CHAPTER 1: INTRODUCTION

1.1 BACKGROUND

Sports are a way of life. Among sports, futsal and football are more popular as it is loved by all. Young teenagers are nowadays involved in futsal more than ever so it is being popular among youths day by day thus more stadiums and futsal arenas are being opened. This 21st century is all about technology. Combining the fields of sports and technology can be done for to make life easier and effective. Many attempts have been made to enhance the field of sports by the use of IT. If we particularly look at futsal sports there has been little to none attempts to collaborate it with IT. And talking about Nepal, not a single attempt has been taken.

Futsal Recommender System is a web-app which provides user with variousfeatures like rating and futsal recommendation. This application allows the user to create an account and log in to the system. The data is then stored in the database. Using the account the user can rate futsal and get recommendation from the system. It helps the user to easily get the information about the futsal and the available facilities and correspondingly book the futsal arena. This system willovercome the difficulties that every futsal player is facing these days in our city. However, we thought of collaborating Futsal with IT. IT being our profession and Futsal being our passion, we thought of bringing passion and profession together. So we are creating an "Futsal Recommender System" which will help the players to rate and get information about nearby arenas and events in those arenas.

1.2 PROBLEM STATEMENT

A Futsal player and a team have to face a lot of problems to book the ground and finding opponent was much more difficult. It is quite a difficult task to find the nearby futsal arenas. So we always thought of linking futsal with IT creating a system where players can get full information about the nearby arenas and their facilities. This system is intended for both the players and the futsal owners. It will also help the futsal owner to advertise their arena

with proper description and attract more players to their arena. The main focus of the project is to allow the players to rate the arena. Also, teams can get the recommendations of the other preferable arenas through their rating data.

Listed are the few problems:

1. The price of the futsal arena per hour is not same in every Futsal and user finds difficult to compare the facilities and prices.
2. It is difficult to know the vacant futsal especially in the holiday.
3. The price of the futsal arena per hour is not same in every Futsal and user finds difficult to compare the facilities and prices.
4. The location of the futsal arena is difficult to allocate, especially in the new areas.
5. One has to spend a lot of time surfing the information about the futsals which can be tedious process.

1.3 OBJECTIVES

This system will overcome the difficulties that every futsal player is facing these days in our city. Because of the easy availability, increased love for the sports and tradition of playing futsal, the demand of futsal is growing rapidly. With focusing the increasing craze of futsal in our country and adding a small bricks for its development, we have thought about this project. The main objective of this project includes;

- To locate the futsals in and around the valley.
- To share the latest news about the futsal scheme, tournaments and other information among a large number of people.
- To allow user to register and rate the futsal arenas.
- To allow user to book the futsal arena.
- To recommend the registered teams with the futsal on the basis of the ratings given by the user.

1.4 PROJECT FEATURES

Features provided are:

- Web based system with Team registration and rating.
- Search for futsal and retrieve the futsal information.
- Recommender system: The possible team preferred arena is recommended by the system using the team's rating data.

1.5 Scope

Futsal Recommender System is a web-based application allowing user to access the information regarding the futsals in and around the Kathmandu valley. This project is applicable to the players regularly playing futsal and teams who want to explore and search for new arenas. With the integrated feature of team login, team registered and logged onto the system can surf the arenas and get information along with book the arenas as per the preferred and available time.

Additionally, Teams registered can rate the futsal arenas as per their choice and preference as well the feeling of quality of playing and facilities within the futsal. On the basis of the rating values, recommendation system recommends team with similar futsal that team can prefer to play in the future.

1.6 Limitation

The limitation of the project includes:

- Registration is must for using the features of the system so not any users can use the system.

- Initially, futsal and ratings data has to be added to the system manually as recommendation requires pre stored data and rating values.

CHAPTER 2: LITERATURE REVIEW

In recent years, there have been rise in the number of applications based on Recommendation system and have been successfully applied to different areas as diverse as drive traffic, provide relevant material, engage costumers, transform shoppers to clients, increase average order value, boost number of items per order, control retailing and inventory rules, lower work and overhead, provide reports, offer recommendations and direction and so on. Recommender system are used in various sectors such as movies, music, news, books, research articles, search queries, social tags, and products in general. Recommendation system includes collaborative filtering, content- based filtering, hybrid recommender systems. Futsal Recommendation System is one of the recommender system that gives the rating of different futsal given by the team, that gives choice to the new players that wants to play in the new arena. Futsal recommendation system helps to increase the futsal business that is way productive from the futsal owner point of view. As the number of futsal are limited in the specific area, any new person with love towards futsal can enjoy the beautiful game at a better place given rating by the regular players that frequently visit the arena. During the past day and even in the present days there have been problem in phone calls booking and choosing the best arena among the many futsal. When someone has to call the futsal owner for booking and also they don't know the quality of the arena, there has been found some dissatisfaction about the quality and service. Recommendation system emphasis on improving the futsal business and giving quality service to the players. When a user is logged in, it recommends among the best according to the rating of the futsal. An internet booking engine (IBE) is a website that allows the travel agents and consumers to book flights, hotels, holiday packages, insurance and other services online. An internet booking engine allows a customer to specify their travel requirements such as city of departure, departure date, return date and class of travel. Once this information is received, the IBE will offer a list of available air tickets, hotels and excursions which the customer can then book.

Recommendation systems can be of two different approaches that can include content-based or collaborative filtering algorithms. Content based algorithms are fully dependent over the user stored data and values and on the analysis of these content, recommendations are generated. in collaborative approach all users are involved in rating based on their interests. In this way, similar users who have the same tastes are linked together (put in the same group/community). Therefore, it can be said that collaborative filtering does not have content-based filtering limitation since it does not depend on the contents; as a result, filtering information from any sources is possible. Moreover, using collaborative filtering makes complex and deep relationships between users and items, such as the needed quality or taste of a certain user. The collaborative filtering mechanism uses different algorithms which includes;

1. Pearson Correlation Coefficient.

$$sim(a,b) = \frac{\sum_{p \in P}(r_{a,p} - \bar{r}_a)(r_{b,p} - \bar{r}_b)}{\sqrt{\sum_{p \in P}(r_{a,p} - \bar{r}_a)^2}\sqrt{\sum_{p \in P}(r_{b,p} - \bar{r}_b)^2}} \qquad (1)$$

   In the equation, we use U = {u1, …, un} to denote the set of users, P = {p1, …, pm} for the set of products (items), and R as an n × m matrix of ratings ri,j, with i ∈{1…m}. The equation (1) returns a real number between to -1. If two users strongly have similar tastes to each other the output of the equation is closer to 1 whereas if their tastes are dissimilar the output be closer to -1.

2. Cosine Similarity.

   The similarity between two items a and b – viewed as the corresponding rating vectors a and b – is formally defined as follow, equation (2).

$$sim(\vec{a},\vec{b}) = \frac{\vec{a} \cdot \vec{b}}{|\vec{a}| * |\vec{b}|} \qquad (2)$$

The · symbol is the dot product of vectors, a ρ is the Euclidian length of the vector that defines as the square root of the dot product of the vector.

CHAPTER 3: REQUIREMENT AND FEASIBIITY ANALYSIS

3.1 FEASIBILITY ANALYSIS

An analysis and evaluation of a proposed project to determine if it is technically feasible within the estimated cost, and if it will be profitable. Some key factors to analyze feasibility are as follows

3.1.1 Economic Feasibility

It shows the analysis of a project's costs and revenues in an effort to determine whether or not it is logical and possible to complete. This project is a web application, available and accessible via internet which makes it economically feasible. Users only require an Internet connection to access contents included in the web application. Moreover, there are no charges of any sorts associated in the contents in the web application.

3.1.2 Technical Feasibility

The web Application is technically feasible; complies with current technology, including both the hardware and the software. The Web application is supported by almost all latest web browsers, and most of all, it can be run on modern day systems.

3.1.3 Operational Feasibility

The web application solves problem faced by the target group. The target users can look up to the web application if and when the problem arises. Furthermore, features such as factual information, efficiency, and cost effective is testament to the fact that the web application is operationally feasible.

3.1.4 Schedule Feasibility

Schedule feasibility is concerned with the timings and schedule of the project development and management. The project is intended to be developed within 13 weeks and is practically feasible for development within the specified time. Different techniques can be

used for representing the schedule feasibility of the project and the most commonly used mechanism is Gantt chart, The Gantt chart for the project divided among 13 different weeks can be represented as follows:

Gantt chart

Gantt chart is project management tools that highlight and clarify the schedule of the projects. This tools shows the activities or task performed in project displayed against defined time.

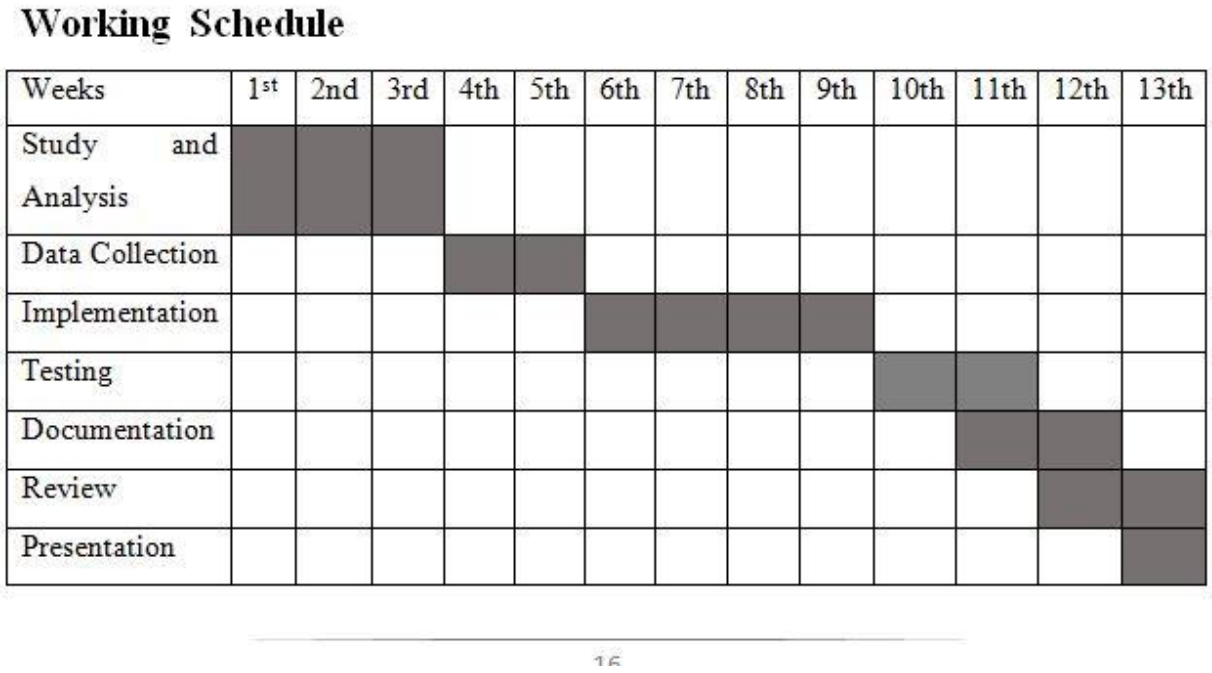


Figure 1: Gantt chart

3.2 REQUIREMENT SPECIFICATION

Requirements analysis concerns the process of reviewing and managing the system necessities and requirements basically the functional and non-functional requirements to be met by the system. It uses different approaches that includes the following:

3.2.1 Preliminary Analysis

- Problem statement specifying the problem analysis.
- Study and analysis of the existing systems to have information regarding the literature review.
- System planning and design analysis.

3.2.2 Functional Requirements

Functional requirement determines the provision of the system and the system's processing to certain inputs and how the system operates usually.

a. User Registration

Registration is open to all the visitors to Futsal Recommender System. User can register to the system by filling the necessary information in the sign up tab. User then selects an appropriate login credentials (username and password) to access his profile.

b. User Function

Only registered user can have access to the system. Without creating the user profile, one cannot enter to the system.

c. User profile

Futsal Recommender system allows the registered user to access their own personal profile i.e. user profile where the user can rate the futsal, get information and recommendation.

d. Sign out

User can logout of the system after finishing using the web application.

3.2.3 Non-Functional Requirements

a. User friendly

The term user-friendly is self-explanatory. When something is userfriendly, it is easy to access and work with. Futsal Recommender System is user friendly. Visitors or Users with basic knowledge and skills of computer can easily use the web application. This system uses a simplified design and navigation, as well as simple language on the content to improve the user friendliness of the web application. User friendliness helps the web application to improve and increase the amount of visitors who use the web application.

b. Easy Access

Futsal Recommender System is web application. Thus, it can be accessed anytime from anywhere with an Internet Connection. This overcomes the geo-boundary and concurs with „Go beyond Borders".

c. Responsive

Futsal recommender system uses Bootstrap, which improves the responsiveness of the web application and it also concure the mobile-first technology which would enhance the functionality of web application in mobile devices. This nature could prove to be extremely beneficial to people living in areas with limited access to computers.

d. Information Accuracy

Information included in this system is obtained from reliable sources such as the arenas owners. They are verified and checked thoroughly before publishing on the web application. The web application makes sure to avoid making mistakes during data and information retrieval. Thus, Futsal Recommender System provides accuracy of information.

e. Speed of Application

The speed of application depends on basically two factors: System configuration and Internet Speed. System with good configuration will most definitely lag performance if the Internet bandwidth is below par and vice versa.

3.2.4 Software Requirements

S.N	Category	Software
1	Platform (Backend/ Frontend)	Java script
		Bootstrap
		jQuery
		Css ,php
2	Server Side	Apache
		My SQL
3	Client side	Browser

Table 1: Software Requirements

3.2.5 Hardware Requirements

PC or Laptops with minimum system requirement of

1. Operating System: Microsoft Windows XP or higher
2. Processor: 800MHz Intel Pentium III or higher
3. Memory: 512MB
4. Disk space: 750MB or higher
5. Network connection: yes

CHAPTER 4: SYSTEM DESIGN AND METHODOLOGY

4.1 SOFTWARE PROCESS MODEL

In software engineering, a software development methodology or system development methodology is a framework that is used to structure, plan, and control the process of developing an information system. There are different models or methods used or followed during the SDLC (Software Development Life Cycle) process such as the waterfall model, prototyping model, incremental model, spiral model and others based on the nature or objective of the software.

In Incremental model, each module passes through the requirements, design, implementation and testing phases. A working version of software is produced during the first module, so we have working software early on during the software lifecycle. Each subsequent release of the module adds function to the previous release. The process continues till the complete system is achieved.

Advantages of Incremental Model are:

- Generates working software quickly and early during the software life cycle.
- More flexible and less costly to change scope and requirements.
- Easier to test and debug during a smaller iteration.
- Easier to manage risk because risky pieces are identified and handled during its iteration.
- Each iteration is an easily managed milestone.

Disadvantages of Incremental Model

- Each phase of an iteration is rigid and do not overlap each other.
- Problems may arise pertaining to system architecture because not all requirements are gathered up front for the entire software life cycle.

The incremental process follows the steps as;

1. In initial, UI design and front end development
2. User login and signup module development
3. User profile design
4. Recommender design and development
5. Integration of module
6. Testing for each module was done using team and futsal data.

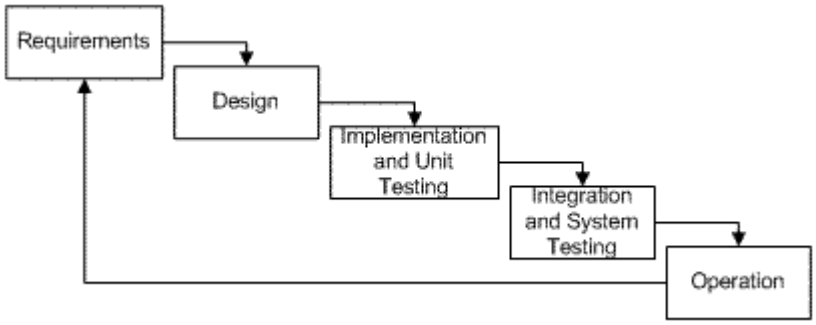


Figure 2: Iterative Model

4.2 USE CASE DIAGRAM

A use case diagram is a graphical depiction of the interaction among the elements of a system. A use case diagram looks something like a flowchart. Intuitive symbols represents the system elements. A use case diagram explains how user interacts with the system.

Futsal Recommendation is now associated with 4 cases. In the figure, user have to register to the system. They now can login to the system using their username and password. Using the id, they now can search for the futsal and book the futsal. User cannot access offline searching. In real time browsing, user can browse their necessary files, images and videos through website or when user is online.

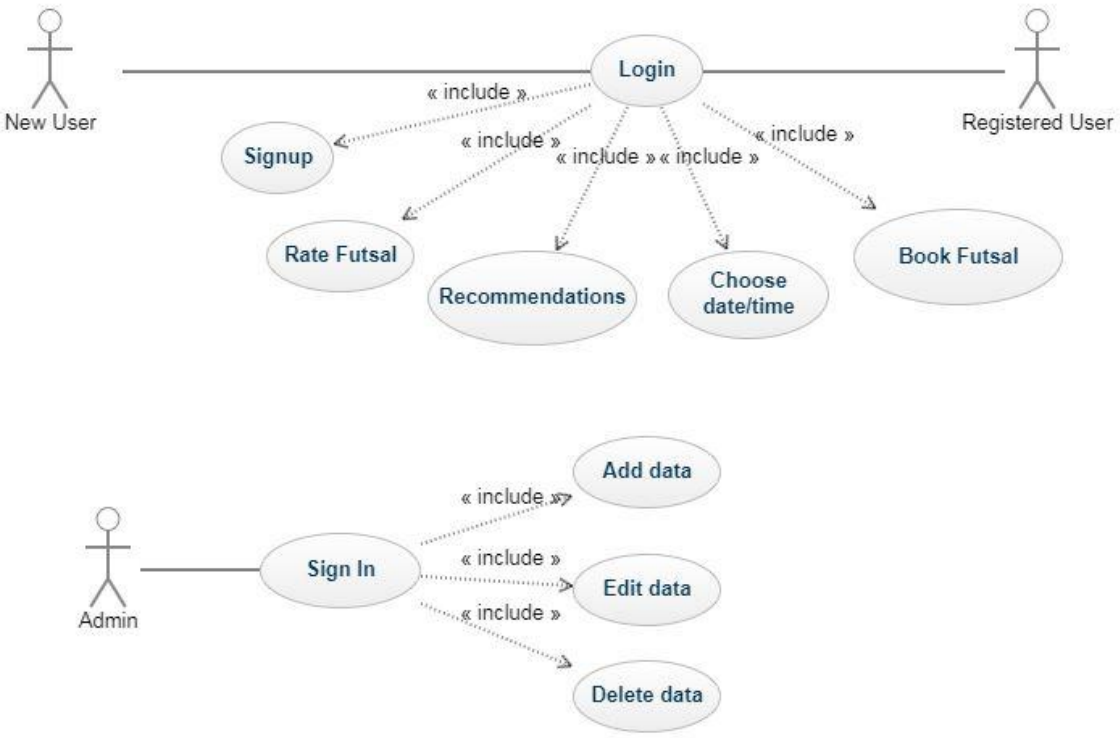


Figure 3: Use-Case Diagram

4.3 CLASS DIAGRAM

Class diagram as a UML diagram, represents the document's software architecture describing the object-oriented programming approach. As class are the building blocks of the object oriented approach, class and objects structures the software with object oriented approach. The classes in a class diagram represents both the main elements, interactions in the applications, and the classes to be programmed. Class diagram programs the system components with objects and classes along with the methods involve within the system.

Figure represents the class diagram with 3 different classes; Futsal, Booking, Team and corresponding attributes as objects and the methods involved as function along with their type and access specifier.

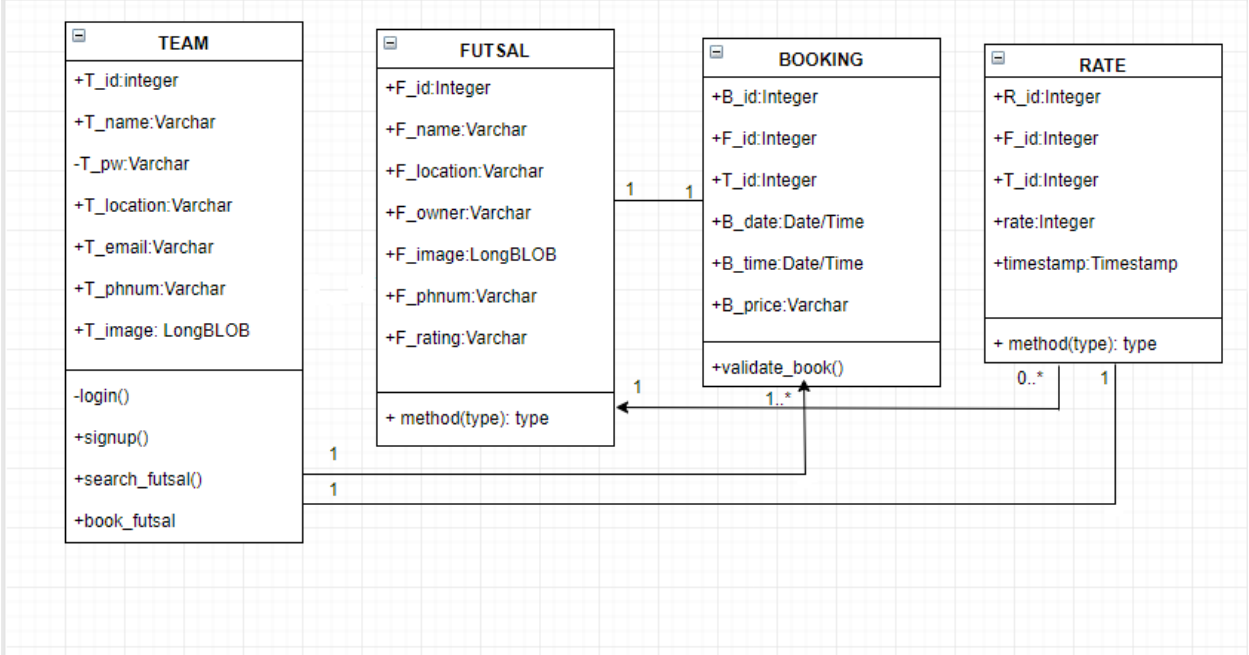


Figure 4: Class Diagram

4.4 SEQUENCE DIAGRAM

A sequence diagram is an interaction diagram that shows how objects operate with one another and in what order. It is a construct of a message sequence chart. Futsal Recommender sequence diagram constitutes 3 class with their life line. On the initial time, user registers to the system. The user info is then passed to the database by the system. The database then returns that the data is validated and system shows the login module. The user then logins to the system. The system checks whether user is registered or not. If registered, then the user is allowed to search the futsal and book accordingly. The user is then allowed to rate the futsal.

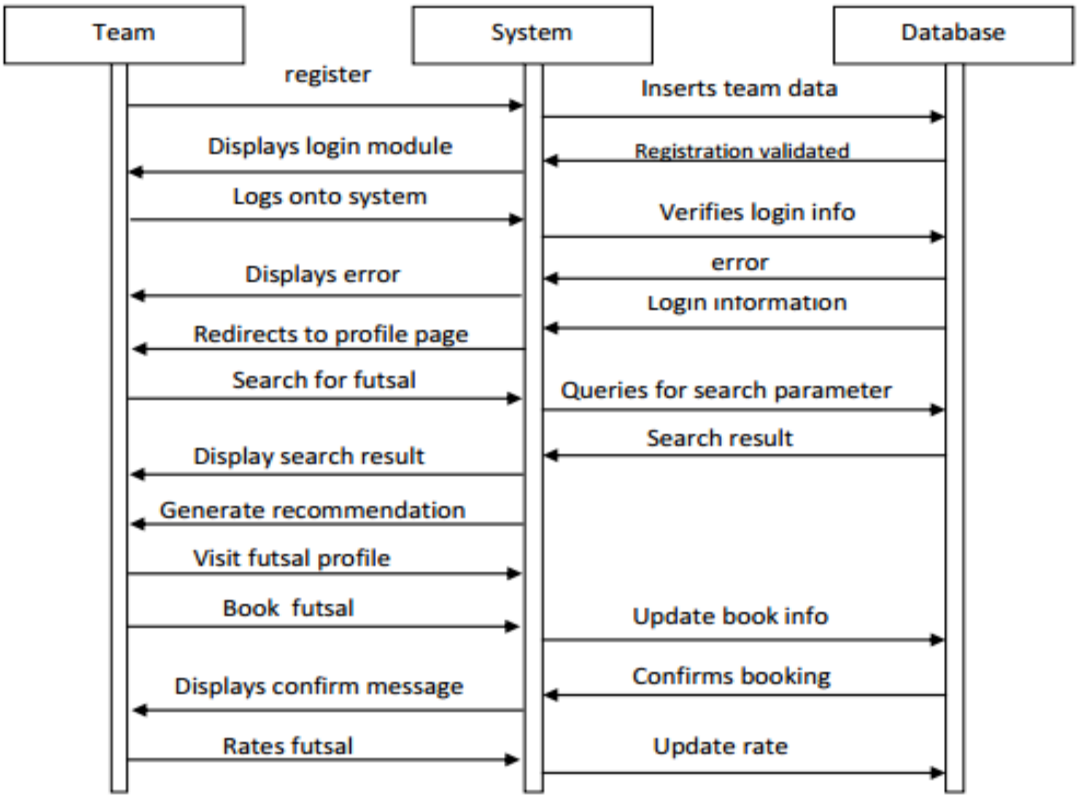


Figure 5: Sequence Diagram

4.5 COLLABORATION DIAGRAM

A collaboration diagram is an interaction diagram that shows how objects operate with one another and in what order. It is also known as communication diagram which states the order of communication between the objects. It is a construct of a message sequence chart.

Following chart constitutes 3 objects with their communication order. On the initial time, user registers to the system. The user info is then passed to the database by the system. The database then returns that the data is validated and system shows the login module. The user then logins to the system. The system checks whether user is registered or not. If registered, then the user is allowed to search the futsal and book accordingly.

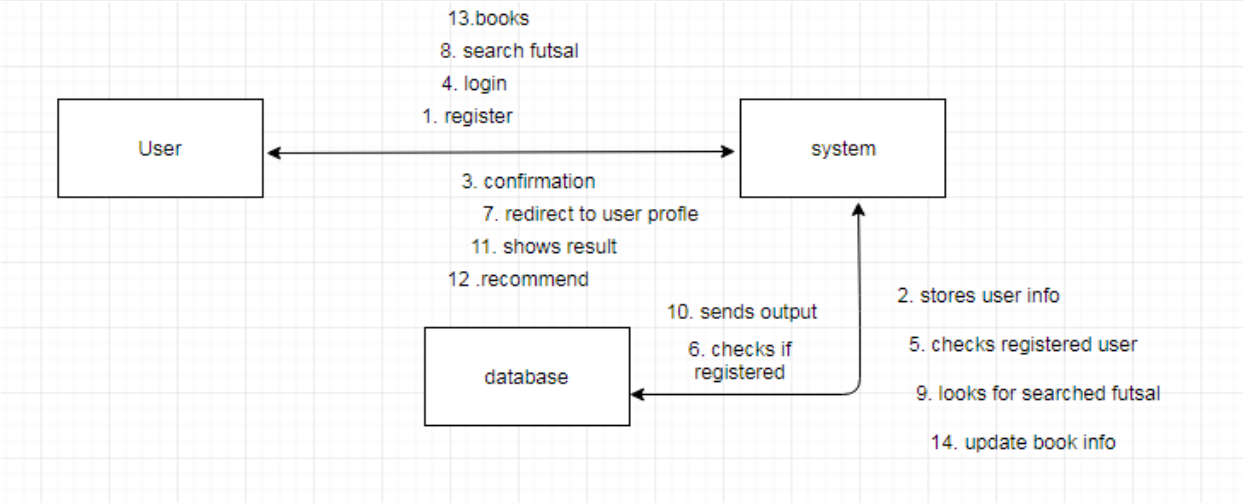


Figure 6: Collaboration Diagram

4.6 ER DIAGRAM

An entity relationship diagram (ERD) shows the relationships of entity sets stored in a database. An entity in this context is a component of data. In other words, ER diagrams illustrate the logical structure of databases. It is the specialized symbols, and the meanings of those symbols, that make it unique. In figure, the diagram depicts the connection between the database entities and the general entities. Futsal Recommender consists of 3 entities; Futsal, Team, Rate and Booking. The team contains the attributes such as T_name, T_location, T_email, T_phnum, T_image, T_pw, T_id. The futsal contains the attributes like F_id, F_location, F_owner, F_phnum, F_rating, F_image. And the attributes of Booking are B_id, B_id, T_id, B_date, B_time, B_price.

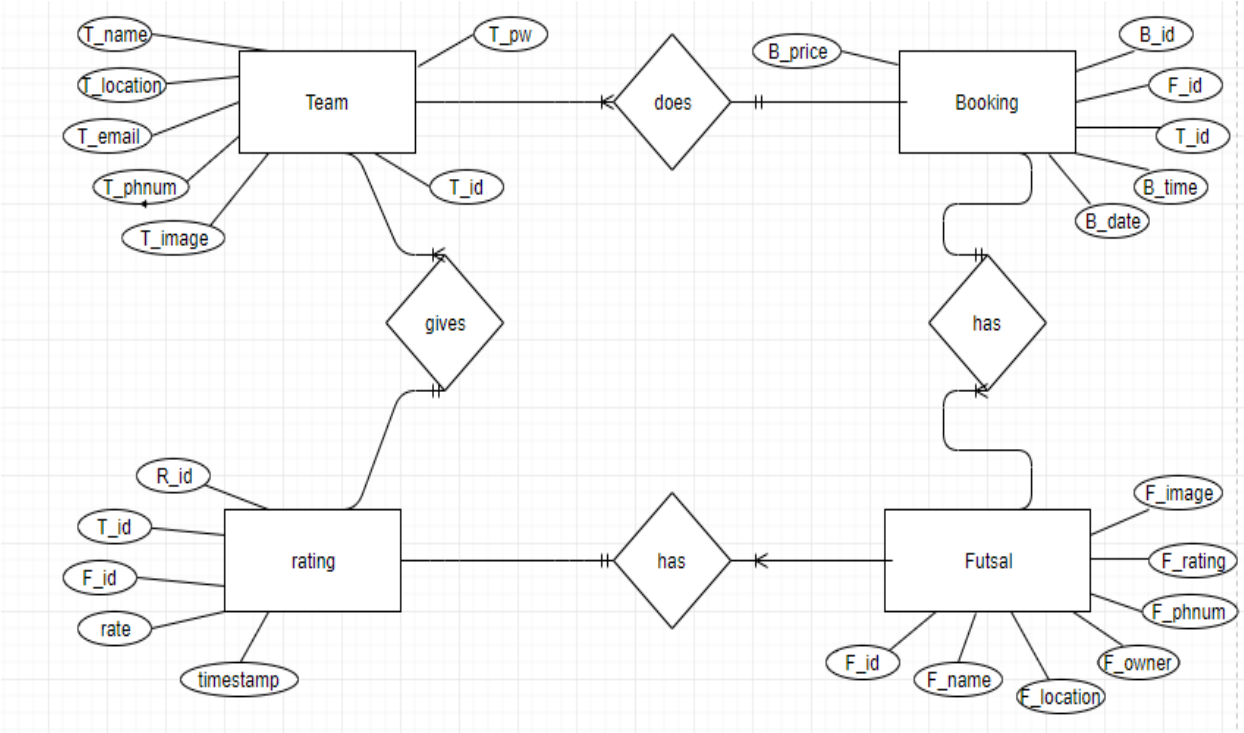


Figure 7: ER Diagram

4.7 DATA DICTIONARY

It is a set of information describing the contents, format, and structure of a database and the relationship between its elements, used to control access to and manipulation of the database. A data dictionary is a collection of descriptions of the data objects or items in a data model for the benefit of programmers and others who need to refer to them. A first step in analyzing a system of objects with which users interact is to identify each object and its relationship to other objects. This process is called data modeling and results in a picture of object relationships. After each data object or item is given a descriptive name, its relationship is described (or it becomes part of some structure that implicitly describes relationship), the type of data (such as text or image or binary value) is described, possible predefined values are listed, and a brief textual description is provided. This collection can be organized for reference into a book called a data dictionary.

S.N	Entity	Attribute	Data Type	Field Size	Constraints	Format

1.	Admin	admin_id	int	11	Pk	9999
		admin_username	varchar	20		Xxxxxx
		admin_pw	varchar	20		Xxxxxxx
2.	Book	B_id	int	20	Pk	99999
		F_id	int	20		99999
		G_id	int	11		99999
		T_id	varchar	20		Xxxxxxx
		B_date	Date			Dateandtime
		B_time	Time			Dateandtime
		B_price	varchar	20		Xxxxxxx
3.	Futsal	F_id	int	20	Pk	9999
		F_name	Varchar	20		Xxxxxxx
		F_location	Varchar	20		Xxxxxxx
		F_owner	varchar	20		Xxxxxxx
		F_phnum	varchar	20		Xxxxxxx
		F_image	varchar	500		Jpg png gif
4.	Rates	R_id	int	11	pk	9999
		F_id	int	11	Fk	9999
		T_id	int	11		9999
		rate	int	11		9999
		timestamp	timestamp			
5.	Team	T_id	int	20	Pk	9999
		T_name	varchar	20		Xxxxxxx
		T_pw	varchar	500		Xxxxxxx
		T_location	varchar	20		Xxxxxxx
		T_email	varchar	20		Xxxxxxx
		T_phnum	varchar	20		Xxxxxxx
		T_image	longblob	500		Jpg png gif

Table 2: Data Dictionary

CHAPTER 5: SYSTEM DEVELOPMENT AND TESTING

Software development is the process of developing software through successive phases in an orderly way. This process includes not only the actual writing of code but also the preparation of requirements and objectives, the design of what is to be coded, and confirmation that what is developed has met objectives. Software testing is a process of executing a program or application with the intent of finding the software bugs. It can also be stated as the process of validating and verifying that a software program or application or product. Simply the coding tools and the testing methodologies can be discussed under this section.

5.1 SYSTEM DEVELOPMENT

5.1.1 Technologies and Platform Used:

Since our project is fully concerned with the development of a web based application it seems like it is appropriate to give an overview of the different tools used in the web application.

- **HTML**

  HTML is a computer language devised to allow website creation. These websites can then be viewed by anyone else connected to the Internet. It is relatively easy to learn, with the basics being accessible to most people in one sitting; and quite powerful in what it allows you to create. It is constantly undergoing revision and evolution to meet the demands and requirements of the growing Internet audience under the direction of the » W3C, the organization charged with designing and maintaining the language.

- **BOOTSTRAP**

  Bootstrap is the most popular HTML, CSS, and JS framework for developing responsive, mobile first projects on the web. Bootstrap is a free and open-source collection of tools for creating websites and web applications. It contains HTML and CSS-based design

templates for typography, forms, buttons, navigation and other interface components, as well as optional JavaScript extensions. It aims to ease the development of dynamic websites and web applications. Bootstrap is a front end framework, that is, an interface for the user, unlike the server-side code which resides on the "back end" or server.

- **JAVASCRIPT**

  It is client side scripting language. It is used for form validation in Futsal Recommender System & it also simplifies user-application interactivity.

- **CSS**

  CSS stands for "Cascading Style Sheet." Cascading style sheets are used to format the layout of web pages. They can be used to define text styles, table sizes, and other aspects of Web pages that previously could only be defined in a page's html.

- **PHP**

  PHP (recursive acronym for PHP: Hypertext Preprocessor) is a widely used open source general-purpose scripting language that is especially suited for web development and can be embedded into HTML. The version 7.2 of PHP delivers higher security and data compatibility. PHP 7.2.0 comes with numerous improvements and new features such as

  - Convert numeric keys in object/array casts
  - Counting of non-countable objects
  - Object typehint
  - HashContext as Object
  - Argon2 in password hash
  - Improve TLS constants to sane values

- Mcrypt extension removed
- New sodium extension

- **MY SQL**

  MySQL is a freely available open source Relational Database Management System (RDBMS) that uses Structured Query Language (SQL). SQL is the most popular language for adding, accessing and managing content in a database. It is most noted for its quick processing, proven reliability, ease and flexibility of use. MySQL is just the brand of one database software, one of many.

  - **APACHE SERVER**

    Apache Web Server is open source Web server creation, deployment and management software. Initially developed by a group of software programmers, it is now maintained by the Apache Software Foundation. Apache Web Server is designed to create Web servers that have the ability to host one or more HTTP-based websites. Notable features include the ability to support multiple programming languages, server side scripting, an authentication mechanism and database support. Apache Web Server can be enhanced by manipulating the code base or adding multiple extensions/addons.

5.1.2 Algorithm Implementation

5.1.2.1 Matrix formulation

```
7.  <?php
8.          $futsal_lists=mysqli_query($conn, "select * from rates");
9.          $matrix=array();
10.         $teams = array();
11.         while ($futsal_list = mysqli_fetch_array($futsal_lists))
12.         {
```

```
13.                 $teamId = $futsal_list['T_id'];
14.                 $futsalId = $futsal_list['F_id'];
15.                 $teams = mysqli_query($conn, "SELECT T_name from team
    where T_id =$teamId");
16.                 $teamname = mysqli_fetch_array($teams);
17.                 $futsals = mysqli_query($conn, "SELECT F_name from futsal
    where F_id =$futsalId");
18.                 $futsalname = mysqli_fetch_array($futsals);
19.
    $matrix[$teamname['T_name']][$futsalname['F_name']]=$futsal_list['rate'
    ];
20.              }
21.             ?>
22.             <?php
23.              getRecommendation($matrix, $name);
24.              ?>
```

5.1.2.2 Similarity Calculation

```
<?php
function similarity_distance($matrix, $team1, $team2)
{
   $similar =array();
   $sum =0;
   foreach ($matrix[$team1] as $key => $value)
   {
      if(array_key_exists($key,$matrix[$team2]))
      {
         $similar[$key]=1;
      }
      if ($similar==0){
```

```
        return 0;
    }
    foreach ($matrix[$team1] as $key => $value)
    {
        if(array_key_exists($key,$matrix[$team2]))
        {

            $sum = $sum+pow($value-$matrix[$team2][$key],2 );
        }
    }
        return 1/(1 +sqrt($sum));
  }
}
```

5.1.2.3 Recommendation

```
6.  function getRecommendation($matrix,$team)
7.  {
8.      $total =array();
9.      $simsums =array();
10.     $ranks =array();
11.     foreach ($matrix as $otherteam => $value)
12.     {
13.         if ($otherteam!= $team)
14.         {
15.             $sim=similarity_distance($matrix, $team, $otherteam);
16.             foreach ($matrix[$otherteam] as $key => $value)
17.             {
18.                 if(!array_key_exists($key, $matrix[$team]))
19.                 {
20.                     if(!array_key_exists($key, $total))
21.                     {
22.                         $total[$key]=0;
```

```
23.                 }
24.                 $total[$key]+=$matrix[$otherteam][$key]*$sim;
25.                 if (!array_key_exists($key, $simsums))
26.                 {
27.                     $simsums[$key]=0;
28.                 }
```

5.2 SYSTEM TESTING

Software testing is the process of evaluation a software item to detect differences between given input and expected output. It also assesses the feature of a software item. Testing assesses the quality of the product. Software testing is a process that should be done during the development process.

- **Unit Testing**

  The Unit testing part of a testing methodology is the testing of individual software modules or components that make up an application or system. These tests are usually written by the developers of the module and in a test-driven-development methodology they are actually written before the module is created as part of the specification. As work was divided and after coding it was parallel tested and after getting bug it was made bug free. Completing module & testing was done together.

- **Integration Testing**

  The Integration testing part of a testing methodology is the testing of the different modules/components that have been successfully unit tested when integrated together to perform specific tasks and activities. The test is often done on both the interfaces between the components and the larger structure being constructed, if its quality property cannot be assessed from its components. After integrating the requirements, we tested it, it was fine and satisfactory.

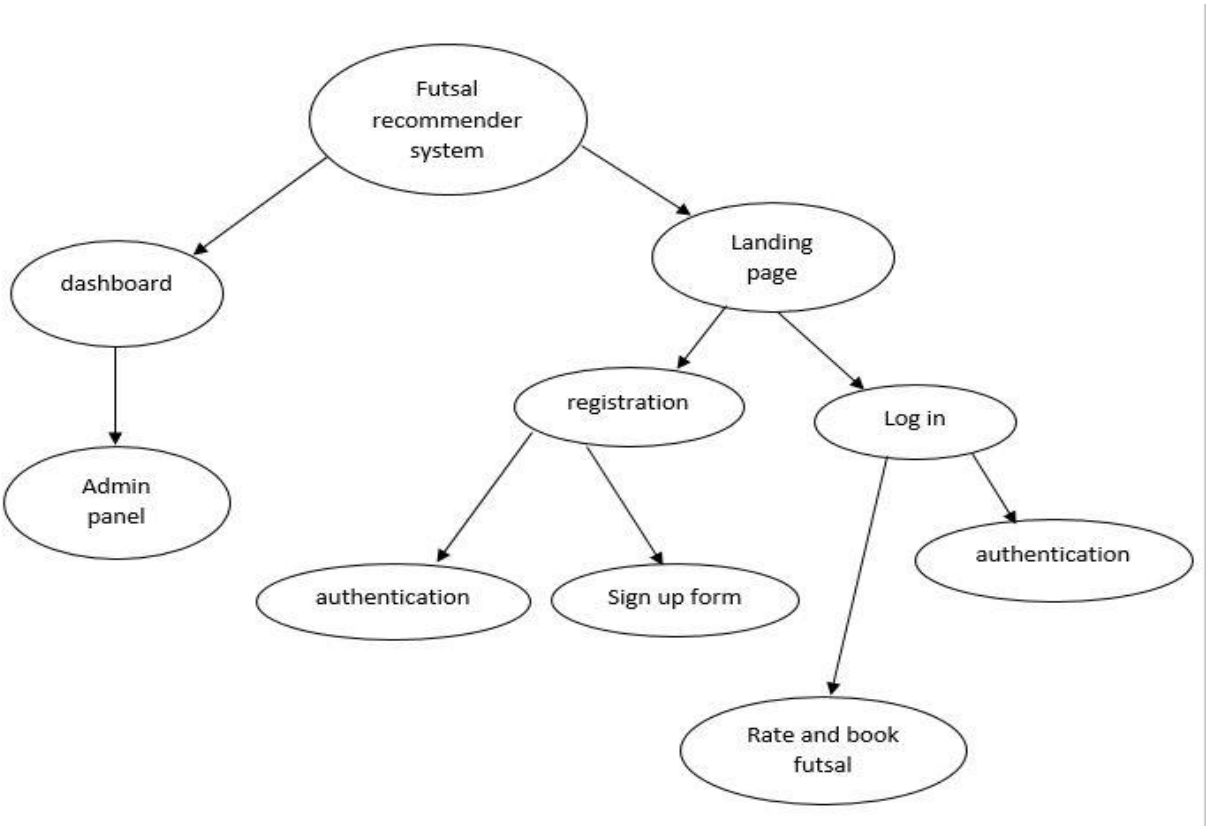


Figure 8: Integrated Testing

- **System Testing**

  The system testing part of a testing methodology involves testing the entire system for errors and bugs. This test is carried out by interfacing the hardware and software components of the entire system, and then testing it as a whole. This testing is listed under the black-box testing method, where the software is checked for user expected working conditions as well as potential exception and edge conditions.

Some of the testing process performed with their test cases can be represented as follows;

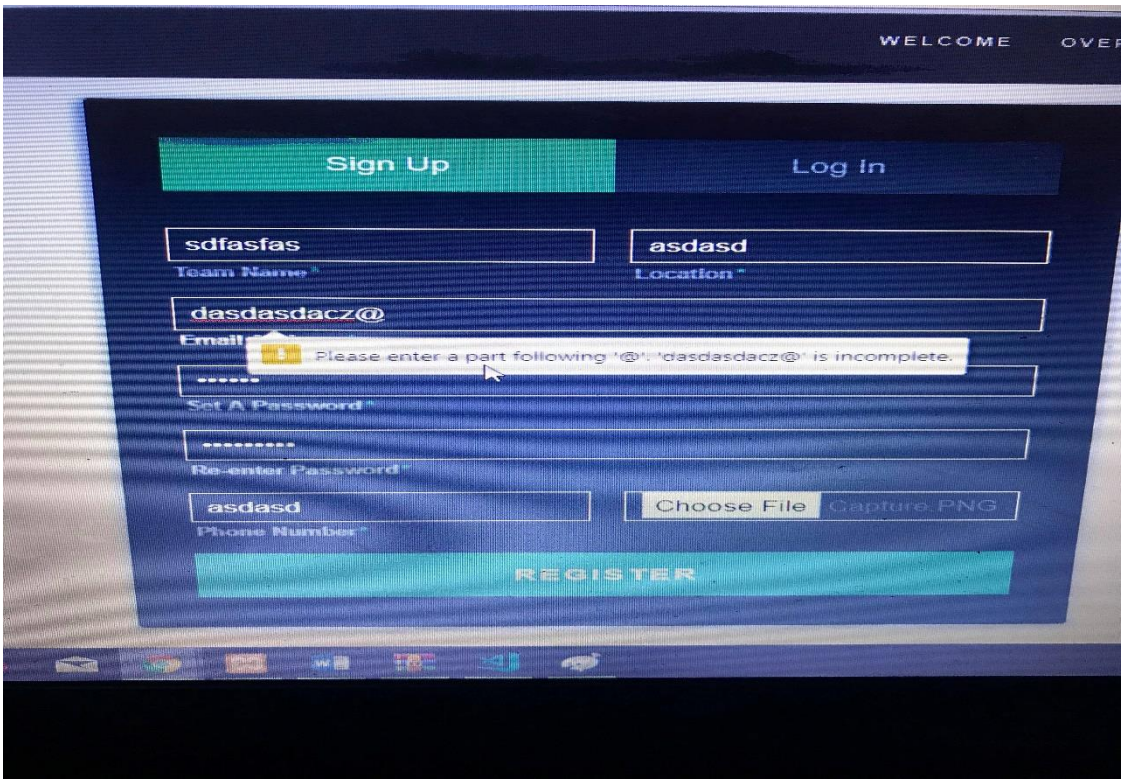
S.N	Test case ID	Test Description	Input test data	Expected Result	Actual Result	Pass/Fail	Remarks

1.	TC-01	Open browser and enter url	http://localhost/futsal	Login page should be displayed with username and password	Login page displayed with username and password field	Pass	Apache server launched
2.	TC-02	Enter valid data in teamname and password field	Teamname:voke_team Password: **********	It should redirect to home page	Home page displayed	Pass	Login validation
3.	TC-03	Enter valid data in teamname and leave password field empty	Teamname: voke_team Password: empty	Error message as password field cannot be empty	Error message displayed as Pw field cannot be empty	Pass	Login validation
4.	TC-04	Leave teamname and password field empty and press login	Teamname: empty Password: Empty	Error message as username and PW is required	Displays an error stating username and PW is required	Pass	
5.	TC-05	Enter invalid teamname and password	Teamname:dfdsfsdgfsgfgd Password:gfdgdfgdfgrtre	Error stating invalid username	Invalid username and	Pass	

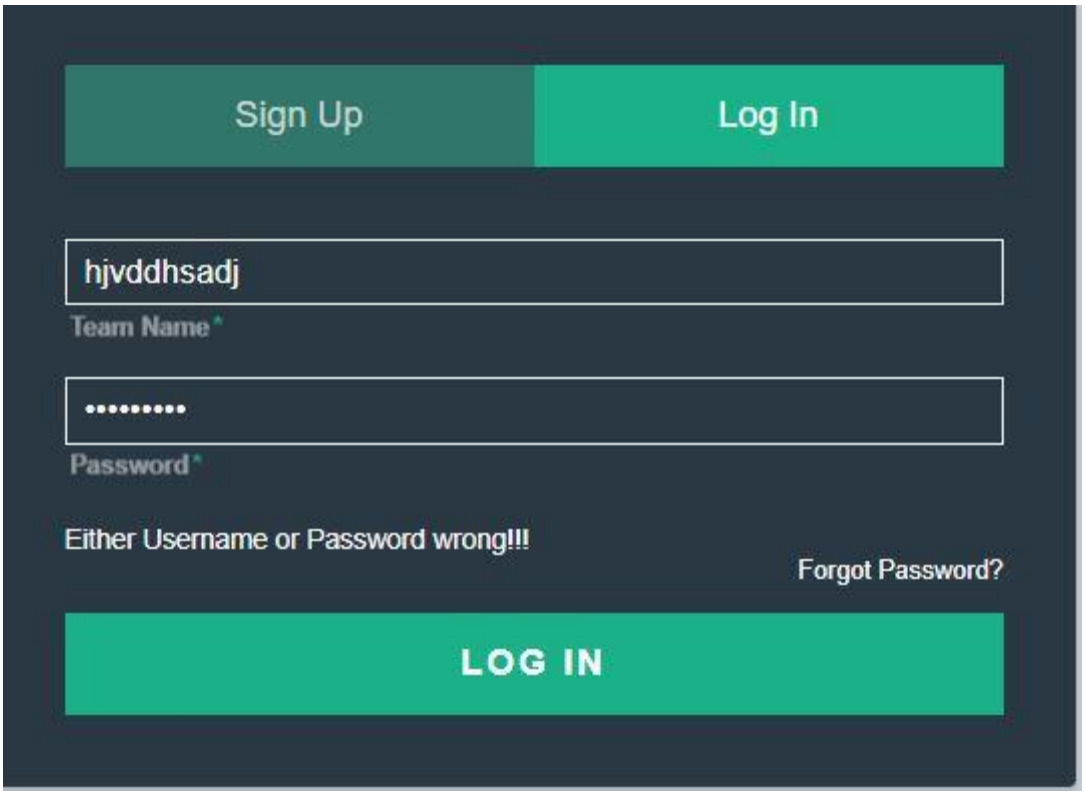
				and password to be displayed	password displayed		

Table 3: Test-case for Login

5.3 TEST RESULTS (Screenshots)



Screenshot 1: Sign-up validation



Screenshot 2: Login validation

CHAPTER 6: OUTPUT AND CONCLUSION

6.1 OUTPUT

This project implements features like: futsal recommendation, searching futsal arenas, futsal recommendation. This project was made with the objective of facilitating futsal players to book the futsal arenas which has now been completed. We successfully can access the arenas from this ‘Futsal Recommender System’.

6.2 FUTURE PLAN

The currently designed system is limited within the specific search and surfing of the futsal arenas as per the requirements of the user but has no scope regarding the extraction of the location based data which can be further enhanced via updates and upgrades of the web application. Similarly, the booking features can be made more efficient and lively.

6.3 CONCLUSION

The 'Futsal Recommender System' is aimed to assist the futsal teams and players in order to surf and search the arenas around the valley along with the facility of booking and acquiring the recommendation from the system as per their preferences and likelihood. The system can be highly helpful for team registration, booking and rating the futsal arenas. Alongside the application can be source of advertisement for the Futsal arena owners which implies the system has been built to overcome the daily faced problems for the futsal players, teams and Arena managers.

REFERENCES

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  http://www.kovansports.com/
- Recommendation algorithm info
  http://technocalifornia.blogspot.com/2013/07/recommendations-as-personalized.html
- https://www.lucidchart.com/
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- https://www.tutorialrepublic.com/php-tutorial/php-mysql-ajax-live-search.php
- **https://creately.com/diagram/iypmzl3o/Online%20Futsal%20Booking%20System**
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- **https://medium.com/recombee-blog/machine-learning-for-recommender-systems-part-1-algorithms-evaluation-and-cold-start-6f696683d0ed**
- **https://github.com/grahamjenson/list_of_recommender_systems**
- **https://www.coursera.org/specializations/recommender-systems**
- **http://umpir.ump.edu.my/id/eprint/5198/1/CD6505.pdf**
- **http://futsal.softwaresea.com/Windows-software-download/futsal-booking-system**
- **http://eprints.utem.edu.my/4750/**

APPENDIX

Source Code

Index.php

```
<?php
session_start();
include('php/db.php');
if(!isset($_SESSION['message']))
 {$_SESSION['message']= ""; }
if(isset($_SESSION['err'])){
  ?>
  <script type="text/javascript">
    var Err = "<?php echo $_SESSION['err']?>";
    alert(Err);
  </script>
  <?php
}
?>
<!DOCTYPE html>
  <head>
    <meta charset="utf-8">
    <meta http-equiv="X-UA-Compatible" content="IE=edge">
    <meta name="viewport" content="width=device-width, initial-scale=1">
    <link rel="shortcut icon" href="images/favicon.ico" type="image/x-icon">
    <title>Footsal</title>
    <!-- style -->
    <link href="css/style.css" rel="stylesheet" type="text/css">
    <link href='http://fonts.googleapis.com/css?family=Titillium+Web:400,300,600'
rel='stylesheet' type='text/css'>
```

```
<link rel="stylesheet" href="https://cdnjs.cloudflare.com/ajax/libs/font-awesome/4.7.0/css/font-awesome.min.css">
<link rel="stylesheet" href="https://cdnjs.cloudflare.com/ajax/libs/normalize/5.0.0/normalize.min.css">
<link rel="stylesheet" href="css/style1.css">
<!-- Bootstrap -->
<link href="css/bootstrap.min.css" rel="stylesheet" type="text/css">
<!-- responsive -->
<link href="css/responsive.css" rel="stylesheet" type="text/css">
<!-- font-awesome -->
<link href="css/font-awesome.min.css" rel="stylesheet" type="text/css">
<!-- animate-css -->
<link href="css/animate.min.css" rel="stylesheet" type="text/css">
<!-- popup-css -->
<link href="css/popup.css" rel="stylesheet" type="text/css">
</head>
<body class="module-home" data-spy="scroll" data-target=".navbar">
<!-- header -->
<header role="header" class="header-top" id="headere-top">
<?php
include('php/header.php')
?>
<!-- banner Text -->
<section class="text-center">
<h2>Looking for Futsal in and around your area?</h2>
<p>We are here to help you</p>
<a class="popup-vimeo video-button" href="videos/index.mp4"><i class="fa fa-caret-right" aria-hidden="true"></i></a>
<a href="#section-two" class="button-header">Join Us</a>
</section>
```

```
        <!-- banner Text -->
        <!-- banner image -->
        <figure>
                <div class="parallax-window item tp-banner-container" data-parallax="scroll" data-image-src="images/index_figure.jpg"></div>
        </figure>
        <!-- banner image -->
      </header>
   <!-- header -->
   <!-- main -->
        <main role="main" id=" main-wrapper">
        <!-- section-one -->
        <section class="section-one text-center" id="section-one">
                <div class="container">
                <header role="title-page">
                <h4>Overview</h4>
                <h2>We Facilitate you to <br/> locate futsal <br/>challenge with teams </h2>
              </header>
              <article>
                <p>Booksal application targets to provide all the information regarding the futsal grounds in and around the Kathmandu Valley<br/>
                </p>
              </article>
              <!-- four boxes  -->

                <div class="row four-box-pan" role="four-box">
                  <section class="col-xs-12 col-sm-6 col-md-3">
                        <figure><i class="fa fa-user-plus" aria-hidden="true"></i></figure>
                        <h5>Membership</h5>
```

Become a member to use all the facilities

</section>

<section class="col-xs-12 col-sm-6 col-md-3">

<figure></figure>

<h5>Locate Futsal</h5>

Find Futsal grounds in your area

</section>

<section class="col-xs-12 col-sm-6 col-md-3">

<figure></figure>

<h5>Book Futsal</h5>

Book different futsal grounds around Kathmandu valley.

</section>

<section class="col-xs-12 col-sm-6 col-md-3">

<figure></figure>

<h5>Offers</h5>

Different offers in Futsal and tournaments going around the valley

```
                    </section>
                </div>

                <!-- four boxes -->
            </div>

        </section>

        <!-- section-one -->
        <!-- section-two -->

        <section class="section-two" id="section-two">

          <div style="height: 50px; width: 100%;">
          </div>
<!-- main div -->

<div class="form">

    <ul class="tab-group">
      <li class="tab"><a href="#signup">Sign Up</a></li>
      <li class="tab active"><a href="#login">Log In</a></li>
    </ul>

    <div class="tab-content">

      <div id="login">

       <form action="login_action.php" method="post" autocomplete="off">
```

```
<div class="field-wrap">
<label>
Team Name<span class="req">*</span>
</label>
<input type="text" required autocomplete="off" name="teamname" style="color: #fff;font-size: 18px; padding-left: 10px;" />
</div>

<div class="field-wrap">
<label>
Password<span class="req">*</span>
</label>
<input type="password" required autocomplete="off" name="password" style="color: #fff;font-size: 18px; padding-left: 10px;"/>
</div>
<div class='error'>
<p style="color: #fff; font-size: 15px; text-align: left;"><?php echo $_SESSION['message'] ;?></p>
<p class="forgot" ><a href="forgot.php" style="color: #fff;">Forgot Password?</a></p>
</div>
<button class="button button-block" name="login" />Log In</button>
</form>
</div>
<div id="signup">
<form action="register_action.php" method="post" autocomplete="off" enctype="multipart/form-data">
<div class="top-row">
<div class="field-wrap">
<label>
```

```
          Team Name<span class="req">*</span>
        </label>
        <input type="text" required autocomplete="off" name='teamname' style="color: #fff;font-size: 18px; padding-left: 10px;" />
      </div>

      <div class="field-wrap">
        <label>
          Location<span class="req">*</span>
        </label>
        <input type="text"required autocomplete="off" name='location' style="color: #fff;font-size: 18px; padding-left: 10px;"/>
      </div>
    </div>

    <div class="field-wrap">
      <label>
        Email Address<span class="req">*</span>
      </label>
      <input type="email"required autocomplete="off" name='email' style="color: #fff;font-size: 18px; padding-left: 10px;"/>
    </div>

    <div class="field-wrap">
      <label>
        Set A Password<span class="req">*</span>
      </label>
      <input type="password"required autocomplete="off" name='password' style="color: #fff;font-size: 18px; padding-left: 10px;"/>
    </div>
    <div class="field-wrap">
```

```
<label>
Re-enter Password<span class="req">*</span>
</label>
<input type="password"required autocomplete="off" name='confirm_password' style="color: #fff;font-size: 18px; padding-left: 10px;"/>
</div>
<div class="top-row">
<div class="field-wrap">
<label>
Phone Number<span class="req">*</span>
</label>
<input type="text"required autocomplete="off" name='phnum' style="color: #fff;font-size: 18px; padding-left: 10px;"/>
</div>
<div class="field-wrap">
<label>
<span class="req"></span>
</label>
<input type="file"required autocomplete="off" name='image' style="font-size: 18px; padding-left: 10px;"/>
</div>
</div>

<button type="submit" class="button button-block" name="register" />Register</button>

</form>

</div>

</div><!-- tab-content -->
```

```
</div> <!-- /form -->
  <script src='http://cdnjs.cloudflare.com/ajax/libs/jquery/2.1.3/jquery.min.js'></script>

    <script src="js/index.js"></script>

    <!-- main div  -->

   </section>
          <!-- section-two -->
          <!-- section-three -->

          <section class="section-three" id="section-three">
                  <div class="container">
                   <header role="title-page" class="text-center">
                  <h4>Get in touch</h4>
                  <h2>Have any questions? Our team will happy to<br/>answer your questionss.</h2>
                </header>
                <!-- contact-form -->
                <div class="contact-form">
                   <div id="message"></div>
                        <form method="post" action="php/contactfrom.php" name="cform" id="cform">
                        <div class="col-md-6 col-lg-6 col-sm-6">
                           <input  name="name" id="name" type="text" placeholder="Full Name">
                        </div>
                        <div class="col-md-6 col-lg-6 col-sm-6">
                           <input name="email" id="email" type="email" placeholder="Email Address">
```

```
                    </div>
                    <div class="clearfix"></div>
                    <textarea name="comments" id="comments" cols="" rows="" placeholder="Question in Detail"></textarea>
                    <div class="clearfix"></div>
                    <input name="" type="submit" value="Send mail">
                    <div id="simple-msg"></div>
                  </form>
                </div>
                <!-- contact-form -->
          </section>
          <!-- section-three-->

         <!-- footer -->
         <footer role="footer" class="footer text-center">
          <?php
           include('php/footer.php')
           ?>
         </footer>
         <!-- footer -->

      </main>
    <!-- main -->

    <!-- jQuery (necessary for Bootstrap's JavaScript plugins) -->
    <script src="js/jquery.min.js" type="text/javascript"></script>
          <script src="js/parallax.min.js" type="text/javascript"></script>
          <script type="text/javascript">
          $('.parallax-window').parallax({});
    </script>
```

```
    <script src="js/main.js" type="text/javascript"></script>
        <script src="js/maps.js" type="text/javascript"></script>
        <script type="text/javascript" src="js/video.js"></script>
    <script src="js/custom.js" type="text/javascript"></script>
        <script src="js/jquery.magnific-popup.min.js" type="text/javascript"></script>
        <script src="js/jquery.contact.js" type="text/javascript"></script>
    <script src="js/bootstrap.min.js" type="text/javascript"></script>
        <script src="js/html5shiv.min.js" type="text/javascript"></script>
  </body>
</html>
<?php session_destroy(); ?>
```

Recommend.php

```
<?php
function similarity_distance($matrix, $team1, $team2)
{
        $similar =array();
        $sum =0;
        foreach ($matrix[$team1] as $key => $value)
        {
                if(array_key_exists($key,$matrix[$team2]))
                {
                $similar[$key]=1;
                }
                if ($similar==0){
                        return 0;
                }
                foreach ($matrix[$team1] as $key => $value)
                {
```

```
                    if(array_key_exists($key,$matrix[$team2]))
                    {
                        $sum = $sum+pow($value-$matrix[$team2][$key],2 );
                    }
                }
                    return 1/(1 +sqrt($sum));
        }
}
function getRecommendation($matrix,$team)
{
        $total =array();
        $simsums =array();
        $ranks =array();
        foreach ($matrix as $otherteam => $value)
        {
            if ($otherteam!= $team)
            {
                $sim=similarity_distance($matrix, $team, $otherteam);
                foreach ($matrix[$otherteam] as $key => $value)
                {
                    if(!array_key_exists($key, $matrix[$team]))
                    {
                        if(!array_key_exists($key, $total))
                        {
                            $total[$key]=0;
                        }
                        $total[$key]+=$matrix[$otherteam][$key]*$sim;
                        if (!array_key_exists($key, $simsums))
                        {
                            $simsums[$key]=0;
```

```
                                        }
                                        $simsums[$key]+=$sim;
                                }
                        }
                }
        }

        foreach ($total as $key => $value)
        {
                if($simsums[$key]!=0)
                $ranks[$key]=$value/$simsums[$key];
}
        arsort($ranks);
        $i= 1;
        $conn = mysqli_connect("localhost","root","","futsaldb");
        foreach ($ranks as $key => $value) {
                if($i<=4){
        $rdt = mysqli_query($conn, "SELECT * FROM futsal WHERE F_name='$key'");
        $row= mysqli_fetch_array($rdt);
        $i= $i+1;
                ?>
```