1**: User creates a profile indicating their interests in sports or fitness activities.

**Step 2**: System recommends relevant groups or discussions based on user interests.

**Step 3:** User joins discussions or groups to engage with like-minded members.

**Step 4:** Through consistent participation, users build connections and can organize meetups or events.

**5.2.6 NOTIFICATION MODULE:**

1. Booking Confirmation Notifications

Step 1: User completes a booking (e.g., for a class, event, or service).

Step 2: The system generates a confirmation notification with details of the booking (e.g., date, time, location).

Step 3: Notification is sent in real-time to the user's preferred communication channel (e.g., email, SMS, in-app notification).

Step 4: User receives the booking confirmation and can review or modify the booking details if necessary

2. Notifications for Booking Changes or Cancellations

Step 1: Changes or cancellations are made to the user's booking (e.g., rescheduled event, canceled appointment).

Step 2: The system generates a new notification with updated booking details or cancellation information.

Step 3: Notification is sent in real-time to the user's preferred communication channel (e.g., email, SMS, in-app notification).

Step 4: User receives the update or cancellation notification and takes necessary action (e.g., reschedule, confirm changes)

3. Important System or Event Updates Notifications

Step 1: System detects an important update (e.g., new event, change in terms, or system maintenance).

Step 2: A notification is generated to alert users about the update.

Step 3: Notification is sent in real-time to users via their preferred channel (e.g., email, SMS, in-app notification).

Step 4: User receives the alert and reviews the details to take action, if required (e.g., sign up for a new event, adjust plans).

4. Reminder Notifications for Upcoming Bookings or Events

Step 1: The system identifies upcoming bookings or events for the user (e.g., a fitness class or appointment).

Step 2: A reminder notification is generated, sent at the specified time before the event (e.g., 24 hours, 1 hour).

Step 3: Notification is sent in real-time to the user's chosen communication method (e.g., email, SMS, app notification).

Step 4: User receives the reminder and prepares for the upcoming event or booking.

### 5.2.7 ANALYTICS AND REPORTING MODULE

1. Tracking User Behavior

Step 1: System collects data on user interactions, including logins, bookings, and activity within the platform.

Step 2: The system analyzes user behavior patterns, identifying trends such as peak usage times or frequently booked services.

Step 3: The insights are aggregated into visual reports (e.g., graphs, charts) for easy interpretation.

Step 4: Managers receive the behavioral reports and can use this data to improve user experience and engagement strategies.

2. Analyzing Booking Patterns

Step 1: The system tracks booking activity, capturing details such as booking frequency, types of services, and user demographics.

Step 2: The system analyzes booking trends over time to identify peak booking times, high-demand services, and seasonal variations.

Step 3: Reports are generated summarizing booking trends and patterns, which may include booking cancellations and no-shows.

Step 4: Managers review the reports and use the insights to optimize service availability and marketing strategies.

3. Monitoring Facility Usage

Step 1: System tracks usage data for each facility or resource (e.g., gym equipment, meeting rooms).

Step 2: The system analyzes utilization rates, identifying overused or underutilized facilities.

Step 3: Reports are generated showing the facility usage patterns, including peak hours, idle times, and usage frequency.

Step 4: Managers review the reports to adjust facility schedules, optimize resource allocation, and plan for maintenance or upgrades.

4. Generating Customizable Reports

Step 1: Users (e.g., managers, admins) select report parameters such as date ranges, user demographics, or facility types.

Step 2: The system compiles data based on the selected parameters and generates customized reports.

Step 3: Reports are presented in various formats (e.g., PDF, Excel) with visualizations for better insights.

Step 4: Managers can download or share the reports to make informed decisions, track KPIs, and improve operational efficiency.

# CHAPTER 6

# UML DIAGRAMS

## 6.1 USE CASE DIAGRAMS

The use case diagram illustrates the interactions between users and the Online Booking System, detailing the various actions available to both users and administrators within the system. The primary actors include the User, Admin, and Payment Gateway, each playing distinct roles. The User represents general users who interact with the system to complete bookings by performing actions such as searching for services, selecting a service, specifying date and time, entering personal information, reviewing booking details, confirming the booking, and processing payments through the Payment Gateway. The Admin oversees the system's functionality by managing services and availability, including viewing bookings, adding, editing, or deleting services, and updating availability to ensure resources are accessible for user reservations.

## 6.2 CLASS DIAGRAM

The class diagram for the turf booking system, "Pullveli," outlines its core components and their interactions. The Pullveli system serves as the main class, managing userDatabase, turfDatabase, and bookingDatabase, which store User, Turf, and Booking objects, respectively. It offers methods such as searchTurf() for locating turfs by location, date, and time; bookTurf() for booking a turf; getRecommendations() for personalized turf suggestions; and viewReviews() for accessing turf reviews. The User class includes attributes like userId, name, location, and preferences and provides methods such as viewBookings() to display user reservations and submitReview() to post feedback on a turf. User preferences are encapsulated in the Preferences class with attributes for preferredLocation, preferredTime, and preferredTurfType. The Turf class, representing individual turfs, includes attributes like turfId, location, availability, and reviews, along with a checkAvailability() method to verify open slots. The Booking class captures reservations with attributes like bookingId, user, turf, date, and time, and provides a cancelBooking() method for cancellations.

## 6.3 SEQUENCE DIAGRAM

The sequence diagram for booking a turf on the "Pullveli" platform outlines a streamlined process. Initially, the user searches for available turfs by providing preferences, prompting the Pullveli platform to query nearby turfs from the Turf Database and return a list of available options. Next, the user selects a specific turf, date, and time, after which the platform verifies the turf's availability in the database and confirms it to the user. Upon receiving confirmation, the user proceeds to confirm the booking, triggering the Pullveli platform to process payment securely via the Payment Gateway and receive a payment confirmation. Finally, the platform updates the booking details in the Turf Database and sends a booking success confirmation to the user, along with relevant suggestions. This process ensures a seamless experience with real-time availability checks and secure payment handling.

## 6.4 DATA FLOW DIAGRAM

The Data Flow Diagram (DFD) for the Turf Booking System highlights the interactions between its components. The **User** serves as the primary actor, initiating actions like searching for turfs, selecting and booking turfs, and receiving payment confirmations. The **Turf Booking System** processes these requests by showing available turfs to the user, checking availability, updating booking data in the **Turf Database**, and interacting with the **Payment Gateway** to initiate and confirm payments. The **Turf Database** stores essential information, including turf availability and booking data, supporting operations like checking availability, updating booking records, and generating booking reports for the **Admin**. The **Payment Gateway** facilitates secure payment processing, handling payment initiation from the Turf Booking System and sending payment confirmations to the user. The **Admin** oversees the system by viewing bookings, managing turf data, and generating reports from the Turf Database to ensure efficient operation. These interactions create a cohesive system, enabling seamless turf booking, secure payments, and effective administrative management.

# CHAPTER 7

# SOFTWARE DEVELOPMENT LIFECYCLE MODEL

The **Pullveli Turf Booking Website** project is designed and developed using the **Waterfall Model**, a sequential and systematic development methodology. This approach ensures that each phase is completed before moving on to the next, providing a clear structure to the project lifecycle.

The process begins with the **Requirements Phase**, where detailed specifications are collected to define the system's functionality. The key requirements include secure user authentication through a login and signup system, real-time turf availability checks, the ability to book turfs by selecting a date and time, payment processing via a secure gateway, and feedback collection with options for rating and reviews. These requirements establish the foundation for the project's objectives, focusing on a seamless user experience, efficient turf booking, and secure payment processing.

In the **Design Phase**, a comprehensive architecture is created to define the flow of the application. This includes designing the user interface for the login/signup page, the turf search and booking dashboard, and the feedback page for posting reviews and ratings. The backend design involves creating algorithms for real-time availability checks, booking management, and secure payment processing. The database is structured to store user profiles, turf details, booking records, and feedback data securely. Additionally, the design incorporates a robust admin interface for managing turfs and generating reports.

The **Implementation Phase** involves developing individual components of the website. The user interface is built using HTML, CSS, and JavaScript for an interactive and responsive design, while the backend is developed with appropriate frameworks to handle business logic. Features like user authentication, turf availability checks, and booking confirmation are implemented with a focus on reliability.

# CHAPTER 8
# PROGRAM CODE AND OUTPUTS

## 8.1 PROGRAM

```
from flask import Flask, render_template, request, redirect, url_for, session
import firebase_admin
from firebase_admin import credentials, auth, db
import os

app = Flask(__name__)
app.secret_key = os.getenv("SECRET_KEY", "your_secret_key")

# Initialize Firebase Admin SDK with Realtime Database URL
cred = credentials.Certificate(r"C:\Users\Deepa\Downloads\fir-76d09-firebase-adminsdk-qdjnu-cb873358f9.json")
firebase_admin.initialize_app(cred, {
    'databaseURL': 'https://fir-76d09-default-rtdb.firebaseio.com'  # Replace with your Realtime Database URL
})

# Initial login page route
@app.route('/')
def login_page():
    return render_template("login12.html")
ed=0
# Handle user login
@app.route('/login', methods=['POST'])
def login():
    username = request.form.get("username")
    password = request.form.get("password")
    sdf=request.form.get("turf_name")
    print(sdf)
    global ed
    ed=sdf
    # Check if username is a valid email
    if '@' not in username or '.' not in username:
```

```
        return "Please enter a valid email address.", 400

    try:
        user = auth.get_user_by_email(username)
        session['user_id'] = user.uid  # Store user ID in
session
        return redirect(url_for('show_bookings'))
    except firebase_admin._auth_utils.EmailNotFoundError:
        return "Login failed: User not found or incorrect
credentials", 401
    except Exception as e:
        return f"An unexpected error occurred: {str(e)}",
500

# Show customer bookings only if logged in
@app.route('/show_bookings')
def show_bookings():
    if 'user_id' not in session:
        return redirect(url_for('login_page'))  # Redirect
to login if not logged in

    # Filter bookings based on turf name provided by the
user (you might store this in the session or use a form)
    turf_name = request.args.get("turf_name")  # Get turf
name from query or a form field
    global ed
    turf_name=ed
    print(ed)
    bookings_ref = db.reference('bookings')
    all_bookings = bookings_ref.get()

    # Filter bookings by turf name
    bookings_list = [
        dict({'id': key}, details)
        for key, details in all_bookings.items()
        if details.get("turf_name") == turf_name
    ] if all_bookings else []

    return                    render_template("show.html",
bookings=bookings_list)
```

```
# Log out user and clear session
@app.route('/logout')
def logout():
    session.pop('user_id', None)
    return redirect(url_for('login_page'))

if __name__ == "__main__":
    app.run(debug=True, port=5000)
```

```
from flask import Flask, request, redirect, url_for,
render_template, session, send_from_directory
import firebase_admin
from firebase_admin import credentials, auth, db
import random
import smtplib
from flask_mail import Mail, Message
from email.mime.text import MIMEText
from email.mime.multipart import MIMEMultipart
import os
import time

app = Flask(__name__)
app.secret_key = os.getenv("SECRET_KEY",
"your_secret_key")

# Email configuration (use your email settings)
app.config['MAIL_SERVER'] = 'smtp.gmail.com'
app.config['MAIL_PORT'] = 587
app.config['MAIL_USE_TLS'] = True
app.config['MAIL_USERNAME'] = "r9691171@gmail.com" #
Replace with your email
app.config['MAIL_PASSWORD'] = "hnjk kgqq wqqx gdpq" #
Replace with your email password

mail = Mail(app)

# Initialize Firebase Admin SDK with Realtime Database URL
cred =
credentials.Certificate(r"C:\Users\Deepa\Downloads\fir-
76d09-firebase-adminsdk-qdjnu-cb873358f9.json")
firebase_admin.initialize_app(cred, {
```

```
    'databaseURL': 'https://fir-76d09-default-
rtdb.firebaseio.com'  # Replace with your Realtime Database
URL
})

otp_storage = {}

def send_otp_via_email(email, otp):
    msg = MIMEMultipart()
    msg['Subject'] = 'Your OTP Code'
    msg['From'] = "r9691171@gmail.com"
    msg['To'] = email
    body = f"Your OTP is: {otp}. It is valid for 5 minutes."
    msg.attach(MIMEText(body, 'plain'))

    try:
        with smtplib.SMTP('smtp.gmail.com', 587) as
server:
            server.starttls()
            server.login("r9691171@gmail.com", "hnjk kgqq
wqqx gdpq")
            server.send_message(msg)
            print(f"OTP sent to {email}")
    except Exception as e:
        print(f"Failed to send email: {e}")

@app.route('/')
def login_page():
    data = r"downloada.jpg"
    return render_template("login.html", data=data)

@app.route('/signup', methods=['POST'])
def signup():
    username = request.form.get("username")
    password = request.form.get("password")
    user = auth.create_user(email=username,
password=password)
    otp = random.randint(100000, 999999)
    otp_storage[user.uid] = {
        'otp': otp,
        'timestamp': time.time()
```

```
    }
    send_otp_via_email(username, otp)
    session['uid'] = user.uid
    return redirect(url_for('verify'))

@app.route('/login', methods=['POST'])
def login():
    username = request.form.get("username")
    password = request.form.get("password")
    user = auth.get_user_by_email(username)
    otp = random.randint(100000, 999999)
    otp_storage[user.uid] = {
        'otp': otp,
        'timestamp': time.time()
    }
    send_otp_via_email(username, otp)
    session['uid'] = user.uid
    return redirect(url_for('verify'))

@app.route('/verify')
def verify():
    return render_template("verify.html")

@app.route('/verify_otp', methods=['POST'])
def verify_otp():
    uid = session.get('uid')
    entered_otp = request.form.get("otp")

    if uid in otp_storage:
        otp_data = otp_storage[uid]
        if   otp_data['otp']   ==   int(entered_otp)   and
(time.time() - otp_data['timestamp'] < 300):
            del otp_storage[uid]
            session['user'] = uid
            return redirect(url_for('main_page'))
        else:
            return "Invalid or expired OTP!", 400
    else:
        return "No OTP sent for this user!", 400

@app.route('/turf_locations')
```

```
def turf_locations():
    return  send_from_directory(os.path.dirname(__file__),
'turf_locations_tamilnadu.json')

def send_confirmation_email(name, email, date_time):
    msg       =       Message("Booking       Confirmation",
sender='r9691171@gmail.com',    recipients=[email])       #
Replace with your email
    msg.body   =   f"Hello   {name},\n\nYour   booking   for
{date_time} has been confirmed."
    mail.send(msg)

@app.route('/booking')
def booking():
    turf_name = request.args.get('name', 'Unknown Turf')
    return                      render_template("book.html",
turf_name=turf_name)

@app.route('/submit_booking', methods=['POST'])
def submit_booking():
    name = request.form['name']
    email = request.form['email']
    phone_number = request.form['phone_number']
    date_time = request.form['date_time']
    turf_name = request.form['turf_name']

    # Add booking to Firebase Realtime Database
    bookings_ref = db.reference('bookings')
    new_booking_ref = bookings_ref.push()
    new_booking_ref.set({
        'name': name,
        'email': email,
        'phone_number': phone_number,
        'date_time': date_time,
        'turf_name': turf_name
    })

    send_confirmation_email(name, email, date_time)
    return redirect(url_for('booking_confirmation'))

@app.route('/booking_confirmation')
```

```
def booking_confirmation():
    return render_template("confirm.html")

@app.route('/main')
def main_page():
    return render_template("rffrrf.html")
@app.route('/logout')
def logout():
    session.pop('user_id', None)
    return redirect(url_for('login_page'))

if __name__ == "__main__":
    app.run(debug=True, port=5000)
```

## 8.2 OUTPUT SCREENSHOTS

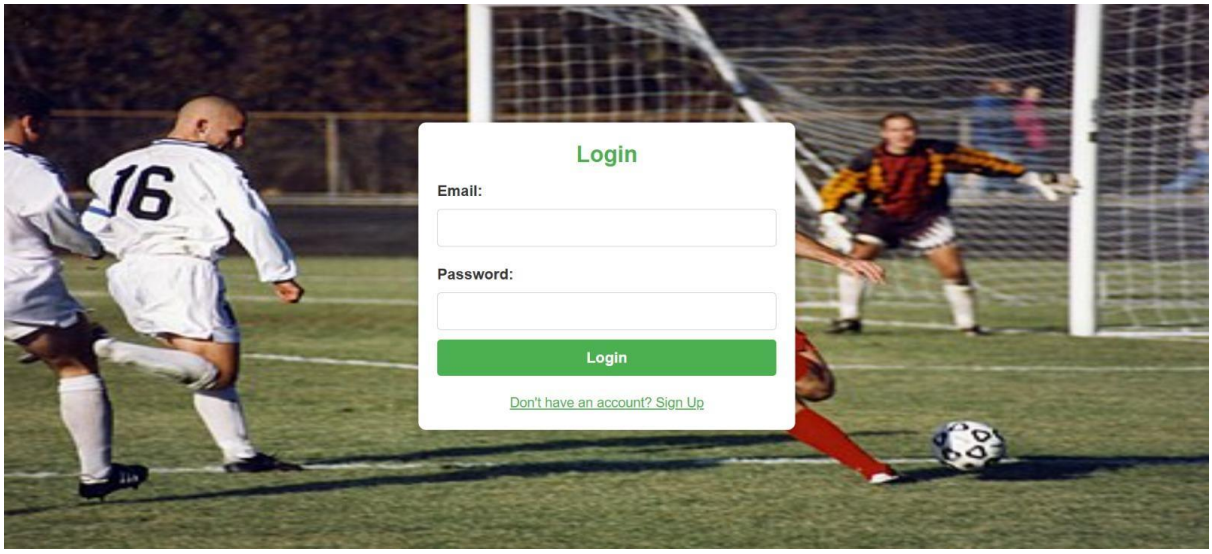


**Fig 2. Login Page**

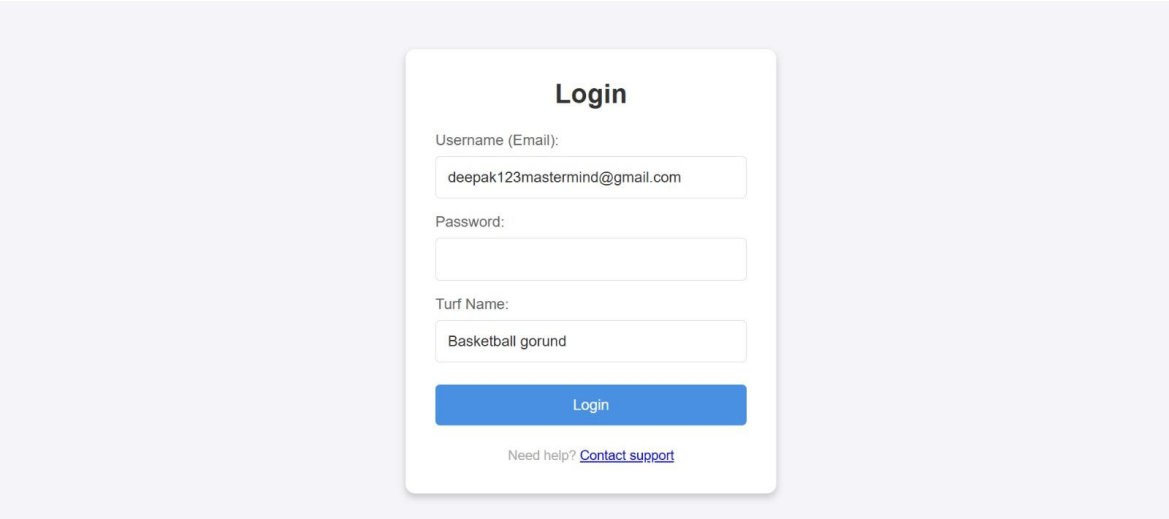


**Fig 3. Booking details**

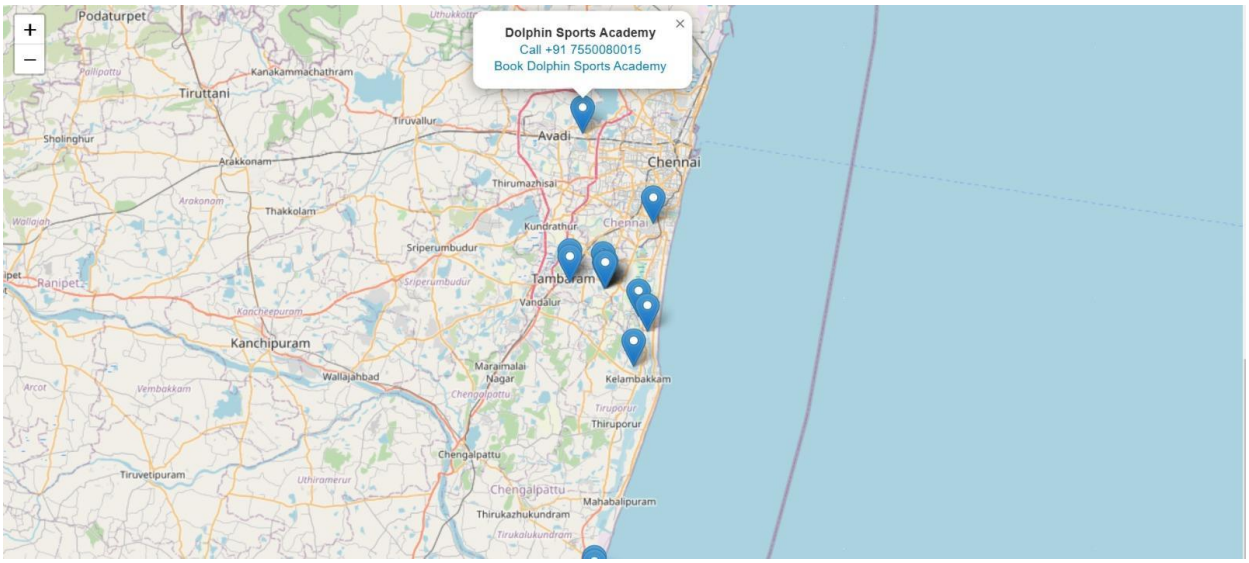


**Fig 4. Nearby turf locations**

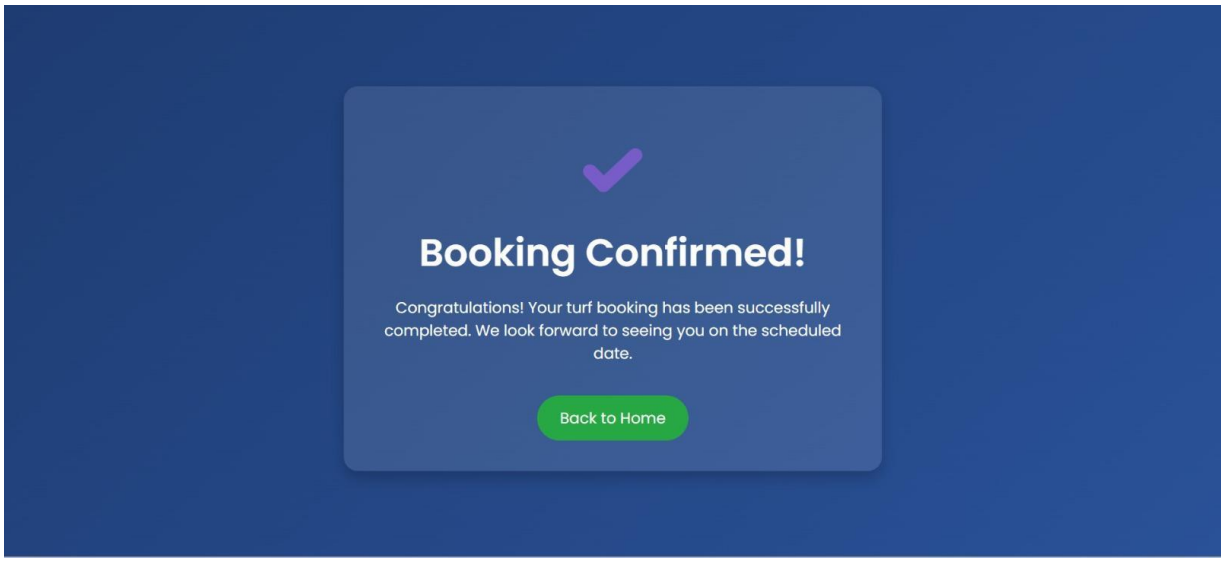


**Fig 5. Booking Confirmation**

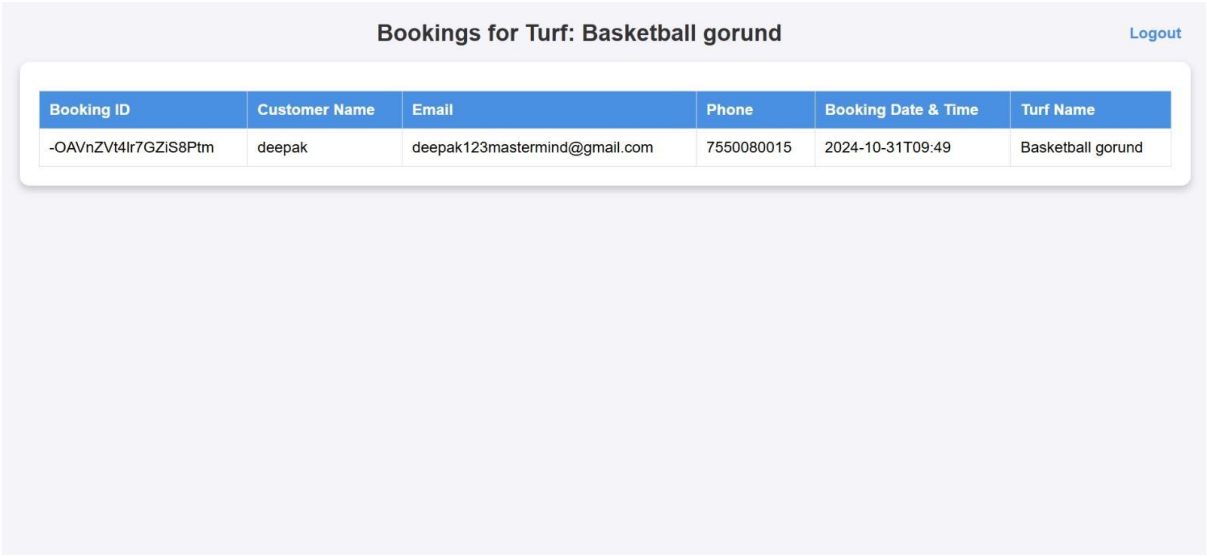


**Fig 6. Booking Confirmation details**

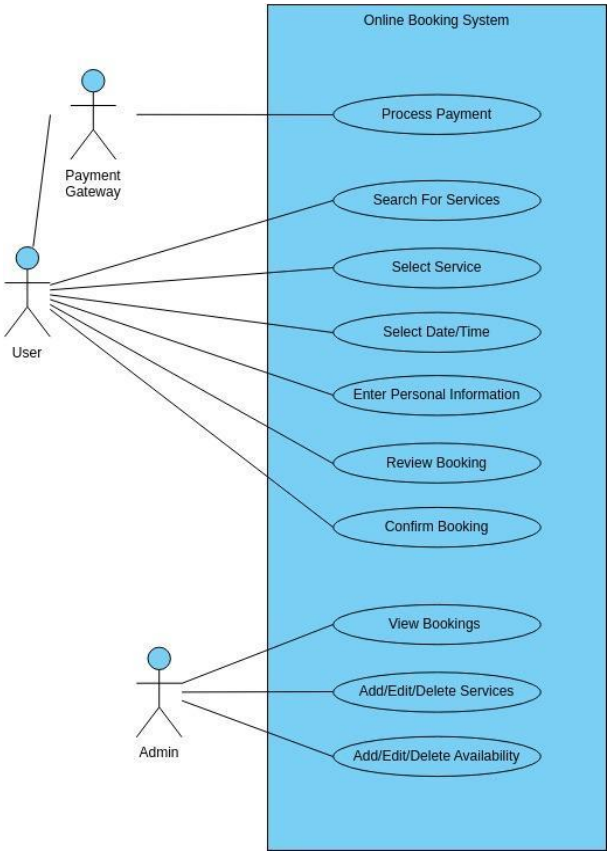


**Fig 7. Use Case Diagram**

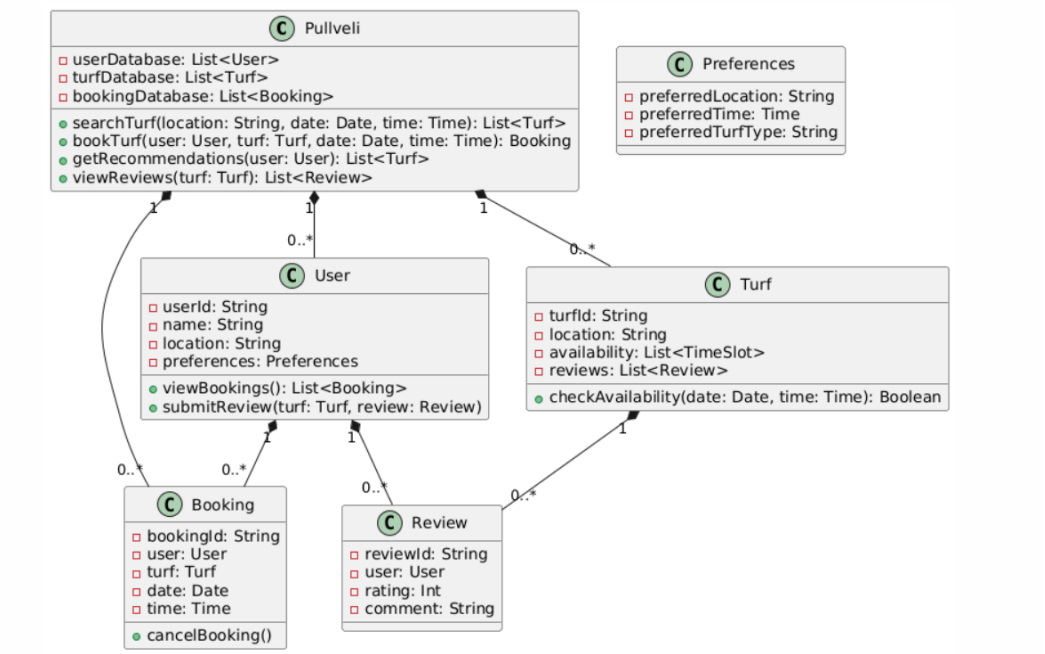


**Fig 8. Class Diagram**

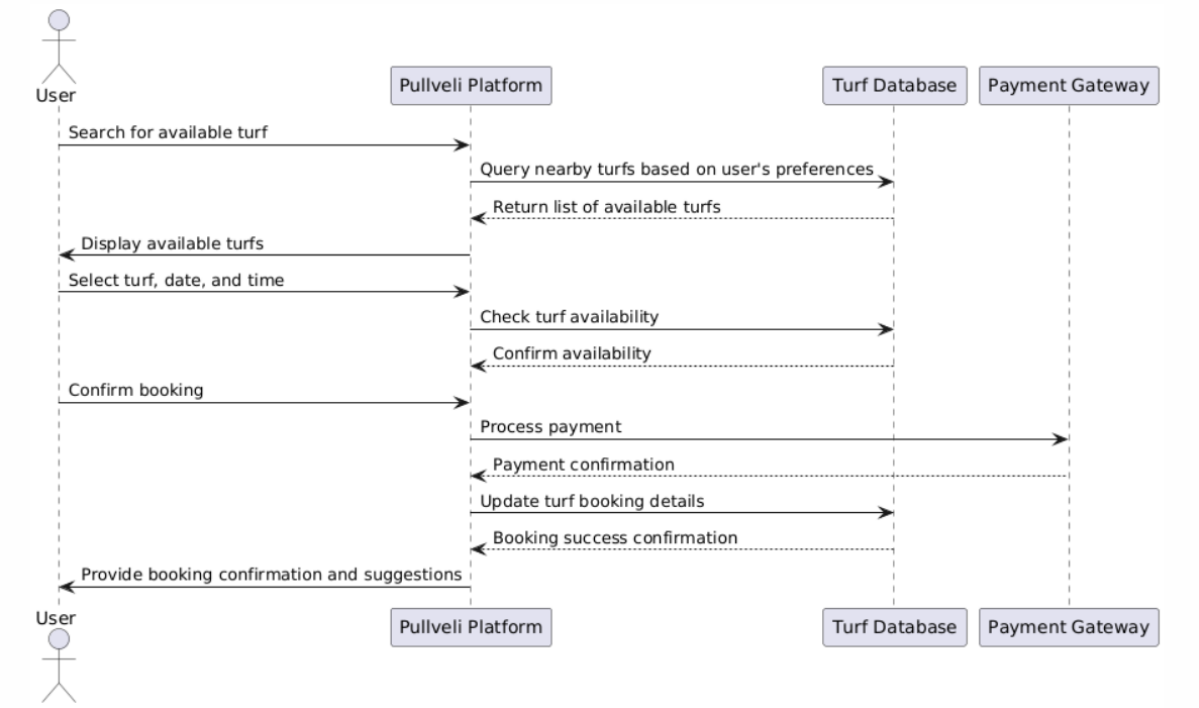


**Fig 9. Sequence Diagram**

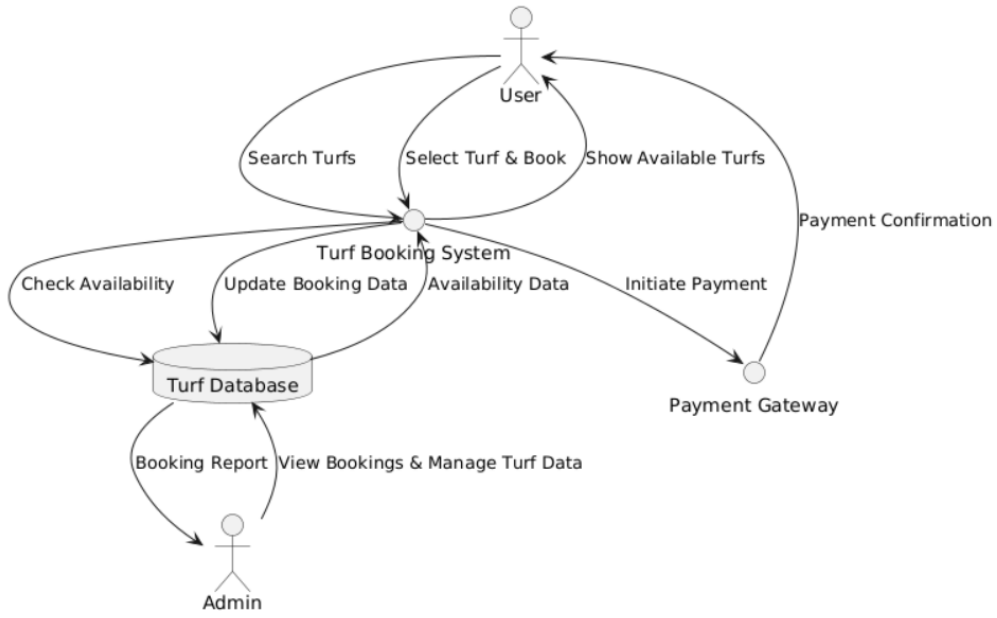


**Fig 10. Data Flow Diagram**

## CHAPTER 9

# TESTING

## 9.1 UNIT TESTING

Unit testing is a software testing method where individual components of an application are tested to ensure they work as expected. For a Flask application, this typically involves testing routes, database models, and utility functions.

**CODE:**

**TESTING MODELS**

```
import unittest
from app.models import TurfBooking
class ModelTests(unittest.TestCase):
    def test_model_creation(self):
        booking = TurfBooking(date="2024-11-09", time="10:00", user_id=1)
        self.assertEqual(booking.date, "2024-11-09")
        self.assertEqual(booking.time, "10:00")
if __name__ == '__main__':
    unittest.main()
```

**TESTING DATABASE:**

```
import unittest
from app import create_app, db
from app.models import TurfBooking
from config import TestingConfig
class DatabaseTests(unittest.TestCase):
    def setUp(self):
  self.app = create_app(TestingConfig)
```

```
        self.app.app_context().push()
        db.create_all()
    def tearDown(self):
        db.session.remove()
        db.drop_all()
if __name__ == '__main__':
    unittest.main()
```

**9.2 OUTPUT:**

output with error:

```
PS C:\Users\bhara> $ python -m unittest discover tests
.F
======================================================================
FAIL: test_booking_route (tests.test_routes.RouteTests)
----------------------------------------------------------------------
Traceback (most recent call last):
  File "/path/to/your/project/tests/test_routes.py", line 12, in test_booking_route
    self.assertEqual(response.status_code, 200)
AssertionError: 404 != 200

----------------------------------------------------------------------
Ran 2 tests in 0.003s

FAILED (failures=1)
```

output after fixing the error:

```
PS C:\Users\bhara> $ python -m unittest discover tests
...
----------------------------------------------------------------------
Ran 3 tests in 0.004s

OK
```

# CHAPTER 10
# RESULTS AND DISCUSSION

## 10.1 RESULTS:

The implementation of secure user authentication has enabled users to register and log into the turf booking system safely. The MongoDB database securely stores user passwords in a hashed and encrypted format, meeting data protection standards and ensuring compliance with privacy regulations. This approach builds user trust and provides a strong shield against unauthorized access.

The chatbot integration has been effective in assisting users with their booking process, providing a responsive and interactive experience. It handles a large volume of user inquiries efficiently, reducing the load on customer support while improving user satisfaction. This feature has received positive feedback, as it enhances the overall ease of use and engagement with the platform.

The booking system offers a streamlined experience, allowing users to browse various turf options, make customizations, and complete bookings smoothly. Automated email notifications deliver timely confirmations and updates, ensuring users are well-informed throughout the process.

## 10.2 DISCUSSION:

The platform’s user-centric design prioritizes ease of navigation and an enjoyable booking experience. Feedback has shown that users appreciate the simple layout and efficient search options, which make finding and reserving turfs straightforward. This focus on usability is essential to maintaining user engagement and encouraging frequent use of the platform.

The chatbot has proven to be a valuable tool in guiding users through the booking process, reducing the need for direct customer support. However, ongoing refinement will be necessary to improve its effectiveness over time, based on real user interactions.

# CHAPTER 11

# CONCLUSION AND FUTURE ENHANCEMENT

## 11.1 CONCLUSION:

In conclusion, Pullveli is a user-centric turf booking platform that prioritizes convenience, flexibility, and personalization. By offering a streamlined experience, Pullveli allows users to easily find and book nearby turfs that match their specific needs, saving time and enhancing accessibility.A key feature of Pullveli is its integration of user reviews and tailored recommendations. These tools empower users to make informed decisions and receive personalized suggestions based on their preferences, enhancing engagement and satisfaction. Overall, Pullveli provides a hassle-free, reliable environment for turf booking, making it the go-to platform for sports enthusiasts, teams, and casual players. Its commitment to user satisfaction and quality service sets a new standard in the turf booking industry, ensuring each booking is seamless and tailored to individual needs.

## 11.2 FUTURE ENHANCEMENT:

1.Mobile Application Development

- Description: Develop a mobile application version of the turf booking website to enhance accessibility for users on the go. The app can provide features such as turf browsing, booking, and notifications directly on users' smartphones.
- Technologies: React Native or Flutter for cross-platform mobile app development.

2.Enhanced Chatbot Capabilities

- Description: Improve the chatbot’s natural language processing (NLP) capabilities to provide more accurate responses to user queries. This can include training the chatbot with real user interactions and adding support for more complex queries.
- Technologies: Dialogflow, Rasa, or custom NLP solutions.

## REFERENCES


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