ABSTRACT

Looking for scholarships manually was a big issue for users. Users could not find the best scholarships. Plus, users had no idea which scholarship is suitable for them. Scholarship Spy solved this problem by offering scholarships from different sources on a single platform. Scholarship Spy (SS) also provides a platform to provide students with the personalized recommendations of scholarships. SS can effectively seek scholarships that are best suited to the user based on his/her profile.

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1. INTRODUCTION

This chapter is composed of several sections introducing our system from different perspectives. Each section highlights significance of the system in its domain. It was intended to summarize industry roles and responsibilities of system under construction. You will find more about each perspective under the subheadings System Introduction, Background of the System, Objectives of the System and Significance of the System. For more details, please investigate each subheading under the sections of this chapter.

1.1 System Introduction

SS is a web-based platform to provide users with personalized recommendations for scholarships. SS will efficiently hunt scholarships that will be best suited for the user on the base of his profile. SS provides scholarships from different sources on a single platform. SS also provides the student with different kind of searches and help them to reduce their time for manual searching on different websites and different Facebook pages.

1.2 Background of the System

Scholarship hunting is a complex and manual task. Moreover, there is no single repository for scholarships offered. Users had to find scholarships on different websites and different Facebook pages. Finding an appropriate scholarship for a specific individual is a personalization problem and hence need a platform for a recommendation of scholarship.

1.3 Objectives of the System

The main objective of the project is

- Scholarship spy provides a single repository of scholarships for users.
- Users can easily search for all available scholarships.
- The main objective of SS is scholarship recommendation.
- Scholarship spy helps the users to find the best-suited scholarships according to their interests.

1.4 Significance of the System

SS will provide recommendation of scholarship based on user profile. System will analysis the person profile and haunt the best suited scholarships. SS will also provide those scholarship that are normally hidden from most of the users searching scholarships online. Scholarship sources can be Facebook pages, NGO's etc. SS provides different types of searches for scholarship. These searches include Time based Search, Search by Region, Search by Keyword, Search by field

2 REQUIREMENT SPECIFICATIONS

This is the most important section of our system development: Requirement specification section. In this section we are going to study basic to advanced functional and non- functional requirements. Each subheading covers a unique view of system following top- to-bottom approach. To support some technical aspects, we have added a lot of visuals for each set of requirements. These visuals come from the domain of software engineering e.g., UML diagrams and some traditional summary tables. Each heading has some uniformly chosen attributes that describes best the feature under consideration and removes ambiguity faced by novel readers. These attributes include technical issues, description**,** criticality**,** cost and schedule and risks**.** These features will have key role for project management activities. Some quality attributes are also covered. For a broad view, visit each section below.

2.1 Product Scope

The Scholarship Spy will reduce the manual search of the user by providing them the platform that helps them to hunt for scholarships that are best for them. SS will provide the user with personalized recommendations of scholarship. Scholarship Spy will be a single repository of the scholarship containing scholarship from different platforms like scholarship websites and Facebook pages. SS will also provide the user with different types of searching. Scholarship Spy can be used in any device that contains a web browser and a working internet connection.

2.2 Product Description

2.2.1 Product Perspective

The product will be a web-based platform that will be accessed by using a web browser and a working internet connection. A user-friendly GUI will be provided to the user to perform the functionality. To use this product the user must register to the system once and user data will be store in the system. After that user can log in to the system and access the functionality provided by the system.

2.2.2 Product Functionality

2.2.2.1 Personalized Recommendation:

SS will provide recommendations of scholarship based on the user profile. The system will analyze the person profile and haunt the best-suited scholarships

2.2.2.2 Searching:

SS provides different types of searches for a scholarship. These searches include:

- Search by Country
- Search by Keyword
- Search by Category
- Search by scholarship Title / keyword

2.2.2.3 User Feedback:

User will be able to give feedback about the scholarships and his experience using the website.

2.2.2.4 History:

We will save the history of user's scholarship to facilitate the user.

2.2.3 Users and Characteristics

Users must know about operating a web browser and know how to access different websites. He must also have the knowledge of English language as our system is in English.

There are mainly two users for this system Student and Admin

I. Student:

- Student can register and then login to the system
- Student can manage his profile by updating and deleting his information.
- Student can search scholarship through many ways like keyword search, search by country and subjects.
- Student will provide a purpose of statement by giving his all-previous information.
- Student will give feedback.

II. Admin

- Admin will login to the system
- Admin will manage the account of student
- Admin will manage the scholarship and data.
- Admin will initiate the crawler so that best scholarships can be recommended to the user.

2.2.4 Operating Environment

The project can operate at any device that has a web browser and an internet connection. There is no other special requirement for this project to work.

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2.3 Specific Requirements

2.3.1. Functional Requirement

2.3.1.1. Sign Up:

FR1: The system shall provide the user with a signup form to register.

2.3.1.2. Login

FR2: The system shall allow users to Login by providing valid email and password.

2.3.1.3. Search Scholarships

FR3: The system shall provide different types of searching for scholarships like time-based searching, category-based searching, and country-based searching.

2.3.1.4. Get Recommendation

FR4: The system shall get information from the user profile and perform analysis on his information.

FR5: The system shall provide recommendations to the user based on his profile.

2.3.1.5. Manage Profile

FR6: The system shall allow users to add new information to his profile.

FR7: The system shall allow the user to delete his profile data.

FR8: The System shall allow the user to update his profile data.

2.3.1.6. Data Collection

FR9: As our system is scholarship recommendation system for this purpose,

we will have to collect data from multiple resources.

As data from different sources will be in different formats so we will apply multiple data cleaning techniques and transform it into a generalize format.

2.3.1.7. Pre-Processing

FR10: The system shall be able to process the crawl data and remove irregularities in the data.

2.3.1 Behavioral Requirements

This use case diagram shows the overall behavior of our project. Our project includes two major actors.

1. **Admin**
2. **User**

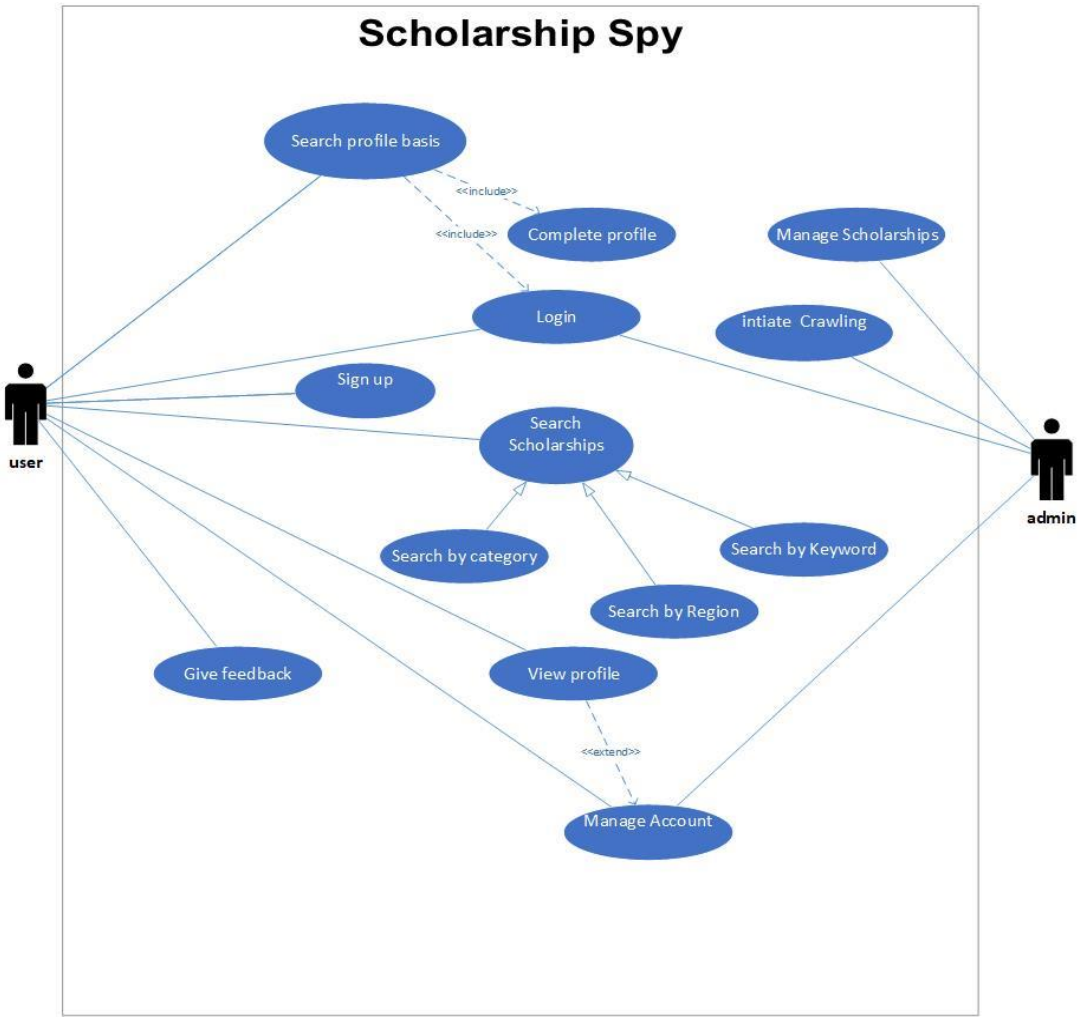

Figure 2.2.3-1 Use case

2.3.2 External Interface Requirements

2.3.3.1. User Interfaces

SS will be a web-interface. There will be different GUI for features of the project. SS will have GUI for different features like sign up, log in, profile dashboards, search bars, etc.

- **Sign Up Form**

The user will have a signup form where he can enter his information and register to the system. Sign Up forms will consist of text boxes, button, drop-down menu, etc.

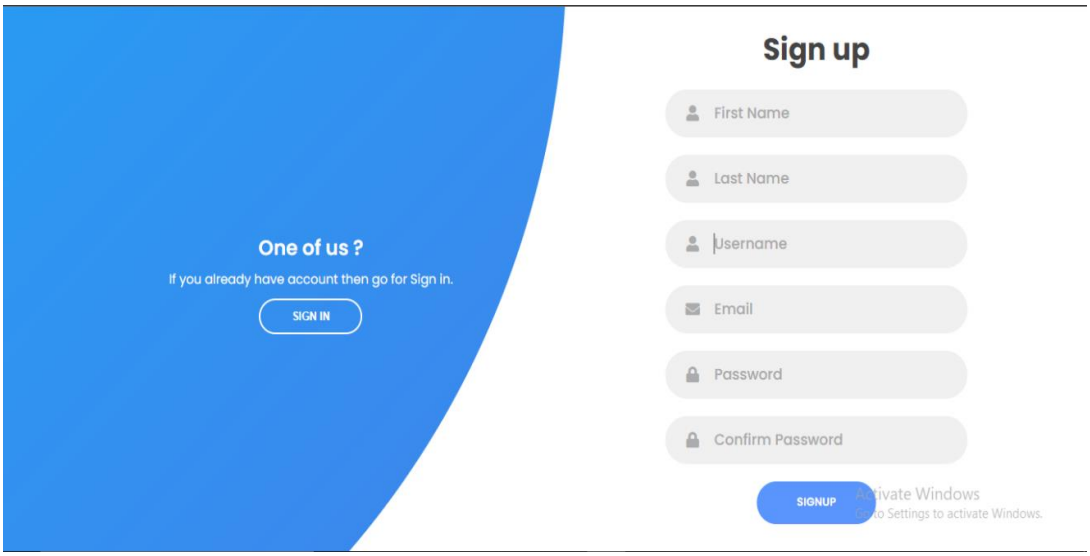

Figure 2.3-2.2 Sign Up Form

- **Sign-in Forms**

The user will have a sign-in form where he can enter his information and login into the system. Sign-in forms will consist of text boxes, buttons.

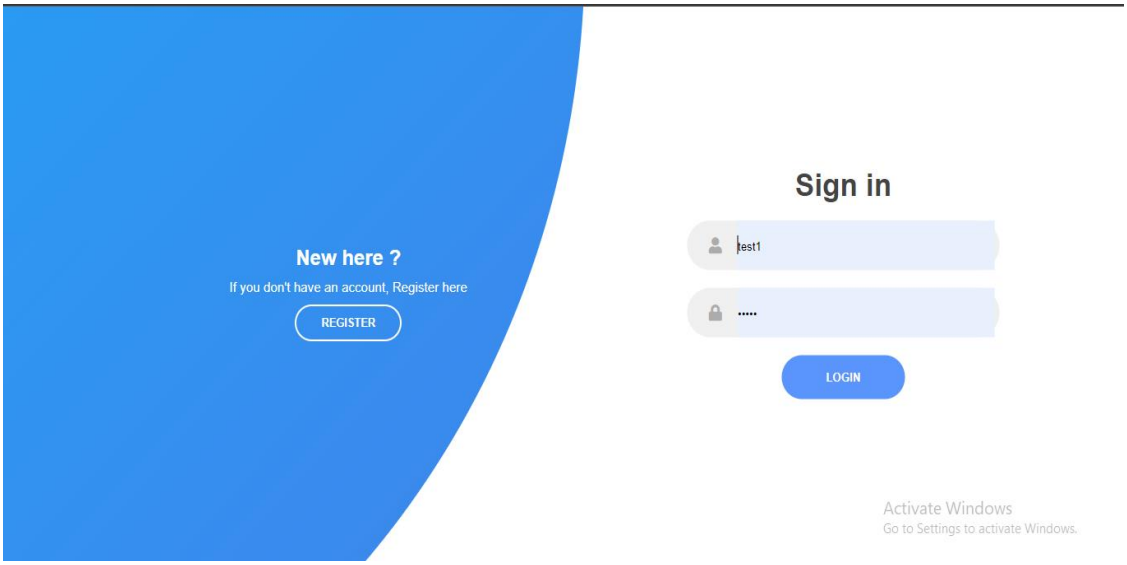

Figure 2.2.3-3 Sign In Form

➢ Home page

On the home page, user will be able to search the scholarships using any four options.

1. **Search by Keyword Page**

   Users will have a keyword search page to search for the scholarship by any keyword.

2. **Search by Category Page**

   User will be able to select in which level of qualification he wants to study in e.g. Masts/ Bachelor's/PhD or other short courses.

3. **Search by Field of interest Page**

   The user will have a Category Search page where he will be provided a drop-down menu to search the scholarship by selecting any category from the drop-down menu like Computer Science, Accounting.

4. **Search by Country Page**

   The user will have a Country Search page where he will be provided a drop-down menu to search the scholarship by selecting any country from drop-down menu.

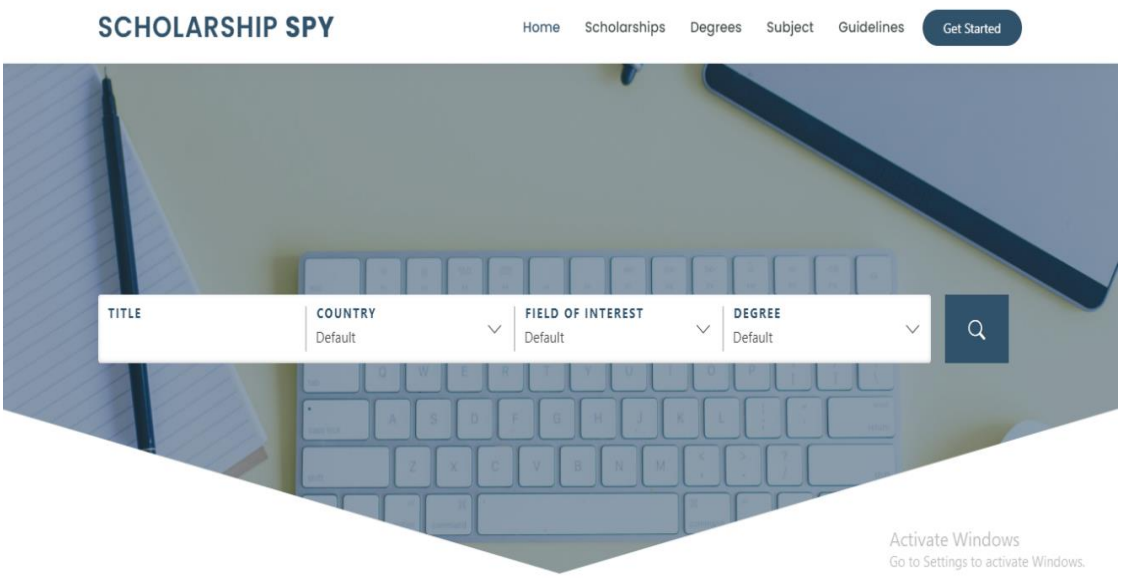

Figure 2.2.3-4 Home Page

➢ Profile Dashboard

The user will have a dashboard where he can manage his profile. Do searches and get recommendations.

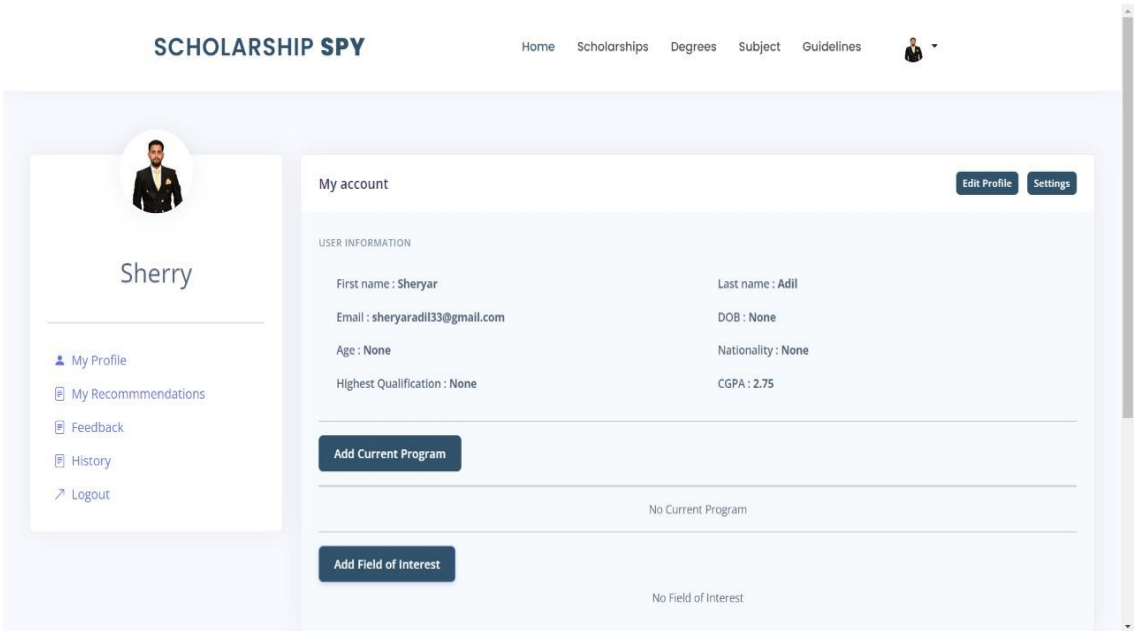

Figure 2.2.3-5 Profile Dashboard

➢ Recommendation Page

Users will Enter his personal statement and then clicks on “Recommend Me” ,

then the recommendations will be generated.

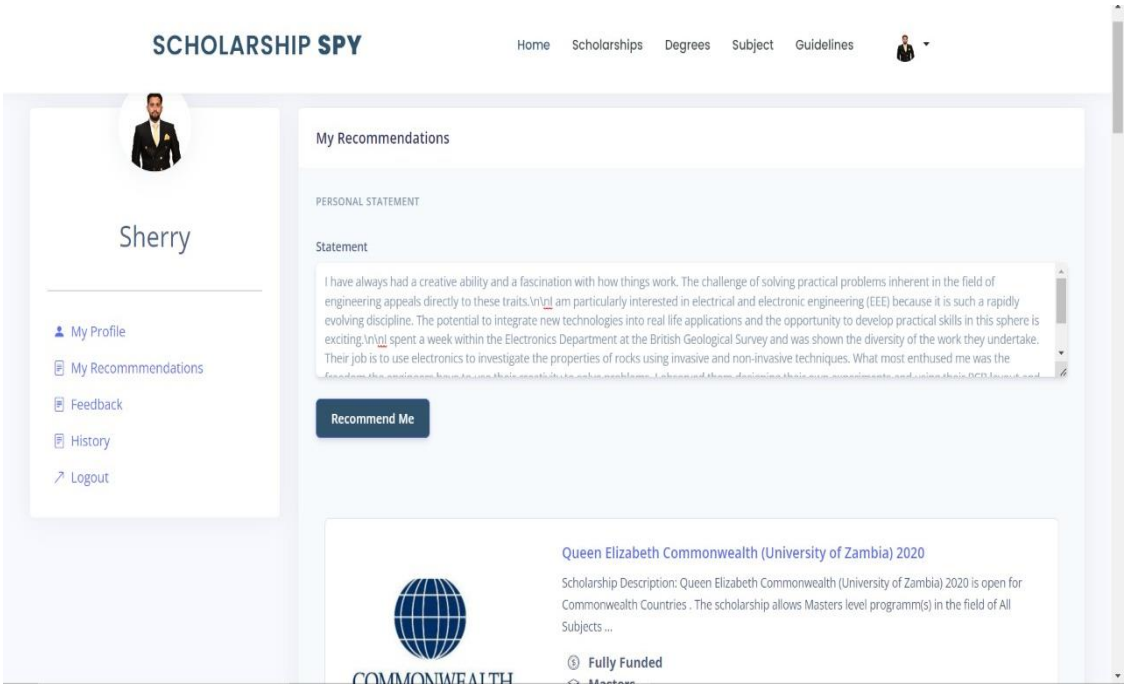

Figure 2.2.3-6 User Dashboard

➢ History

User will be able to see all the recommended scholarships with respect to each Personal Statement.

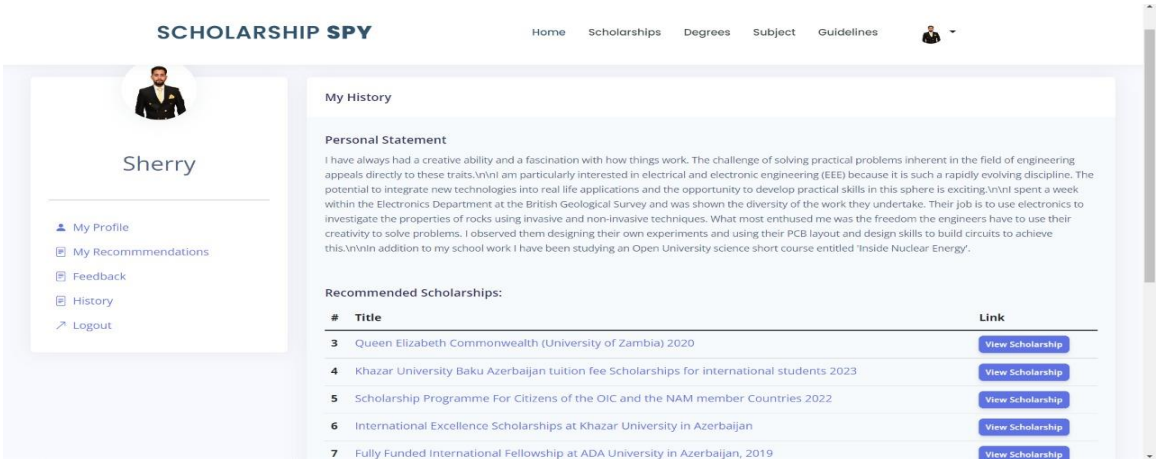

Figure 2.2.3-7 User History

➢ Feedback

User can give feedback about his experience while using the Scholarship Portal.

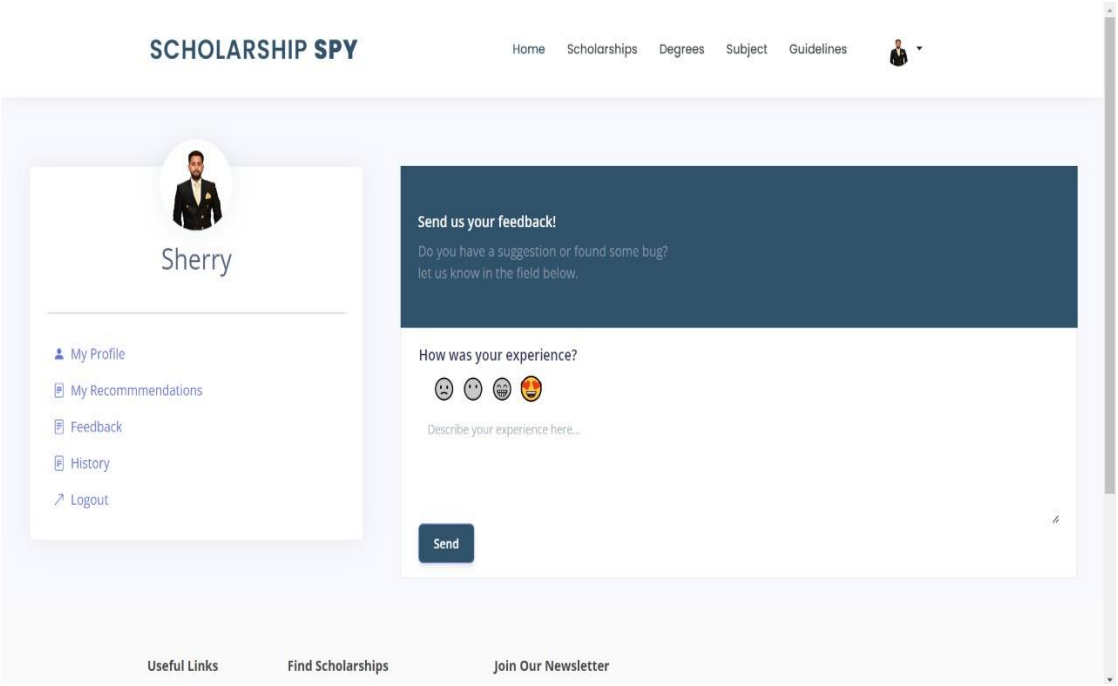

Figure 2.2.3-8 Feedback

➢ All Scholarships

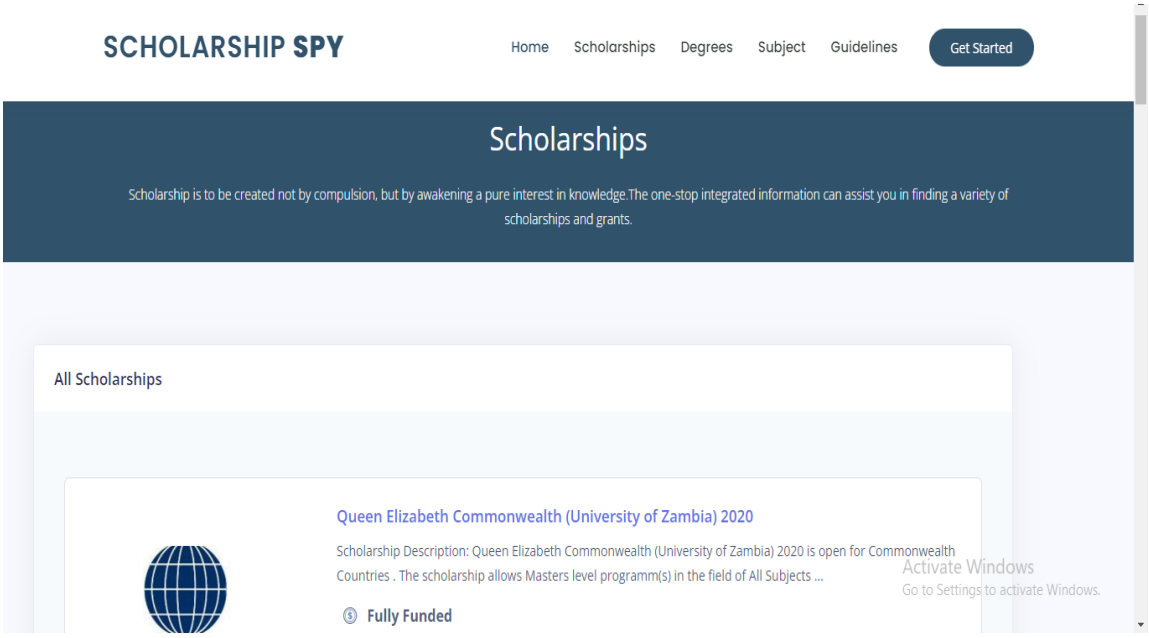

Figure 2.2.3-9 All scholarships Page (a)

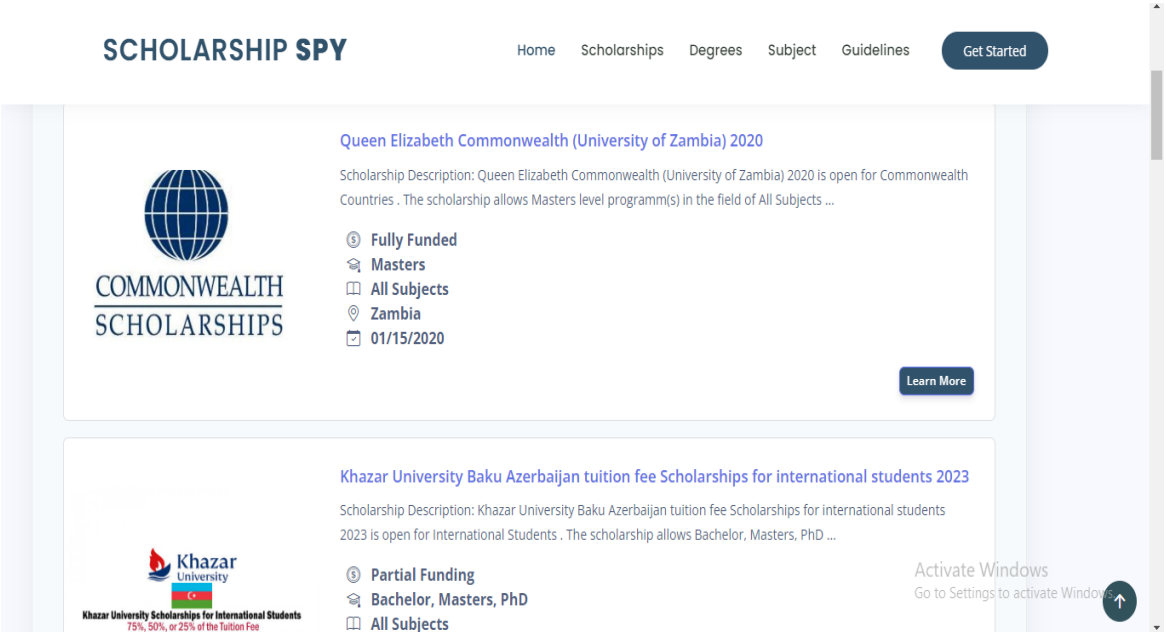

Figure 2.2.3-10 All scholarships Page (b)

➢ Scholarships by Degree

Figure 2.2.3-11 Degree page

➢ **Scholarships by Subject**

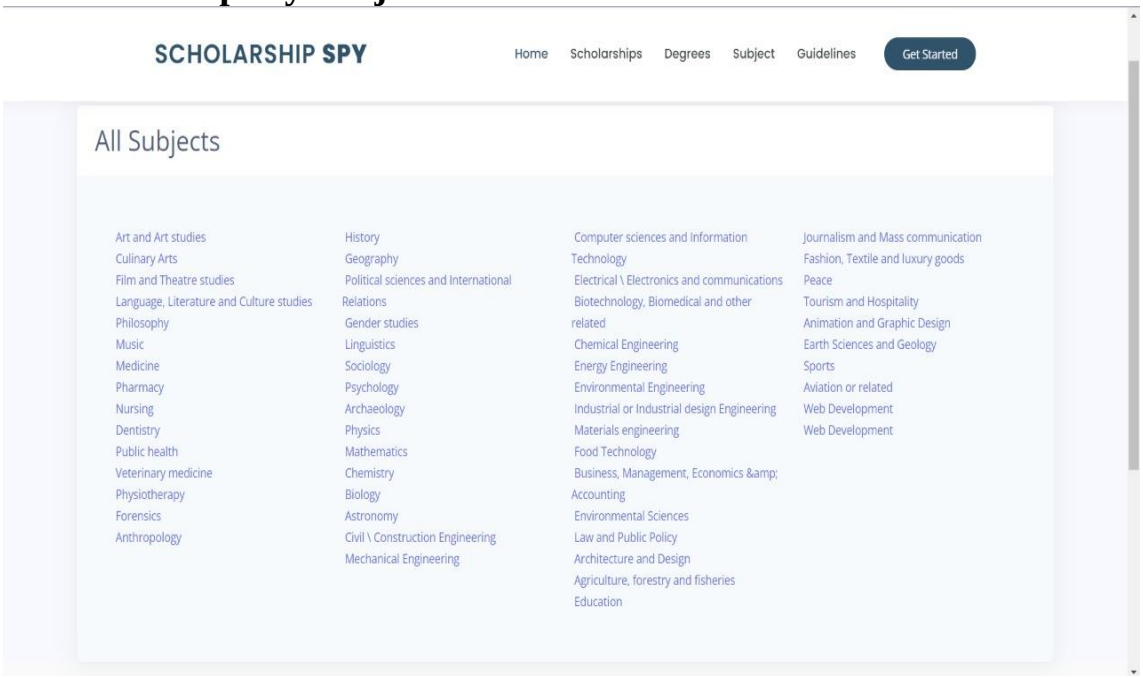

Figure 2.2.3-12 All Subjects

2.3.3.2. Hardware Interfaces

SS is a web-based application so it can run on any hardware that has a web browser and an internet connection. Different hardware like PC, Laptops, and Mobile can be used to access SS.

2.3.3.3. Software Interfaces

The system will be a web-based application that will use basic technologies such as HTML, CSS, and bootstrap. Additionally, the system will use the latest technologies such as Django. The system will be implemented in python language for crawling and scraping techniques.

2.3.3.4. Communication Interfaces

SS shall use HTTP protocols to communicate over the internet. This

communication is necessary because without using these protocols SS cannot be available on the internet.

2.4 Non-functional Requirements

2.4.1. Performance Requirements

NF1: The system should provide search results within 5 seconds.

NF2: The system should update the database within 5 seconds.

NF3: The system should update in less than 2 seconds.

NF4: The system should have high band internet access.

2.4.2. Privacy Requirements

NF5: The system should secure the confident data of the user such as username, password, and academic records.

NF6: The system should not allow any unauthorized user to access the user data.

Security Requirements

NF7: The system should not allow any unauthorized user to access the system's internal operations.

2.4.3. Software Quality Attributes

2.4.3.1. Usability

The System should be easy to use. The system should provide the error message with a description in case the error occurred. The layman user should be able to operate the system.

2.4.3.2. Availability

The system should be available 24/7. As the system is a web-based application to it should be available to the user whenever he wants to access the software.

2.4.3.3. Maintainability

The system should be maintainable. The system should be able to adapt to new features. Previous functionality should not be disturbed in case of adding new functionality.

2.4.3.4. Reliability

The system should be reliable. The system should be able to cop internal and external errors for continuous access to user.

2.4.3.5. Accuracy

The system should provide accurate results on user request. Users should get accurate scholarships according to the profile. Information should be valid for all scholarships.

2.4.3.6. Portable

The system should be able to run on different platforms. The system should be able to run on different hardware like Windows, Android, and Mac.

2.4.3.7. Accessibility

The system should be accessible to all users in different locations.

3 DESIGN SPECIFICATIONS

A lot of work is done using UML tools to investigate each aspect of final system. This section highlights different visual notations. This notation will be used to test our system against proposed components. Moreover, we have highlighted some key modules to equally manage each role among team members. The developed system will directly reflect to what is tried to elaborate under subheadings of chapter 3.

3.1 Introduction

As discussed earlier, this section of design document consists of fundamental design diagrams (class, activity, sequence, and state chart) and algorithm, the algorithm that highlights an abstract view of functional requirements of this system. Remember, these are the requirements that have highest priority and cannot be ignored.

3.2 Composite Viewpoint

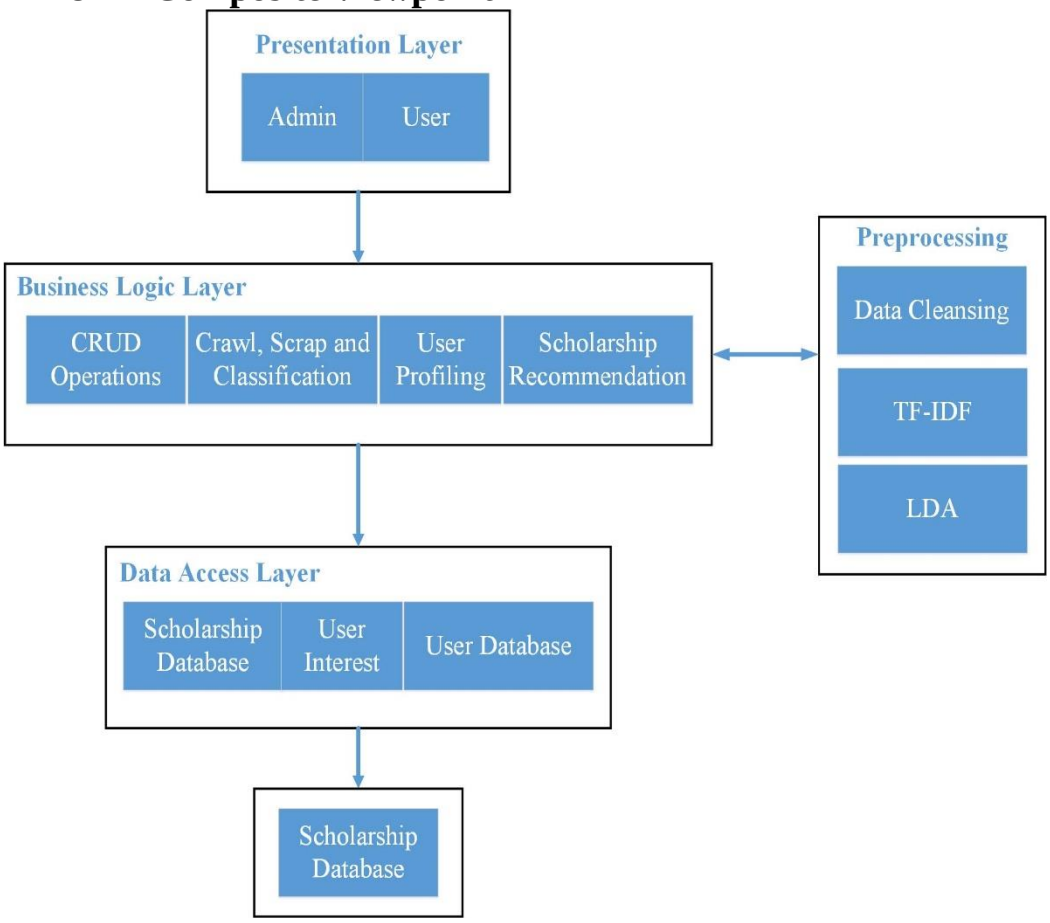

Figure 3.2-1Composite Viewpoint 1

3.3 Logical Viewpoint

A class diagram in UML is a type of static structure diagram that describes the structure of a system by showing the system's classes, their attributes, operations, and relationships among the objects. Class diagram is the basic building of object-oriented modeling.

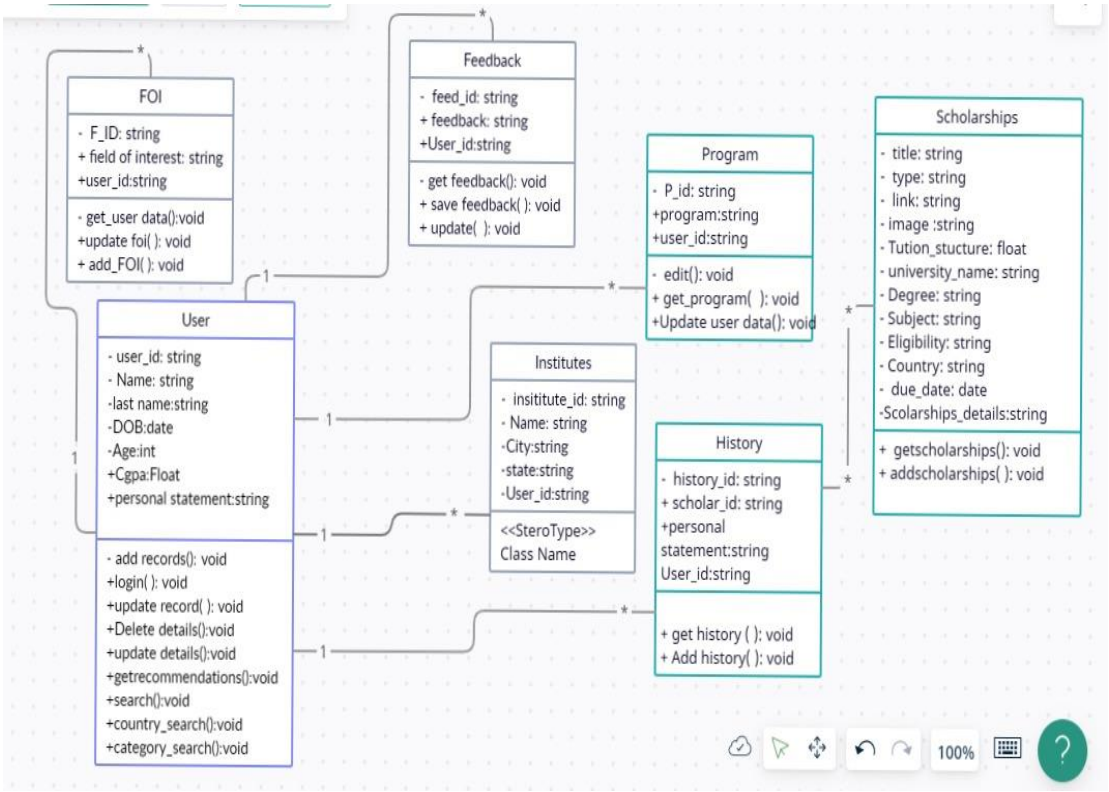

Figure 3.3-1Class Diagram 1

3.4 Information Viewpoint

An Entity Relationship Diagram (ERD), also known as an entity relationship model, is a graphical representation that depicts relationships among people, objects, places, concepts, or events within the system.

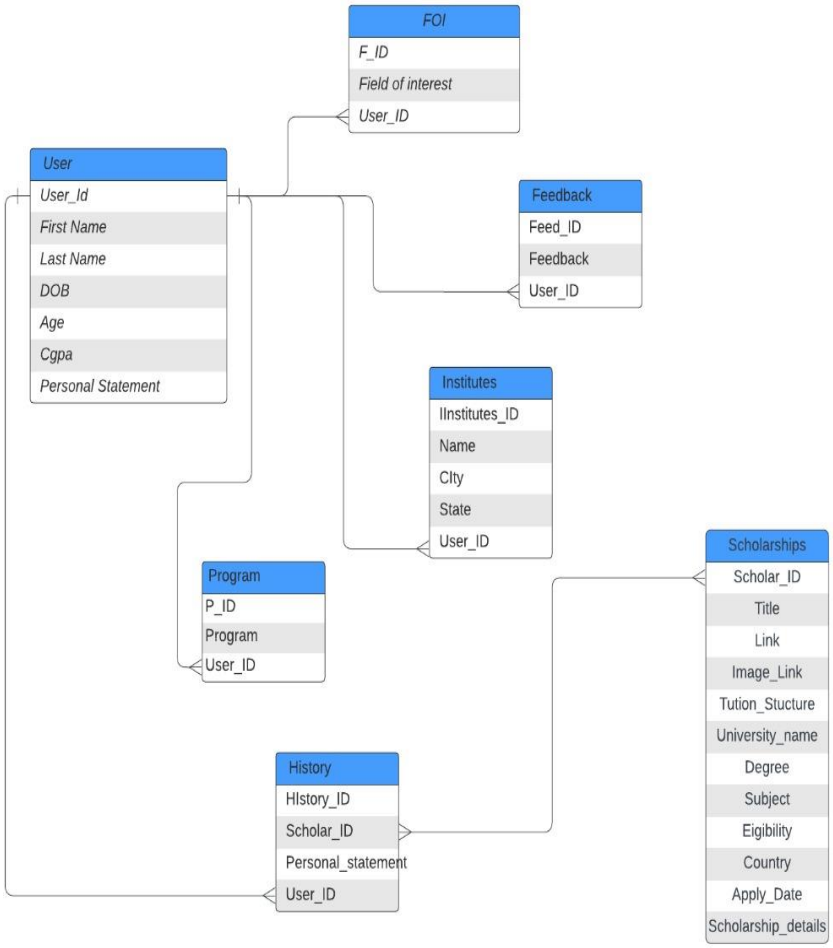

Figure 3.4-1ER Diagram 1

3.5 Interaction Viewpoint

A sequence diagram simply depicts interaction between objects in a sequential order i.e., the order in which these interactions take place.

3.5.1. Complete Profile

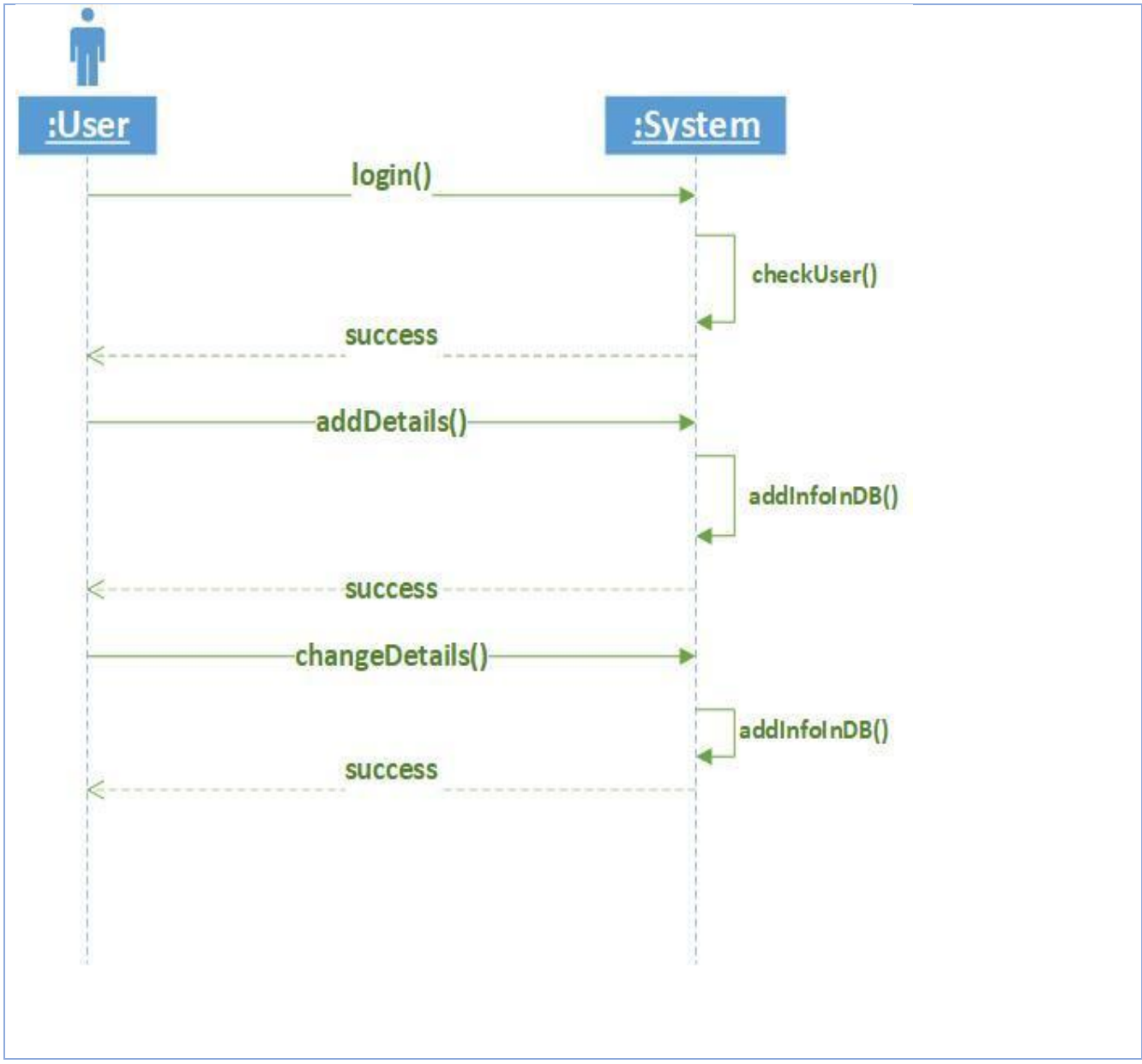

Figure 3.5-1Interaction Viewpoint of Complete Profile

3.5.2. Personalized Search

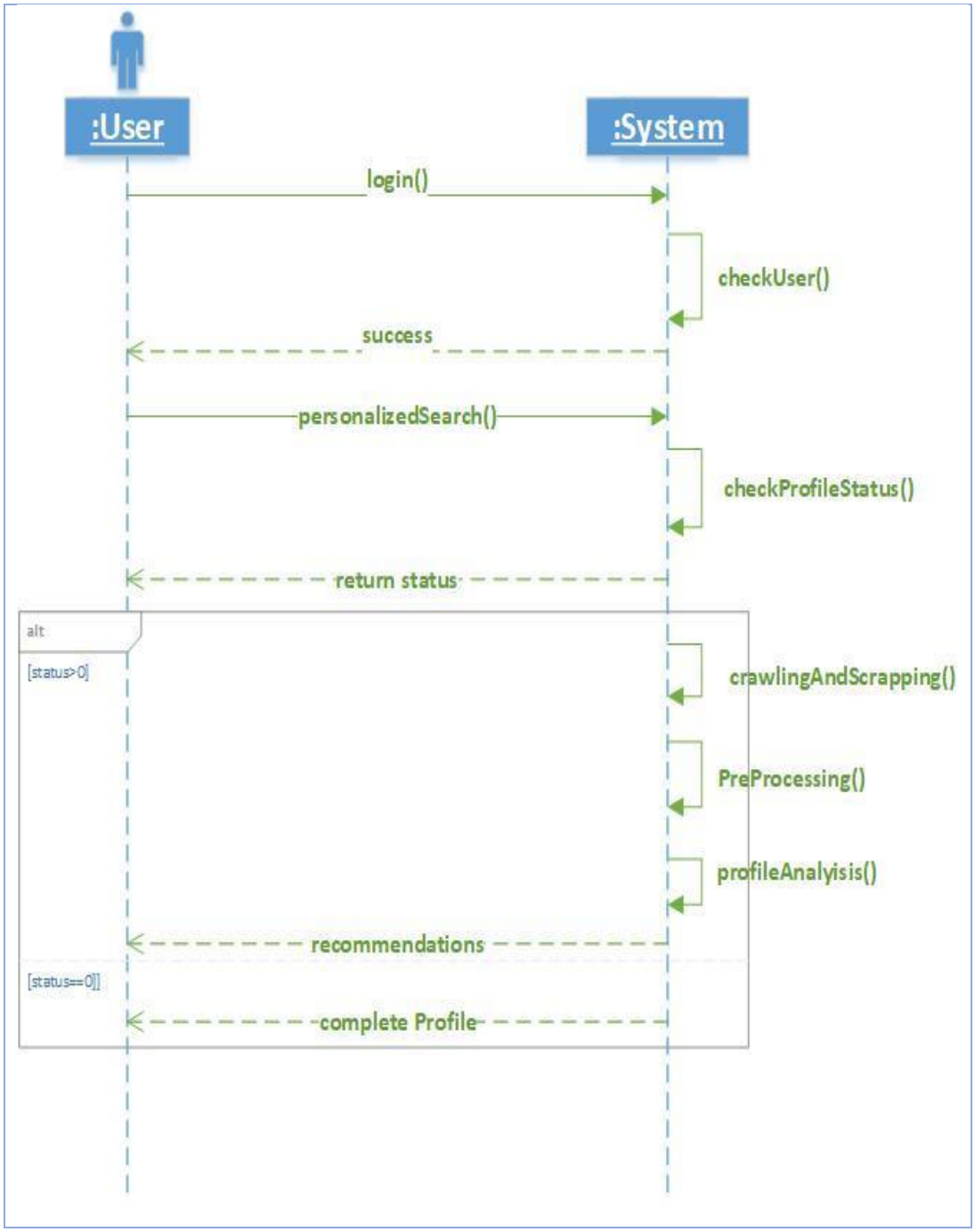

Figure 3.5.2-1Interaction Viewpoint of Personalized Search

3.5.3. Sequence Diagram

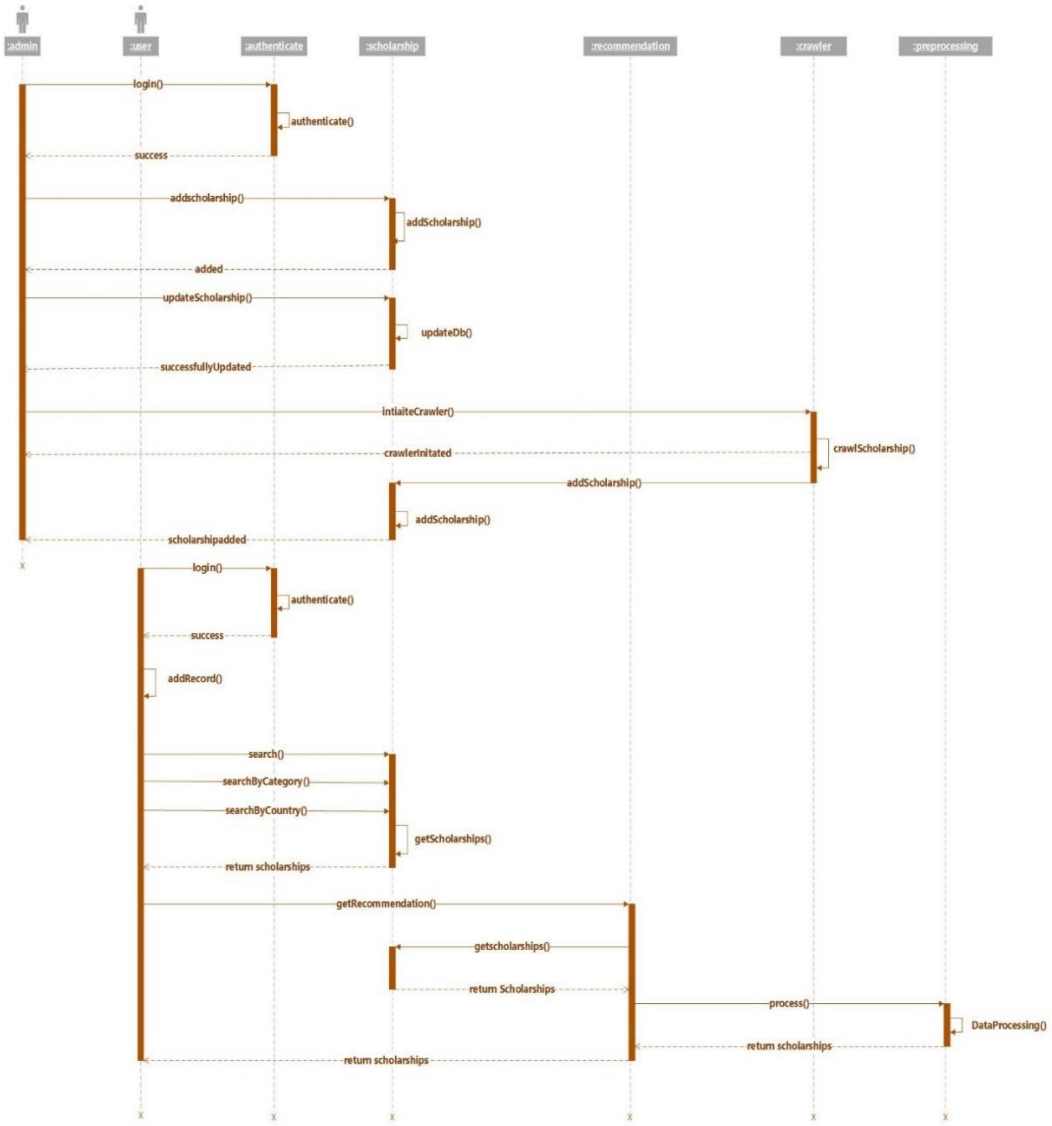

Figure 3.5.2-2 Sequence Diagram

3.6 State Dynamics Viewpoint

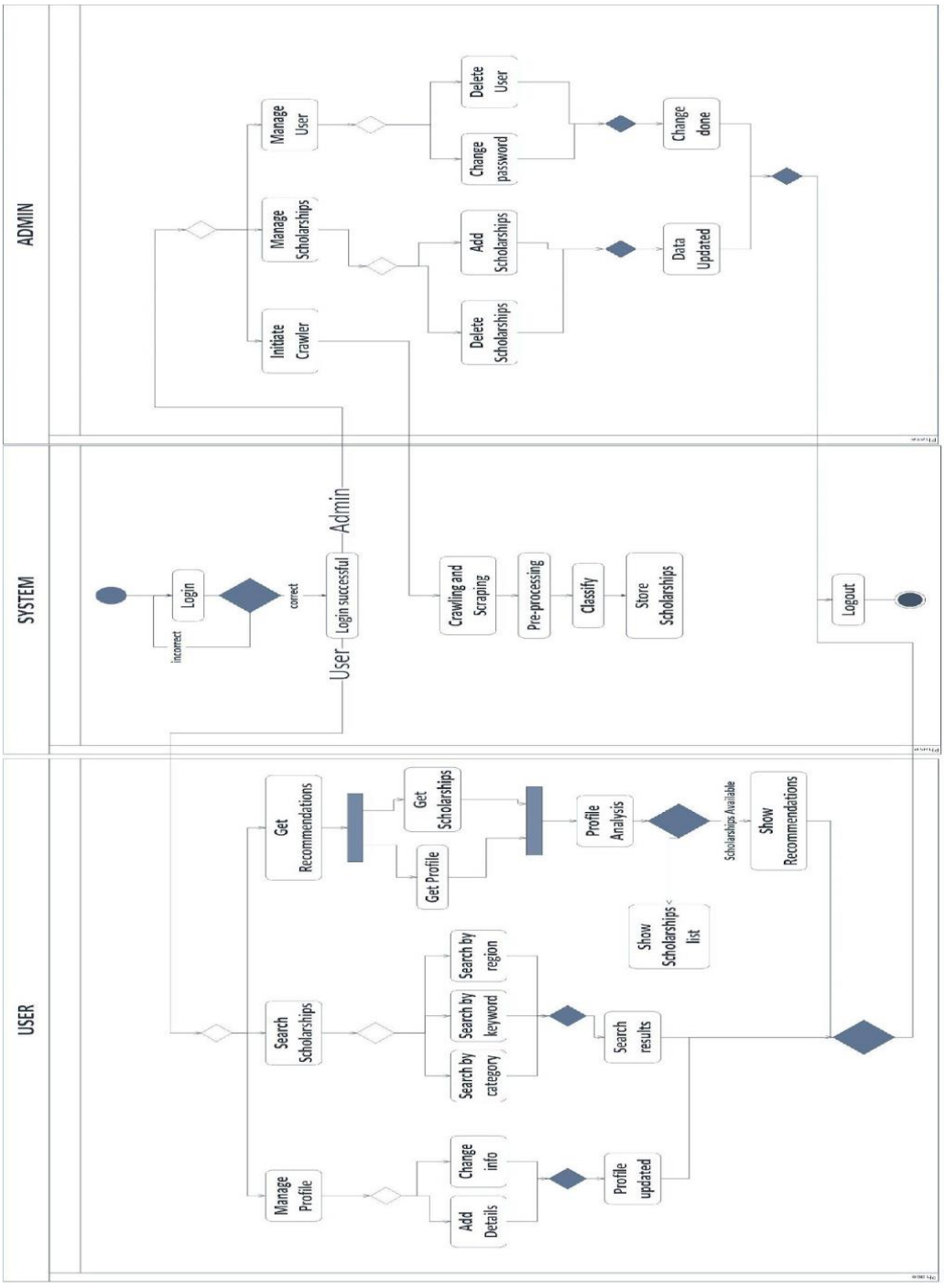

Figure 3.6-1 State Machine Diagram 1

3.7 Algorithmic Viewpoint

START

Users must login to System

Select login

Input email address

Input Password

IF email and password is valid

    Go to user Console

Else

    Print (“These credentials don’t match our records.”)

In case if users Forgot password

IF (username==valid) && (email==valid)

    Print (“Email have been sent successfully”)

Else

    Print (“Enter valid username and email”)

For account Registration

Select Register Here

Input username

Input Email

Input Password

Input confirm password

Input confirm password

IF password is not strong

    Print (“password must contain the following :”)

    Press Register Button

    Print (“You are registered”)

Else

    Print (“Fill up the above Fields”)

After login, Visibility of Dashboard

IF user press on login

    User reach on Dashboard

Else

Login time expire

User information

User will see a form with multiple queries and then submit

Print (“your response has been submitted”)

Else

Print (“Submission time expired”)

Recommendation

A recommendation will be made by our system for user

Searches

If user click on country search

Return (filter country-based scholarship)

If user click on Degree-wise search

Return (filter subject-wise scholarship)

Else

Print (“invalid searches”)

Admin

Users must login to System

Select login

Input his id

Input Password

IF email and password is valid

Go to Admin Console

Else

Print (“These credentials don’t match our records.”)

In case if Admin Forgot password

IF (id==valid) && (email==valid)

Print (“Email have been sent successfully”)

Else

Print (“Enter valid username and email”)

Admin console

Admin can manage account

Admin can add, delete update scholarship.

Admin initiate the crawler

User Give Feedback

User see Feedback Button in corner on his user dashboard

IF User give feedback and then submit

    Print (“Thank you! For your Feedback”)

Else

    Users perform another activity

END

4 DEVELOPMENT AND TOOLS

This section shortly describes the development plans and technology adopted to achieve these goals by executing our plan. Highest motivation of planning is to get work done in order to meet academic deadlines and to keep our work aligned. Moreover, these are several tools and ways to perform a task. This section best describes choices made by our own team.

4.1 Introduction

In development phase, we provide a full development plan in which we describe how and what work is done by which team member, which tools are used for development and in last conclusion and future work plan for the application is described.

4.2 Developme nt Plan

Table 4:1 Development Plan

Misbah Noor	• Back end: Database • Front End • Scraping • Data Preprocessing
Sheryar Adil	• Front End • Back End • ML Integration • Data Integration
Aneela Tabasum	• Scraping • Clustering • Recommendations • ML integration

4.3 Development Tools

- Visual Studio Code
- Google Colab
- Jupyter Notebook

4.4 Conclusion and Future Work/Extensions

The Scholarship Spy will provide a personalized recommendation for the scholarships. It intends to replace the existing manual searching of scholarships on different websites and different Facebook pages. As there is no platform available where users can get a scholarship recommendation based on their profile and Personal Statement, so, Scholarship Spy will surely emerge as a top platform for this purpose.

In future, we will extent it to the next level by adding online career counselling for the students. In this case, people will get much better user experience by getting all needs at one place.

5 QUALITY ASSURANCE

In system development paradigm, quality has equal importance as of functional requirements. This section was built to propose some highly recommended quality goals necessary for our system for being chosen by clients. There are some predefined sets of rules that uniformly determines the quality of our system. We will try to cover all in the section below.

5.1 Introduction

In quality assurance phase, to ensure satisfaction of end user, a proper testing mechanism was devised in the form of test cases and to trace each test case against desired functional requirement a requirement traceability matrix have been devised which include test case ID against each and every functional requirement desired by user.

5.2 Traceability Matrix

Requirement Traceability Matrix												
	Test Case ID	TC -1	TC -2	TC -3	TC -4	TC -5	TC -6	TC -7	TC -8	TC -9	TC - 10	**# Test Cases for Respective Requirement**
Req. ID												
Login		✖										1
Req -2			✖									1
Req -3				✖								1
Req -4					✖			✖				2
Req -5						✖	✖	✖				3
Req -6			✖		✖	✖	✖	✖				5
Req -7				✖		✖	✖		✖		✖	5

5.3 Test Plan

Table 5.1 Test case 1

Test ID	TC-1
Test name	User Registration
Date of test	20/11/2022
Name of application	Scholarship Spy
Description	User will fill the form and provide necessary information to create an account
Input	User register from submission
Expected output	Account created
Actual output	Created account for new user
Test Role (Actor)	User
Test verified by	Team member

Table 5.2 Test case 2

Test ID	TC-2
Test name	User login
Date of test	20/11/2022
Name of application	Scholarship Spy
Description	User will fill the form and provide necessary information to create an account
Input	User login form submission
Expected output	Account found
Actual output	Account logged in of user
Test Role (Actor)	User
Test verified by	Team Member

Table 5.3 Test case 3

Test ID	TC-3
Test name	User Dashboard/profile
Date of test	20/11/2022
Name of application	Scholarship Spy
Description	User will click on the My profile in the user menu
Input	Click on My profile ,User id
Expected output	User dashboard
Actual output	User profile Dashboard Displayed
Test Role (Actor)	User
Test verified by	Team member

Table 5.4 Test case 4

Test ID	TC-4
Test name	User My Recommendations
Date of test	20/11/2022
Name of application	Scholarship Spy
Description	User will click on My recommendations in the user menu
Input	Click on My Recommendations
Expected output	Recommendations page will be displayed
Actual output	Recommendations page will be displayed
Test Role (Actor)	User
Test verified by	Team Member

Table 5.5 Test case 5

Test ID	TC-5
Test name	User Feedback
Date of test	20/11/2022
Name of application	Scholarship Spy
Description	User will click on emojis and describe his feedback
Input	Click on emojis
Expected output	Successfully your feedback is forwarded
Actual output	Thank you for your feedback
Test Role (Actor)	User
Test verified by	Team Member

Table 5.6 Test case 6

Test ID	TC-6
Test name	History
Date of test	20/11/2022
Name of application	Scholarship Spy
Description	User will click on the history in user menu and then history screen will be displayed
Input	User click on the history in user menu
Expected output	User history of personal statement and its respective recommendations will appear
Actual output	History of user recommendations will be displayed and user can analysis it.
Test Role (Actor)	User
Test verified by	Team Member

Table 5.7 Test case 7

Test ID	TC-7
Test name	Recommendation
Date of test	20/11/2022
Name of application	Scholarship spy
Description	User will enter his 250-300 words personal statement and then click on recommend me button
Input	Click on recommend me button
Expected output	Required recommendations will appear for user
Actual output	Top 5 Personalized Recommendations for user wil be displayed
Test Role (Actor)	User
Test verified by	Team Member

Table 5.8 Test case 8

Test ID	TC-8
Test name	Home page
Date of test	20/11/2022
Name of application	Scholarship Spy
Description	User will click on home page on navigation bar
Input	Click on home page
Expected output	Home page will be displayed
Actual output	Home page will be displayed
Test Role (Actor)	User
Test verified by	Team Member

Table 5.9 Test case 9

Test ID	TC -9
Test name	Scholarship Page
Date of test	20/11/2022
Name of application	Scholarship Spy
Description	Click on the scholarship page on navigation bar
Input	Click on Scholarship page on navigation bar
Expected output	Scholarship page will be displayed
Actual output	Scholarship page will be displayed
Test Role (Actor)	User /admin
Test verified by	Team Member

Table 5.10 Test case 10

Test ID	TC -10
Test name	Degree page
Date of test	20/11/2022
Name of application	Scholarship Spy
Description	Click on degree page on navigation bar.
Input	Click on degree page on navigation bar.
Expected output	Degree page will be displayed
Actual output	Degree page will be displayed
Test Role (Actor)	User/Admin
Test verified by	Team Member

Table 5.11 Test case 11

Test ID	TC -11
Test name	Subject page
Date of test	20/11/2022
Name of application	Scholarship Spy
Description	Click on Subject on navigation bar.
Input	Click on Subject page on navigation bar.
Expected output	Subject page will be displayed
Actual output	Subject page will be displayed
Test Role (Actor)	User/Admin
Test verified by	Team Member

Table 5.12 Test case 12

Test ID	TC-12
Test name	Searches
Date of test	20/11/2022
Name of application	Scholarship Spy
Description	Make Desired categories search and create a query for searches
Input	Categorical searches on home page
Expected output	Required result will be displayed
Actual output	Required Result will be displayed
Test Role (Actor)	User
Test verified by	Team Member

6 USER MANUAL

Every device comes with a precise user guide. This basically the set of rules and interactions created by programmer and developer of the system. In order to catch right customers and right usage of system. There are also some technical issues to cover that we will mention in our user manual. This is a universal document that is made on behalf of every programmer or non-programmer user of the system to get maximum benefit out of product.

6.1 Introduction

In user manual phase, to provide user a guide to interact with our system we provide user manual in which hardware and software requirements of the system are given for the installation with an operating manual to access all the functionalities of the application.

6.2 Hardware/Software Requirements for the System

- Internet Connection
- Browser
- Dual core pc or laptop
- Minimum Android version 5.0
- Minimum iOS version 9.0

6.3 Installation guide for Application

There is website which do not need any installation.

6.4 Operating Manual

- **Create an Account**

  Customer can create an account by clicking on “Signup” button on the home screen below

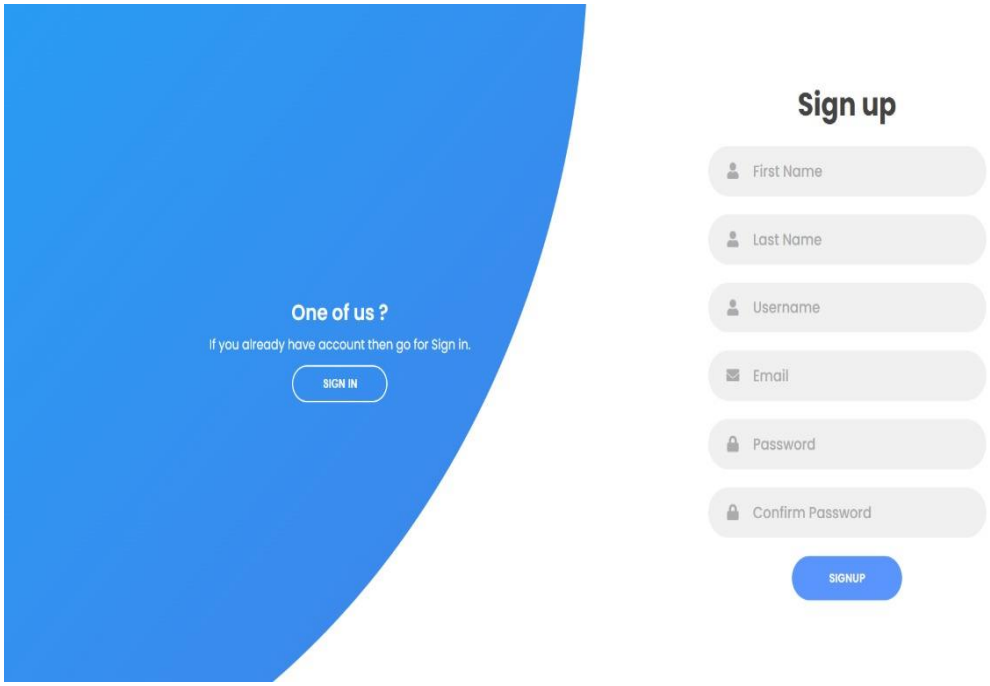

Figure 6.1 Create an Account 1

- **Search for Scholarships**

  Customers can search for the Products from the below selected fields

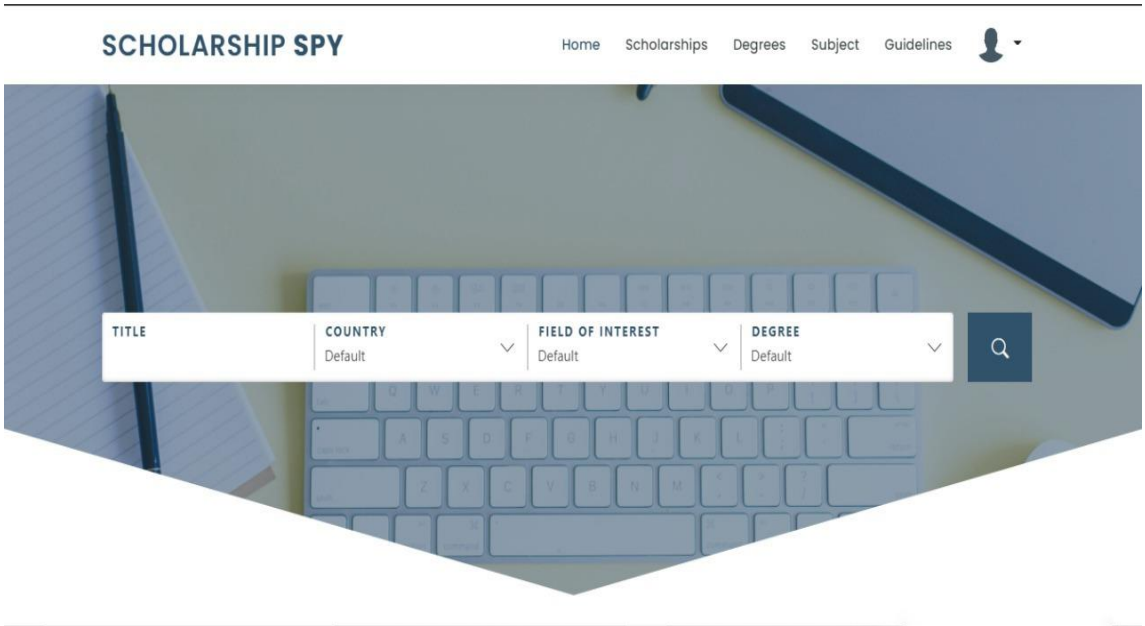

Figure 6.2 Search section 1

- **Get recommendations:**

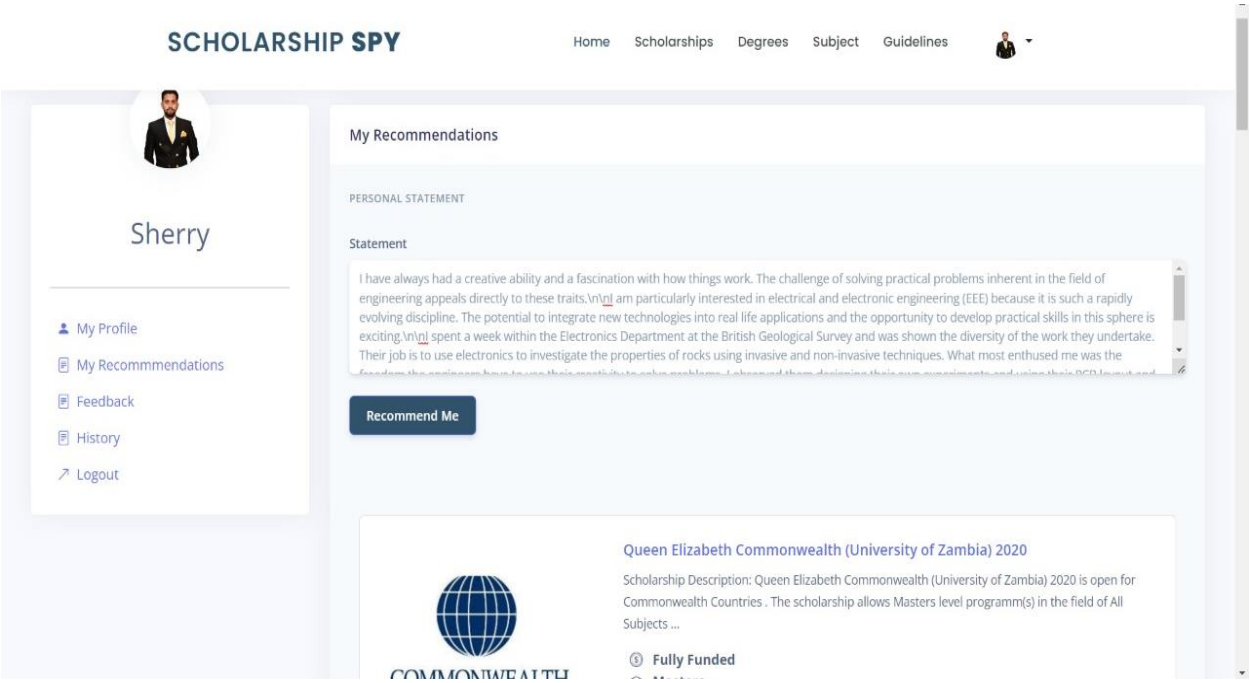

Figure 5.2-1 User recommendation

- **See Recommendation history:**

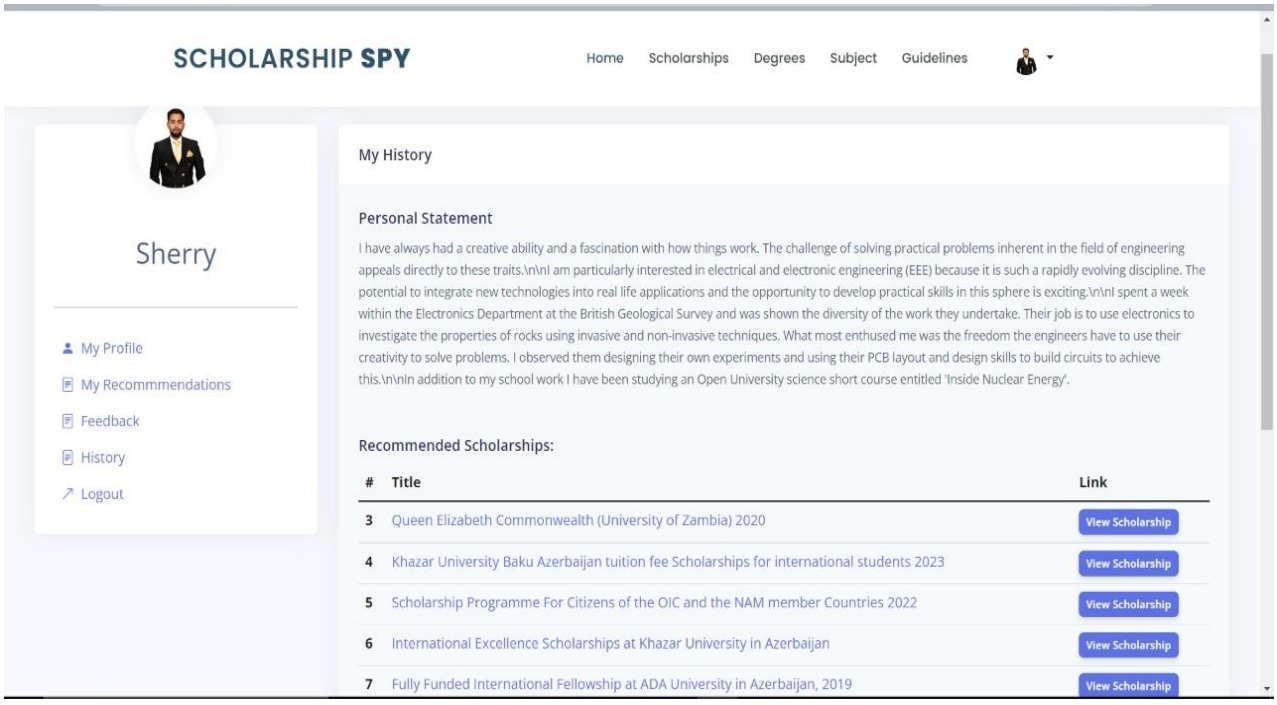

Figure 5.2-2 recommendation history

- **Admin Login**

  Admin will login through this page with their login information

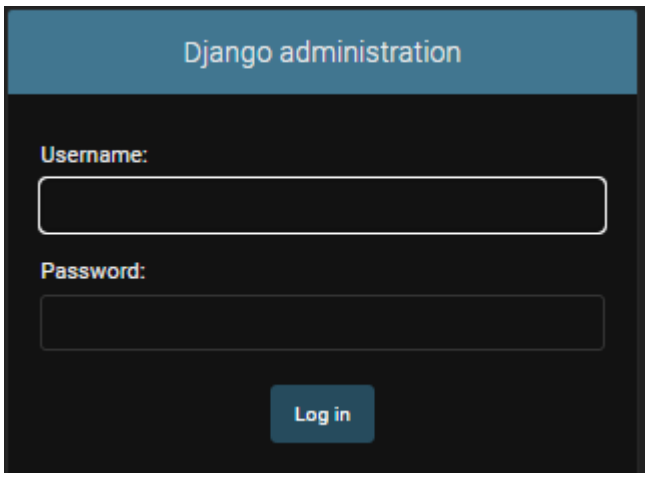

Figure 6.3 Admin Login User Manual 1

- **Company Dashboard**

  Admin uses dashboard to select different fields