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## “Jobable”

# Job Portal for the Differently-abled

University Id: 2050062

Student Name: Sahaja Phuyal

Award/Course: Bsc. (hons) Computer Science

Cohort: 5

Supervisor: Swastik Gurung

Reader: Nirmal Thapa

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## Acknowledgment

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## Abstract

A web application “Job portal for differently-abled people” named “Jobable” has been proposed and developed to fill the market gap between differently-abled people looking for jobs and recruiters willing to give opportunities to differently-abled people. This project aims to investigate the concerns and obstacles that people with disabilities experience in obtaining work possibilities and aid them by building a disabled-friendly job portal that makes it easier for them to find job opportunities and enhance their economic independence. This is a Django-based application that has features such as quick job search, recommendation system, accessibility options and many more. Content-based filtering algorithm has been used to build the recommendation system.

This paper contains all of the pertinent details on various areas of a project, as well as a comprehensive overview of the advances made in the project. The findings of the research, aims and objectives, major subsystems, technologies and techniques used, the structure in which the development was carried out, the rationale for selecting certain methodology and technologies for this project, etc are some of the things that are included in the paper.

This is the kind of project that can create an impact on society and make a difference in the lives of a number of differently-abled people. This project has been built as a final year project under the direction of our supervisor Mr. Swastik Gurung.

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## 1. Introduction

On an equal footing with others, people with disabilities have the right to exercise their civic, political, social, economic, and cultural rights. Physical, intellectual, or sensory impairments, medical issues, or mental illness can all render people disabled. These disabilities, diseases, or disorders might be permanent or temporary. Social devaluation and negative identities are common among people with such impairments. Although these people might be facing such disabilities they aren't incapable but are capable in a different way or we might call them differently-abled for that matter. They can still perform most of the tasks that other people can and therefore are also capable of being fit for most jobs as well. However, disabled people face discrimination as a result of prejudice and ignorance in society. Furthermore, because of a lack of access to basic services, they frequently do not have the same opportunities as other individuals. Thus, the web application "Jobable" has been proposed and developed to connect employers who act as the source of resources and differently-abled job seekers who can find and apply for suitable jobs.

### 1.1 Project Briefing

#### 1.1.1 Problem Domain

In the context of Nepal, there have been many job portals created over the last few years to help recruiters connect with job seekers but there isn't quite a job portal to help the differently-abled people find job opportunities that might be suitable for them or help them to find recruiters who might be open to giving them such opportunities. Besides, disabled persons are subjected to discrimination due to societal prejudice and ignorance, so they do not have the same number of job opportunities as others.

#### 1.1.2 Project as a Solution

This project aims to investigate the concerns and obstacles that people with disabilities have in obtaining work possibilities and aid them by building a job portal that will make it easy and efficient for them to find job opportunities that will enhance their economic independence. This job portal is specially designed for differently-abled people as it provides a user-friendly interface with various accessibility options.

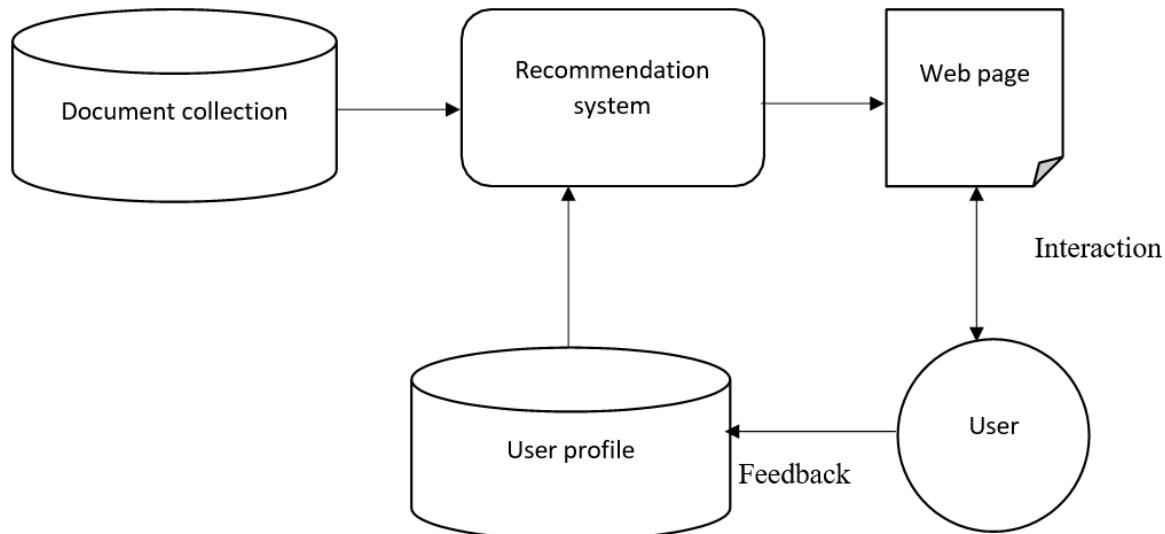
### **1.1.3 AI implementation**

In this project, a recommendation system has been built, where job seekers are recommended jobs that they could be interested in. Content-based filtering has been used to develop a recommendation system that recommends items by matching the content to the seeker profile. The approach suggests related material depending on the subject's attributes.

#### **1.1.3.1 Description of Algorithm**

Content-based filtering recommends items based on the relationship between the job's items and the user's profile. Each accessible entry's content is treated as an object and compared to the primary data provided by the client during the user creation process. This strategy may be used to suggest job openings to job seekers. It sorts objects into categories based on their characteristics; the most popular method is using the keywords to explain every content. This program analyzes information of seekers and suggests some jobs.

Recommendation system uses a trained data model to filter information. It is much more likely to provide a dataset that a user might find valuable. Training data is created depending on the user's input, which aids the filtering system in determining what to recommend and what is irrelevant to the user. The user's contact with the recommendation system is recorded in the training data set. Every item from a training instance has a unique property. The attribute allows to specify the item's class depending on the user's like category or recommended data. (Taghi, 2020)



*Figure 1: Mechanism of Recommendation System*

#### 1.1.3.2 The AI Type

The content-based filtering recommender system which has been implemented in this project is a supervised machine learning type of AI. Various machine learning platforms utilizes supervised learning in different ways. It allows for the acquisition of data as well as the output of prior experiences. It uses labeled datasets to detect and forecast data with improved accuracy. Thus, content-based filtering is categorized as supervised machine learning.

#### 1.1.3.3 Mathematics behind Algorithm

Content-based filtering is a simple technique to create recommendation models when proposing a single object to a person because it does not require data from numerous users. Instead, it looks for the recommendation in the user's profile data and preferences.

In order to describe documents, creating keywords is the first step. This keeps non-essential terms out of the index. A stop list is frequently linked to a group of documents by a retrieval system of a text. A stop list is a collection of irrelevant words like am, the, with, of, for, etc. The system of information retrieval must be able to distinguish groups of words that share modest syntactic variations and only gather the similar word prefix for each cluster. A set of diverse words may share a word stem.

The bulk of content-based recommender systems uses the Vector Space Model (VSM), which employs TF-IDF weighting system. Text information is represented graphically in VSM. Every element is defined as an n-dimensional vector, for each dimension corresponding to a term from the text collection's broad dictionary. Every text is expressed in the form of word weights, with every weight denoting the document relationship.

Words that appear often in one document (TF = term-frequency) but only infrequently elsewhere (IDF = inverse-document-frequency) are more likely to be critical to the subject of the document. Additionally, balancing the weight vectors reduces the potential of identifying longer records.

The association among a term  $t$  and the text  $d$  is calculated using the term frequency matrix. It is set to 0 if the word isn't found in the document; alternatively, it is declared as non-zero. The term frequency is compared to the actual number of observations of all words in the document to determine the relative term frequency.

Term Frequency's formula is as follows:

$$TF(d,t) = \begin{cases} 0 & \text{if } freq(d,t) = 0 \\ 1 + \log(1 + \log(freq(d,t))) & \text{otherwise} \end{cases}$$

*Figure 2: Term Frequency Formula*

The inverse document frequency (IDF), which represents the scaling factor, or the value of a word  $t$ , will be reduced if a term  $t$  occurs in a high number of documents, which is another important measure in the above equation. The term knowledge may be underestimated in various study articles.

Inverse Document Frequency's formula is shown below:

$$IDF(t) = \frac{\log 1 + |d|}{|dt|}$$

*Figure 3: Inverse Document Frequency Formula*

Where dt represents the list of documents that include the term t, and d represents the collection of document. The TF - IDF measure, which is provided in the equation below, is formed by combining TF and IDF in a full vector space model.

$$TF-IDF(d,t) = TF(d,t) * IDF(t)$$

*Figure 4: TF - IDF measure equation*

## 1.2 Aims

The major goal of this project is to successfully develop the job portal to make job searching fast, reliable and efficient for differently-abled people where they can find job depending on their skills and the nature of their disability. In other words, this project aims at building a disabled-friendly job portal that makes it easier for differently-abled people to find job opportunities that would enhance their economic independence.

## 1.3 Objectives

- To create a platform for disabled job seekers where they can connect with hundreds of small, medium, and even large organizations who are eager to recruit them.
- To make job-seeking simple, trustworthy, and effective and fast for differently-abled people where they can find jobs depending on their skills and the nature of their disability.
- To implement various accessibility features to enhance the user experience for disabled people.
- To enhance the economic independence among the differently-abled people.

- To implement a recommendation system that will recommend similar jobs to the job seekers.

## 1.4 Artefact

In basic terms, an artefact is anything that's made in order to build any software. This might include things like workflow diagrams, design or report documents, and test cases and so on.

In this report, the artefact of the project "Job portal for the differently-abled" has been illustrated. The major artefacts of this project are SRS, Use-case diagrams, activity diagrams, ER diagrams, wireframes, test cases, etc. The detailed artefact designing have been presented in the artefact designing section below: [Artefact Designs](#).

### 1.4.1 System as a whole

There are three level of users in this system: admin, seeker and the recruiter.

Seeker and recruiter have to register to the system by filling up required information. Then after the email verification, they can successfully log in to the system. Seeker and recruiter both can add additional details to their profile to complete their profile. Since, this job portal is for the differently-abled, seekers are required to select the type of disability that they have. In the dashboard page of the seeker, there is a recommendation system that recommends jobs according as per their disability type. Content-based filtering recommender system is used which utilizes TF-IDF algorithm and recommends the content with highest term frequency.

Recruiters are responsible for posting the job vacancies, accepting or declining the application, deleting or editing jobs etc. Seekers can apply to the job that they are interested at or the job that matches their skillset by attaching their CV. Moreover, they can also save the jobs or cancel the jobs that they have applied to. After the acceptance or declination of their application, they will receive an email notification regarding it.

#### 1.4.2 Sub-systems of the project

The project “Job portal for the differently-abled” is distributed into the following subsystems to make the development process faster and more efficient.

1. User Management System

2. Jobs Management System

3. Recommendation System

#### 1.4.3 Functional Decomposition Diagram (FDD)

The subsystems of the project are illustrated here.

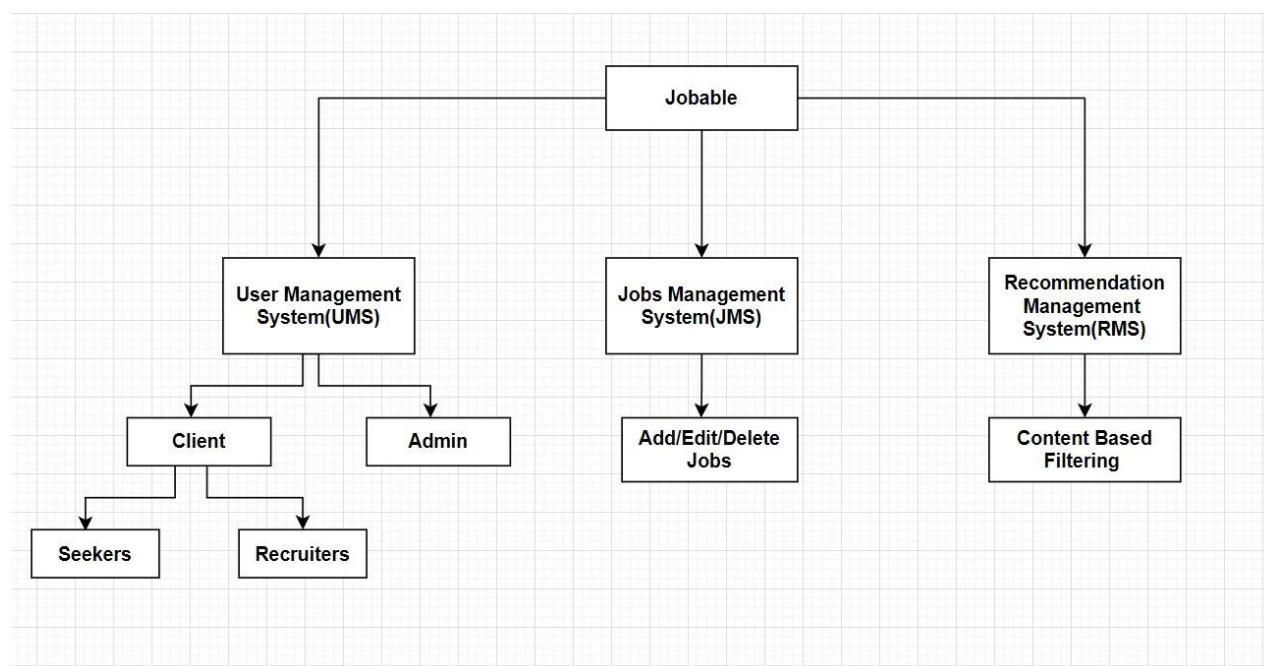


Figure 5: Functional Decomposition Diagram (FDD)

#### 1.4.4 Detailed explanation of the sub-systems

1. **User Management System (UMS):** As shown in the figure above, there are three levels of users in this system which are admin, seeker, and recruiter. They are briefly described below:

- **Admin:** The admin has access to the data and information that the users (seeker and recruiter) have submitted. Thus, it is capable of performing the functionalities such as creating new user and job vacancies, editing user and job details, deleting the users and the posted jobs, etc. Moreover, it can send emails to users informing them of their feedback and alerting them to positions they have applied for.
- **Seeker:** The seeker can create their account by registering to the portal. To access all the functionalities of the portal, they need to log in using the credentials which they had created during the registration process. They can add various information to their profile like their education level, skills, preferred job location, etc. Furthermore, they can also add their profile picture and change it whenever they want to. Most importantly, they can search and view all the posted jobs and can save or apply to the job of their interest. They can attach their CVs while applying for the job. They can also cancel their application or delete the jobs they've saved. On the dashboard page, they can view recommended jobs that are recommended according to their profile information. Lastly, they can also give feedback to the portal.
- **Recruiter:** Like seekers, they can also register and login into the system. They are required to fill in various information during the registration which later they can view in their profile. They can add or delete information in their profile later. The major role of the recruiter is to post job vacancies. They are required to fill in various details while posting a job. Furthermore, they are able to see all of their posted jobs and the applicants who have applied for the jobs. They can view the applicant's CV and accept or decline their application based on their CV. They can also give feedback to the system.

2. **Jobs Management System (JMS):** As the name suggests, this sub system has to do with managing the jobs. The functionalities like adding jobs by the recruiter, saving or applying for jobs by the seekers, and accepting or declining jobs by the recruiter all come under this subsystem. As discussed above, there are three levels of users: admin, seeker, and recruiter. Admin can access all the information of seekers, recruiters, and jobs. Hence, it can add new jobs or edit and delete the existing jobs. Likewise, a recruiter can also perform the functionalities like adding, editing, and deleting jobs. Seekers can save or apply to the posted jobs and the recruiter can accept or decline their application.
3. **Recommendation Management System (RMS):** Seekers are recommended the jobs that they catch their interest on the dashboard page. Content-based filtering recommender system is used in this system which suggests items by matching the content to the user profile. It uses the Vector Space Model (VSM), which employs basic TF-IDF weighting, then leveling the weight, vectors eliminates the possibility of lengthier records being identified and recommend the content with the highest term frequency (which is the most repeated words in the content.) This has been described in detail in the Link to the AI implementation section: [AI implementation](#).

## 1.5 Academic Questions

The academic questions that the project addresses are:

- What is the social impact of this job portal?
- What advantages does this platform provide to the end-user?
- How can it bridge the gap between differently-abled people and employment opportunities?
- What distinguishes this system from Nepal's other job portals?

## 1.6 Explanation of Academic Question

Jobable is the kind of a project that can create a positive social impact in society as it has the potential of touching thousands of lives of differently-abled people. In the context of Nepal, there are various job portals but there hasn't been any job portal that is specially

designed for the differently-abled people. Differently-abled people are often overlooked when it comes to employment opportunities even when they have the required skillsets. This is a major problem that has been addressed in my project and as a solution, a job portal for the differently-abled will be developed. It will benefit the lives of differently-abled people by giving them an employment platform that will enhance their economic independence, thus it bridges the gap between differently-abled people and the employment opportunities. This system will have various accessibility options which can make the site accessible to those with disabilities.

## 1.7 Scope and Limitation of the Project

### 1.7.1 Project Scope

Jobable is a job portal for the differently-abled which aims to investigate the concerns and obstacles that people with disabilities experience in obtaining work possibilities and aid them by building a disabled-friendly job portal that makes it easier for them to find job opportunities to enhance their economic independence. The project has been carried out using the Agile Scrum methodology where the major deliverables are project proposal, artefact designing, data modeling diagrams, wireframes, overall system, report, etc. The major technologies used are Python, Django, SQLite, HTML, CSS and JS. This project has various features and functionalities that make it possible for the differently abled to find the best-suited jobs for them.

### 1.7.2 Project Features

Following are the major features of the project.

- **Save and apply for jobs:** Seekers can save or apply for the jobs of their interest.
- **Post jobs:** Recruiters can post jobs by filling up the necessary information.
- **Edit, delete or cancel jobs:** Recruiter can edit or delete the posted jobs, while the seekers can cancel the jobs they have applied for if they change their mind.
- **CV attachment:** Seekers can attach their CV while applying for the job.
- **Email notifications:** Seekers are notified through email about the acceptance or declination of their job application and the feedback they have given to the system. Moreover, when users are trying to register to the system, they will receive an email to verify their account.

- **Job Recommendation:** The system has a feature of automatic job recommendation on the dashboard page of the seeker.
- **Various accessibility options:** Since the end-users of this system are the differently-abled people, there are various accessibility options like font level customization, invert color, grey-scale level, brightness level, etc.
- **Profile Completeness:** Users can add various information to their profile according to which the completeness level of their profile will be shown.

### 1.7.3 Project Limitation

Every system has some level of flaws or inefficiency. This system too has some limitations. They are discussed below.

- **Only for the differently-abled job seekers:** This job portal provides jobs only for differently-abled job seekers which can be one of its limitations as it can't be used by everybody.
- **Lack of interactive blogs or forums:** This system doesn't have any blogs and forums section where users may explore and discuss ideas. Blogs facilitate efficient user communication, which is lacking in this system.
- **Lack of enough job filters:** Although jobs can be filtered by job category, there aren't other filters like salary range, experience, skills, etc.

## 1.8 Report Structure

Section1 i.e Introduction part has been finished.

Section 2 is the literature review section. Here, all the researches done in the topic have been presented. Moreover, similar systems are discussed, compared, and evaluated. Research regarding AI implementation has also been mentioned.

Now, comes Section 3 i.e the Project methodology part. Reasons behind choosing the particular methodology have been talked about in this section. The proposed Gantt chart is also presented here. Then, in Section 4, the tools and technologies used in the system have been discussed as well as the reason behind using them.

In Section 4, Artefact Designs of all the subsystems have been presented. This includes all the diagrams and data models, test cases, etc. Now finally comes the conclusion part in Section 5. Here the project is concluded and possible future

enhancements of the system have also been discussed. In section 6, there is a critical evaluation and self-reflection part where I have discussed my journey of the Final Year Project and the impacts that this project has had on my personal and professional life. Furthermore, in section 7, the evidence of project management has been mentioned. Log sheets, the Gantt chart, and the sprint planning have been presented as evidence of Project Management in this report. Finally, in the end there is a section of references.

## **2 Literature Review**

### **2.1 Introduction**

The literature review is focused on various ideas and findings from the research papers that are relevant to the study of this project. A large number of studies have been found regarding building a disabled-friendly online hiring platform for differently-abled people. Thus, the relevant insights and findings from the research papers are explained thoroughly starting with what online hiring is, how online hiring can benefit differently-abled people, how to make an accessible online hiring platform for differently-abled people, and so on. It also demonstrates a comparison with similar existing systems in the international and national markets. Since the recommendation system is going to be implemented in the project, research papers regarding recommendation system algorithms are also reviewed. The literature has also covered the scope and findings related to the proposed project in the context of Nepal. With the help of the provided literature review, one can gain thorough analysis of the previous findings of the project, the current scenario, and the scope of the project.

### **2.2 Findings from research papers**

#### **2.2.1 Background Research on the topic**

##### **2.2.1.1 Online Hiring**

When compared to a decade or two ago, when resumes were handed out by hand, now the process of hiring has clearly altered. Due to the rapid digitalization and advancement of technologies, online hiring has become very popular. Online hiring encompasses a wide range of operations and services, regardless of whether the

organization makes substantial use of HR productivity tools or just recognizes resumes by email on a regular basis. The current online recruiting system allows us to access interview schedules, reference checks, and other employment-related chores from the comfort of our own homes. The Internet, which has hundreds of job postings and resumes, has proven to be an excellent tool for disseminating information about job openings and people. People may access online recruiting as a useful tool for making job openings apparent. It also saves time and effort by simplifying the candidate search. The organization benefits from using the internet for recruiting since they can reach a larger audience and have a better chance of having a faster and more efficient hiring process. (SAYEL, 2018)

### **2.2.1.2 Online hiring among differently-abled people**

According to (Angela, 2015), Disability is not only a physical problem but also a societal one. Discrimination and inequity are so prevalent in today's environment. Addressing these impediments to their specific problems in social and political methods will not have any remedies until effective and efficient actions are taken. Despite the fact that regulations and legislation have provided for their inclusion in numerous sectors, public acceptance of disability, particularly in the workplace, remains low.

Online hiring can make it easier for a person with a disability to demonstrate his abilities without facing discrimination at the outset. As the job procedure is exclusively based on their skills and ability to work, online hiring reduces the social issues that individuals with disabilities experience. If society continues to view persons with disabilities as incapable of performing productive work, they will continue to be poor, reliant, and live a life without dreams and aspirations. Thus, an online job portal for the differently-abled can be a game-changer for differently-abled people as they can showcase their skills and abilities without the fear of prejudice and make a living on their own. (Vreznaia Altikai Catacutan, 2018)

### **2.2.1.3 Web accessibility for differently-abled**

Despite the fact that an increasing number of differently-abled people are a part of the society, they are often disregarded when web programs are planned and developed. There are a number of guidelines and standards that can help web developers create accessible websites or make their websites accessible to disabled individuals using various assistive technology such as screen readers. (Mehmood, 2012)

As cited in (Vreznaia Altikai Catacutan, 2018) , an interview was conducted with Unilab Foundation, Inc. and NCDA in the Philippines and during their discussion, the researchers learned about an employment platform that focuses solely on employing persons with disabilities. The website was specially designed to be as accessible as possible for people with all kinds of disabilities. The job portal has options such as picture options and text options. The major feature of this job portal was an easy-to-use and accessible skill profile

generator to assist job seekers with disabilities who are having difficulty writing resumes. Moreover, it has accessibility features like text zoom which can be beneficial for people with low vision, and also has a screen reader feature for the visually-impaired people. Hence, the Universal design principle should be used to make the system as accessible as possible. Also, various accessibility options should be taken into utmost consideration while building a system for the differently-abled.

#### **2.2.1.4 Recommendation System**

People rely on recommendations from others in day-to-day life, be it through spoken words, newspapers, TV ads, and so on. Now, with the digital and technological advancements, the recommendation system is being used by so many platforms like Netflix, Spotify, Facebook, Tinder, etc as it helps in enhancing the user experience and customer satisfaction.

The content-based recommender system, which will be employed in this project, is one of the various algorithms for recommender system. Content-based recommender systems look at a collection of texts or information on formerly categorized objects to build a model profile of a customer's wishes based on the qualities of the items the user has looked at. The portfolio is a standardized description of a user's needs which is used to recommend new products that they would like. The recommending system's primary concept is to connect the features of a user account to the characteristics of a type of content. As a result, a proper assessment represents the user's amount of focus on that object.

A portfolio that accurately displays user interests is tremendously advantageous to the success of a system model. The information access technique becomes significantly more efficient when a user's interests are effectively reflected in a profile. It could be used to limit query results by evaluating if a consumer is engaged in a certain Webpage and, or even, preventing that page from becoming displayed. (Semeraro, 2012)

A user's list of wanted products is sent to a recommendation system. It calculates the analytical data for the specified list and provides a new list of things that users could find helpful. The examined information is then processed using one or more qualities or tags from consumer items on the list. The end-user also may receive new item

recommendations from various sources depending on attributes analysis data where the recommendations are to be dependent.

### **2.2.2 Research on end-users**

The major end-users of this project are the differently-abled people who are having trouble finding jobs despite having excellent skills. Then there are the recruiters who are willing to provide jobs for persons with disabilities who also are end-users of this system. So, this application aims to provide jobs to differently-abled job seekers by connecting them with the recruiters who are open to giving them such opportunities. The current scenario of the end-users of this system is discussed below.

#### **2.2.2.1 Global context**

According to the Bureau of Labor Statistics in the United States, only 17.5 percent of differently-abled people were working in 2015, compared to 65 percent of those without any kind of disabilities. In 2015, the rate of unemployment for differently-abled people was 10.7%, nearly twice that of people without disabilities (5.1 percent). (Bureau of labor statistics , 2020) The number of persons with disabilities who confront difficulties in pursuing their desire of working in a fulfilling career continues to climb. Employers are less interested in disabled applicants than in those without disabilities. Furthermore, according to (Karma Jigyel, 2017) the lack of employment opportunities for differently-abled people is one of the reasons why various countries have higher poverty rates and insufficient healthcare programs, resulting in a greater reliance on governments to support programs for people with disabilities.

#### **2.2.2.2 Nepal's context**

According to Nepal's National Population Census (2011). Disability affects 1.94 percent of the population. This is roughly 500,000 Nepalese. There are no data on disability and work that has been separated. However, based on firsthand knowledge, we can confidently state that the employment situation for individuals with disabilities in Nepal is dire. Only a small percentage of people with disabilities are employed. Thus, employment opportunities for people with disabilities are very low.

Because of many disability myths, it is assumed that people with disabilities can only perform particular types of employment. That is why companies in Nepal are hesitant in hiring differently-abled people. However, several large companies have set a positive example by hiring differently-abled people. Cloud Factory, Deurali Janta Pharmaceuticals, and The Bakery Cafe are a few of those companies.

Despite the fact that the job situation for people with disabilities is now unsatisfactory, several projects are underway that promise positive outcomes in the future. Many acts are being amended as a result of the new constitution, including Nepal's employment law.

### 2.3 Research on Similar Systems

Online recruitment has seen a significant increase in popularity over the recent years when fast financial developments created a great demand for competent workers that the labor market couldn't completely provide. However, online hiring platforms specially designed for the differently-abled people are very few. Some of them are mentioned below:

#### i. AbilityLinks

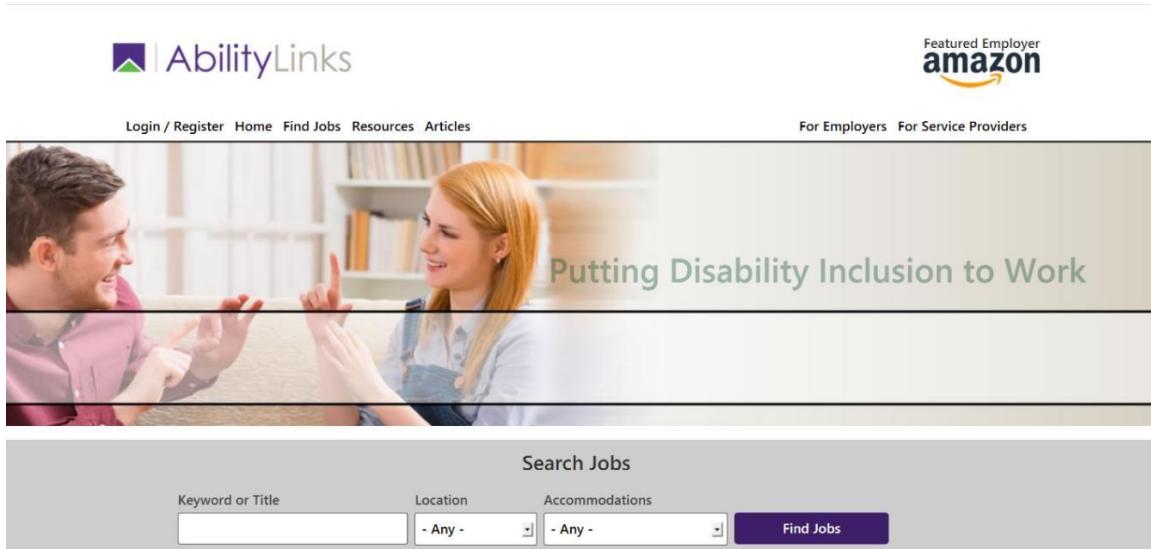
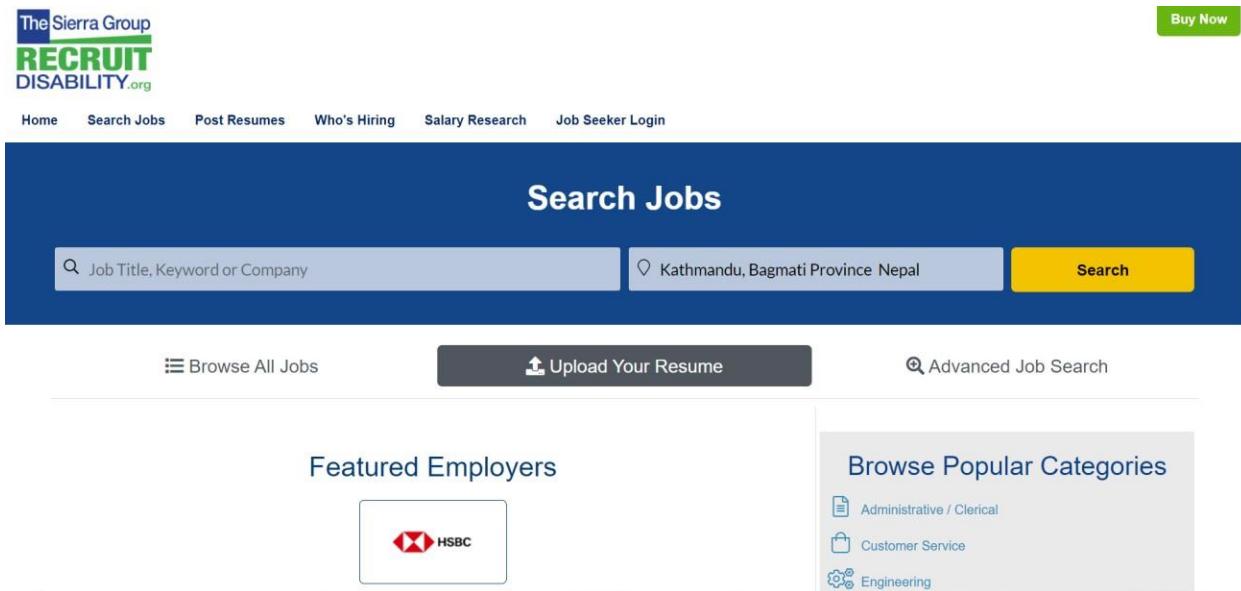


Figure 6: Landing page of AbilityLinks

AbilityLinks was the first job site for people with disabilities, launched in 2001. Over 700 people have reported obtaining work using the platform since its introduction. It was the only site found that enables users to search for employment depending on the sort of disability.

AbilityLinks, like other job sites, allows to search for jobs by title, keyword, area, and employment type. Users can also filter by specific accommodations, such as vision, hearing, neurodiversity, learning, mental health, or mobility. AbilityLinks has employment for people with diverse levels of expertise in sectors including architecture and engineering, food services, media, manufacturing, and sales, among others. AbilityLinks is free to use for job seekers. (Polner, 2021)

## ii. Recruit Disability



The Sierra Group  
**RECRUIT**  
DISABILITY.org

Buy Now

Home Search Jobs Post Resumes Who's Hiring Salary Research Job Seeker Login

### Search Jobs

Job Title, Keyword or Company Kathmandu, Bagmati Province Nepal Search

Browse All Jobs Upload Your Resume Advanced Job Search

Featured Employers

HSBC

Browse Popular Categories

- Administrative / Clerical
- Customer Service
- Engineering

Figure 7: Landing page of Recruit Disability

RecruitDisability provides jobs for people with disabilities in more than 12 countries. Accounting, engineering, financial services, healthcare, marketing, and other areas are among the most popular on the site. Users can utilize their sophisticated search options to look for certain keywords, titles, firms, and dates posted for a more customized browsing experience. By going to the "Salary Research" option, users may look up typical pay for various occupations. On RecruitDisability, job seekers may search for and apply to positions for free. (Polner, 2021)

## Similar systems existing in Nepal

There hasn't been any job portal that is specially designed and dedicated to offering job opportunities to differently-abled people in the context of Nepal. However, there are several normal job portals that provide jobs to people in Nepal. Some of them are mentioned below:

- i. **Merojob**



*Figure 8: Merojob Logo*

Merojob is the most popular website owing to its user-friendly interface and large quantity of job openings. However, the site lacks a job recommendation system. This online system suggests employment based on a basic filtering mechanism that meets the requirements of job searchers. Furthermore, there are no accessibility options to make it accessible to individuals with disabilities. (Merojob, n.d.)

ii. **Jobjee**



*Figure 9: Logo of Jobjee*

Jobjee is a similar web application that uses artificial intelligence to make job recommendations. It has a number of functions, including job ranking, suggestion, and job filter. Job seekers can apply for jobs through the job portal or by sending their resume to the supplied email address. Recruiters and potential employees each have their own dashboard and login/registration sites. Recruiters may use the platform to advertise jobs, build their business, connect with applicants, and manage their submissions. This site makes job seeking reliable than other portals since it immediately advises the job that is most suited to the job seeker. This site, however, is not accessible to people with disabilities. (Jobjee, n.d.)

## 2.4 Comparison table with similar systems

Feature	AbilityLinks	RecruitDisability	Jobjee	Mero Job	Jobable (My system)
Search Jobs	✓	✓	✓	✓	✓
View available jobs	✓	✓	✓	✓	✓
Recommendation system	X	X	✓	X	✓
Feedback Form	X	X	✓	X	✓
Searching job by category	✓	X	X	X	✓
Accessibility options for the differently-abled.	X	X	X	X	✓

Table 1: Comparison table of proposed system with the similar system

## 2.5 Research regarding the implementation of AI

Despite having a large number of disabled people, there aren't any job recommendation systems specially designed for them that cater to their needs. A recommendation system helps in enhancing the user experience and customer satisfaction. Thus, a recommendation system has been implemented in the project.

A content-based recommendation algorithm is used in this system to create a link in between a job seeker's profile and job information to suggest users the positions of their preference. This algorithm examines the details available by job searchers and proposes possible jobs to them. Seeker's portfolio contains information about their kind of disability, academic history, career choices etc., whereas the posted position has information about job titles, locations, and minimal criteria. The algorithm then analyses similarities between both the job seeker's profile and job information supplied by recruiters when advertising a vacancy in order to propose jobs to them. (Hui Li, 2012)

Recommendation systems uses a trained model to filter the input. This system will most likely give facts that a user will find valuable. A training data set is created depending on the input of the user to assist the filtering technique in determining what to suggest and what is unimportant to the user. The user's record of interactions with the recommendation system is stored in the training set. There is an attribute on every object from a training sample. The attribute allows you to designate the object's class depending on the user's category or information.

## 2.6 Similar Algorithms

### i. KNN Algorithm

The K-Nearest Neighbor (KNN) technique is among the most fundamental machine learning techniques. It is based on the Supervised MI methodology.

The K-NN method assures that the fresh case/data and current instances are comparable, and it assigns the fresh case to a group that is most identical to the earlier ones.

The K-NN approach stores all relevant information and finds sets of data depending on how closely they resemble the current data. This means that using the K-NN approach, new data may be swiftly classified with a good classification. Although the K-NN method can be utilized for both categorization and regression problems, it is more typically employed for categorization.

The k-NN classifier contributes to class membership. Depending on a majority of votes from its neighbors, the most frequent category among item's k nearest neighbors ( $k = \text{slight positive number}$ ) is assigned to it. When  $k = 1$ , the item is assigned to the category of the object's single nearest neighbor. The item's value of the property is indeed the output of the Knn. The mean of the valuations of the k nearest neighbors determines the value of the property.

The neighbours are picked from a group of items that have a common category (in k-NN categorization) or an item's asset (in k-NN regression). This may be considered as the algorithm's data-gathering phase, even if no obvious learning steps are required.. Because it adjusts to the data's spatial correlation, the k-NN approach is unique. (K. Taunk, 2019)

## ii. Collaborative Filtering

Collaborative filtering is a form of a recommender system that uses a user's previous activities to produce predictions. For collaborative filtering, a list of goods based on the user's past choices is necessary. This system does not require a huge variety of product features to work. Each object and User are described by an embedded or feature map, which sinks both the things and the consumers in the same embedded place. On its own, it generates enclosure for goods and users.

E-commerce recommender systems, particularly those used by huge online stores such as Amazon and eBay, function in a challenging environment. A recommendation system system that provides timely and trustworthy recommendations may usually attract customers' interest while also benefiting enterprises. The ability of Collaborative Filtering methods to create greater forecasts or suggestions is based on how effectively they manage difficulties, which are also aspects of Collaborative Filtering jobs.

When it gets down to it, there are two types of collaborative filtering: memory-based and model-based.

The following is how the memory-based technique estimates the similarities between users' ii and jj:

$$s_{i,j} = \sum_{p \in P} w_p \text{simil}(p_i, p_j)$$

Where p denotes a preference that has been offered as part of a collection of preferences P,

Similarly is a user-defined similarity function that analyzes how similar two choices ( $p_i$  and  $p_j$ ) seem to one another, whereas  $w_p$  is a weight related to a

single choice to determine its relevance (higher means more similar). (J. Ben Schafer, 2007)

## 2.7 Summary of the Literature Review

To sum up, it was found that there has been a massive shift in the traditional hiring process and organizations have shifted to online hiring through job portals, but the hiring process of disabled people still did not have a proper presence on job portals. This was making it difficult for recruiters seeking to hire differently-abled people to find them and vice versa. Thus, a market gap was seen in this context. Moreover, in the context of Nepal, there was no job portal found specifically catering its services to the recruitment process of disabled people. However, there were a few job portals specifically catering their services for helping in the recruitment process of differently-abled people on the international platform. When designing a system for the differently-abled, numerous accessibility choices should be taken into account.

The current scenario of the end-user of the system has shown that most of the companies worldwide and in the context of Nepal are hesitant to give job opportunities to the differently-abled. However, some companies are doing a tremendous job by giving opportunities to people with disabilities. For instance, in the context of Nepal, companies like Cloud factory, The Bakery Café, etc. have been employing people with disabilities and breaking the stereotype.

Furthermore, the use of a recommendation system in creating a job portal for differently-abled people seemed to be effective according to the literature and similar systems in the international market. So, as the recruitment process has become much easier for job seekers and providers through job portals, there is still a gap that needs to be filled in regards to the recruitment of differently-abled people. Hence, a job portal for differently-abled people using a recommendation system could fill this existing market gap.

### 3 Project Methodology

For carrying out any project, selecting a suitable project management methodology is very important. There are various project management methodologies like Waterfall, Kanban, Agile, etc.

Among them, Scrum framework has been chosen for this project to carry out the project efficiently and on time. A scrum is an agile approach that breaks the projects into small parts which can be called sprints. Various scrum rituals are carried out during the project.

Hence, the tasks of the project “Jobable” were divided into several sprints and carried out one by one. This methodology has proven to be very effective for this project.

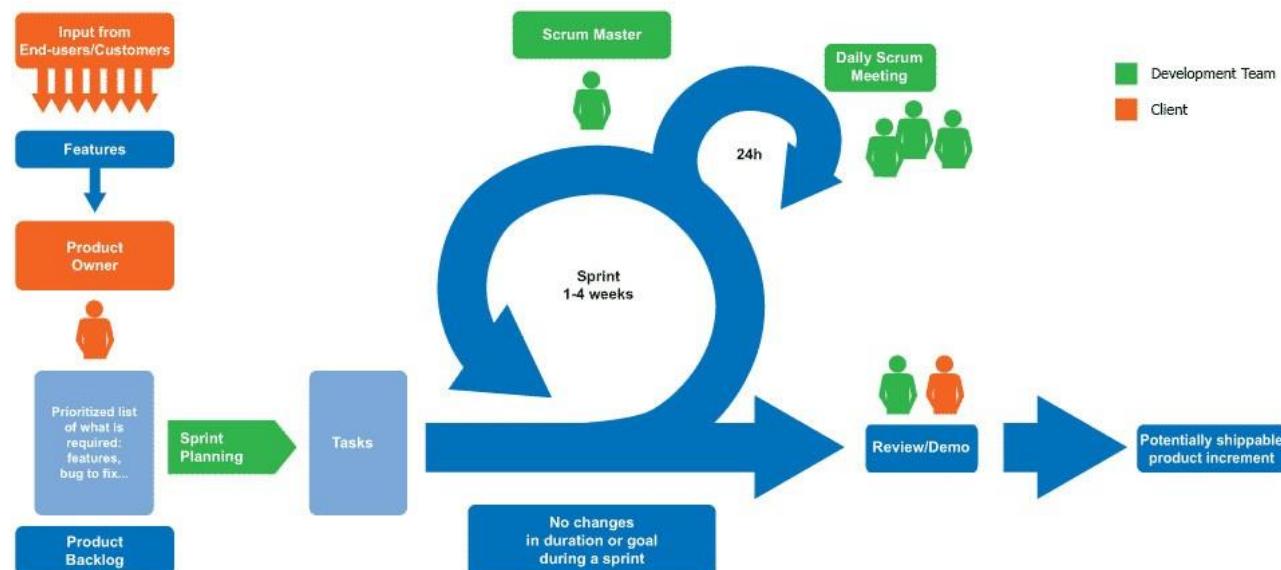


Figure 10: Agile Scrum Methodology graphical representation

#### 3.1 Reasons for choosing the Agile Scrum Methodology

There are various reasons for choosing the agile scrum methodology in this project. They are briefly discussed below.

- In Scrum, a goal must be accomplished within the deadline set in every sprint, so this technique encourages the faster development of the product. Thus, this

technique was adopted to ensure that the job portal's growth is constant to accomplish the desired goals. (Daily, 2020).

- Scrum requires lots of planning and collaborating which encourages one to focus on the sprint goal which helps in boosting efficiency. The project "Jobable" also required a focused goal and regular planning. Therefore, this methodology was adopted to execute the project in an efficient manner and on time.
- In the Scrum framework, there is a major deliverable every week. Instead of months, the software is delivered in a weekly manner part by part which makes it easier to make any change in the development.
- Scrum framework promotes better communication. In case of this project, it has helped in maintaining good communication with the supervisor who can be called as "client" of this project.
- Even late updates to a project's requirements are supported in this methodology. As a result, this technique was adopted to allow for easy adaptation to changes in the project requirements.
- Lastly, the scrum framework gives continual attention to technical excellence and better architecture. Thus, this methodology has been chosen to ensure the quality of the project. (Logica, 2021).

### 3.2 Proposed Gantt chart

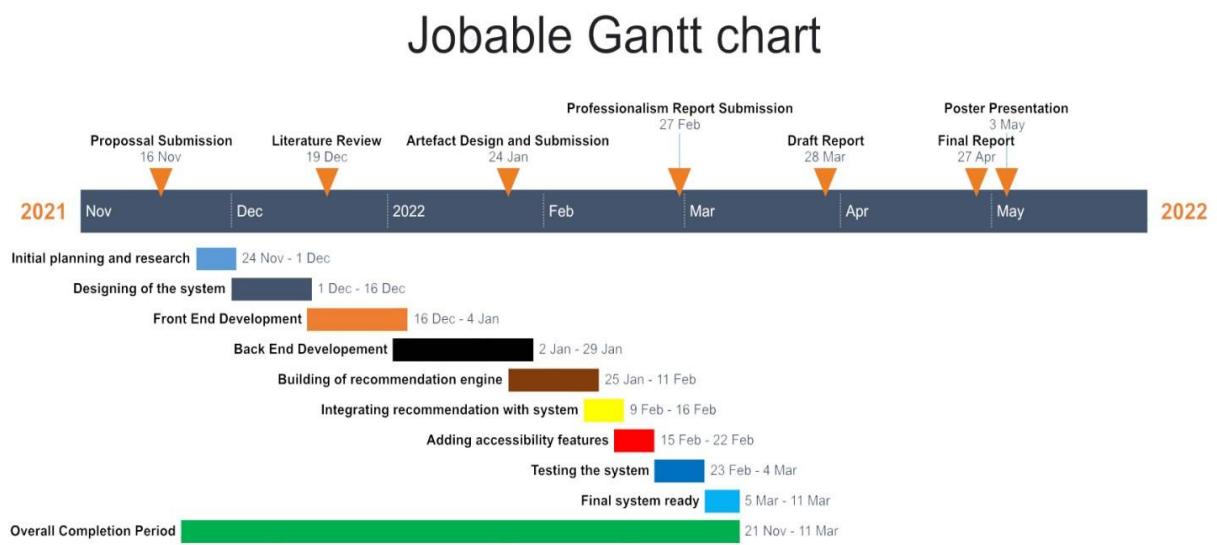


Figure 11: Proposed Gantt chart

## 4. Tools and Technologies

Various tools and technologies have been used to carry out the entire project. They have been briefly discussed in this section.

### 4.1 Tools and technologies table

Tools and technologies	Description
Laptop	<p>Laptop with following specifications has been chosen to do this project.</p> <p>Processor: AMD Ryzen 5 4600H with Radeon Graphics,</p> <p>RAM: 8 GB</p> <p>GPU: Nvidia Geforce GTX</p> <p>OS: Windows 11</p>
Visual Studio IDE	<p>Visual Studio IDE has been chosen to write the code because of its user friendly interface and various shortcut features.</p>
Draw.io , Visio and Balsamiq	<p>Draw.io and Visio have been chosen to design various data models and diagrams such as UML diagrams, class diagrams, activity diagrams, ER diagrams, etc as these tools are very easy to use.</p> <p>Balsamiq has been used to do the wireframes of this system as it is one of the easiest tools to design the wireframes.</p>
HTML,CSS,JS	<p>HTML, CSS and JS have been used to develop the frontend of the system as they are easy to understand and code.</p>

Python	Python has been used to build the recommendation system in the project. Python libraries like numpy, pandas, sklearn etc have been used to effectively build the recommender system.
Django	Django framework has been used for the backend of the system as it has various features regarding web development and is easy to understand. This has been further discussed in the upcoming section. <a href="#"><u>Reasons to choose Django Framework for this project</u></a>
SQLite 3	SQLite 3 has been used as the system's database as it is the default database of Django framework.
Github	Github has been used as a data backup and the version control system in this project to keep track of project's code.
MS Words, Excel	MS Word has been used for documentation, Excel for sprint planning.

*Table 2: Tools and Technologies used with description*

#### **4.2 Reasons to choose Django Framework for this project**

There are several reasons for choosing the Django framework for this project. They are as follows:

- Django has a wide and dedicated community that provides various facilities, likewise, the tutorials and articles regarding this framework are in the abundant amount on the internet which makes it easier for people to understand and implement this framework. While executing a huge project like this, it is important

to choose a framework which has abundant resources online. Hence, Django framework has been chosen.

- Django doesn't require the use of additional database software. Thus, it is very convenient to use.
  - Django helps to develop secure and stable websites quickly.
  - Django provides an automatic admin interface to manage the overall site.
  - Django provides automated debugging and testing tools for the developers.
  - Django can face majority of the web development challenges, allowing the developer to concentrate on building the application rather than building the tools. Thus, this framework was chosen to make the project a little less complicated.
- (Docs, 2021).

## 5. Artefact Designs

Here, the detailed artefact designs of all the subsystems with the necessary diagrams and tables have been presented. The system is divided into three major subsystems. They are:

- User Management System
- Jobs Management System
- Recommendation System

### 5.1 Important Terminologies regarding Artefact Designs

This section describes all the terminologies regarding artefact designs that have been addressed or graphically presented in this project.

1. **Software requirement specification (SRS):** A software requirement specification (SRS) is a document that outlines how and what the program will accomplish. The SRS of every subsystem has been designed and presented in the coming section.
2. **Functional, non-functional, and usability requirements**

**Functional Requirements:** The activities that should occur in the software for acquiring input, along with the processing and producing outputs, are known as functional requirements.

**Non-Functional Requirements:** Non-functional requirements are those that do not fall inside the scope of the functional requirements.

**Usability Requirements:** Usability requirements also fall under the non-functional requirements. It evaluates how user friendly the interface is and if the user experience is smooth.

The functional, non-functional and usability requirement tables of each subsystem have been presented in the coming section.

3. **Use-case Diagram:** A use case diagram can help to outline the characteristics of users of the program (which are also known as actors) and how they interact with

it. The use case diagrams of all subsystems have been presented in the coming sections.

4. **Activity Diagram:** An activity diagram shows the movement of information from one action to the next. The activity diagrams of all subsystems have been presented in the coming sections.
5. **Class Diagram:** The properties and structures of a class are illustrated in a class diagram. Class diagrams of all the sub systems have been presented in the coming section.
6. **ER Diagram:** An Entity Relationship (ER) Diagram shows how entities such as users, products, or concepts, have a relation to one another. ER diagram of every subsystem is presented in the coming sections.
7. **Data Dictionary:** A Data Dictionary is a list of data like names, descriptions etc. in a database. Data Dictionary of every subsystem is presented in the coming sections.

## 5.2 Subsystem 1: User Management System

Admin, seeker, and recruiter are the three levels of users in the User Management System. All the artefacts regarding this subsystem have been presented in this section.

### 5.2.1 Functional, non-functional, and usability requirements of User Management System

To understand the table:

Requirement codes
UMS: User Management System
JMS: Jobs Management System
RMS: Recommendation Management System
F: Functional Requirements
NF: Non-Functional Requirements
UR: Usability Requirements

Req code	Requirement	Requirement Description	MoSCoW
UMS-F-1	Register	Users should be allowed to register to the system.	Must Have
UMS -NF-1	Error handling	If user has entered incorrect credentials, Must system should aware user about it by displaying pop-up messages.	Have
UMS -F-2	Login	Once the registration is done, users should be able to login to perform all the major functionalities of the site.	Must Have
UMS -U-1	Dashboard	There should be a dashboard for every user after they have logged in to the system.	Should Have
UMS -F-3	Logout	Users should get to logout of the system whenever they want to.	Must Have

Table 3: Requirement Table of User Management System

### 5.2.2 Diagrams and data modelling of User Management System

All the designs and diagrams of User Management System have been presented here. The User Management System has also been explained in detail in the artefact of the introduction section above. Link to the section: [Detailed explanation of the sub systems](#).

### 5.2.2.1 Use-case Diagram

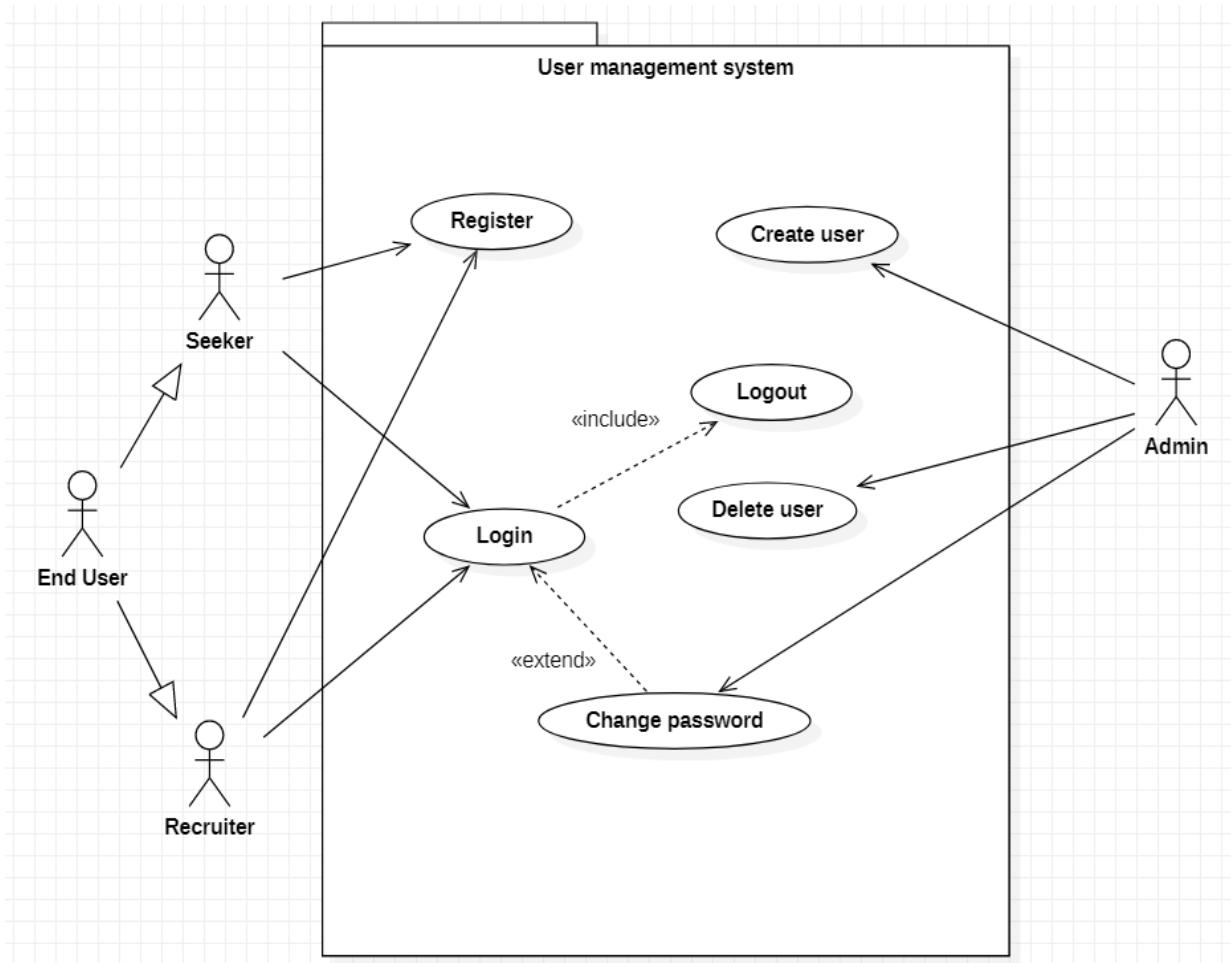


Figure 12: Use-Case Diagram of the User Management System

As seen in the use-case diagram above, major users of this system are admin, seeker and recruiter. Admin is responsible for managing major functionalities of the system like creating user, deleting user etc. Seeker and recruiter can sign up first, then log in to the system to perform various activities.

### 5.2.2.1.1 High Level Use-Case Description

#### 1. Register:

**Use Case:** Registering to the system

**Actors:** Admin, Seeker, Recruiter

**Description:** Users can register to the system by providing required information.

#### 2. Login :

**Use Case:** Log in to the system

**Actors:** Admin, Seeker, Recruiter

**Description:** After successfully being registered to the system, now users can login using the details they entered while registering.

#### 3. Manage Users:

**Use Case:** Managing the Users

**Actors:** Admin

**Description:** Admin performs the activities like adding, editing, and deleting the users.

#### 4. Logout :

**Use Case:** Log out from the system

**Actors:** Admin, Seeker, Recruiter

**Description:** Users have the option to log out of the system at any time.

### 5.2.2.2 Activity Diagram

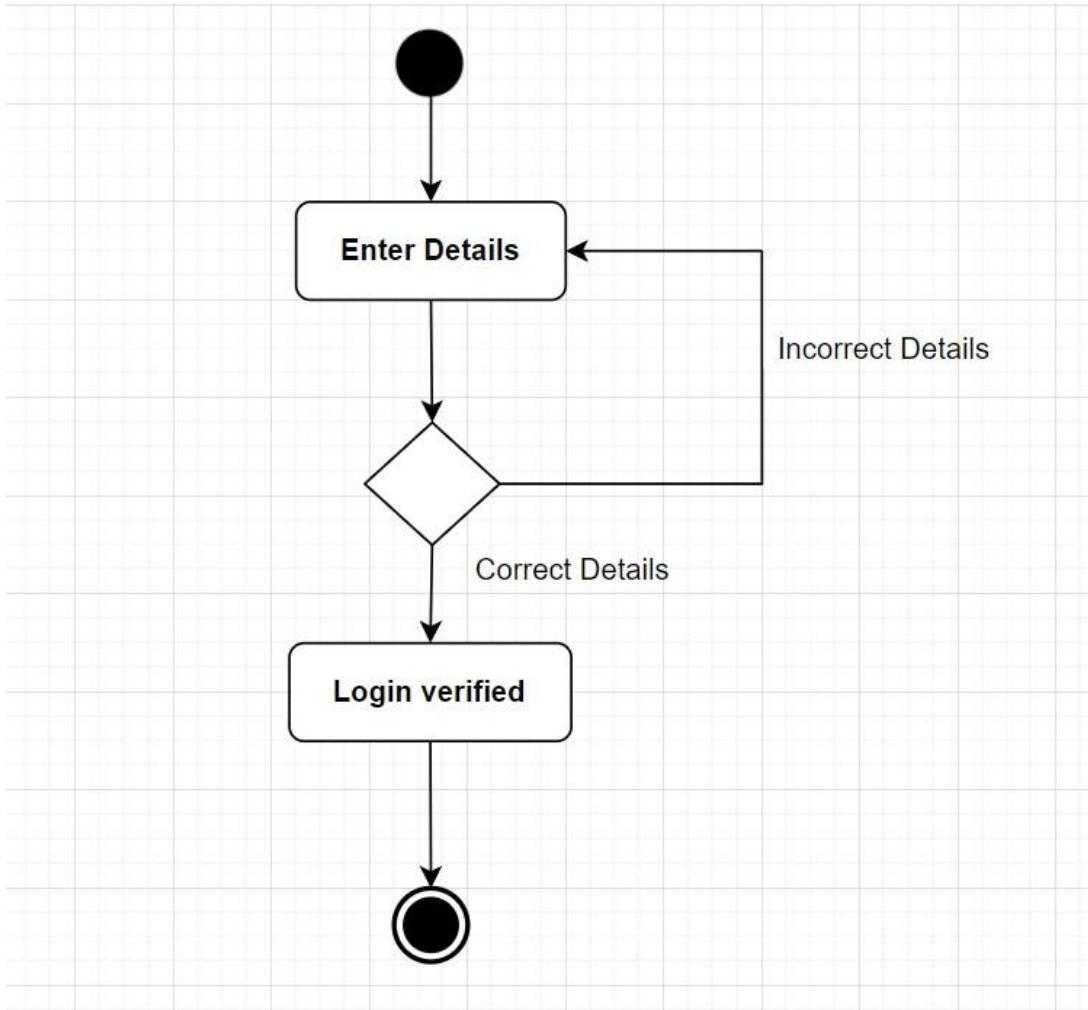


Figure 13: Activity Diagram of the User Management System

As shown in the figure above, the major action performed by the User Management System is logging in to the system by entering the correct details.

### 5.2.2.3 Class Diagram

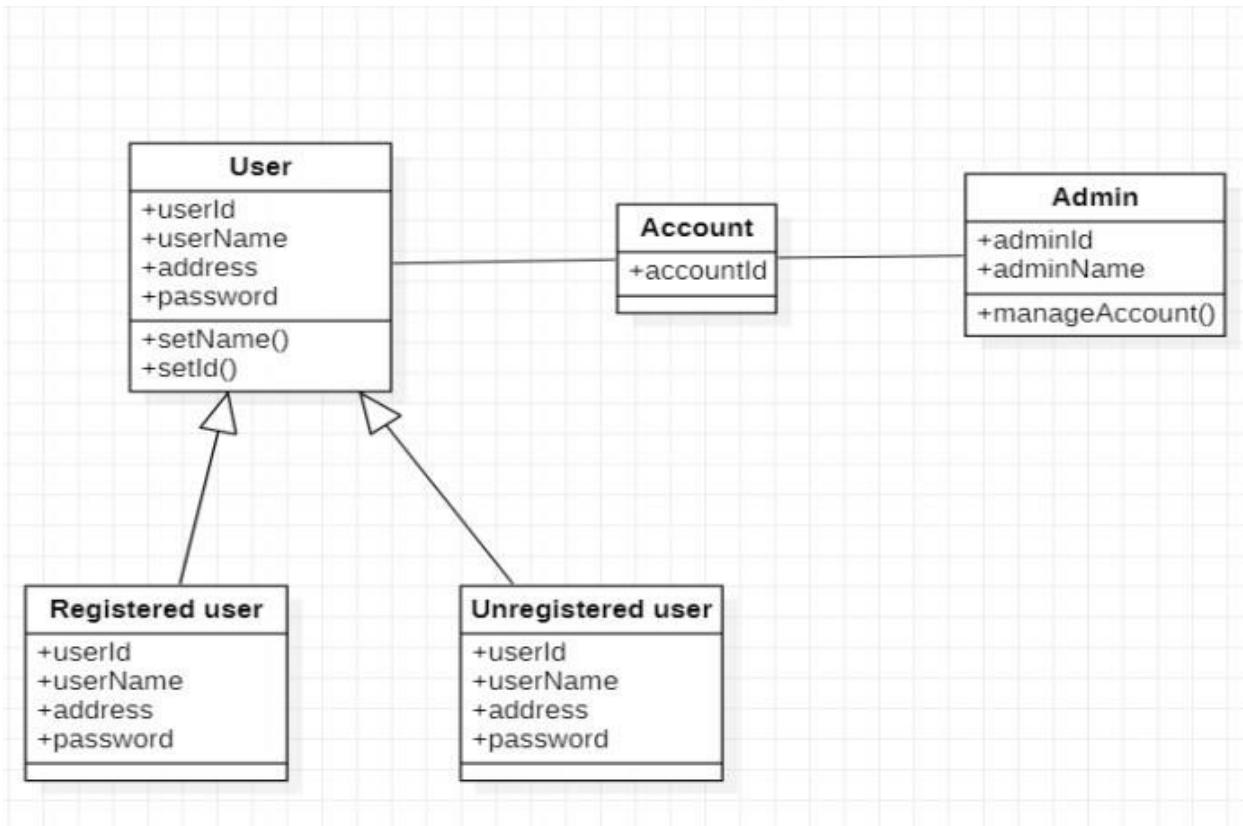


Figure 14: Class Diagram of the User Management System

As shown in the figure above, the major classes of this subsystem are Users and the Admin. There are further two classes of users: registered and unregistered users. The properties and function of the classes are also depicted in the figure above.

#### 5.2.2.4 ER Diagram

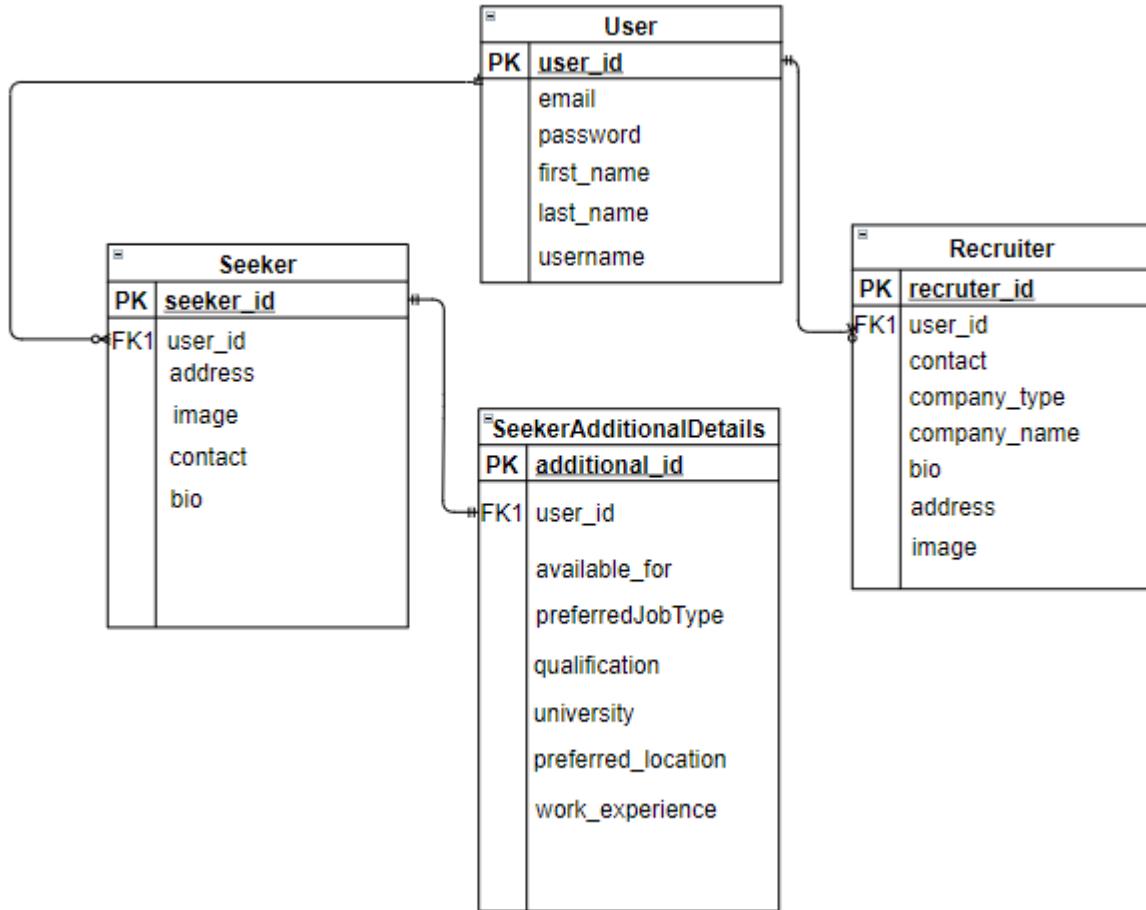


Figure 15: ER Diagram of User Management System

The relationship between various tables of the database like seeker, recruiter, and seeker additional details are shown in the ER diagram above. Each entity consists of various attributes or fields. User id acts as a primary key in every table.

### 5.2.2.5 Data Dictionary

Name of the Field	Size	Data type	Description	Example
User name	30	Text	Unique name or id of the user	Sahaja11
Password	25	Text	A security code created while registering to the system.	Iloveroses123
Email	25	Email	Email of the user.	sahaja@gmail.com
First name	15	Text	User's first	Sahaja
Last name	15	Text	User's last name	Phuyal
Address	150	Text	User's Address	Kathmandu
Image	-		Profile picture	Sahaja.jpg
Contact	15	Int	User's phone number	9840876121
Bio	600	Text	Information entered about the user or the company	Hello this is Sahaja Phuyal.
Qualification	150	Text	User's education	Bachelors running

			qualification	
University	500	Text	Where the user had studied or is studying	University of Wolverhampton
Preferred location	150	Text	Location where users prefer to work	Pokhara
Work experience	150	Text	Experience of work in the particular field.	3 years +
Available for	100	Text	User's availability for work	10 AM – 5PM
Disability type	50	Text	The kind of disability that the user has	Visually impaired
Company type	150	Text	Company's type	E-learning
Company name	150	Text	Company's name	Chimpvine

Table 4: Data Dictionary of User Management System

## 5.2 Subsystem 2: Jobs Management System

This subsystem performs activities to manage the jobs. The functionalities like adding jobs by the recruiter, saving or applying for jobs by the seekers, and accepting or declining jobs by the recruiter all come under this subsystem.

### 5.2.1 Functional, non-functional, and usability requirements of the Jobs Management System

Req code	Requirement	Requirement Description	MoSCoW
JMS-F-1	Apply for jobs	The system should allow users to apply the jobs of their interest.	Must Have
JMS-F-2	Jobs having proper details	While posting the job, all the information about the job must be filled in.	Must Have
JMS-NF-1	Jobs with categorization	The system should allow users to select jobs according to their category of disability.	Should Have
JMS -NF- 1	Description	The system should include a concise overview of the recruitment company's details and requirements.	Should Have
JMS -F-3	Cancel application	Users should be able to cancel the application if they change their mind.	Should Have
JMS-UR-1	Clean job	The interface of the posted jobs	Should Have

	interface	should be clean and appealing.	
--	-----------	--------------------------------	--

*Table 5: Requirement Table of Jobs Management System*

### **5.2.2 Diagrams and data modelling of Jobs Management System**

All the designs and modelling diagrams of Jobs Management System have been presented here. The Jobs Management System has also been explained in detail in the artefact of the introduction section above. Link to the section: [Detailed explanation of the sub systems.](#)

### 5.2.2.1 Use-Case Diagram

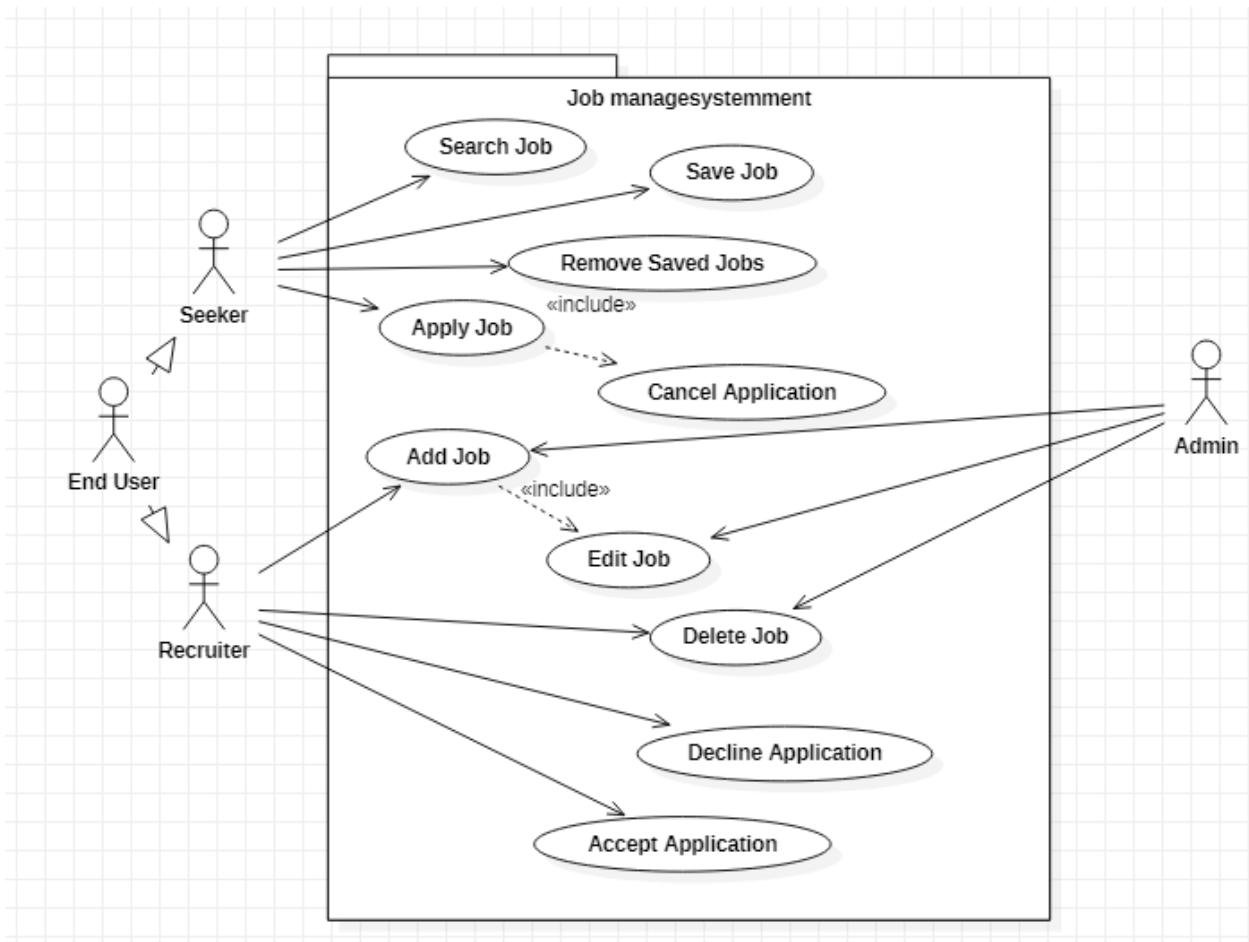


Figure 16: Use-Case Diagram of Jobs Management System

As shown in the figure above, admin and recruiter can perform the CRUD functionalities i.e create, read, update and detail. Seekers can search, apply and save jobs.

### 5.2.2.1.1 High-Level Use Case Description

#### 1. Job post with CRUD:

**Use Case:** Posting Job and being able to edit or delete them as well.

**Actors:** Recruiter, Admin

**Description:** Recruiter and Admin can post the job vacancies adding various details.

They can also edit or delete the posted jobs.

#### 2. View and Accept/Decline Job Applicants:

**Use Case:** Viewing the details of job applicants and accepting or declining their application.

**Actors:** Recruiter, Admin

**Description:** A recruiter and admin can view the candidates who have applied to the jobs and decide whether to accept or decline their application.

#### 3. View and apply Jobs

**Use Case:** Viewing and applying Job Vacancies

**Actors:** Seeker

**Description:** A seeker is able to see the job openings posted by the recruiter and if they want to, they can apply for the jobs.

### 5.2.2.2 Activity Diagram

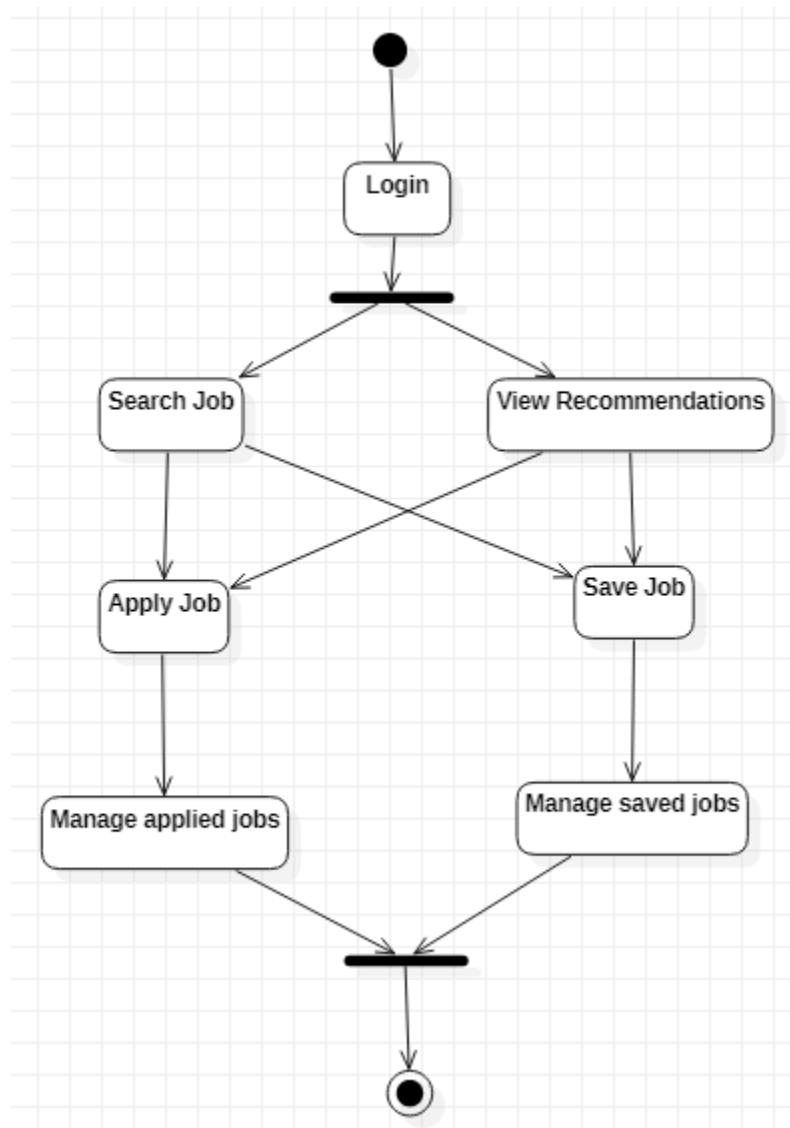


Figure 17: Activity Diagram of Jobs Management System

As shown in the figure above, the major actions performed in the jobs management system are searching job, applying job, saving job, managing applied jobs, and managing saved jobs.

### 5.2.2.3 Class Diagram

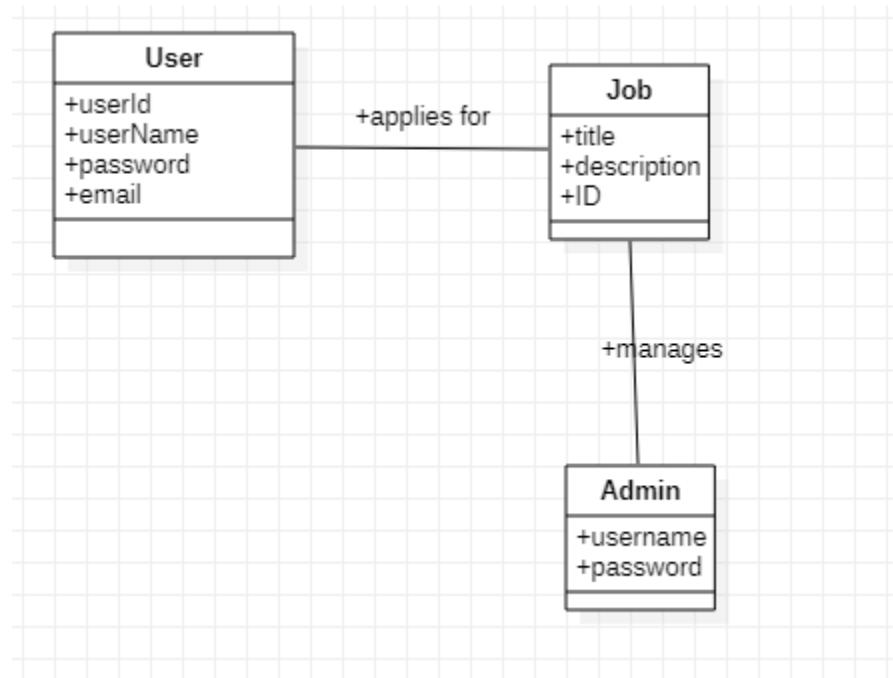


Figure 18: Class Diagram of Jobs Management System

As shown in the figure above, the major classes of jobs management systems are user, job and admin. User applies for the job and the admin manages both the users and the jobs.

#### 5.2.2.4 ER Diagram

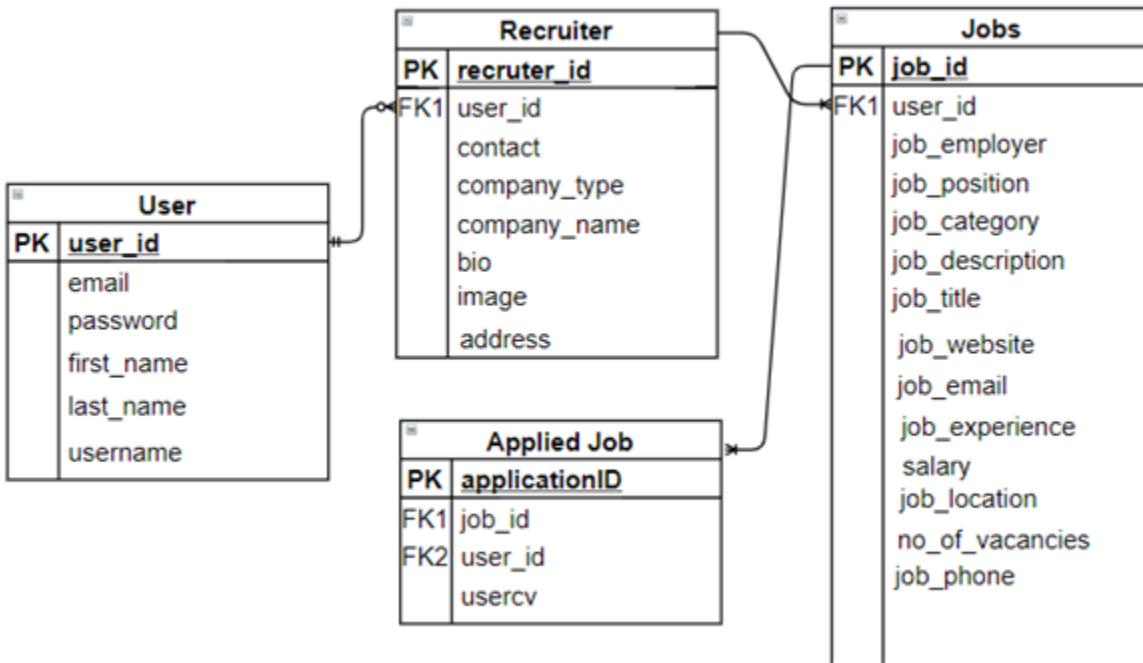


Figure 19: ER diagram of Jobs Management System

The figure above shows the relationship between tables in the jobs management system. The major tables of this subsystem are User, Recruiter, Jobs and applied jobs and each of them has a relation with each other.

### 5.2.2.5 Data Dictionary

Name of the Field	Size	Data type	Description	Example
User id	5	Int	Unique id or tag of the user.	20
Job recruiter	40	Text	Job recruiter's name	John Lennon
Job position	40	Text	Name of the job position	Digital Marketer
Disability category	30	Text	What category of disabled person can apply to the job.	Visually impaired
Job description	500	Text	A short description of the job.	We are looking for a manager with...
Job title	60	Text	Job's title	UI/UX designer wanted!
Job website	30	URL	Company's website	<a href="https://np.chimpvine.com/">https://np.chimpvine.com/</a>
Job email	30	Email	Company's email	chimpvine@gmail.com
Job experience	50	Text	Minimum experience required for the job.	3 years

Salary	15	Int	Salary provided	20000
location	30	Text	Company's Location	Mulpuni
Vacancy no	20	Int	Number of vacancy	5
Contact No	15	Int	Company's contact no	9826327822

Table 6: Data Dictionary of Jobs Management System

### 5.3 Subsystem 3: Recommendation Management System

Content-based filtering recommender system is used in this system which suggests items by matching the content to the user profile. Users can see job recommendations that might catch their interest in the dashboard page.

#### 5.3.1 Functional, non-functional, and usability requirements of the Recommendation Management System

Req code	Requirement	Requirement Description	Moscow
RMS-F-1	Precise Recommendation	Users should be able to view similar jobs that they are interested at.	Must Have
RMS-NF-1	Nearest Recommendation	In some cases, system should recommend the nearest	Would Have

	on	comparable jobs to the seekers.	
--	----	---------------------------------	--

*Table 7: Requirement Table of Recommendation Management System*

### **5.3.2 Diagrams and data modelling of Recommendation Management System**

All the designs and modelling diagrams of Recommendation Management System have been presented here. The Recommendation Management System has also been explained in detail in the introduction section above:  
AI implementation

### 5.3.2.1 Use-Case Diagram

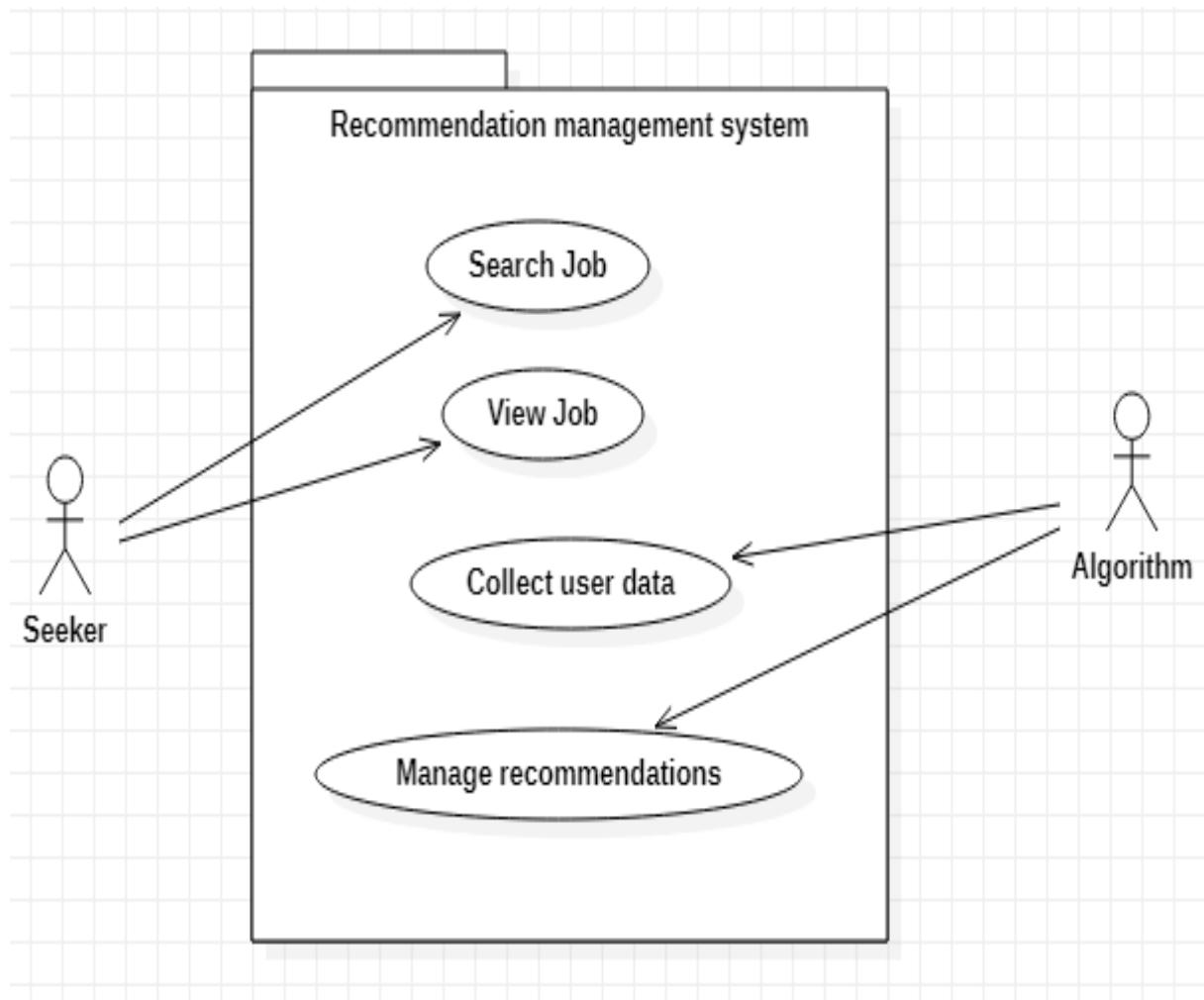


Figure 20: Use-Case Diagram of Recommendation Management System

As shown in the figure above, the algorithm of the recommendation system first collects user data and on the basis of data, it recommends similar jobs to the users. The algorithm content based filtering manages the recommendation system.

### 5.3.2.2 Activity Diagram

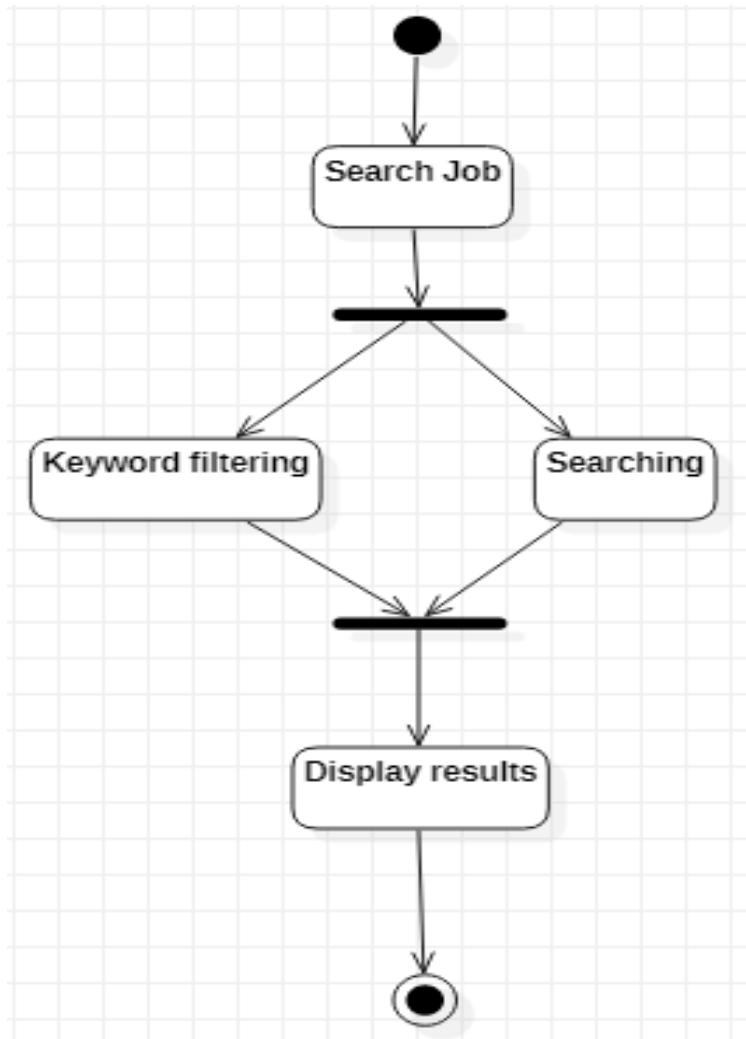


Figure 21: Activity Diagram of the Recommendation Management System

As shown in the figure above, major activities performed by the recommendation management system are keyword filtering, searching and displaying results.

### 5.3.2.3 Class Diagram

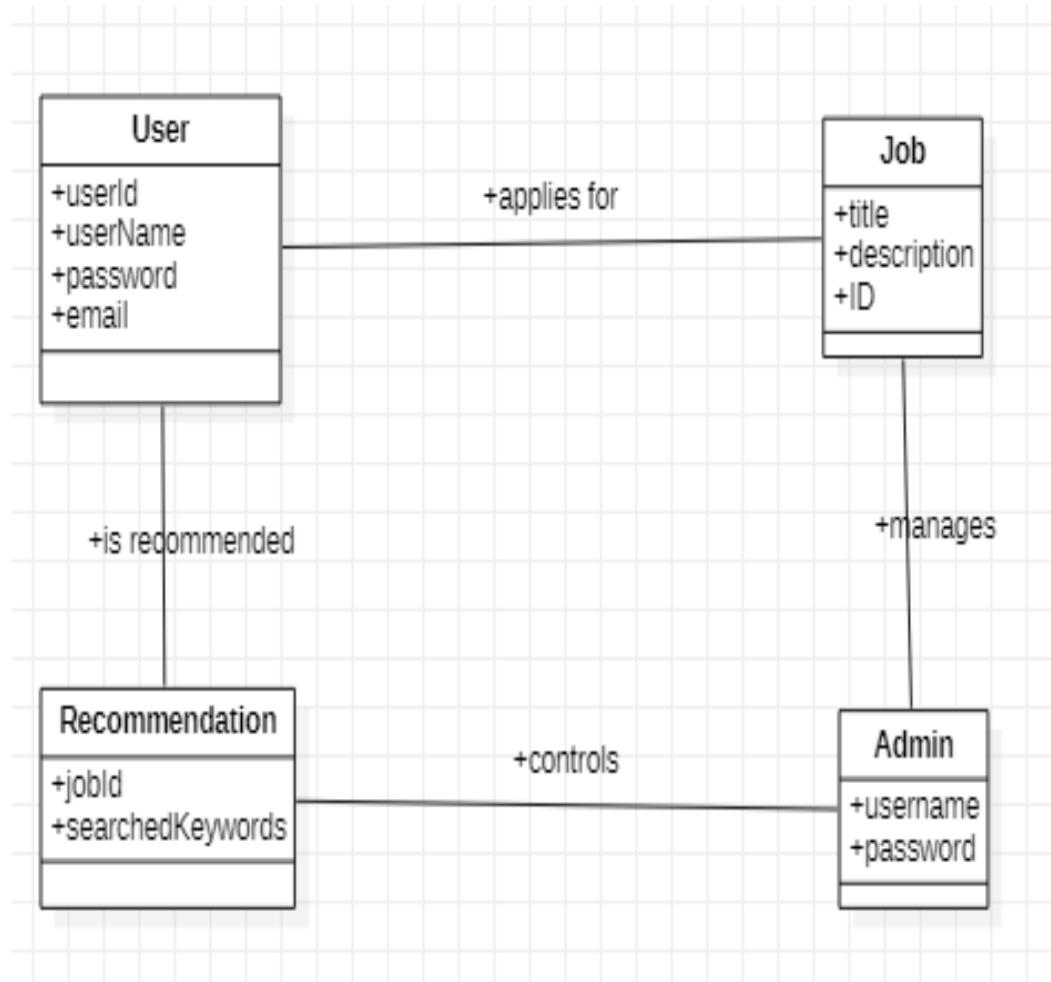


Figure 22: Class Diagram of Recommendation Management System

As shown in the figure above, major classes of recommendation management systems are user, job, recommendation and admin. User applies for the job, and the user is recommended with similar jobs. Admin manages the users and the job.

#### 5.3.2.4 ER Diagram

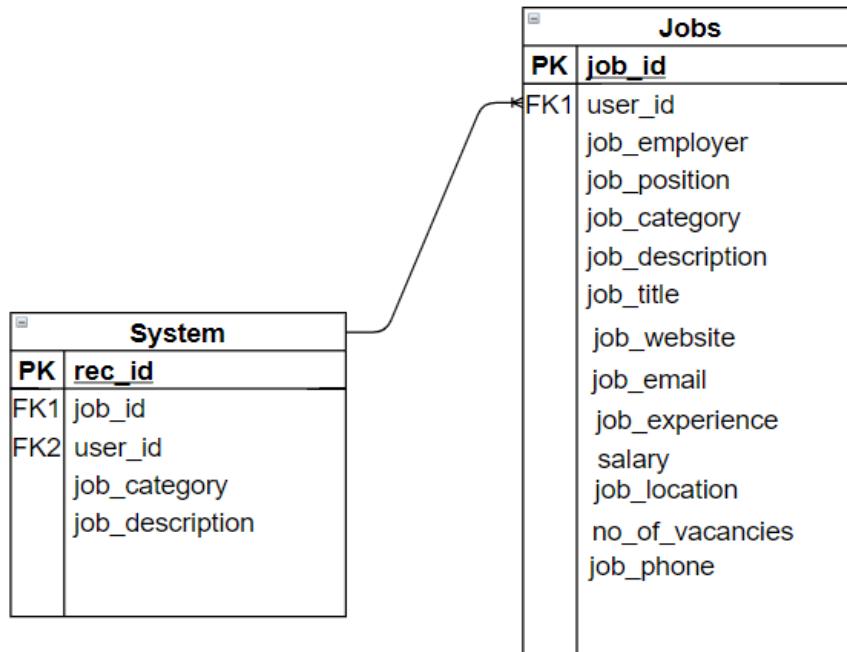


Figure 23: ER Diagram of Recommendation Management System

As shown in the figure above, the major tables of recommendation management system are system and jobs. They are related to one another as the system can only recommend the jobs that have been posted.

#### 5.3.2.5 Data Dictionary

Name of the field	Size	Data type	Description	Example
Rec id	15	Int	Recommendation tag or id which should be unique.	20
User id	40	Text	User id or tag which should be unique.	30

Job id	50	Text	Position of the vacancy	Project Manager
Disability category	30	Text	What category of disabled person can apply to the job	Visually Impaired
Job description	200	Text	Short description about the job.	We are looking for a graphic designer....

Table 8: Data Dictionary of Recommendation Management System

#### 5.4 Testing

The testing method applied in this project is the **black box testing**. In this type of testing, the functionalities of the software is evaluated without needing the knowledge of the code structure. It is reliant on software guidelines and specifications. This kind of testing allows determining whether or not all of the standards have been satisfied.

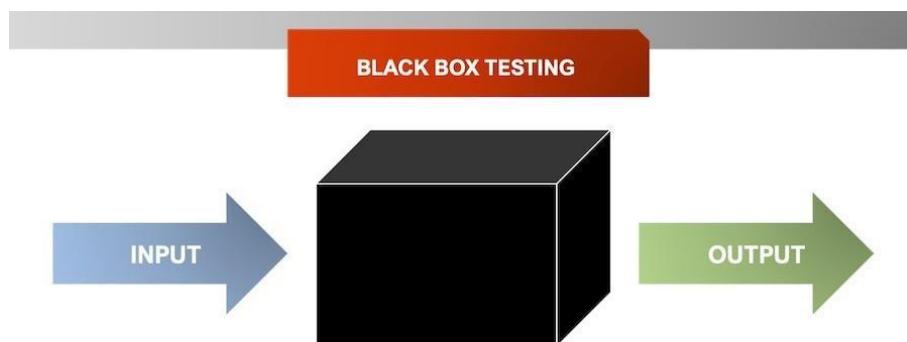


Figure 24: Black Box Testing

### 5.4.1 Test Cases

Test Cases of some of the functionalities are presented in this section.

#### 5.4.1.1 Login Test

Test Case No: 1

Objective: To check if the login of the system is working or not.

S. N	Test Data	Anticipated outcome	Real outcome
1	Right username and wrong password	Failed log in	Failed log in
2	Wrong username and right password	Failed log in	Failed log in
3	Wrong username and wrong password	Failed Log in	Failed log in
4	Right username and right password	Successful log in	Successful login

Table 9: Login Test case

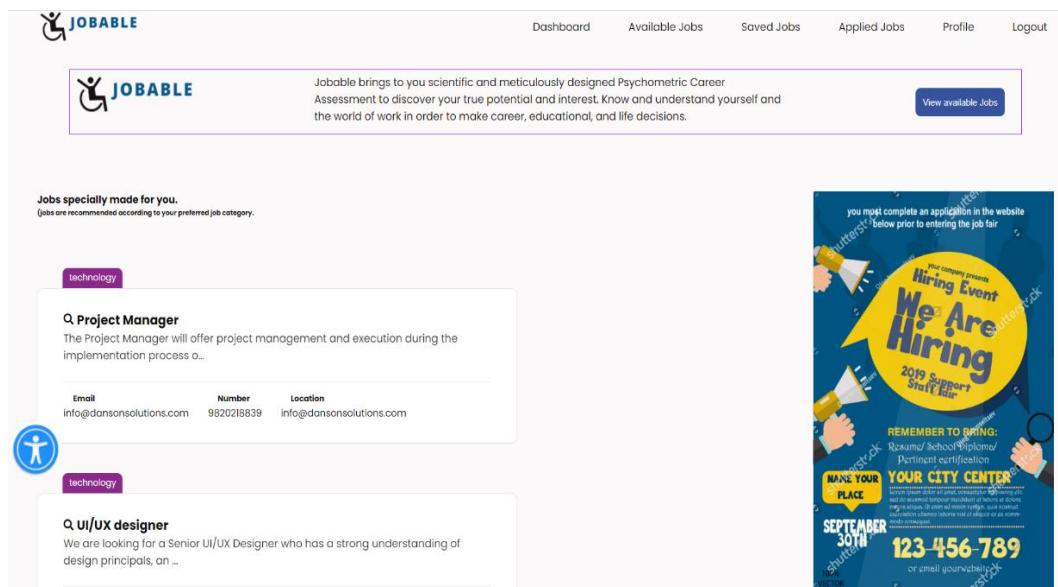


Figure 25: User Dashboard Page after successful Login

The screenshot above shows the proof of the successful login. It is the Seeker Dashboard page that is only accessible after login.

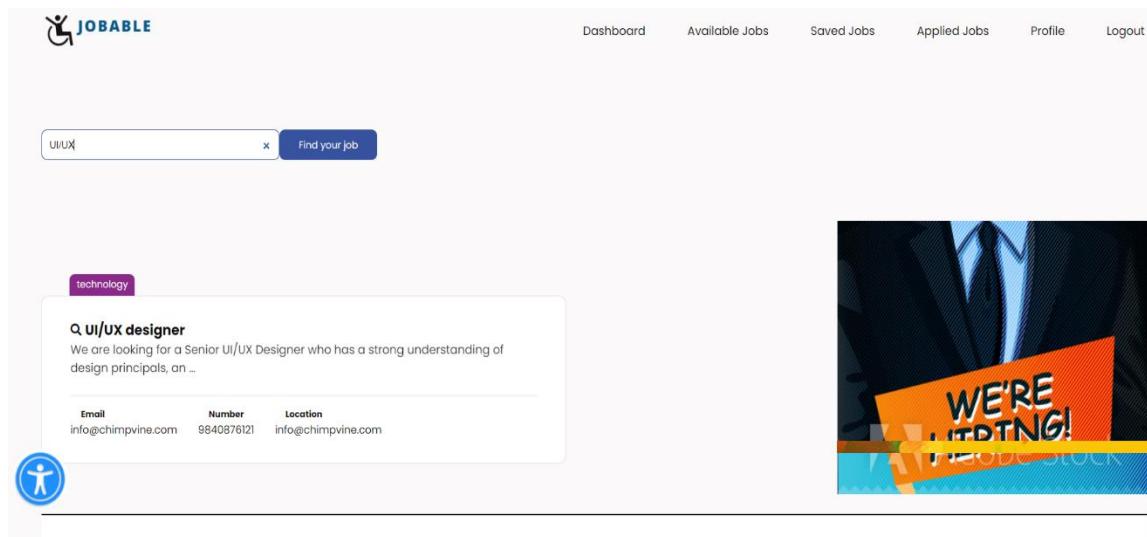
#### 5.4.1.2 Search testing

Test case: 2

Objective: To evaluate if the search functionality works properly or not.

S. N	Data	Anticipated outcome	Real outcome
1	Incorrect search keywords.	No Jobs found.	No Jobs Found.
2	Correct search keywords.	Job results shown.	Job results shown.

Table 10: Search Test Table



*Figure 26: Successful Search Testing*

The screenshot above shows the successful search result when user searched with correct key words.

#### 5.4.1.3 Apply job

Test case: 3

Objective: To test whether a seeker can successfully apply for jobs.

S. N	Data	Anticipated outcome	Real outcome
1	Trying to apply without attaching CV.	Couldn't apply.	Couldn't apply.
2	Applying with attaching CV.	Applied successfully.	Applied Successfully.

*Table 11: Apply jobs test*

Table 12: Apply job test

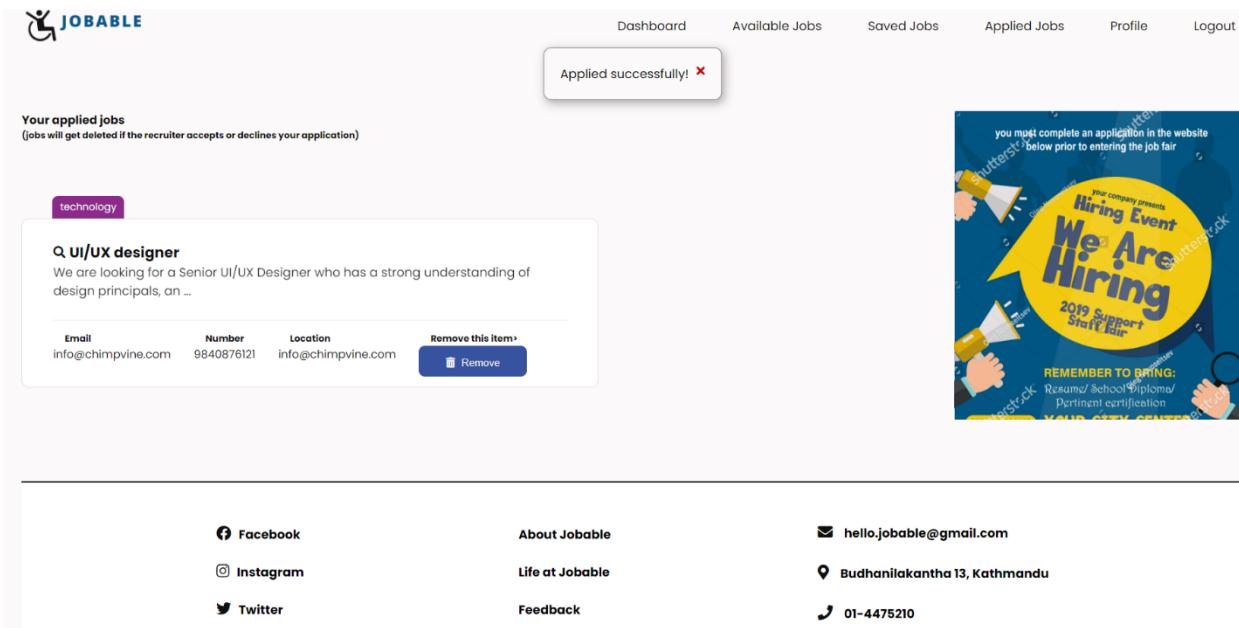


Figure 27: Job applied successfully page

The screenshot above shows the job applied successfully when the user applied by attaching their CV.

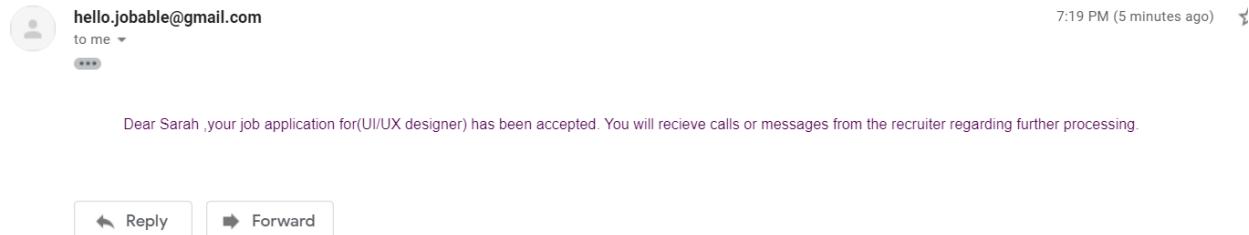
#### 5.4.1.4 Accept/Decline Job Application

Test case: 4

Objective: To test the email notification when a recruiter accepts or declines the job application.

S. N	Data	Anticipated outcome	Real outcome
1	Accepted the application.	Couldn't send mail.	Couldn't send mail.
2	Accepted the application.	Mail sent.	Mail sent.

Table 13: Accept/Decline Jobs



*Figure 28: Email notification after job application acceptance*

As shown in the figure above, the email notification system after the job acceptance has been successful.

## 5.5 Wireframes

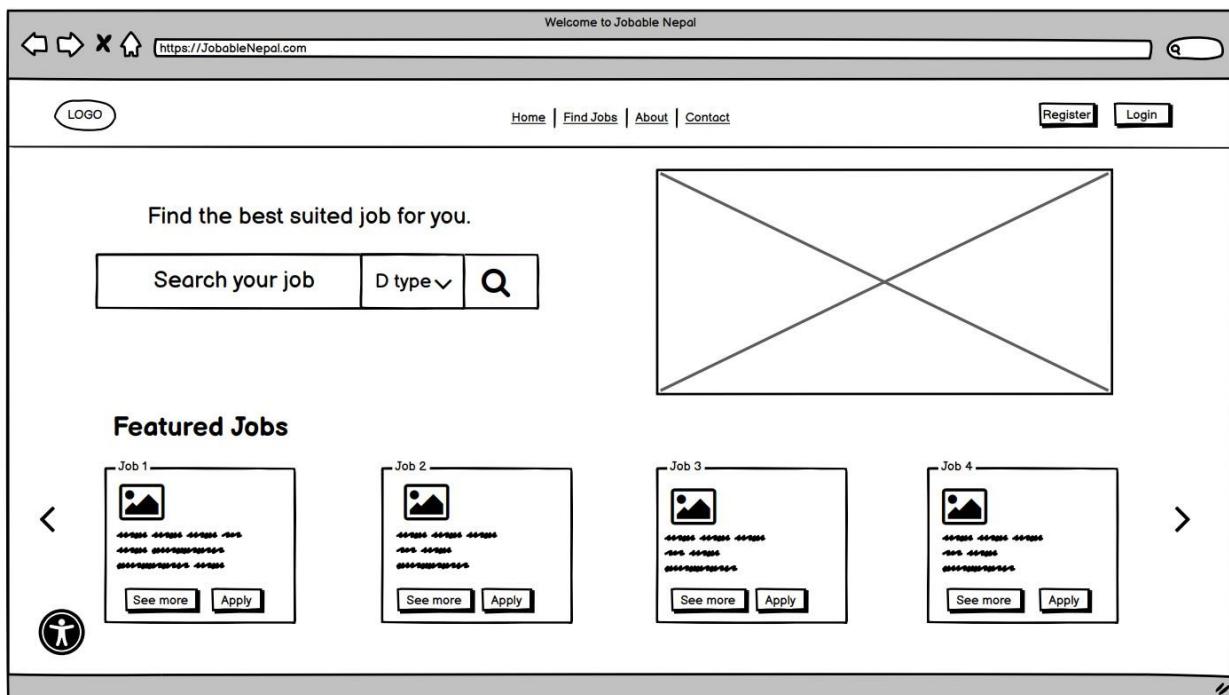


Figure 29: Home Page of Jobable

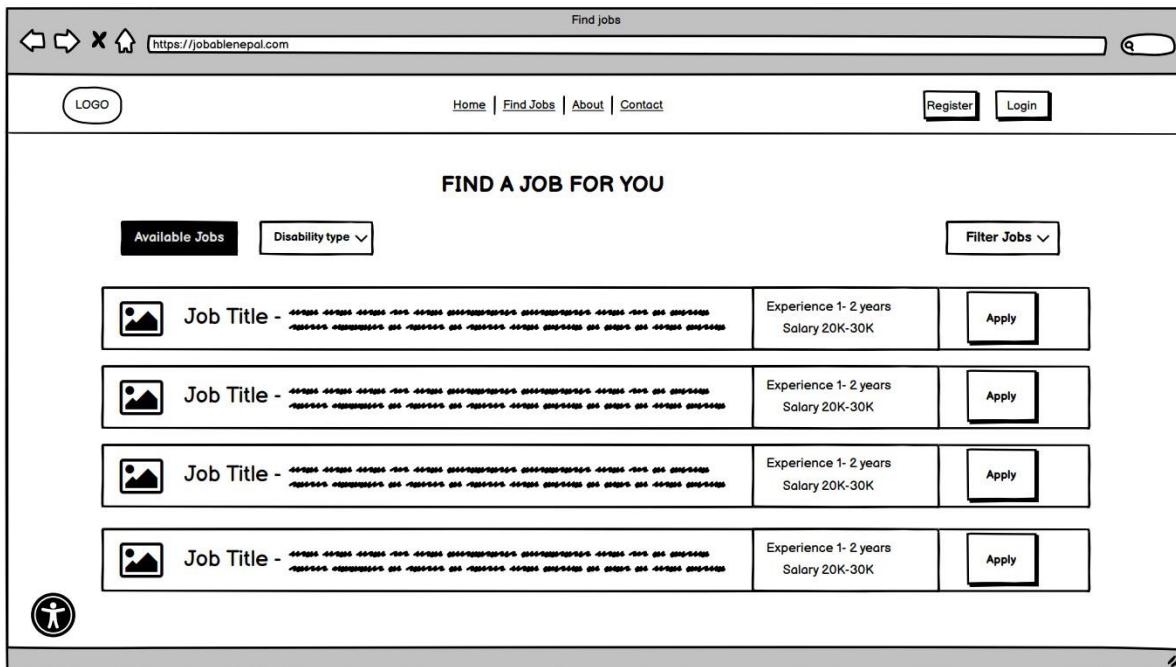


Figure 30: Available Jobs Page

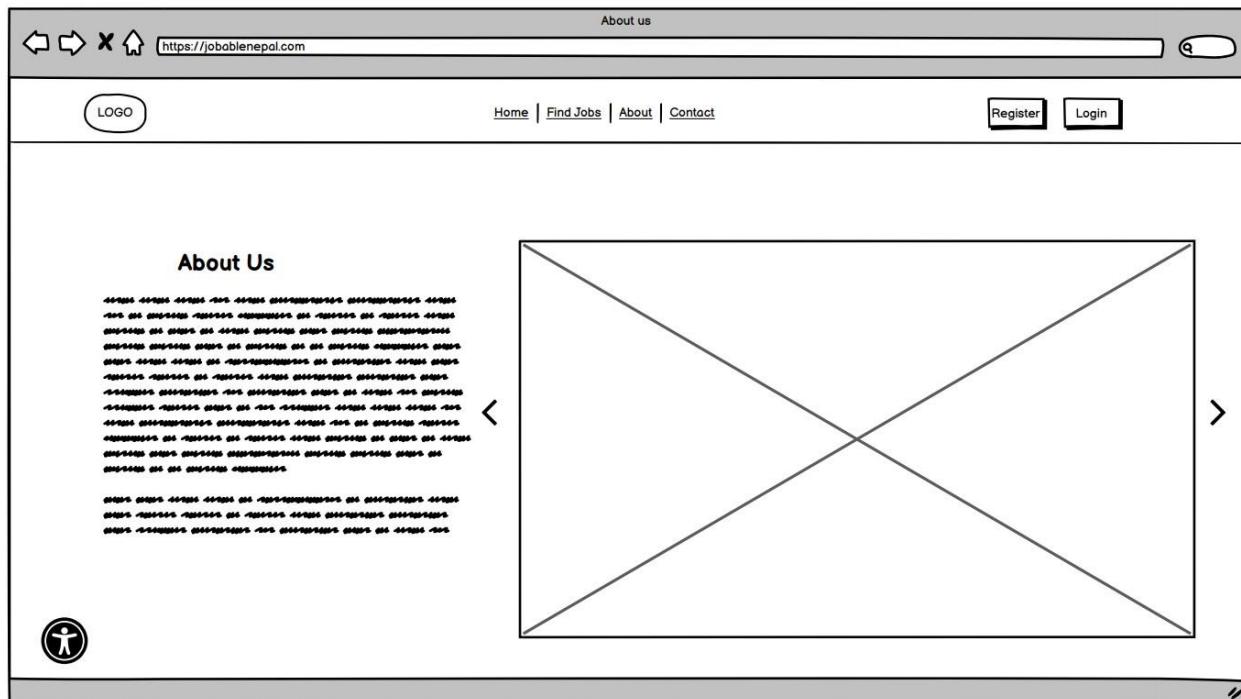


Figure 31: About Us Page

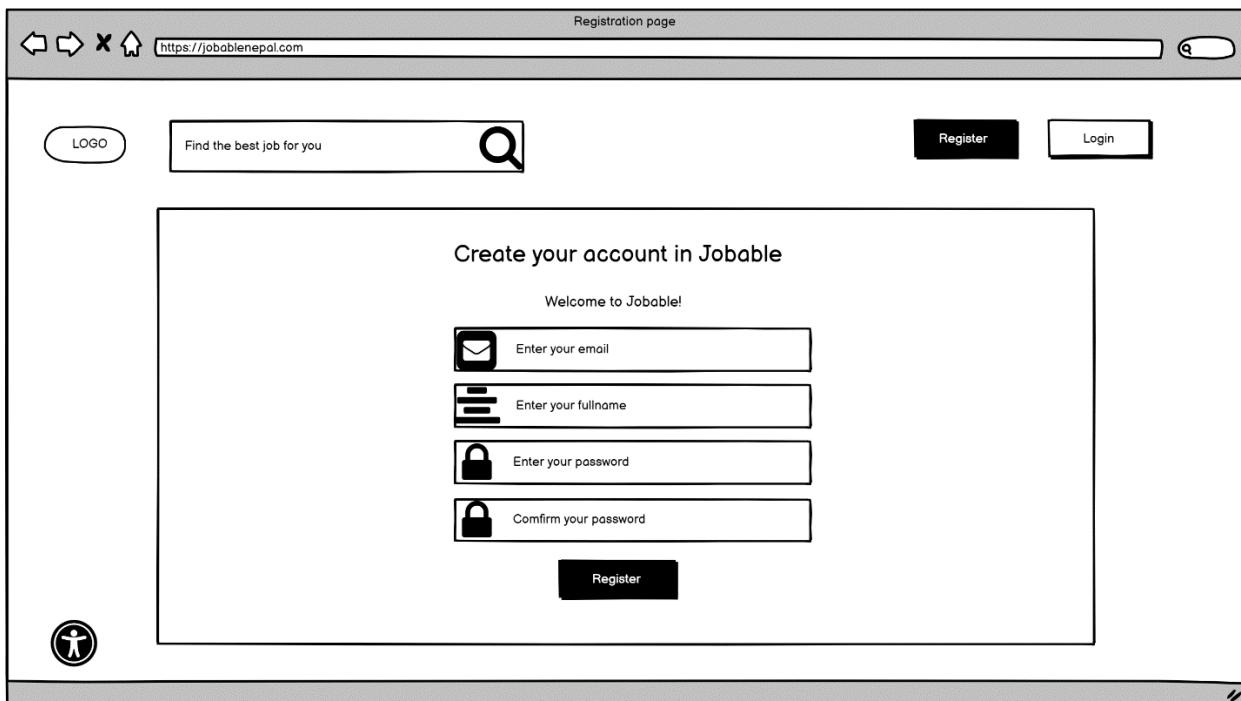


Figure 32: Register Page

Login page

<https://jobable nepal.com>

LOGO Find the best job for you Register Login

Log in to your account

Welcome to Jobable!

Enter your email

Enter your password

Log in

Don't have an account? [Sign up](#)



Figure 33: Log in Page

Vacancy create page

<https://jobable nepal.com>

LOGO Find the best job for you Register Login

Create Vacancy

Fill in the details to create a vacant post.

Job title

Experience required

Job description

Contact no

Post Vacancy



Figure 34: Create Vacancy Page

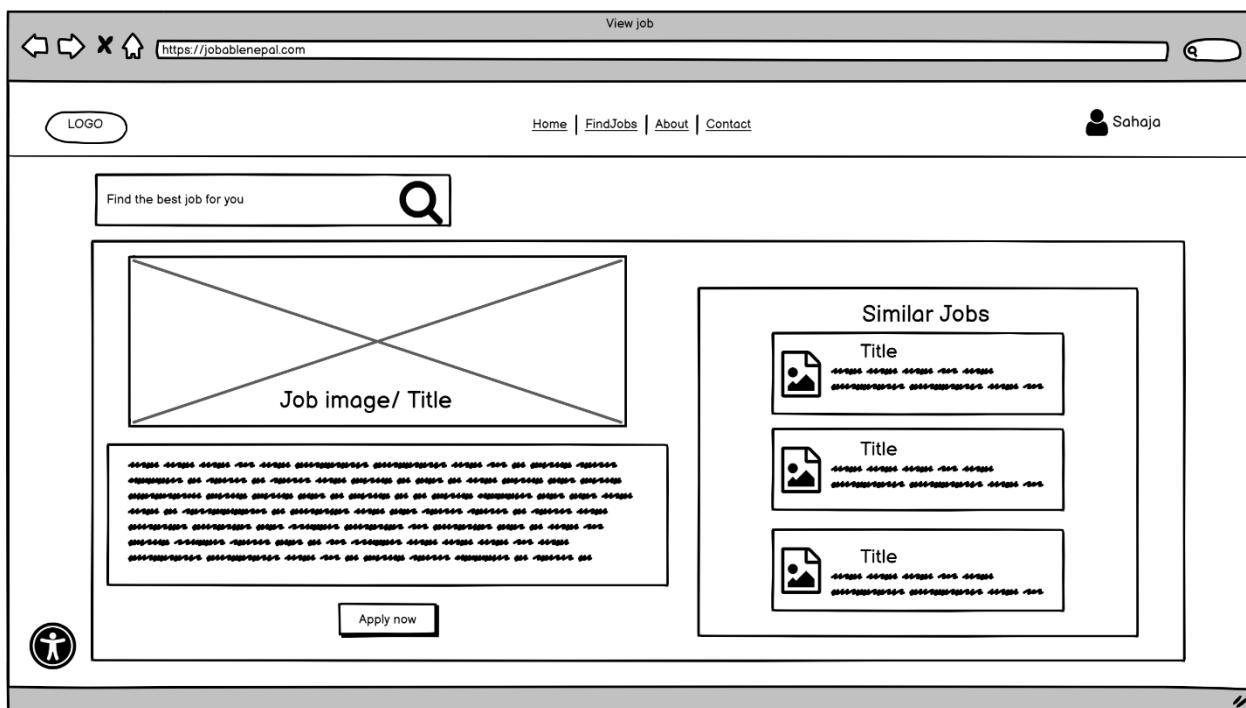


Figure 35: View Jobs Page

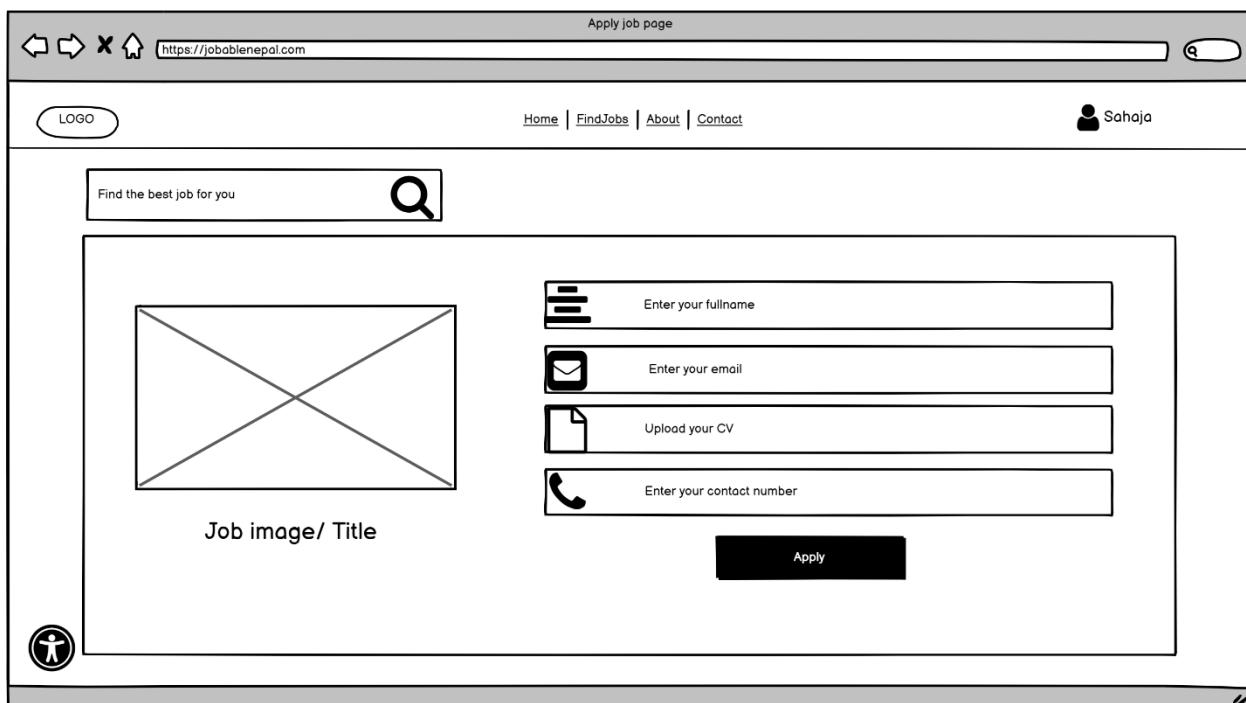


Figure 36: Apply Job Page

## 6. Conclusion

To sum up, “Jobable” can be a very impactful project for thousands of differently-abled people as it aids them in finding the job that can change their life. According to research, it has been found that public acceptance of disability, particularly in the workplace remains very low. A web application like this can make it easier for a person with a disability to demonstrate his/her abilities without facing discrimination at the outset. As the job procedure is exclusively based on their skills and ability to work, this project can reduce the discrimination that individuals with disabilities experience.

This Django based web application has been developed in a very systematic manner, choosing the right technology and methodology. Various mandatory and few optional features have been implemented making the job portal very useful for the persons with disabilities. There are various accessibility options like grey-scale level, invert color, font size etc. which can be beneficial for differently-abled people. One of the major features of the project is its recommendation system. Content-based filtering recommender system has been implemented which makes use of TF-IDF algorithm which recommends contents with highest term frequency. In simple words, content-based filtering suggests items by matching the content to the user profile. Agile Scrum Methodology has been used to monitor and manage the project. Tasks had been broken down into 11 sprints and completed successfully. It is safe to say that this project has been successfully developed, tested and now is ready to serve its purpose.

## 7. Possible future enhancements

This project can be further enhanced in the future by adding few more features. Some of them are discussed below:

- **Inclusion of more accessibility options:** Since this job portal is for the differently-abled people, inclusion of more accessibility options which can serve all kinds of disabilities can be implemented.

- **Online Interview Feature:** When the recruiter accepts the job application, a feature which enables recruiter to set up an interview with the seeker can be added. This will make the system even more applicable.
- **Blogs and Communication Forum:** Enabling users to post blogs and communicate through communication forum can be a better way to attract and engage more users to the system.

## 8. Critical Evaluation

I have successfully completed the project “Jobable” a job portal for the differently-abled where recruiters who are open to giving opportunities to the differently-abled people can post job vacancies and differently-abled seekers who are actively looking for jobs can apply for the jobs. As this project can impact the lives of many differently-abled people, I have been so motivated towards this cause and strived to carry out the project with utmost dedication and hard work. I have always been interested in doing things that can create a social impact. Initially, I researched about employment opportunities among differently-abled people in both the global and in the context of Nepal. It was found that differently-abled people are often overlooked when it comes to employment opportunities even if they have all the skillsets required. In the context of Nepal, there aren’t any job portals that are specially made for the differently-abled people. So I came up with an idea to build a job portal for the differently-abled people as my Final Year Project. And ever since that time, I have been working very hard on this project.

I chose Django as a major programming language in this project since I had some prior knowledge on Django. And for the project management methodology, I chose Scrum. Now I feel very confident to say that I have a good grasp on Django Framework. Moreover, I have learned so much about software development lifecycle through this project that I feel like I have become industry ready. To sum up, I can proudly say that I have successfully completed this project and learned so much about software development.

### 8.1 Self-reflection

As I look back and reflect on my journey of carrying out the Final Year Project, I feel like I have learned so much both professionally and personally. With the help of this project,

now I have a clear idea of how the project is initiated and carried out effectively. I have a better understanding of software lifecycle processes and how to mitigate risks of the project. Working on a Django framework has made me explore so many functionalities of Django and now I feel like I can successfully code in Django in further projects as well. As a Final year student, I am trying to slowly step into the industry and a project like this have made me so confident about my skills and abilities.

Furthermore, this project has had a major role in my personal development as well. Through weekly meetings with my supervisor, I feel like I have enhanced my communication and presentation skills. Most importantly, I have become very efficient in researching and self-studying with the help of this project.

Hence, this project has a great positive influence on both my academic and personal life and I feel very motivated and determined to do more projects like this in the future.

## 9. Evidence of Project Management

### 9.1 Sprint Planning

Sprint	Task Id	Task Name	Status	Start date	End date
Sprint-1	1	Requirement Gathering	Completed	Oct 2 ,2021	Nov 20,2021
	2	Feasibility Study	Completed		
	3	Brainstorm	Completed		
	4	Proposal	Completed		
	5	Wireframe for Splash Screen, Google verification (Allow, deny) and Welcome Screen	Completed		
	6	Managing and Setting resources	Completed		
	7	Wireframes	Completed		
Sprint-2	1	Literature review	Completed	Nov 21,2021	Dec 19,2021
	2	Development of User Management System(Frontend )	Completed		
	3	Testing the pages	Completed		
Sprint-3	1	Artefact designing report	Completed	Dec 20,2021	Jan 24,2022
	2	Development of User Management System (Backend )	Completed		
	3	Testing	Completed		
Sprint-4	1	Development of Jobs Management System (Frontend)	Completed	Jan 25,2022	Feb 15,2022
	2	Testing	Completed		
Sprint-5	1	Professionalism Report	Completed	Feb 16,2022	Feb 27,2022
	2	Development of Jobs Management System (Backend)	Completed		
	3	Testing	Completed		
Sprint-6	1	Development of Jobs Management System (Backend)	Completed	Feb 28,2022	Mar 15,2022
	2	Testing	Completed		
Sprint-7	1	Working on the Final Report	Completed	March 16,2022	March 25,2022
	2	Finalization of Jobs Management System	Completed		
	3	Testing	Completed		
Sprint-8	1	Working on the Final Report	Completed	March 26,2022	April 10,2022
	2	Development of the recommendation system	Completed		
	3	Testing	Completed		
Sprint-9	1	Development of the recommendation system	Completed	April 11,2022	April 19,2022
	2	Testing	Completed		
Sprint-10	1	Development of Accessibility options	Completed	April 20,2022	April 25,2022
	2	Testing	Completed		
Sprint-11	1	Finalization of report	Completed	April 28 ,2022	April 30,2022
	2	Final System Testing	Completed		

Figure 37: Sprint Planning

## 9.2 Gantt chart

Jobable Gantt chart



Figure 38: Final Gantt chart

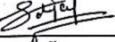
## 9.3 Log Sheets

Faculty of Science and Engineering  
 School of Mathematics and Computer Science



PROJECT MANAGEMENT LOG	
First Name: Sahaja	Surname: Phuyal
Student Number: 2050062	Supervisor: Swastik Gurung
Project Title: Job portal for differently-abled Month: November	
What have you done since last meeting	
<ul style="list-style-type: none"> <li>→ Project Proposal Report</li> <li>→ Got PRF signed</li> <li>→ Sprint planning</li> </ul>	
What do you aim to complete before the next meeting	
<ul style="list-style-type: none"> <li>→ Wireframes</li> <li>→ Frontend (Landing page)</li> <li>→ Start working on Literature review as well.</li> </ul>	
Supervisor Comments	
<ul style="list-style-type: none"> <li>* Start working on UI mockup</li> <li>* Literature review by next week - 50%.</li> </ul>	

We confirm that the information given in this form is true, complete and accurate.

Student Signature: 

Date: 28th Nov, 2021

Supervisor Signature: 

Date: 28th Nov, 2021

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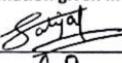
Figure 39: Logsheet 1

Faculty of Science and Engineering  
 School of Mathematics and Computer Science



PROJECT MANAGEMENT LOG	
First Name: Sahaja Phuyal	Surname: Phuyal
Student Number: 2050062	Supervisor: Swastik Gurung
Project Title: Job portal for differently abled Month: December	
What have you done since the last meeting - Wireframes - UI development of landing page, about page, jobs page and contact page. - Logo design - Literature review	
What do you aim to complete before the next meeting - Further UI development - Finalizing the literature review	
Supervisor comments - DRAFT LITERATURE REVIEW — TUESDAY	

We confirm that the information given in this form is true, complete and accurate.

Student Signature: 

Date: 12th December, 2021

Supervisor Signature: 

Date: 12th December, 2021

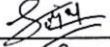
Figure 40: Log Sheet 2



Faculty of Science and Engineering  
School of Mathematics and Computer Science

PROJECT MANAGEMENT LOG	
First Name:	Sahaja
Surname:	Phuyal
Student Number:	2050062
Supervisor:	Swastik Gurung
Project Title:	Job-Portal for the differently-abled
Month:	December
What have you done since the last meeting	
<p>-Frontend development of the user management system. - Finalized the literature review.</p>	
What do you aim to complete before the next meeting	
<p>-Finalizing the Frontend of User management system. - Starting the artifact designing</p>	
Supervisor comments	
<p>- Work on artifact designing.</p>	

We confirm that the information given in this form is true, complete and accurate.

Student Signature: 

Date: 16<sup>th</sup> Dec

Supervisor Signature: 

Date: 16<sup>th</sup> Dec



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Figure 41: Log Sheet 3



**Faculty of Science and Engineering  
 School of Mathematics and Computer Science**

PROJECT MANAGEMENT LOG	
First Name:	Sahaja
Surname:	Phuyal
Student Number:	2050062
Supervisor:	Swastik Gurung
Project Title:	Job portal for the differently abled
Month:	Jan
What have you done since the last meeting	
<ul style="list-style-type: none"> <li>- Started the artefact designing</li> <li>- Development of User Management System.</li> </ul>	
What do you aim to complete before the next meeting	
<ul style="list-style-type: none"> <li>- Completion of User Management System(Frontend)</li> <li>- Further working on artefact designing.</li> </ul>	
Supervisor comments	
<ul style="list-style-type: none"> <li>- Finalize the artefact designing ASAP.</li> </ul>	

We confirm that the information given in this form is true, complete and accurate.

Student Signature:

Date: 2nd Jan, 2022

Supervisor Signature:   
 Date: 2nd Jan, 2022

Date:   
 Supervisor Signature

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Figure 42: Log Sheet 4



**Faculty of Science and Engineering**  
**School of Mathematics and Computer Science**

PROJECT MANAGEMENT LOG	
First Name: <u>Sahaja</u>	Surname: <u>Phuyal</u>
Student Number: <u>2050062</u>	Supervisor: <u>Swastik Gurung</u>
Project Title: <u>Job Portal</u>	Month: <u>January</u>
What have you done since the last meeting	
<ul style="list-style-type: none"> <li>- Finalized the artefact designing (One - subsystem)</li> <li>- Modified the User Management System.</li> </ul>	
What do you aim to complete before the next meeting	
<ul style="list-style-type: none"> <li>- Submitting the artefact design report.</li> <li>- Working on User Management System(Backend)</li> <li>- Working on Jobs Management System(Frontend)</li> </ul>	
Supervisor comments	
<ul style="list-style-type: none"> <li>- Work on development of the project</li> <li>- Artefact designing of atleast 0.2 sub systems.</li> </ul>	

We confirm that the information given in this form is true, complete and accurate.

Student Signature:

Date

Supervisor Signature:

Date: 9th Jan

Date:

Supervisor Signature



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Figure 43: Log Sheet 5



**Faculty of Science and Engineering**  
**School of Mathematics and Computer Science**

PROJECT MANAGEMENT LOG	
First Name: Sahaja	Surname: Phuyal
Student Number: 2050062	Supervisor: Sunstik Gurung
Project Title:	Month: Jan
What have you done since the last meeting	
<ul style="list-style-type: none"> <li>- Finalized the artefact designing (2-sub systems)</li> <li>- Worked on development of Jobs Management System. (Frontend)</li> </ul>	
What do you aim to complete before the next meeting	
<ul style="list-style-type: none"> <li>- Development Finalization of User Management System and Jobs Management System.</li> </ul>	
Supervisor comments	
<ul style="list-style-type: none"> <li>- Submit the artefact design report by 24th Jan.</li> </ul>	

We confirm that the information given in this form is true, complete and accurate.

Student Signature:   
 Date: 21st Jan  
 Supervisor Signature: 

Date: 21st Jan  
 Date:   
 Supervisor Signature



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Figure 44: Log Sheet 6



Faculty of Science and Engineering  
School of Mathematics and Computer Science

PROJECT MANAGEMENT LOG	
First Name:	Sahaja
Student Number:	2050062
Project Title:	Supervisor: Swastik Gurung
Month:	Feb
What have you done since the last meeting	
<ul style="list-style-type: none"><li>- Submitted the Artefact designing report.</li><li>- Worked on Jobs Management System. (Frontend)</li></ul>	
What do you aim to complete before the next meeting	
<ul style="list-style-type: none"><li>- Start the Professionalism report.</li><li>- Development of User Management and Jobs Management. (Backend)</li></ul>	
Supervisor comments	
<ul style="list-style-type: none"><li>- Start working on the professionalism report.</li></ul>	

We confirm that the information given in this form is true, complete and accurate.

Student Signature: Sahaja  
Date

Supervisor Signature: Swastik Gurung

Date: 7th Feb, 2022

Date: 7th Feb, 2022

Supervisor Signature

Figure 45: Log Sheet 7



**Faculty of Science and Engineering**  
**School of Mathematics and Computer Science**

PROJECT MANAGEMENT LOG	
First Name:	Sahaja i
Surname:	Phuyal
Student Number:	20500062
Supervisor:	Swastik Gurung
Project Title:	Job Portal
Month:	Feb
What have you done since the last meeting	
<ul style="list-style-type: none"> <li>- Started working on Professionalism report.</li> <li>- Researched various social, ethical, legal and security issues regarding the project.</li> </ul>	
What do you aim to complete before the next meeting	
<ul style="list-style-type: none"> <li>- Finalizing the professionalism report.</li> </ul>	
Supervisor comments	
<ul style="list-style-type: none"> <li>- Submit the professionalism report draft ASAP.</li> </ul>	

We confirm that the information given in this form is true, complete and accurate.

Student Signature: 

Date: 21st Feb

Supervisor Signature: 

Date: 21st Feb



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Figure 46: Log sheet 8

Faculty of Science and Engineering  
 School of Mathematics and Computer Science



PROJECT MANAGEMENT LOG	
First Name: Sahaja	Surname: Phuyal
Student Number: 2050062	Supervisor: Swastik Gurung
Project Title: Job-patal for differently-able	Month: April March
What have you done since the last meeting	
<p>-Worked on the backend of login and sign up.</p>	
What do you aim to complete before the next meeting	
<ul style="list-style-type: none"> <li>- Finalizing the backend of User Management System.</li> </ul>	
Supervisor comments	
<ul style="list-style-type: none"> <li>- Show Logsheet next week</li> <li>- Show Project management of FYP next week</li> <li>- Show User Management next week</li> </ul>	

We confirm that the information given in this form is true, complete and accurate.

Student Signature: 

Date: 06/03/2022

Supervisor Signature: 

Date: 06/03/2022

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Figure 47: Log Sheet 9



Faculty of Science and Engineering  
 School of Mathematics and Computer Science

PROJECT MANAGEMENT LOG	
First Name: <u>Sabaja</u>	Surname: <u>Phuyal</u>
Student Number: <u>2050062</u>	Supervisor: <u>Suhastik Giurung</u>
Project Title: <u>Job portal for differently-abled</u>	Month: <u>March</u>
What have you done since the last meeting	
<ul style="list-style-type: none"> <li>- completed User Management and Jobs Management System.</li> </ul>	
What do you aim to complete before the next meeting	
<ul style="list-style-type: none"> <li>- Finalize the jobs Management System.</li> </ul>	
Supervisor comments	
<ul style="list-style-type: none"> <li>- JOB DESCRIPTION MORE PRECISE</li> <li>- Email link for job</li> <li>- 5 jobs per page</li> </ul>	

We confirm that the information given in this form is true, complete and accurate.

Student Signature: 

Date: 20/03/2022

Supervisor Signature: 

Date: 20/03/2022



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Figure 48: Log sheet 10



Faculty of Science and Engineering  
 School of Mathematics and Computer Science

PROJECT MANAGEMENT LOG	
First Name: Sahaja	Surname: Phuyal
Student Number: 2050062	Supervisor: Swastik Gurung
Project Title: Job portal for the differently abled Month: April	
What have you done since the last meeting	
<ul style="list-style-type: none"> <li>- Email Verification</li> <li>- Pagination</li> </ul>	
What do you aim to complete before the next meeting	
<ul style="list-style-type: none"> <li>- Finalize the backend and work on the suggestions received by the supervisor.</li> </ul>	
Supervisor comments	
<ul style="list-style-type: none"> <li>- Email sent to be in HTML FORMAT</li> <li>- Button and Field to have space between them → Job search</li> <li>- FIT IMAGE TO FULL PAGE IN HOMEPAGE</li> </ul>	

We confirm that the information given in this form is true, complete and accurate.

Student Signature:

Date: 4/3/2022

Supervisor Signature:

Date: 4/3/2022

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Figure 49: Log Sheet 11



Faculty of Science and Engineering  
School of Mathematics and Computer Science

PROJECT MANAGEMENT LOG	
First Name: Sahaja	Surname: Phuyal
Student Number: 2050062	Supervisor: Swastik Gurung
Project Title: Job portal for the differently-abled	Month: April
What have you done since the last meeting	
<p>- Worked on Recommendation System.</p>	
What do you aim to complete before the next meeting	
<p>- Working on accessibility features.</p>	
Supervisor comments	
<p>- Accessibility for job seekers</p>	

We confirm that the information given in this form is true, complete and accurate.

Student Signature: Sahaja

Date: 17<sup>th</sup> April, 2022

Supervisor Signature: Phuyal

Date: 17<sup>th</sup> April, 2022

Figure 50: Log Sheet 12

Faculty of Science and Engineering  
 School of Mathematics and Computer Science



PROJECT MANAGEMENT LOG	
First Name: Sahaja	Surname: Phuyal
Student Number: 2050062	Supervisor: Swastik Gurung
Project Title: Job-Portal for differently-abled Month: April	
What have you done since the last meeting	
<ul style="list-style-type: none"> <li>- Accessibility options</li> </ul>	
What do you aim to complete before the next meeting	
<ul style="list-style-type: none"> <li>- Complete and Finalize Report.</li> <li>- Finalize the development of the project.</li> </ul>	
Supervisor comments	
<ul style="list-style-type: none"> <li>- Complete FYP Report</li> <li>- Complete FYP Development</li> </ul>	

We confirm that the information given in this form is true, complete and accurate.

Student Signature: 

Date: 24<sup>th</sup> April, 2022

Supervisor Signature: 

Date: 24<sup>th</sup> April, 2022



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Figure 51: Log Sheet 13

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