



UNIVERSITY OF
LEICESTER

Department of Informatics

University of Leicester

CO7201 Individual Project

Final Report

[Job Recommendation System]

[Harshavardhan Raju Vuppalapati]

[hrv1@student.le.ac.uk]

[hrv1]

Project Supervisor: [Maryam Doostani]

Second Marker: [Monasadat Zarbaf]

Word Count: [11183]

[13/01/2023]

DECLARATION

All sentences or passages quoted in this report, or computer code of any form whatsoever used and/or submitted at any stages, which are taken from other people's work have been specifically acknowledged by clear citation of the source, specifying author, work, date and page(s). Any part of my own written work, or software coding, which is substantially based upon other people's work, is duly accompanied by clear citation of the source, specifying author, work, date and page(s). I understand that failure to do this amounts to plagiarism and will be considered grounds for failure in this module and the degree examination as a whole.

Name: [Harshavardhan Raju Vuppalapati]

Date:[13/01/2023]

Table of Contents

Contents

1.1 Introduction	6
1.2 Research Background.....	7
1.3 Aim and Objective	8
1.4 Requirements	9
1.4.1 Essential	9
1.4.2 Recommended.....	10
1.4.3 Optional.....	10
1.5 Research Questions	11
1.6 Research Rationale.....	11
1.7 Problem Statement	11
1.8 Research Structure.....	12
1.9 Summary	13
Chapter 2: Literature Review.....	14
2.1 Introduction	14
2.2 Advantages of the job recommendation system.....	14
2.3 Description of multiple issues in the job recommendation system.....	16
2.4 Description of Java, JSP, and servlets.....	17
2.5 Working process of HTML, CSS, and DBMS.....	18
2.6 Literature gap	19
2.7 Conceptual Framework	20
2.8 Summary	20
Chapter 3: Methodology	22
3.1 Introduction	22
3.2 Required Tools and Techniques.....	22

3.3 Develop Web application Using JAVA	23
3.4 Implementation of HTML, CSS, JSP, and Servlet.....	24
3.5 Database connection using MySQL.....	24
CHAPTER –4: Implementation.....	26
4.1 Run the server	26
4.2 Login Page for Users	26
4.3 Job seeker’s Registration	27
4.4 Job provider’s registration	28
4.5 OTP sent to registered email address.....	29
4.6 OTP validation.....	29
4.7 Job seeker home page	30
4.8 Filtered jobs in home page.....	31
4.9 Recommended jobs based on skills	31
4.10 List of job applications.....	32
4.11 Profile update	33
4.12 Job provider home page	33
4.13 Filtered jobs in home page.....	34
4.14 Add new job post	35
4.15 Recommended job seekers based on skills	36
4.16 Job Provider updates profile	37
4.17 View Job Application	37
4.18 Admin home page	38
4.19 Update job post	39
4.20 List of all job seekers	40
4.21 Admin views list of all job providers.....	40
4.22 Admin views list of pending job seekers	41
4.23 Pending job providers	41

4.24 Email for reset password:.....	42
4.25 OTP for password reset:.....	42
4.26 New password and confirm password	43
4.27 Summary	44
CHAPTER -5: Testing	45
5.1 Introduction.....	45
Advantages of testing	46
5.2 Test Cases for Job Recommendation System	46
5.3 Validation.....	47
5.4 OTP validation error	49
5.5 Non-functional testing	49
CHAPTER -6: Conclusion.....	49
Reference	50
Code Snippets	53

Abstract:-

The objective of this project is to create a job recommendation system to match job seekers with job opportunities based on their skills, qualifications, location, and desired salary range. A job applicant always takes hours searching through the massive amount of recruiting information on the Internet to identify ones that are helpful. The system will be built using JAVA, JSP, HTML, CSS, Servlet for the front-end and MySQL for the database connection. The user interface will be user-friendly and easy to navigate, enabling job seekers to find job opportunities that match their skills and qualifications quickly and efficiently. The system will also learn the preferences of the job seeker over time and provide more accurate recommendations, making the job search process more effective. The ultimate goal of this project is to assist job seekers in finding job opportunities that align with their skills and qualifications, thus streamlining the job search process.

Chapter 1: Introduction**1.1 Introduction**

In the modern world of business and technology, many students are pursuing different universities or colleges to get jobs that can help them settle in their lives. There are different types of platforms in this modern era of technology that can help those students by providing additional job recommendations according to their learning backgrounds. Recommendation systems are a type of platform that can help to provide different things based on the information collected from people over a period using the technology and job recommendation systems are one of these recommendation systems. A job recommendation system is a platform that gathers the information of people enrolled in the website or the application (Dillahun *et al.* 2018). This type of system filters the information; after that, the system provides suggestions to the particular user. Different types of data have been needed in the job recommendation system, such as historical user data, information about the user, details of items, search histories, contextual pieces of information, etc. This research work has been based on developing a job recommendation system using the well-known coding language JAVA. It is a well-known and widely used programming language based on objects. This software platform can run on

computers, laptops, mobiles, medical devices, gaming devices, etc. This project will deliver a job recommendation system using the core programming language java and other platforms such as JSP, HTML, CSS, and Servlets. A database connection will help the job recommendation system store the information of the users and the companies registered with this job recommendation system (Huang *et al.* 2018). The database connection of this java application will be developed using the platform MySQL. MySQL is a type of "*Relational Database Management System (RDBMS)*" which has been developed by using the "*Structured Query Language (SQL)*" in the platform of Oracle. All the information regarding the development of the job recommendation system will be discussed in the further chapters of this project.

1.2 Research Background

In this modern world of business and studies, there are many applications regarding recommendation systems, and job recommendation systems are one of them. Recommendation systems help provide suggestions to the user by their search history or by collecting their private information from their registered profile in the designs. The job recommendation system also works as same. This type of system contains information from the students enrolled in this web application. It provides suggestions of jobs using their search histories and other information such as subjects of pursuing the degree, subjects of interest, etc. In this competitive world, most business organizations recruit their employees using online-based platforms, and job seekers spend hours in front of their mobile and computer devices to find the perfect job that matches their student criteria (Singrodia *et al.* 2019). Applying a job recommendation system will help reduce the time for job seekers to find the ideal jobs based on the suggestions of their choices.

Modern times have brought about a job crisis that has become a major issue for the entire business and other industries, where a lack of employment is caused by the underdevelopment of labour-intensive sectors, which helps to create a variety of job opportunities for the employable population. On the other hand, this system of job recommendations is crucial for every job seeker to locate a position that meets their needs. The present employment portals, where this recommendation algorithm helps to display a huge list of available positions, have made "searching for the most appropriate job" a highly complex chore for every job seeker. Once a student has completed their schooling, this recommendation system is crucial since it

aids in suggesting a position that fits their skill set. According to the user's performance, a job suggestion system was utilized to retrieve the job descriptions for a job application (Singrodia *et al.* 2019). The entire recommendation system links people with job possibilities using publicly available information.

However, this technique has been extensively used to accurately present job prospects to job seekers. This complete system can anticipate user recommendations and aid in offering better employment chances for users to advance their careers. JAVA is a core programming language that helps to develop the job recommendation system. Different filtering applications will be used in this job recommendation system to provide perfect search results for the job seeker. This web application will be developed for university students as, during the pursuit of the degree, it is a vital time to get a job to settle in life. The recommendation algorithm incorporates values of co-apply individuals (the users who'd already registered for the applicant jobs) and matters of learner-used-liked employment in addition to background information such as students' portfolios and specifications of recruitment data.

1.3 Aim and Objective

Aim

The principal aim of this project work is to develop a job recommendation system, particularly for job seekers who is using the coding platforms like JAVA, JSP, HTML, CSS, and Servlet, and using the MySQL database connection.

Objective

- To put into place a system for recommending jobs where incoming students can register and make an account to use the benefits of this program.
- To build a database that has information about at least 50 jobs.
- The job suggestion system should have a unique login form with appropriate validation measures that only authorized students (job seekers) are able to access.
- To keep the information of at least ten students enrolled who are job seekers in this platform of job suggestions.
- To create a website where the students can select each matching employment to learn more, with the matching jobs presented to the learner.
- To implement most advanced Search option to search the job based on different criteria

1.4 Requirements

This comprehensive system application was developed to provide a comprehensive and helpful platform for both job providers and job seekers. To ensure that it functions properly, certain key features must be included in the design. These features are essential for effectively creating an efficient portal that can help streamline the process of hiring and finding employment.

1.4.1 Essential

- To gain access to the application, both job seekers and job providers need to begin by registering for an account. Upon registration, the job seeker can then fill out their profile with pertinent information which they can easily edit, add to, or remove at any time in the future according to their preferences.
- Job seekers can easily upload their details to the website portal. On the other hand, providers are required to create a company profile and provide pertinent details about their business, allowing potential hires to get an idea of what it would be like to work for that specific company.
- With the help of user profiles & skills, job providers now have the ability to effortlessly manage their job opportunities and make informed candidate selection decisions. Furthermore, they can easily add, access, update and delete job options as per their specific needs. To make the process even simpler for employers, sophisticated algorithms are employed to provide job recommendations that are tailored to each employer's individual requirements.
- To make the job search process easier and more efficient for job seekers, this website offers a highly intuitive recommendation feature that allows users to quickly find the most suitable jobs for their respective skills. With just a few clicks, users can identify their preferred roles and immediately apply for them without any hassle. This feature makes it much easier to land the right job with minimal effort.
- Job providers are now able to effortlessly check the details of applicants who have applied for their job openings quickly and accurately, enabling them to find out who the most suitable candidate is with minimal effort. This helps them to assess the credentials of each applicant quickly and easily against their job requirements, giving them an informed decision-making process when making a hiring decision.

1.4.2 Recommended

- To further improve the user experience and provide a secure and controlled access layer, it is highly recommended to incorporate an admin portal within this existing system. This portal would have access to detailed information for both job seekers as well as job providers, allowing them to easily manage their data in one central location.
- An administrative database has been created to store all relevant information pertaining to the application's details. The primary focus of the admin team is to assist job seekers by providing tailored job recommendations and streamlining the application process using a user-friendly web portal, which includes a workflow and application management system.
- The web application's performance is optimized to provide job seekers with relevant job recommendations based on a matching algorithm that considers their qualifications and job preferences. The job filtration system ensures that the job recommendations are tailored to the job seeker's knowledge criteria, resulting in a more efficient and effective job search experience.

1.4.3 Optional

- The main goal of this web application is to gather and present a comprehensive list of job openings in the engineering domain. To achieve this, the application streamlines the process by providing a simplified career portal that is tailored to the specific needs of the engineering field. This allows job seekers to quickly and easily find job openings that match their skills and qualifications.
- To ensure security and authentication, users attempting to log in to the application will receive an OTP via email. This OTP serves as a verification process to confirm the user's identity and authorize their access to the application.
- To add a popup message box on my application to the users to get assistance from admin for any kind of technical help or for any kind of queries.

1.5 Research Questions

1. Why are the job recommendation systems at the peak of delivering more significant student opportunities?
2. What can be the critical problems for job seekers in this modern competitive world?
3. How can the effectiveness of the job recommendation system be measured?
4. What is the main motive of the job recommendation systems?
5. How can job seekers search for their targeted jobs in the job recommendation web application?
6. What are the key benefits that job seekers can gain by using the web application of the job recommendation system?

1.6 Research Rationale

This research plays an important role for job seekers because it has been widely used in order to match their skills, interests along with experiences. On the other hand, it is also necessary for increasing the job efficiency and overall effectiveness of the entire job searching process. It plays an important role for both job seekers and providers. On the other hand, it is also necessary for improving job dissatisfaction that has been widely used to reduce an organization's turnover by matching people with jobs. It is also very crucial research that helps providers in order to identify the recruit the top talent by identifying multiple candidates. This research work helps to identify the key concept of overall project work that creates attractive websites for this job-recommended system. On the other hand, this research work is also important for identifying the key challenges of this recommendation system and providing recommendations for mitigating overall project issues.

1.7 Problem Statement

The modern technological era depends on different web applications or systems for providing various types of recommendation systems. In this project, a job recommendation web application will be designed using the JAVA programming language for job seekers in this modern competitive world. It is very complex to seek a particular job for the job seekers in the available digital portals worldwide, and there is an extended list of job openings. According to Kuusisto and R (2018), students often face different problems in sorting out the perfect job for them to apply for. This job recommendation system will help generate a web application portal for the students to suggest a particular match for their job interests and job profiles. This project

will not only concentrate on creating a matching algorithm but will also practically design an interface for a job recommendation system, where students can register to make an account and then attempt to log in to the program. A database will be designed for the job recommendation web application to store the data for the job seekers and the organization. This problem statement of the project work will derive the software development's motive and help make an attractive and helpful web application for job seekers (students) in this modern competitive world.

1.8 Research Structure

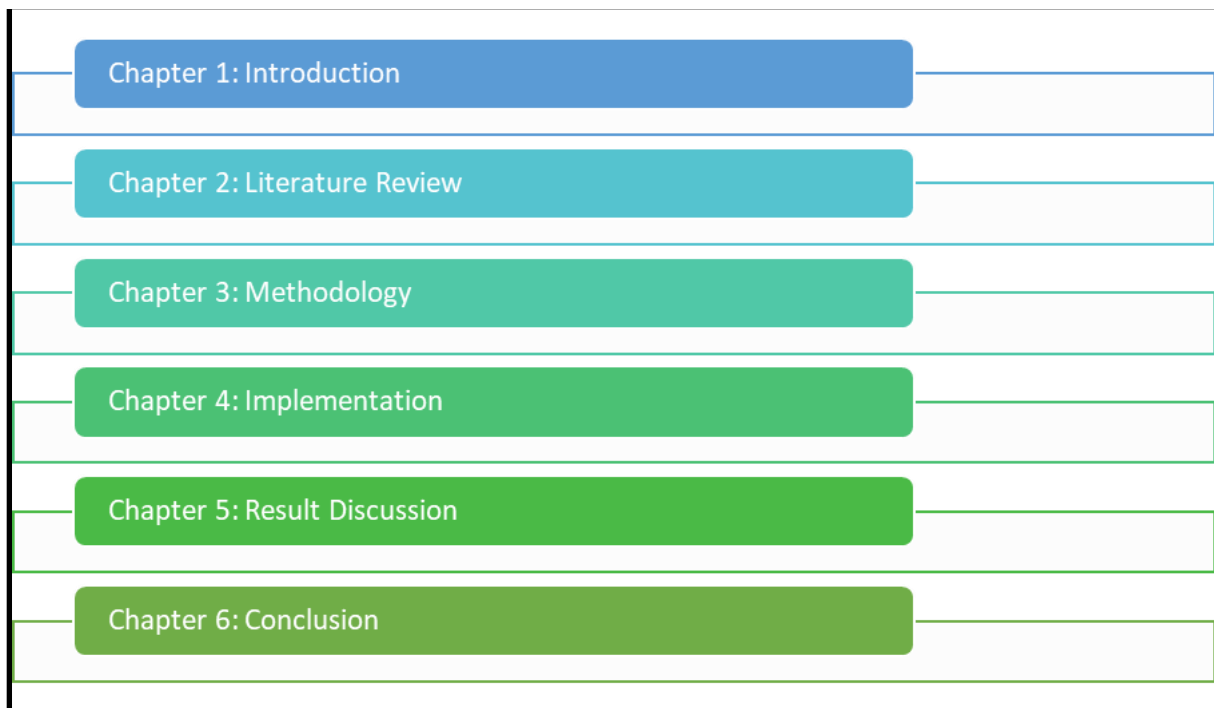


Figure 1.8.1: Research Structure

(Source: Developed by Self)

The first chapter of the project work will discuss the essential information regarding the job recommendation system. This chapter will provide the motive and objectives of the system and other information to conclude the project work. The second chapter of this research will discuss the literature survey regarding the web application. The third chapter will derive the implementation methodology for developing the web application system using the JAVA programming language. The fourth chapter will deliver the implementation phase of the web application. The fifth chapter will discuss the result by analysing the project implementation chapter, and lastly, the sixth chapter will conclude the entire project work by delivering some essential information.

1.9 Summary

This chapter of the project work discussed the general information regarding the job recommendation system using the JAVA programming language. A platform known as a job suggestion system collects data from users who have registered on a website or application. The information is filtered by this kind of system, which then offers ideas to the specific user. The job recommendation system requires a variety of data kinds, including past user data, user information, item details, search histories, contextual data, etc. This research project is based on creating a system for recommending jobs using the well-known programming language JAVA. In this modern world, searching for perfect employment has become a much more complex task for job seekers as there are many job opportunities throughout the globe. This JAVA-based web application will help generate recommended suggestions that match the requirement of the job seeker. This web application will help reduce the complexity of the students entering employment to make their dreams come true and settle in their lives. This job recommendation system will take the input from the registered users into the job application system account, and the details will be stored in the web application database. The database will be included in the system to keep the information of the job seekers (students) and also for the recruitment companies as there is a fight going on in this modern competitive era.

Chapter 2: Literature Review

2.1 Introduction

“Job recommendation system” has been used to retrieve the job descriptions for applicants whose job has been suggested based on the user’s performance. This entire recommendation system uses public information and matches them with job opportunities. On the other hand, this system has been widely used in order to provide accurate job opportunities to job seekers. This entire system has the ability to predict the user’s recommendation and helps to provide them with better job opportunities for career growth. Apart from that, this recommendation system will be created using JAVA which helps to provide a better user satisfaction and also helps to suggest their jobs as per their requirements (Jackson and Tomlinson, 2020). This recommendation system helps to predict users’ interests and recommended actual product items that help to provide excellent job opportunities for every user. In that case, multiple features are present within this job recommendation system where users need to login first by using a username and password. After that, users can register within this system by implementing their personal information. After this registration process, users can get multiple job lists per their requirements, which is necessary for every user to get an excellent job for career growth.

The working process of HTML, CSS, and DBMS implementation will be covered in this chapter, which helps to understand this programming language properly. In that case, multiple literature gaps will be converted within this chapter that will be based on previous literature. A conceptual framework will be created for creating multiple dependents along with the independent variables that will be created by a diagram software named **“draw.io”**. Also, a summary will be summarized to cover the entire chapters that are present within the literature review.

2.2 Advantages of the job recommendation system

In these recent times, the **“job crisis”** has become a big headache for the entire business along with other industries where lack of employment is the poor development of labour-intensive sectors that helps to create multiple job opportunities for the employable population. On the other hand, this job recommendation system is essential for every job seeker to find a suitable job per their requirements. **“Searching for the most appropriate job”** has become a highly complex task for every job seeker as the current job portals where this recommendation system

helps to display a long list of available jobs. This recommendation system plays an important role for every student who has completed their education, where it helps to suggest a suitable job as per their skill profile. This recommendation system has reduced students' complexity in identifying the most relevant jobs (Mohammadi *et al.* 2019). On the other hand, the primary purpose of this job recommendation system is to recommend more suitable jobs to students that have been based on their input taken during registration. Multiple advantages are present within this job recommendation system, and these advantages are given in the below session,

- It is very cost-effective
- Provides job opportunities along with proper job
- Provides flexibility
- Offers branding opportunities for every user
- Provides one or multiple jobs for users
- Enhancing user's resume
- Helps to find the right job that matches their aspirations
- Helps to reduce employee tension

This job recommendation system helps to register on this application, which is free of cost. In that case, it also helps users in order to apply for one or multiple jobs within a single click. The other advantages of this job recommendation system are including ***“enables to access unadvertised jobs”***, ***“provides the best job that is delivered to the user's inbox”***, and ***“helps to track multiple job applications”***. This recommendation system allows users to fill in their details during registration, enabling them to apply for their dream jobs per their skill and preference. On the other hand, this system allows users to track their job applications were. It shows notifications when the organizations are accepting users' CVs. This system enables every user to connect to it through a laptop or mobile application that helps them apply in multiple job sectors per their requirements. Apart from that, it provides flexibility where the interface is very user-friendly, which helps to use one or various jobs as per their skills. It provides direct contact with the organization's recruiters and helps to make the profile visible to many recruiters. Also, it shows multiple jobs of other domains, which is a very important feature of this job recommendation system. In that case, numerous job recruitment sights provide various facilities for choosing jobs per the user requirements (Boranbayev and Kabdulkarimov, 2022). The main critical elements of this job recommendation system include ***“plan development”***, ***“establishing job strategy”***, ***“applying proper searching process”***, ***“screening and shortlisting the jobs,”*** along with ***“plan evaluation”***. In this job recommendation, both job providers along job seekers need to sign in within this system by

providing their essential information about the education and organizations. It is very beneficial for every user in order to search for an exact job as per the user's requirements.

2.3 Description of multiple issues in the job recommendation system

Recently, job seekers have been facing different problems during their job search. Sometimes, multiple job seekers are freshers and find real jobs based on their expertise and skills. In that case, this job recommendation system helps find a real job for all fresher where various organizations are present hiring fresher candidates for their organizational work. It provides an exceptional opportunity for every fresher to enhance their career growth as per their requirements. Apart from that, multiple challenges are present within this job recommendation system. These issues are given in the below session,

- Facing multiple difficulties during the job application process
- Need to stay up to date
- It has limitations within a professional network
- Lack of expertise degree
- Lack of experience gap
- Insufficient training and knowledge gaps
- Lack of strong online presence
- Not following up any information about the interview
- Not getting any offer letters from the selected organization

Recently, cyber security has become a big headache where attackers continuously try to steal users' information from multiple job recommendation systems. In this recommendation system, users need to put their essential information such as their name, address, bank account, education, qualification certificate, and many other personal details. After that, attackers inject some malicious code into the hiring site in order to steal their personal information by applying some dangerous malicious code. Apart from that, it has been considered the most significant issue that needs improvement within this job recommendation site. Several security attacks exist, such as *malware attacks*, *email phishing*, *DDoS attacks*, and many others. Every business and other organization needs to apply multiple types of security protection that helps to mitigate and prevent these types of security attacks. With this application, every job seeker can apply or search for their job without facing any difficulties. It also helps protect data from different security attacks and blocks multiple unauthorized access. Another issue of this job recommendation system is that many organizations are fixing their interview session through

video conferences where job seekers are facing several problems during this interview process, such as *"lack of Internet connection", "facing difficulties in choosing proper online platform", "background noise and distraction"* and many others. The other issues of this online recruitment process are including *"high volume responses", "logistical problems", "technological issues," along with "server issues within the job recommendation websites"*.

2.4 Description of Java, JSP, and servlets

- **Java**

Java is an object-oriented programming language that helps build multiple web applications along with Android applications as per the user *requirements*. *In that case, several characteristics are present such as "It is simple", "platform independent", "provides architectural network", "provides flexible performance along with "user-friendly interface,"* and many others. Apart from that, a good software platform is needed to run the application, and a compiler is required to run the entire Java program without facing any difficulties. In that case, it has multiple significant features rather than the other programming language that performs well to handle multiple programming tasks per the user requirements. It has been designed to be easy and provides an impressive interface where users can write, compile and debug their code very quickly, which helps to deliver projects on time. This programming language plays a vital role in building multiple types of web applications and also helps to create various modular programs and reusable codes (Manelli and Zambon, 2020). On the other hand, the most significant advantage of this programming language is that it provides flexibility while moving code from one system to another. It can run a similar program on multiple systems that are vital to the world wide web server. It is a very popular programming language as it offers multiple security features and has become a comprehensive internet solution.

- **JSP**

JSP is Java server pages that work as technology to develop multiple web pages and applications that support numerous dynamic contents. On the other hand, it helps every web developer in order to insert various Java codes within the HTML pages by using JSP tags. It is a server-side technology used to create multiple web pages and provides flexibility during software work (Dietrich *et al.*, 2018). It has been widely used as an extension within servlet technology, providing multiple features for creating attractive user views. On the other hand,

this JSP page consists of numerous HTML codes and offers various options that have been included within the Java code to create several dynamic contents per the user requirements. JSP plays an essential role within Java implementation that provides job flexibility in order to separate multiple business logic from the presentation logic that has been completed by using Java beans. Multiple features are present within this Java server pages, which are given in the below session,

1. Helps to make interactive web applications
 2. Provide flexibility to read the data from user
 3. It provides multiple features to display the entire server response
 4. It is easier to connect data with a web application database
 5. Offers multiple facilities to track user data
 6. Offers reliability to write the Java code for creating multiple web applications
 7. Helps to save project costs and deliver projects on time
- **Servlets**

Servlet works as a Java programming language class mainly used to extend the possible capabilities of multiple servers. It is able to host the applications by implementing several programming models where it helps to handle server requests and is able to process them and reply to them with properly response (Nazihovna, 2022). On the other hand, users can use this servlet in order to collect various data inputs from a specific user by using the HTML form that is necessary for handling the user databases as per the application requirements. Two types of servlets are there that have been used to develop web applications one is generic servlets, and another one is HTTP servlets, which both play an essential role in application development. For the above reason, this programming language has been used to develop the job recommendation system per user requirements.

2.5 Working process of HTML, CSS, and DBMS

HTML offers multiple raw tools that have been used to structure the interface of the web application. On the other hand. Several features are there that provide flexibility during creating website content, such as "*it is very simple and easy to understand the entire code of HTML*", "*provides flexibility to interact with another programming language*", "*provides user-friendly interface*," and "*easily fixed in any software platform*". In case of CSS, it has been used for evaluating the web styling and laying out the selected web pages. Also, it has been widely used to change the content size, spacing, and colour as per the user's requirements. It

helps create more attractive web applications than the other programming language. Apart from that, MySQL has been used to store the user's data, and it plays a vital role in handling raw data without showing any errors. The database has been connected using MySQLi connector, which can show users' information by generating accurate queries. It has been mainly used for storing and manipulating data and helps define relationships for each table. It provides data protection, data scalability, and high efficiency, which is necessary for maintaining a database.

2.6 Literature gap

This assignment has been based on the job recommendation system created using Java, HTML, CSS, DBMS, JSP, and SERVLETS. In that case, this programming language can be used to build other healthcare and educational websites not covered in this part. It is considered the most significant literature gap that needs to be covered in this chapter. On the other hand, the disadvantages of this programming language are also not covered within this chapter which is also essential for evaluating the software work. Multiple software platforms are present that help evaluates the software codes, which needs to be discussed in the above part. It has been considered another gap in the literature that needs to be covered in the future for evaluating multiple software tasks. Also, the organization can face various types of security threats, and a clear description of numerous security threats needs to be covered within this part. The solutions for mitigating the security threats should be covered within this literature review chapter, which is another gap in this research. Sometimes, multiple errors have been enhanced during software work, and their solutions need to be covered within this chapter, which is also a necessary part of running the web application smoothly.

2.7 Conceptual Framework

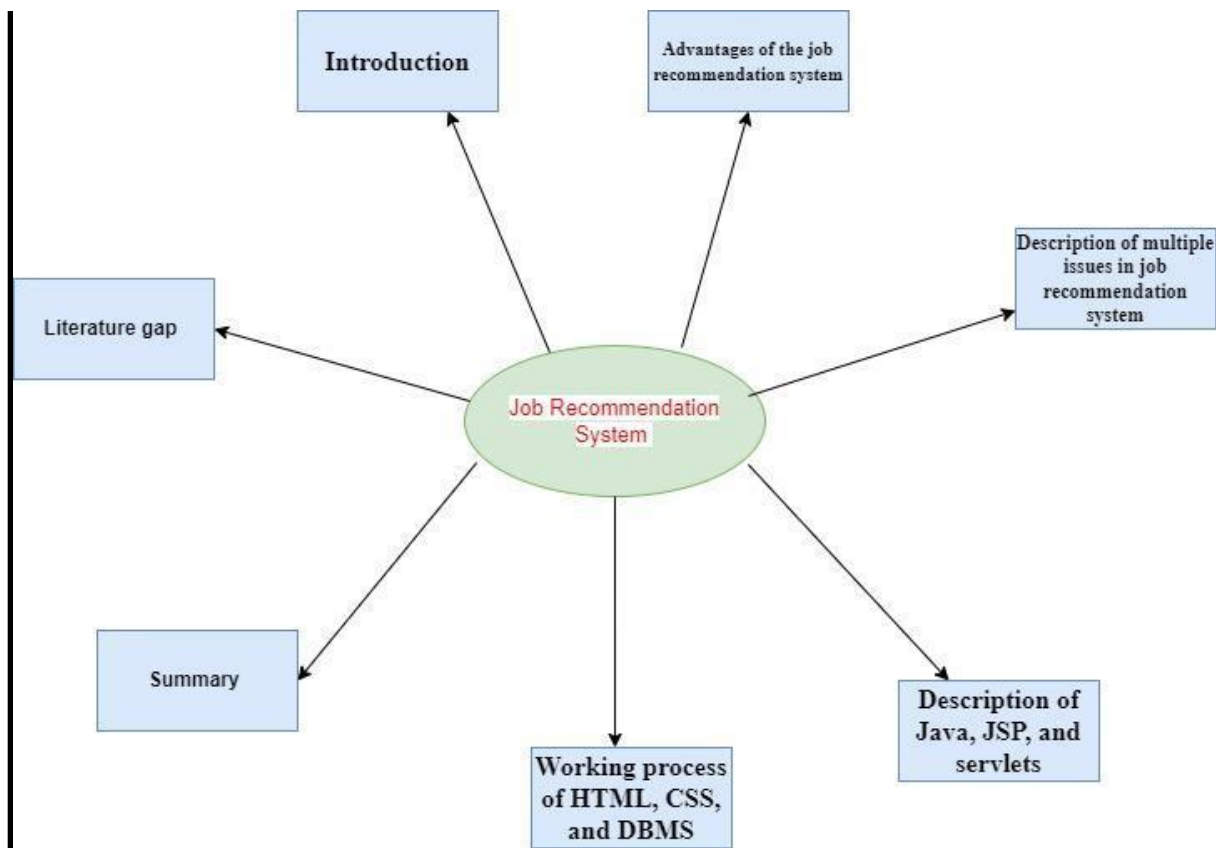


Figure 2.7.1: Conceptual framework

(Source: Developed by Self)

2.8 Summary

At the end of this chapter, it has been summarised that the job a proper evaluation of a job recommendation system is necessary for every job seeker who is searching job based on their skills, and this assignment is based on this *"job recommendation system using java"*. This chapter has already covered general information that helps to understand the entire assignment and enhance the flexibility of future research. The advantage of this job recommendation system has been covered in this chapter, which helps every user get various job opportunities per their skills. This job recommendation system has been created using Java JSP, and servlets of this software aspects are also covered within the above chapter. This chapter covers the walking process of HTML CSS and the evaluation of my SQL for database connection, which helps to understand the software work process. In that case, a literature gap is also mentioned where this research gap is covered. On the other hand, a conceptual framework has been

designed using a diagram named draw.io. This diagram mentions multiple dependents and independent variables in the literature review chapter.

Chapter 3: Methodology

3.1 Introduction

The “*Job Recommendation System*” web application is based on the JAVA programming language. This programming language is object-oriented and can be used on multiple platforms, such as computers, laptops, mobile devices, gaming devices, tablets, etc. This multi-platform programming language helps run different applications on different devices using an internet connection. Several steps have been required to design a web application with both frontend and backend connections. First of all, the motive of the web application will be selected. After that, the required tools for designing the web application will be gathered. After gathering the tools, the required techniques will be chosen to start the implementation of the project work (Trevisan *et al.* 2018). After gathering all the tools and technologies, the performance of the web application development work will be created. After developing the web application’s front end using a different programming language, such as HTML and CSS, the backend connection of the web application will be completed. A backend connection is required to store the data in the web application database server. MySQL will be used to implement the backend connection of the web application. This will be the final step in developing the web application. After creating both the frontend and backend relationship, the web application will be ready for dry test runs. In this project work, the “*Job Recommendation System*” web application will be developed using the following steps for helping job seekers all around the globe by suggesting recommended jobs through their provided information.

3.2 Required Tools and Techniques

In this project, different types of tools have been used to develop a web application of a job recommendation system. Various coding platforms can be used to build web applications. The JAVA programming language is the perfect option for the “*Job Recommendation System*” web application. JAVA is a coding platform that helps to develop various applications that can run on scientific supercomputers, computers, mobiles, laptops, tablets, etc. JSP, or “*Java Server Pages*,” is a technique used to create several web pages and online applications that handle a variety of dynamic content. On the other hand, employing JSP tags enables any web developer to incorporate different Java scripts into the “*Hypertext Markup Language (HTML)*” pages. Servlet is a JAVA programming language platform division that helps extend the web server capability of the host applications that can be accessed utilizing the “request-response”

programming model (Trevisan *et al.* 2018). HTML, known as “*Hypertext Markup Language*,” will be used to develop the frontend of the web application. Lists, links, texts, photos, tables, etc., can be generated using the HTML coding language. CSS, known as “*Cascading Style Sheets*,” can beautify the layout of web applications or web pages. Page size, font colour inside the web application, various decorative features, animations, etc., can be added using the CSS programming language. HTML and CSS will be used to develop the front end of the job recommendation system web application. Lastly, MySQL, a database management system tool, will create a database for the job recommendation system web application and connect the website’s frontend to run flawlessly on every platform that supports the JAVA programming language. All the mentioned tools will be used to develop the “***Job Recommendation System***” web application.

3.3 Develop Web application Using JAVA

This programming language provides multiple project flexibility and is also able to adjust within multiple software platforms. It is one of the most used programming languages that help develop various dynamic wave applications and also helps to utilize the web browser and other technology to perform tax over the internet. In that case, users must first open an eclipse dynamic web project. After that, they need to give a project name for creating a servlet. After that, a servlet jar file needs to be created, an HTML file must be created for running the application, and a GCC compiler must build the wave application without facing any errors. Java works perfectly in order to develop applications, and it has the ability in order to communicate with a large number of systems, which is also a necessary part of building this job-recommended system. It provides flexibility for creating this recommendation system using eclipse, and HTML has been included within the java code by applying the jar file (Sari *et al.* 2022). In that case, HTML has been used to create the application interface, and CSS has been used for changing the background and font colour, making this web application more attractive than the other programming language. This programming language supports building this web application by using multiple servlets. Multiple java applications are present such as “*standalone applications*”, “*web applications*”, “*enterprise applications*,” along with “*mobile applications*”. Other steps of this java application process include “*project setup*”, “*creating and editing exact java source code*”, “*compiling and running the application*”, “*testing and debugging the application*”, and “*running the application*”. On the other hand,

some basic steps need to be followed for Java applications, such as “coding”, “compilation,” along with “code execution”.

3.4 Implementation of HTML, CSS, JSP, and Servlet

The term “*Hypertext Markup Language (HTML)*” is a coding platform that helps generate the frontend of websites or web applications. In this project work, a JAVA application has been developed as the “***Job Recommendation System***” for students all around the globe. HTML will be used to design the frontend of the web app. The front page will contain the registration page, login page, the home page, available jobs, admin page, job seeker page, employee page, job provider page, etc. These pages will be developed using the HTML coding language. CSS or “*Cascading Style Sheets*” will be used to design the web application. The colours of the web application page, boxes, different comment boxes, and the “***Job Recommendation System***” design will depend on the CSS programming language. JSP “*Java Server Pages*” will be used to create the web application as the program is based on the object-oriented programming language JAVA (Jackson *et al.* 2020). The “request-response” programming model can access host programs using the servlet platform division of the JAVA programming language. Servlet helps enhance the web server capacity of the host applications. Two kinds of servlets have been used to create web applications: HTTP and generic servlets. Both types are crucial to the creation of web applications. The job suggestion system was designed using this programming language following user needs for the above mentioned purpose. Firstly, the web page will be created using the HTML coding language. After that, JAVA, JSP, and Servlets will be implemented to design the web page, as the web application is based on the JAVA programming language. After that, implementing CSS into the web application will beautify the “***Job Recommendation System***” web application. At last, a database will be developed and connected with the frontend of the web application using the connection of MySQL.

3.5 Database connection using MySQL

This assignment has been based on the job recommendation system where the user needs to login within this system by inputting their personal details such as their name, skills, education qualification, and others where this database software has been used to handle their data as per the user requirements. In that case, multiple tables have been created within this SQL based on this web application. This MySQL offers to select data types during table creation, and the system admin is responsible to handle the database where users' data has been stored (Dhika *et*

al. 2019). In that case, MySQL connector has been used to connect databases within the web application, and it saves multiple job applicants' information as per their requirements. This database system allows users to update or delete multiple pieces of information from the database. In that case, it allows the user to generate a query for solving multiple problems and visualizes information as per the user's requirements. This job recommendation system works as an open-source relational database management system that helps handle raw data per the user's requirements (Ardian *et al.* 2018).

The web application "***Job Recommendation System***" uses the JAVA programming language. This object-oriented programming language can be utilized on various platforms, including PCs, laptops, mobile phones, game consoles, tablets, and more. This multi-platform programming language enables an internet connection to run multiple apps on many devices. Several stages were necessary to create a web application with frontend and backend connectivity. This chapter of the project discusses the methods to generate a web application's front end using HTML, CSS, JAVA, JSP, and Servlet coding language. After developing the web application's front end, a database will be designed to store data in the application for future use. MySQL has been used to generate the backend database connection. The "***Job Recommendation System***" implementation process will be discussed in the further chapter of the project work.

CHAPTER –4: Implementation

This application Job Recommendation System is a web-based java application which is developed by using Java Servlets. Users who want to hire people based on their needs and who need a job in the relevant industry may find this application useful. Job providers will be able to hire workers depending on their needs and job seekers will be able to find employment by using this application.

4.1 Run the server

If we want to run this application first thing is needed to configure and start the server. After this open the tomcat server in chrome by using localhost <http://localhost:8080/Notifier>

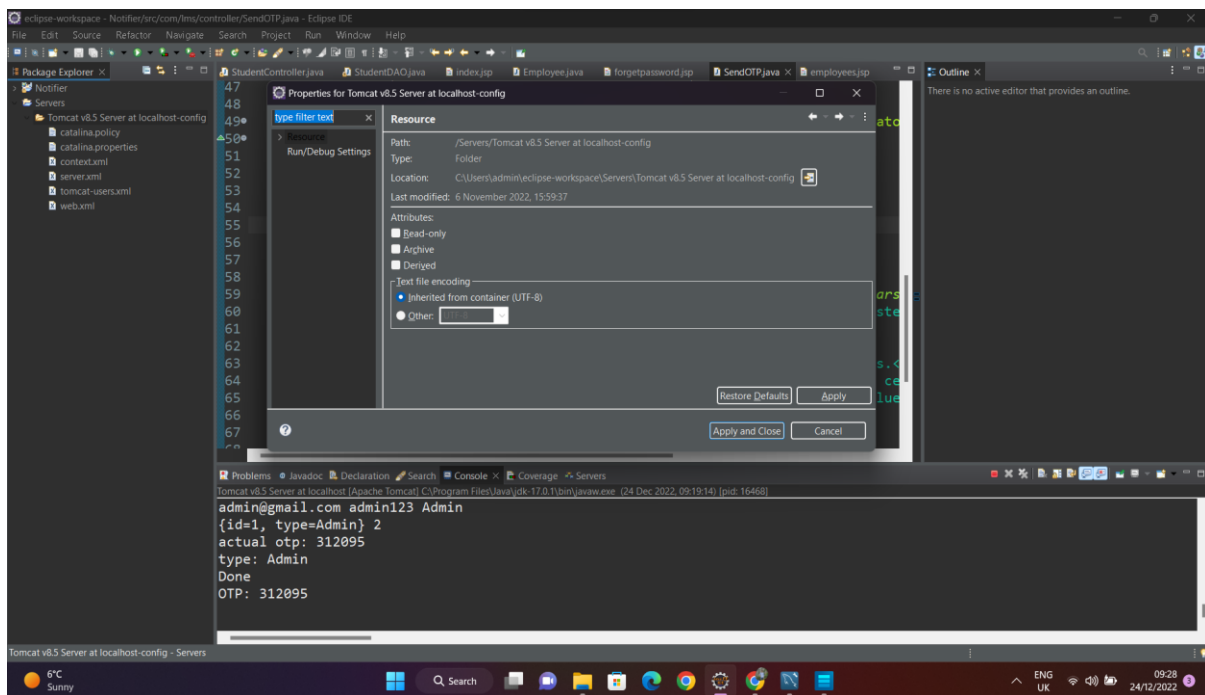


Figure 1 Running the application
(Source: draw.io)

4.2 Login Page for Users

When a user tried to log into an application, they must submit valid information such as their email address, password, and role (Job seeker, Job provider, or admin) on the login page. The user should be selected from the dropdown. In this scenario and they should click the login

button. Then, if the information from the database matches the present information, the user will be taken to the job seeker's home page.

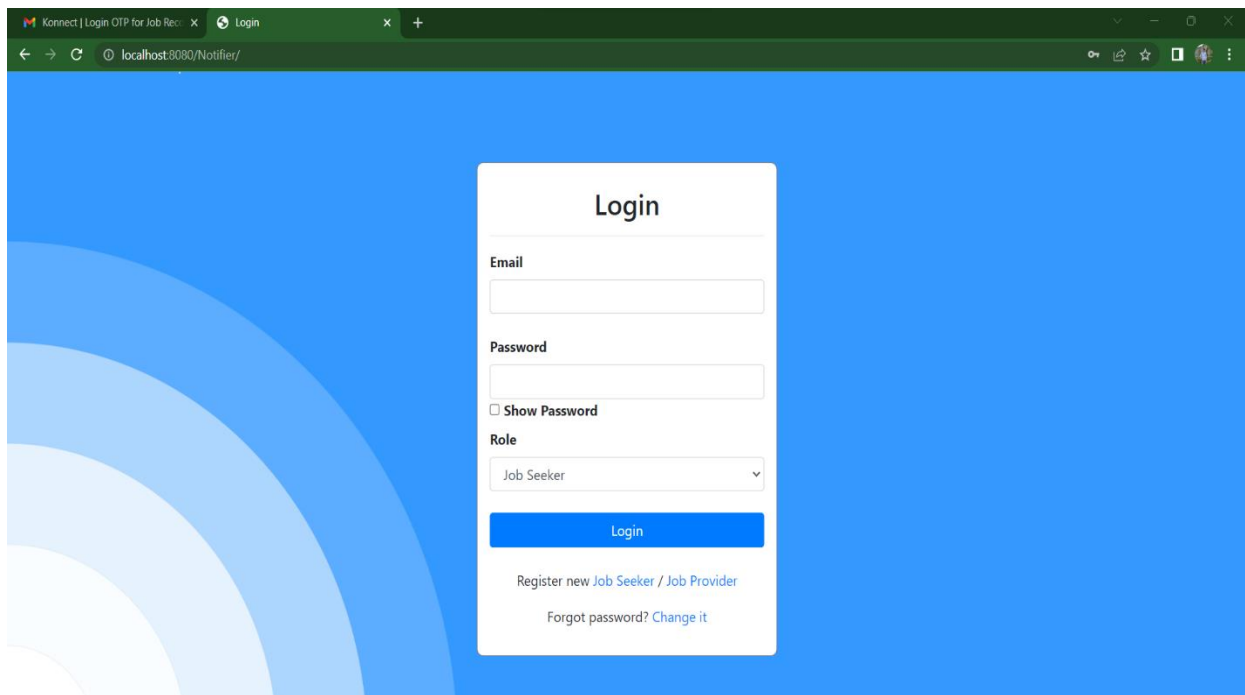


Figure 2 Job seeker's login page
(Source: draw.io)

4.3 Job seeker's Registration

If job seeker wants to register for this application they will click on register new in job seeker, then will be redirected to registration page of Job Seeker where they need to fill some mandatory fields like email address, name, mobile number, password, address of their residence, years of experience, profile picture, resume and skillset applicant possess and then click on register. This information will be stored in the database.

Register Job Seeker

Email

Job Seeker Name

Mobile Number

Password

Address

Experience

Profile picture No file chosen

Resume No file chosen

Skills

[Register](#)

Already have an account? [Login](#)

Figure 3 Job seeker's registration page
(Source: draw.io)

4.4 Job provider's registration

When a provider wants to sign up for this application, they can do so by entering information. If once the user was successfully registered they can login to this application.

Register Job Provider

Email

Job Provider Name

Mobile Number

Password

Address

Company

[Register](#)

Already have an account? [Login](#)

Figure 4 Job Provider's registration page
(Source: draw.io)

4.5 OTP sent to registered email address

When a user attempts to log into an application, the OTP must be validated. The OTP will be sent to the user's registered email address. By entering valid OTP user will be logged into the application.

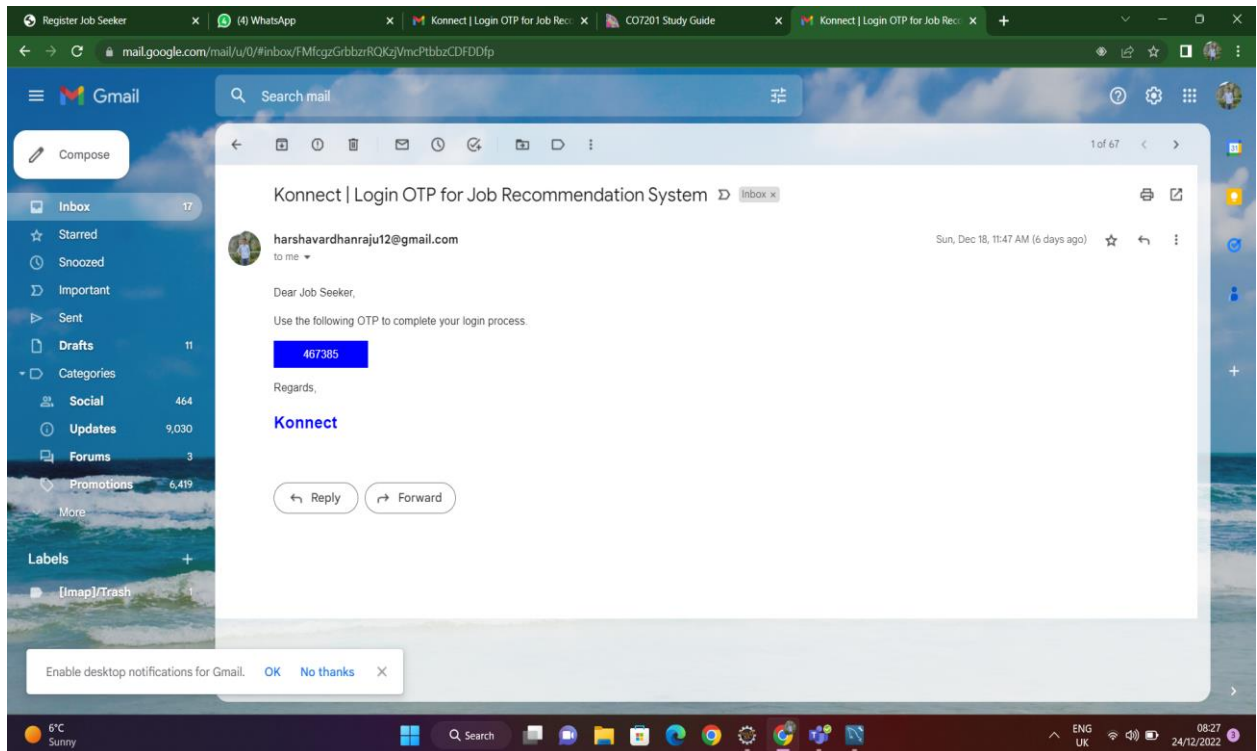


Figure 5 OTP sent to user's email id

(Source: draw.io)

4.6 OTP validation

When a user wants to log into this application, they must enter the 6-digit OTP that was sent to their registered email address and then click on the submit OTP button. After entering a valid OTP, the application will display "login successful" and redirect you to the application's home page.

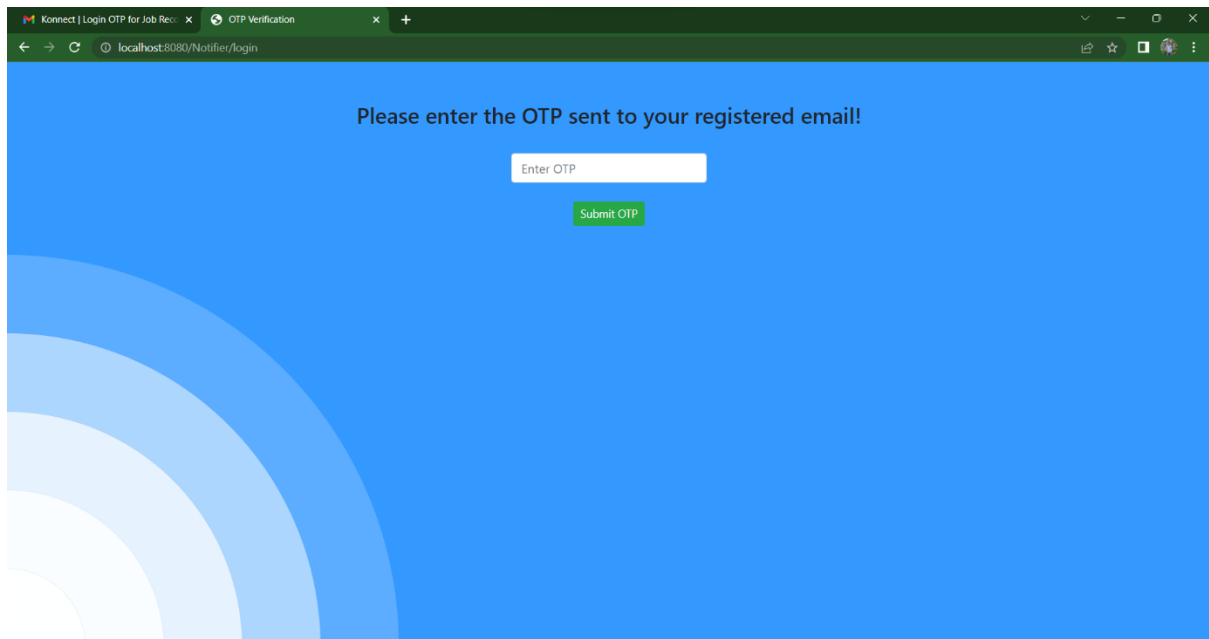


Figure 6 OTP for login into the application
(Source: draw.io)

4.7 Job seeker home page

After entering valid information, the job seeker will be redirected to the Konnect home page, which contains all types of jobs posted by recruiters, jobs recommended to profile, and jobs earlier applied for.

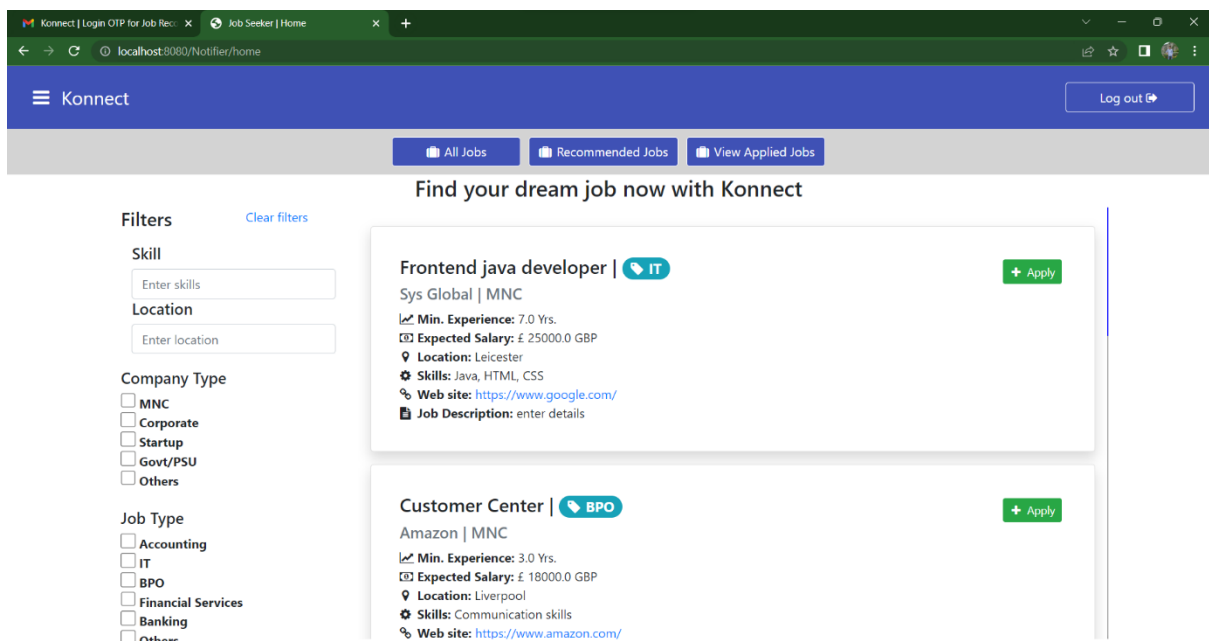


Figure 7 Jobseeker's homepage

(Source: draw.io)

4.8 Filtered jobs in home page

Instead of seeing and ignoring each job, the seeker can apply a filter to specify the type of job they want, such as company type or job type, skill and location. There are filters for company type such as MNC, corporate, start-ups, Government/Public sector (PSUs), and jobs in other sectors. Accounting, Information Technology (IT), Business process outsourcing (BPO), Financial services, banking, and other job types are available. After applying the filter, jobs related to that field will be displayed, and the seeker can apply from those.

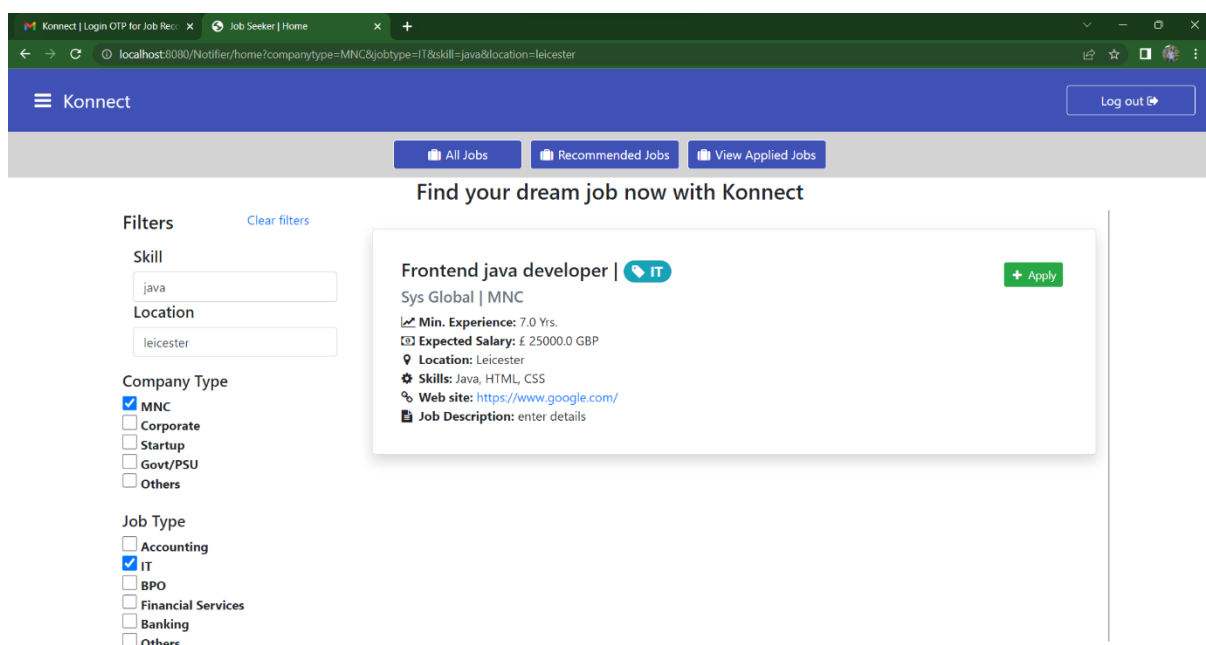


Figure 8 Filter jobs in homepage

(Source: draw.io)

4.9 Recommended jobs based on skills

Jobs will be recommended based on the skillsets of the job seeker. At the time of registration, the seeker will provide some skills that they possess, and some jobs will be suggested based on those skills. If a job seeker is interested in that position, they can simply click on the apply button. When a job seeker clicks on the apply button from the recommended list or all jobs, it sends the application to the job provider and displays the message "Applied for this job," before redirecting to the job seeker's home page.

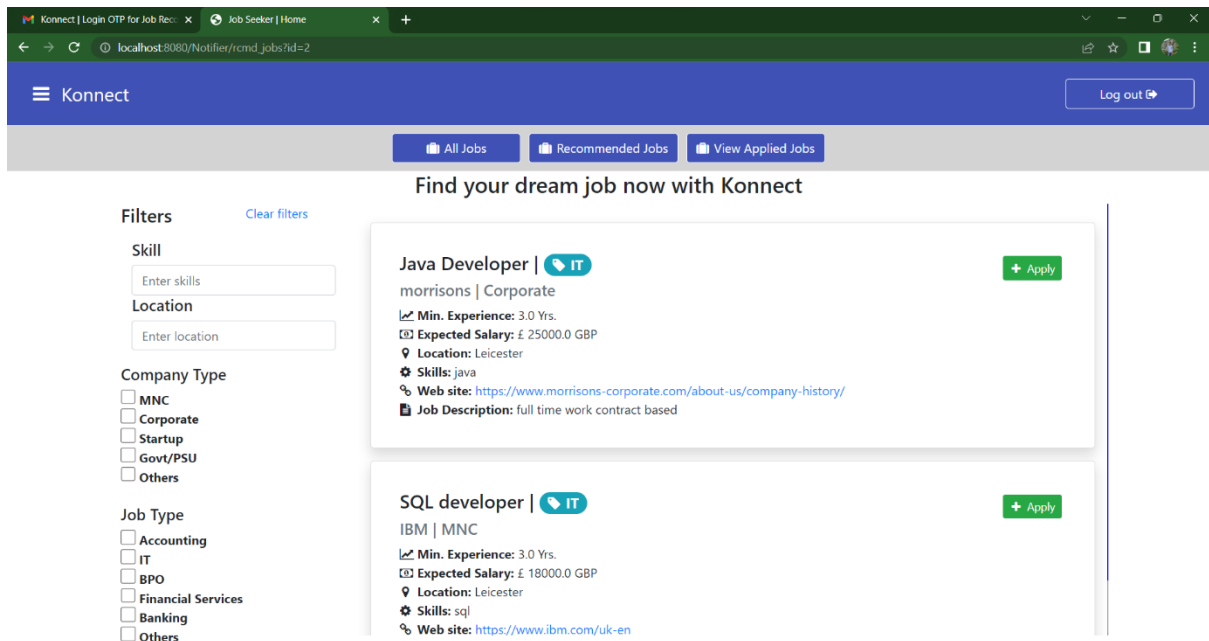


Figure 9 Konnect has recommended jobs to seeker
(Source: draw.io)

4.10 List of job applications

By clicking on view applied jobs on the job seeker's home page, the job seeker can see the jobs that they had previously applied for. Then it will display the jobs that have previously been applied for by job id, job title, company, location, and application status.

Job Id	Job Title	Company	Location	Status
1	Frontend java developer	Sys Global	Leicester	Applied
6	Java Developer	morrisons	Leicester	Applied
7	SQL developer	IBM	Leicester	Applied
8	Cloud Engineer	IBM	London	Applied

Figure 10 List of applications which seeker has already applied

(Source: draw.io)

4.11 Profile update

If a job seeker wishes to update their profile, they can do so by clicking on update profile. This will bring up the previously provided information such as personal details such as profile picture, employee id, employee name, email address, mobile number, password, and professional details such as notice period, years of experience, and skills that the seeker possesses. After updating whatever information is desired, the user can click the update details button.

The screenshot displays a web browser window with the title 'Konnect | Login OTP for Job Rec.' and a tab labeled 'Profile'. The address bar shows the URL 'localhost:8080/Notifier/emp-profile?id=2&role=Employee'. The page header is blue with the 'Konnect' logo and a 'Log out' button. The main content area is a form for updating profile details. It includes a 'Profile picture' field with a placeholder image, an 'Employee ID' field with the value '2', an 'Employee Name' field with 'emp1', an 'Email' field with 'emp1@gmail.com', a 'Mobile Number' field with '9874563214', a 'Password' field with masked characters, an 'Address' field with 'coventry', a 'Professional Details' section with 'Notice Period (months)' set to '0' and 'Experience (Years)' set to '3.0', and a 'Skills (comma separated)' field with 'python, sql, java'. A blue 'Update details' button is located at the bottom of the form.

Figure 11 Job seeker wants to update the profile details

(Source: draw.io)

4.12 Job provider home page

There are add jobs, view jobs, recommended job seekers, view job applicants, and on the home page of job providers. In add jobs, the provider/recruiter can add the job for which position he/she is looking for, in view jobs, the recruiter can view the jobs that were previously posted, some applications will be visible to the recruiter based on the job seeker's profile and the job

provider's requirement, and finally, the recruiter can see the applications that were received to the jobs posted.

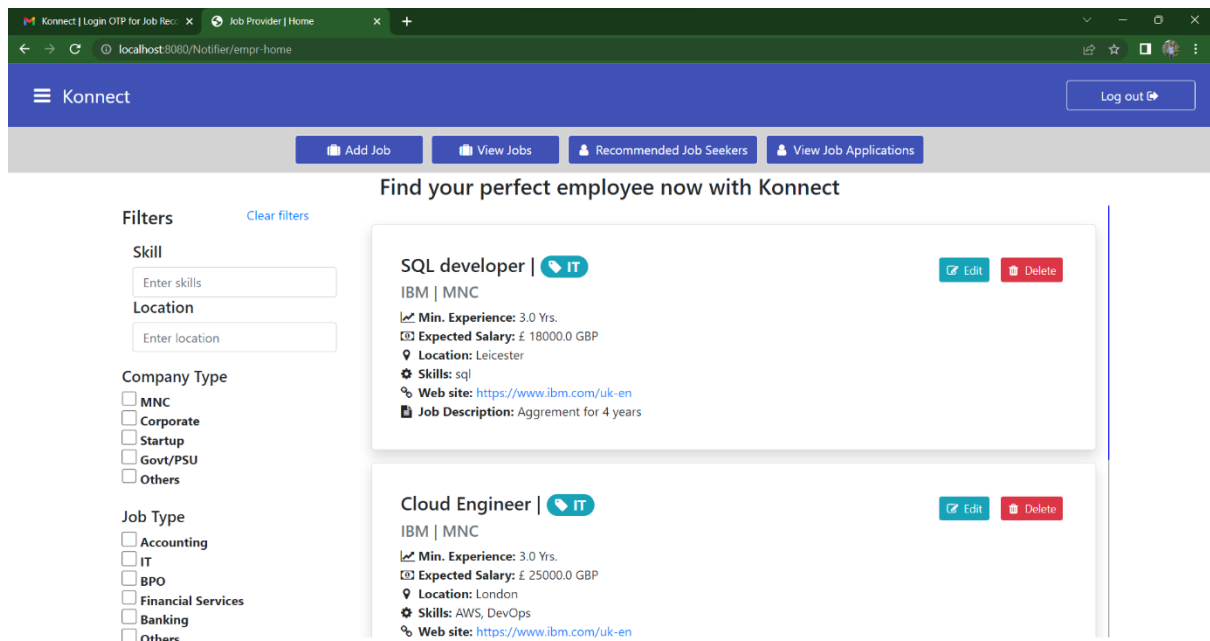


Figure 12 Home page of Job provider
(Source: draw.io)

4.13 Filtered jobs in home page

In the screen below, providers can see jobs that are MNC in company type, IT in job type followed by skill and location. Jobs with that filter are available here, and you can view them. After viewing that job, the recruiter can edit or delete the previously posted job. In the posted job, there are details such as the name of the company, the position for which the job is being posted, the minimum years of experience, the expected salary, the skillset that the seeker should possess, the website of the company, and the roles and responsibilities of the job.

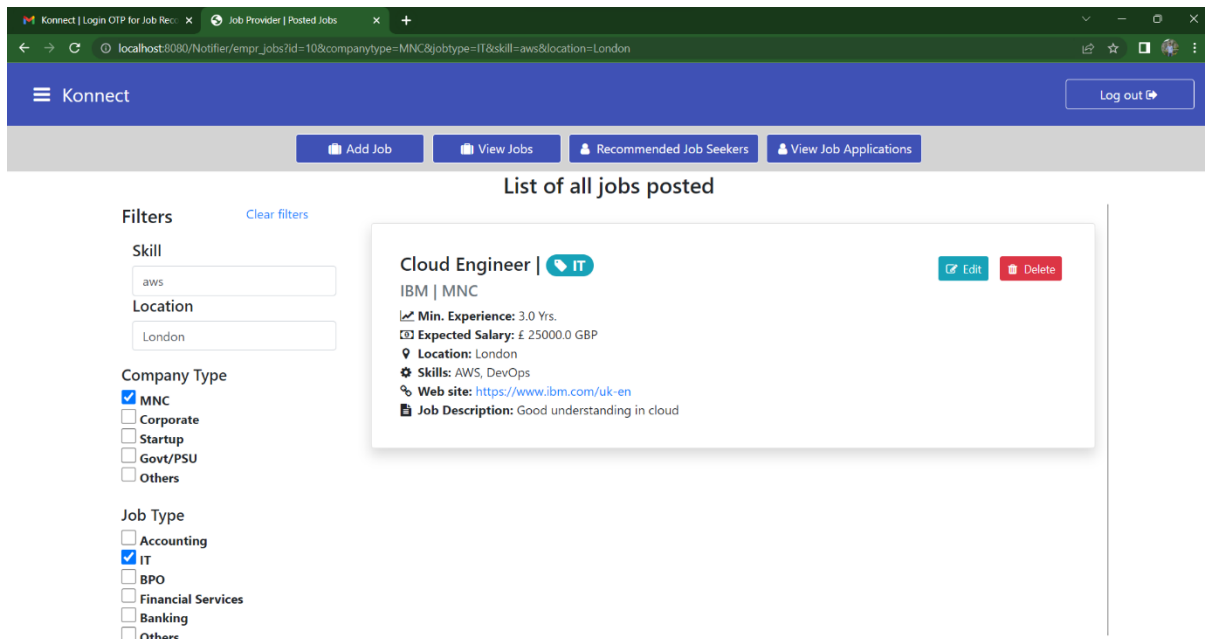


Figure 13 Recruiter can view the jobs after applying filter
(Source: draw.io)

4.14 Add new job post

In add job recruiter can add a job by providing information in the respective fields such as job title, company name, type of company like MNC, corporate etc. from dropdown, minimum years of experience applicant should possess, salary for that position, location where the applicant can work, openings, type of job like accounting, website's URL, skill set which applicant should possess and description. After entering all of the details, the job provider can click the add job button, and the job will be saved in the database. This information will be sent to view jobs in job seeker, and if this post matches an applicant, it will also be recommended jobs.

Add new job post

Job Name <input type="text"/>	Company <input type="text"/>	Company Type --select type--
Minimum Experience <input type="text"/>	Salary <input type="text"/>	Location <input type="text"/>
Openings <input type="text"/>	Job Type --select type--	Web site <input type="text"/>
Skills <input type="text"/>		
Description <input type="text"/>		
+ Add Job		

Figure 14 Job provider adds new job post
(Source: draw.io)

4.15 Recommended job seekers based on skills

Job providers can view the profiles of applicants who meet the requirements for a specific job. When a job provider posts a job that meets the requirements, some applicants' profiles will be recommended to the recruiter in the recommended job seekers section. If a job provider is interested in that profile, they will be given a list of suggested job seekers. Some basic information, such as an email address, phone number, experience, skills, and address, will be displayed.

List of suggested job seekers



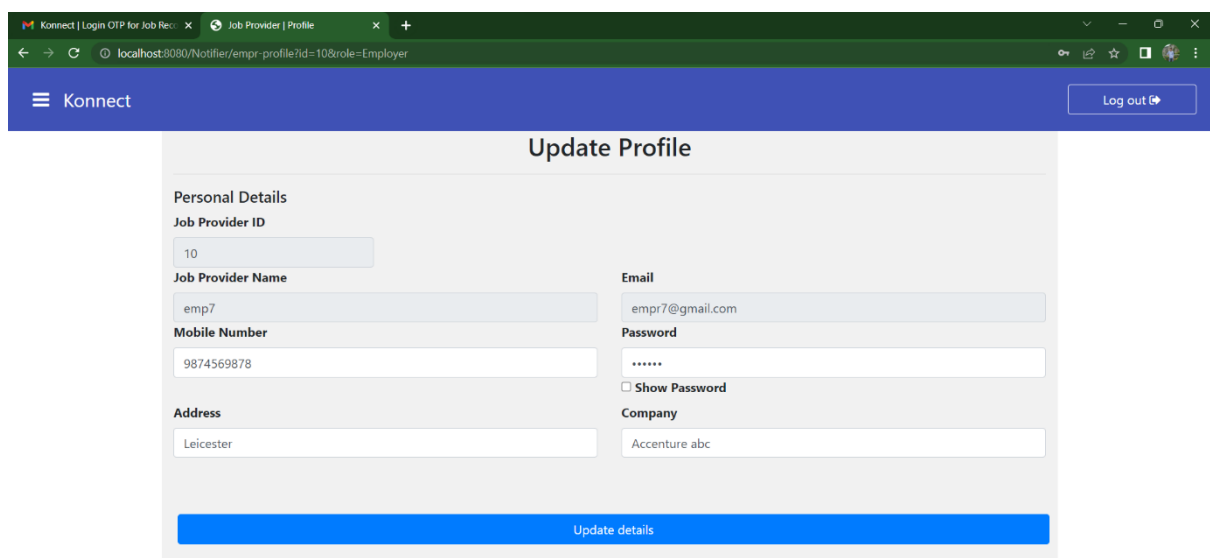
 emp1	Email: emp1@gmail.com Mobile: +44 9874563214 Experience: 3.0 Yrs. Skills: python sql java. Address: coventry
 emp2	Email: emp2@gmail.com Mobile: +44 7895621463 Experience: 3.0 Yrs. Skills: PHP XML AWS java Address: Australia

Figure 15 Job provider views recommended job seekers based on the job posted
(Source: draw.io)

4.16 Job Provider updates profile

When a job provider clicks on "Update Profile," they are taken to this page where they can update their personal information. If they want to see their password, they can check the "Show Password" box. Once all the information has been entered, you can click on update details. When the provider requests to view the profile information, those details will then be displayed after being updated in the database.



The screenshot shows a web browser window with the URL `localhost:8080/Notifier/emp-profile?id=10&role=Employer`. The page has a blue header with the 'Konnect' logo and a 'Log out' button. The main content area is titled 'Update Profile' and contains a form for updating personal details. The form is divided into two columns. The left column contains fields for 'Job Provider ID' (value: 10), 'Job Provider Name' (value: emp7), 'Mobile Number' (value: 9874569878), and 'Address' (value: Leicester). The right column contains fields for 'Email' (value: empr7@gmail.com), 'Password' (value: *****), a 'Show Password' checkbox, and 'Company' (value: Accenture abc). A blue 'Update details' button is at the bottom of the form.

Figure 16 Job seeker's update profile
(Source: draw.io)

4.17 View Job Application

The provider can view the job seeker who applied for the specific role and a few personal details of the seeker will be displayed as shown.

Id	Job Seeker Name	Contact	Skills	Status
2	emp1	emp1@gmail.com 9874563214 coventry	python, sql, java.	Applied
3	emp2	emp2@gmail.com 7895621463 Australia	PHP, XML, AWS, java	Applied

Figure 17 Viewing Job Application
(Source: draw.io)

4.18 Admin home page

When a job seeker registers in the application, the administrator must first approve their registration before they can access the website. Similarly, when a job provider registers in the application, the admin must first approve their registration before they can access the website. All jobs, including those posted by job providers, are available on the administrator's home page. In this case, the number of people awaiting permissions will be counted as both pending job suppliers and pending job seekers. There will be a count of those who are waiting for approvals in the pending job seekers and pending job providers sections. The admin can also edit and delete the job posted by the recruiter from this page. The admin will monitor all activities in this application.

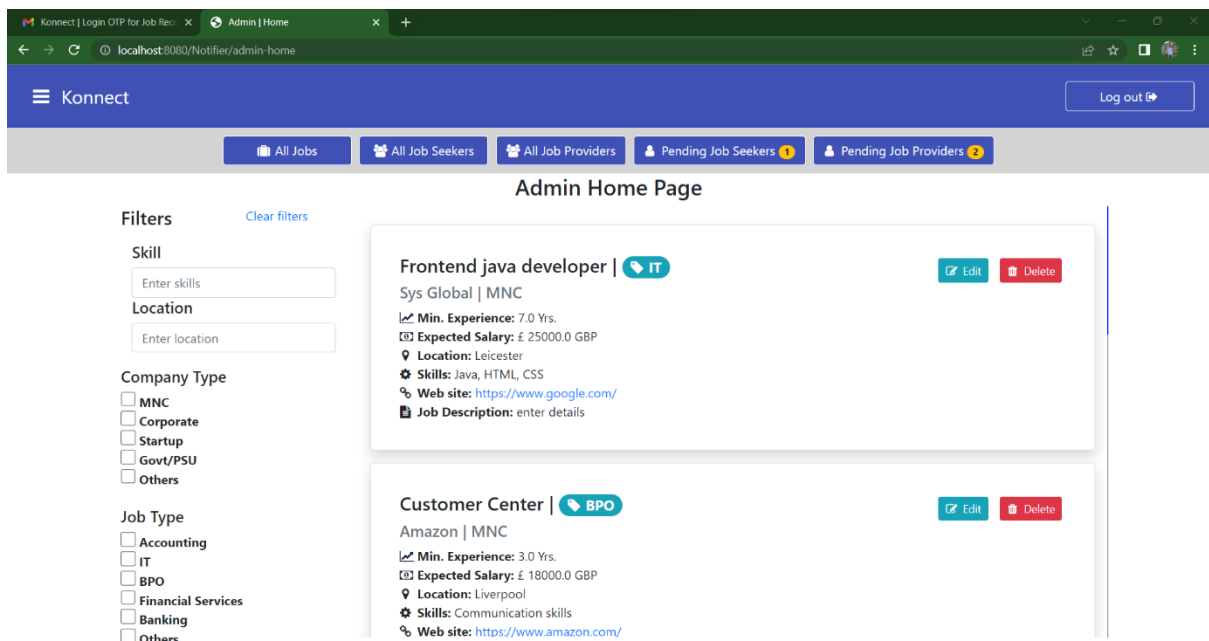


Figure 18 Admin's home page
(Source: draw.io)

4.19 Update job post

When an admin wants to update a post that was created by a job provider, they will use the edit button. Then will be redirected to the update job post page, where there are some fields to update. If admin wants to update any of the information then those will be updated in the database with previous information.

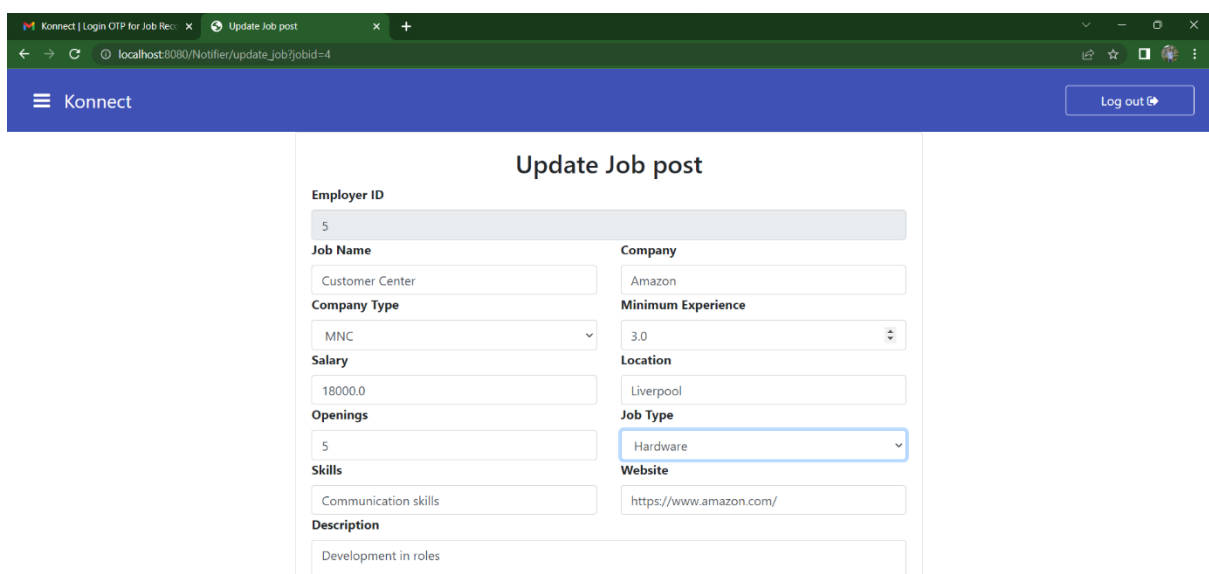


Figure 19 Admin updates the information of job posted

(Source: draw.io)

4.20 List of all job seekers

If an admin clicks on "All job seekers" on the application, all of the job seekers who have registered there will be displayed, together with their personal and professional details. Admin can also see the seeker's profile picture.

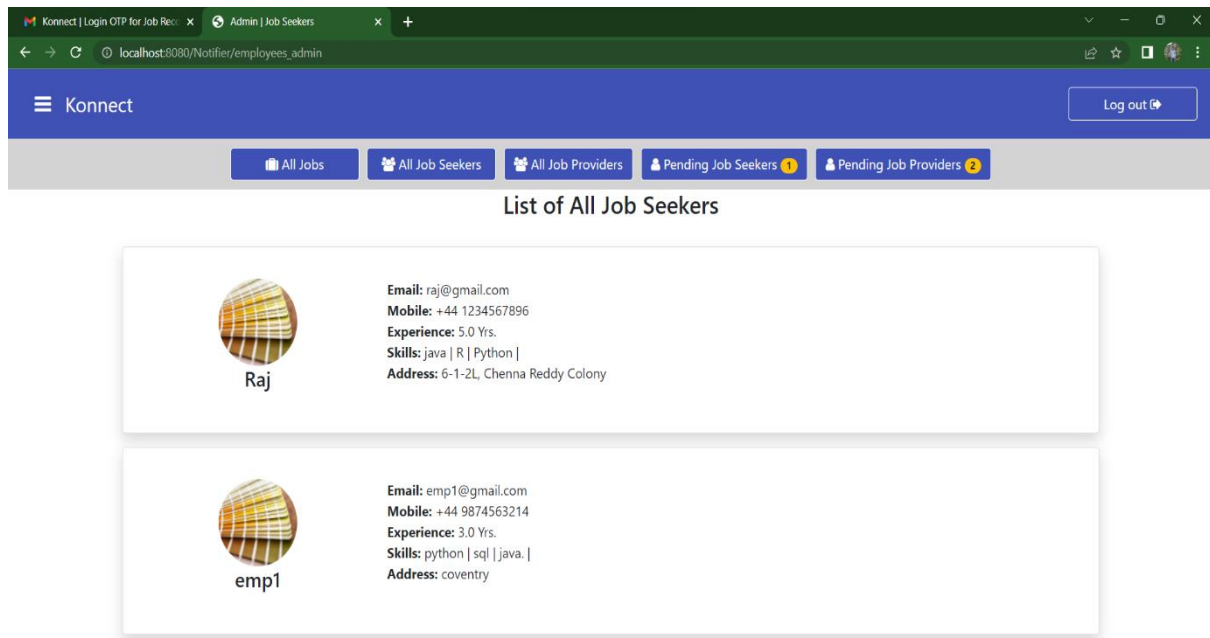


Figure 20 Admin can view the list of job seekers

(Source: draw.io)

4.21 Admin views list of all job providers

If admin wants to view all the job providers who are registered into this application will be seen by clicking on the All-job providers. Here admin can view email address, mobile number and address of the recruiter.

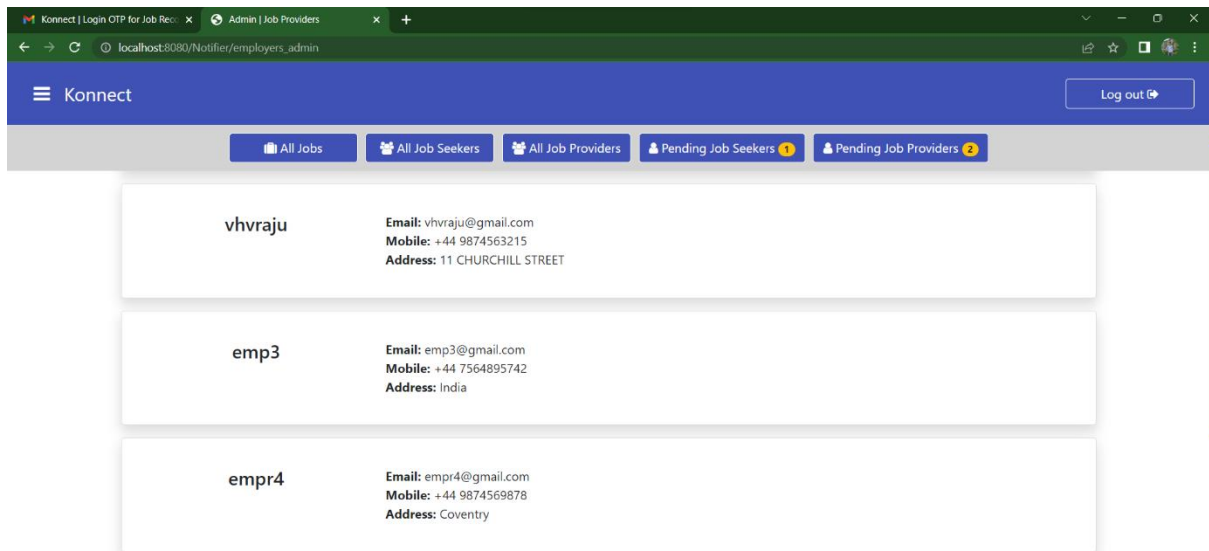


Figure 21 Admin view all the job providers

(Source: draw.io)

4.22 Admin views list of pending job seekers

If admin wants to approve all the pending job seekers then can view by clicking on “Pending job seekers”. Here admin can view the count of applications which are in pending state, that need to be approved by the admin. The list contains the details like Id, username, email address, mobile number and actions that need to be performed by the admin like activating the account.

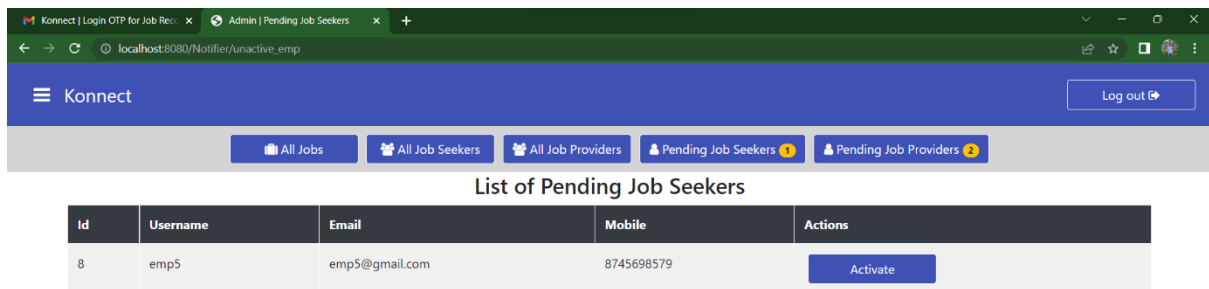


Figure 22 List of Pending job seekers

(Source: draw.io)

4.23 Pending job providers

If an admin wants to approve a job provider's pending requests, they can do so by clicking on "Pending Job Seekers," where they can see a list of all the job seekers whose profiles need to be activated.

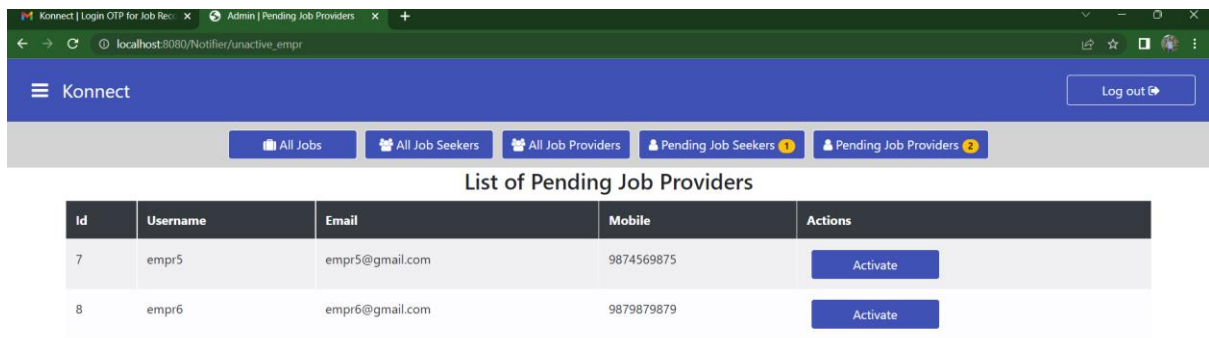


Figure 23 Admin views pending job providers

(Source: draw.io)

4.24 Email for reset password:

When admin wants to reset the password then will click on reset password it will navigate to reset password page where admin should enter the registered email id and click on “Get OTP” button. An OTP will be sent to registered email address.

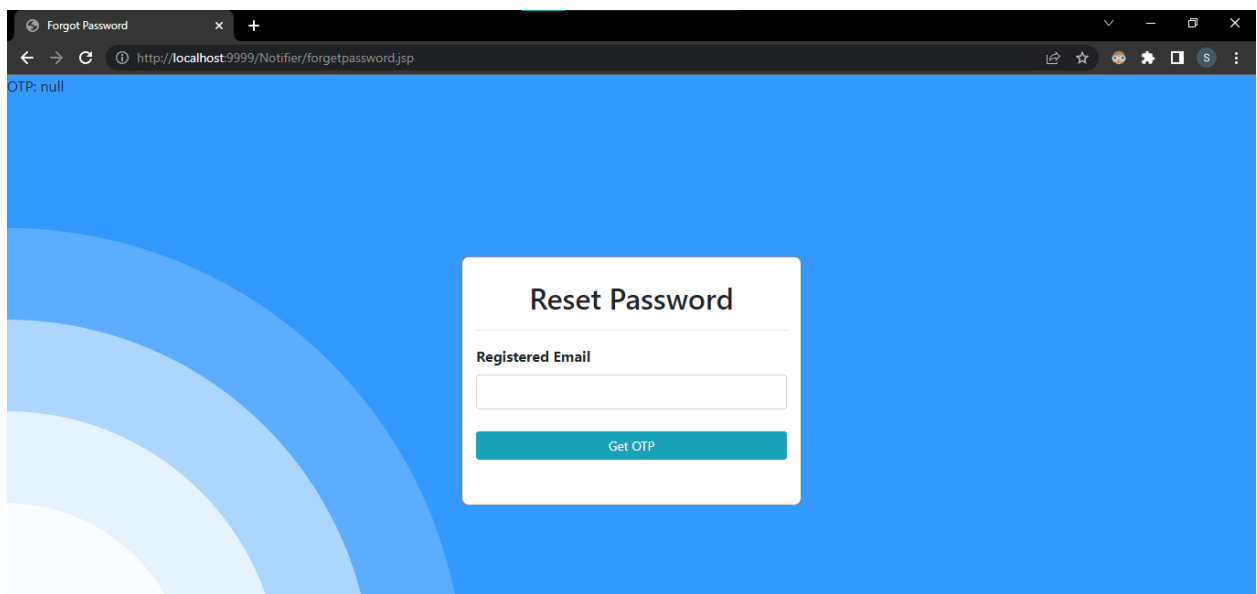


Figure 24 Admins wants to reset password

(Source: draw.io)

4.25 OTP for password reset:

The admin will fill out that one field that is required after getting the verification code through email. It will be sent to the password reset page if they enter the right code.

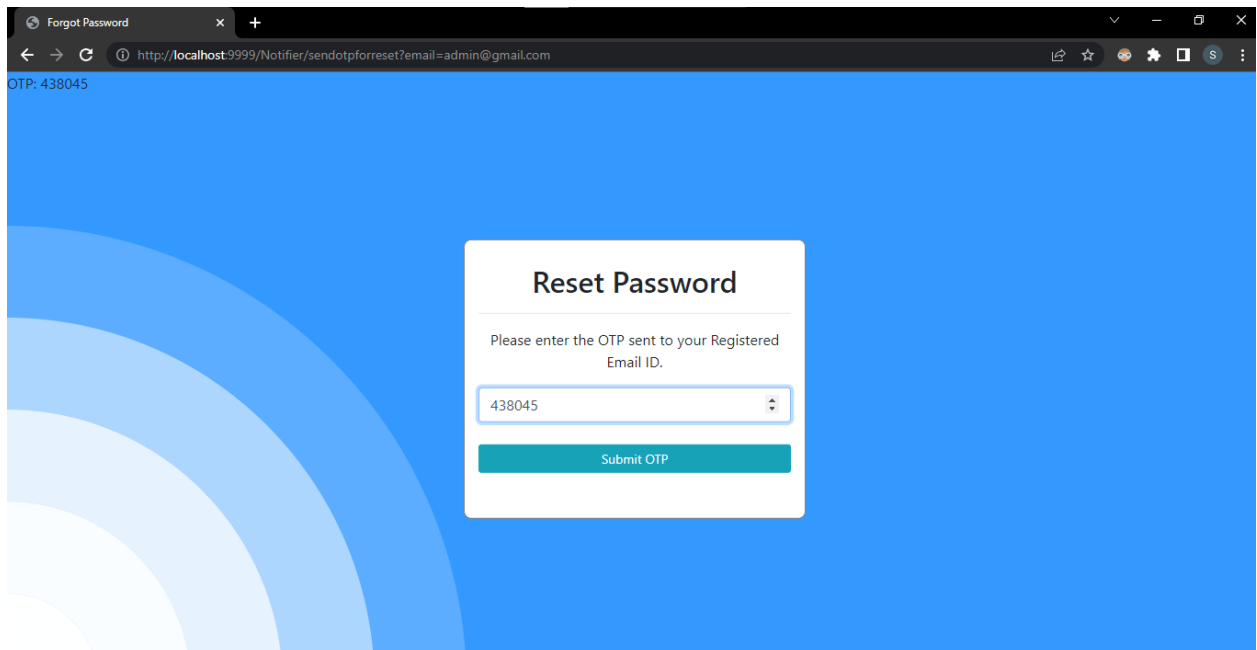


Figure 25 Admin enters OTP
(Source: draw.io)

4.26 New password and confirm password

After providing a valid code, the user is redirected to a page where they can reset their password. On this page, they can input a new password, confirm it, and then click the Change Password button. The information provided on this page will be updated in the database, so the admin must use the most recent password to log in.

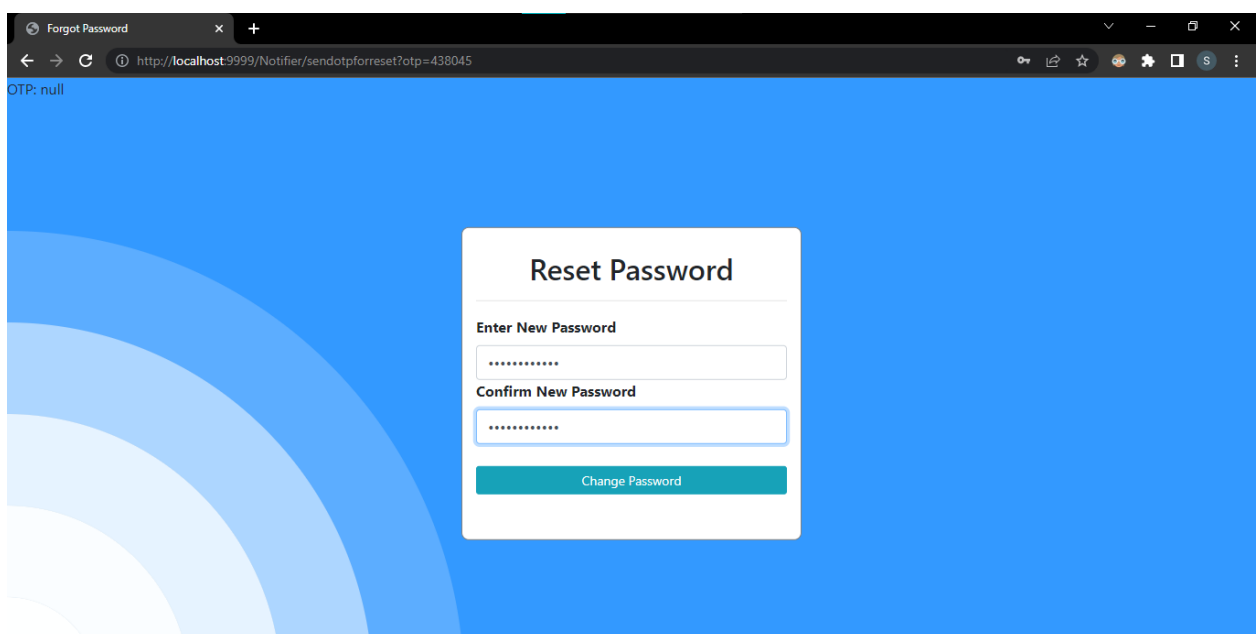


Figure 26 Admin resets the password successfully

(Source: draw.io)

4.27 Summary

The implementation of the job recommendation system provides a complete solution for both job seekers and providers in order to fulfil their necessities in the competitive world. A web-based application is always distributed in nature and users will be able to access their login credentials using most popular browsers. A web server “Apache Tomcat” server the web pages to the web clients. Different java-based libraries provide different predefined classes in order establish the front java-based web application with backend database. JDBC is used to provide complete classes to perform query and non-query operations through front-end java application. The implementation system provides a good user interface using HTML & CSS for the better visibility of the front objects.

CHAPTER -5: Testing

5.1 Introduction

Testing is a process of validating an application whether it matches to the actual requirement or not. When we perform testing if there are any bugs or errors in the code then those will be identified make the application a bit efficient. The actual meaning of testing is “Verification of application Under Test (AUT).

Mainly there are two types of testing they are

- white box testing and
- black box testing.

White box testing refers to test the internal structure, design, and code and also improves the design, usability, and security of the application. In this testing what we test is visible so we call it as clear box testing or transparent box testing, code-based testing etc.

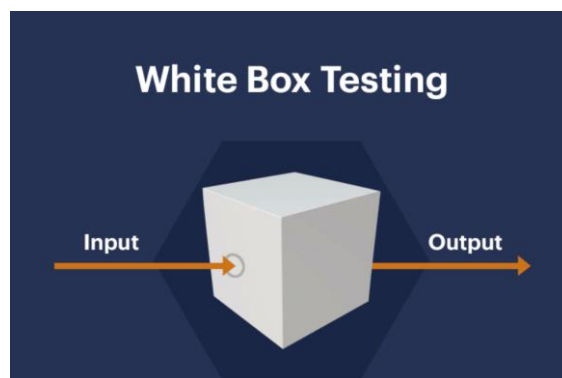


Figure 27 White box testing

(Source: <https://www.openxcell.com/wp-content/uploads/2021/06/white-box-testing.png>)

Black box testing refers to test the functionalities of the software application without having knowledge of internal things like code structure, implementation details internal paths etc. This testing mainly focuses on behaviour of the application like input and outputs, software requirements in this sense it is called behavioural testing.

Advantages of testing

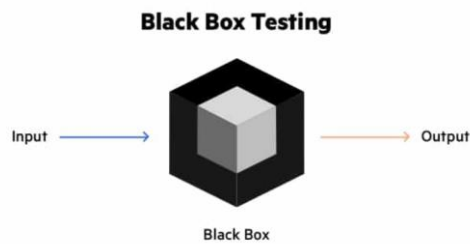


Figure 28 Blackbox testing

(Source: https://www.imperva.com/learn/wp-content/uploads/sites/13/2020/03/thumbnail_Black-box.jpg.webp)

5.2 Test Cases for Job Recommendation System

Test Case ID	Test Case Description	Expected Value	Actual Value	Result
Test_Case_JR_01	Access the Web Site Home Screen	After executing or running the tomcat server the web browser should display the home page	Tomcat Server started successfully and Web site will be accessed using default URL http://localhost:8080/JobRecommendation	Pass
Test_Case_JR_02	Availability of objects	The website should display the Home Screen with all the menu items required to navigate across Admin, Job Seeker & Job Provider Modules	The website is able to display all the navigation menu items required to access various web page Modules	Pass
Test_Case_JR_03	Look & Feel of the screen component	The website should provide with a background image and color combination in order to make the visibility of	All the components are clearly visible in terms of user is able to access each and every web page without any navigation issues. And all the	Pass

		the components of web site	components are clearly visible on the screen.	
Test_Case_JR_Login_01	User Interface of the Login Page & Registration page	The Login is first page of the application through which user should be able to access the Dashboard of the different roles & responsibilities of the Users	The Login page is able to access the Dashboard after providing valid credentials & OTP for two factor authentication to provide a secured login.	Pass

5.3 Validation

This application includes validation checks for each field on the page, such as email, password, and role. If the user does not enter any information, the message will appear at the top of the screen. Because no email address was provided, the message "Please enter a valid Email ID" was displayed.

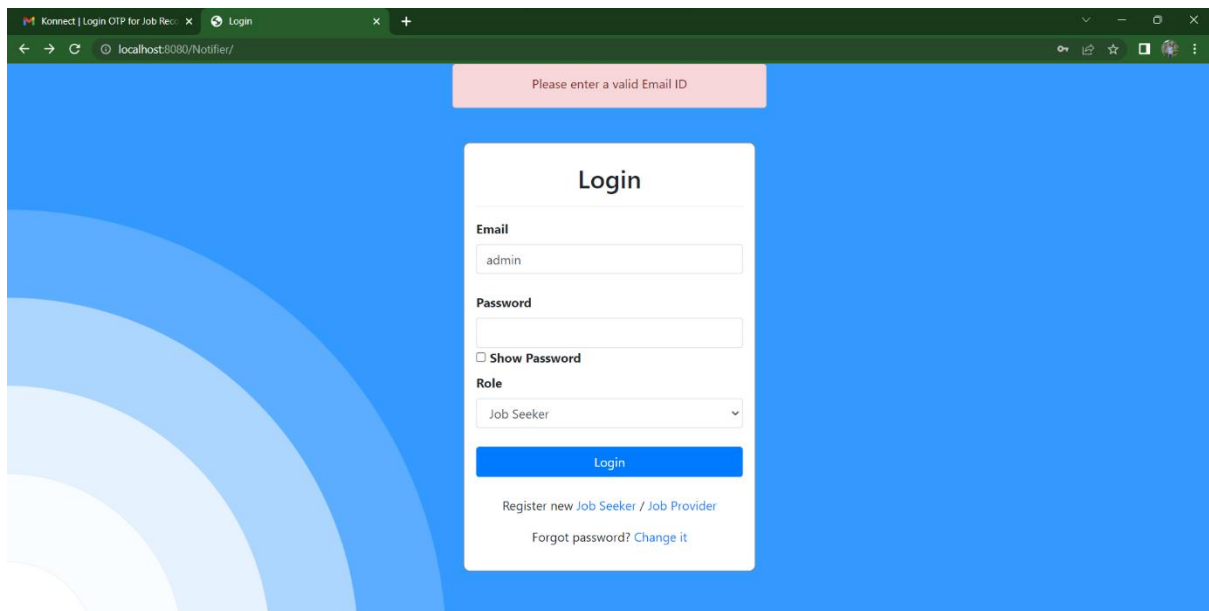


Figure 29 Validation check for Email Id

(Source: draw.io)

When a user enters all of the information in the appropriate fields, it should be compared to the information entered during registration. Here user has entered an incorrect password, which will be validated against data stored in the database; if it does not match, the message "Incorrect password" will be displayed.

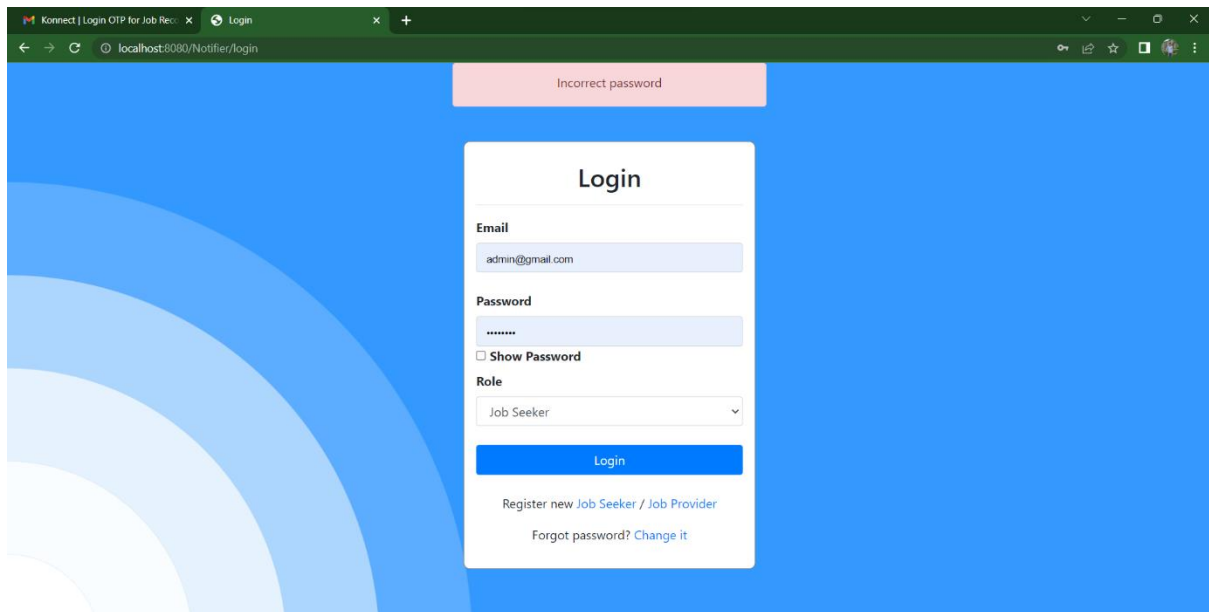


Figure 30 Password Validation

(Source: Draw.io)

When a user enters the incorrect role as an employee, it is compared to the information in the database and a message is displayed at the top of the screen.

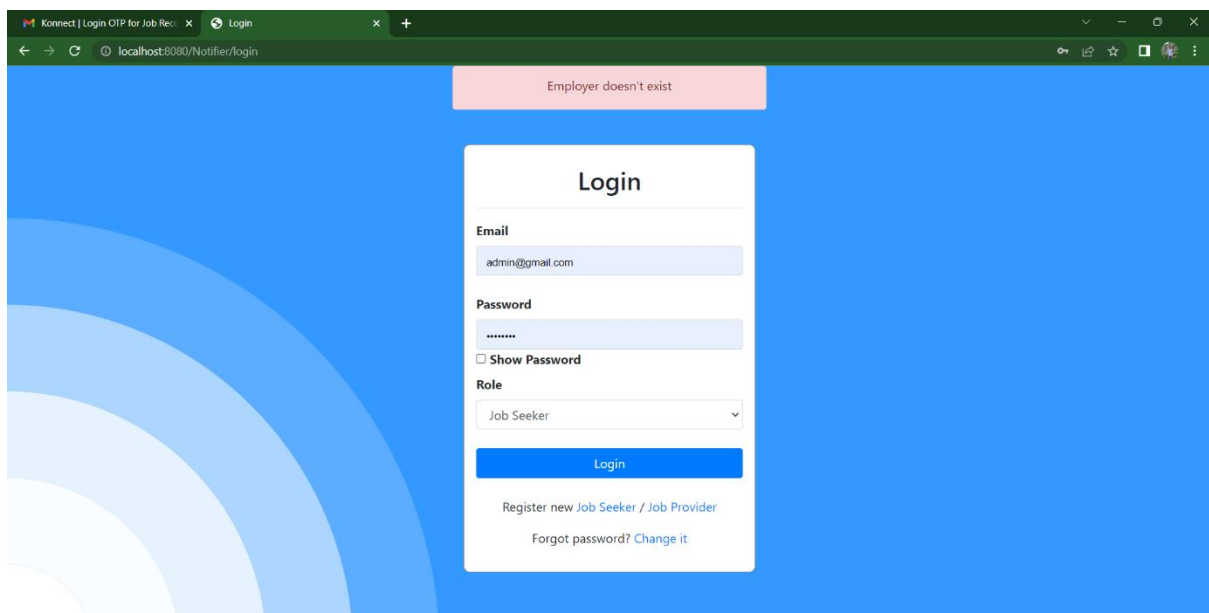


Figure 31 User has entered incorrect role

(Source: Draw.io)

5.4 OTP validation error

Here when user enters an invalid OTP then it will display a message as “Please enter a valid 6-digit OTP.”

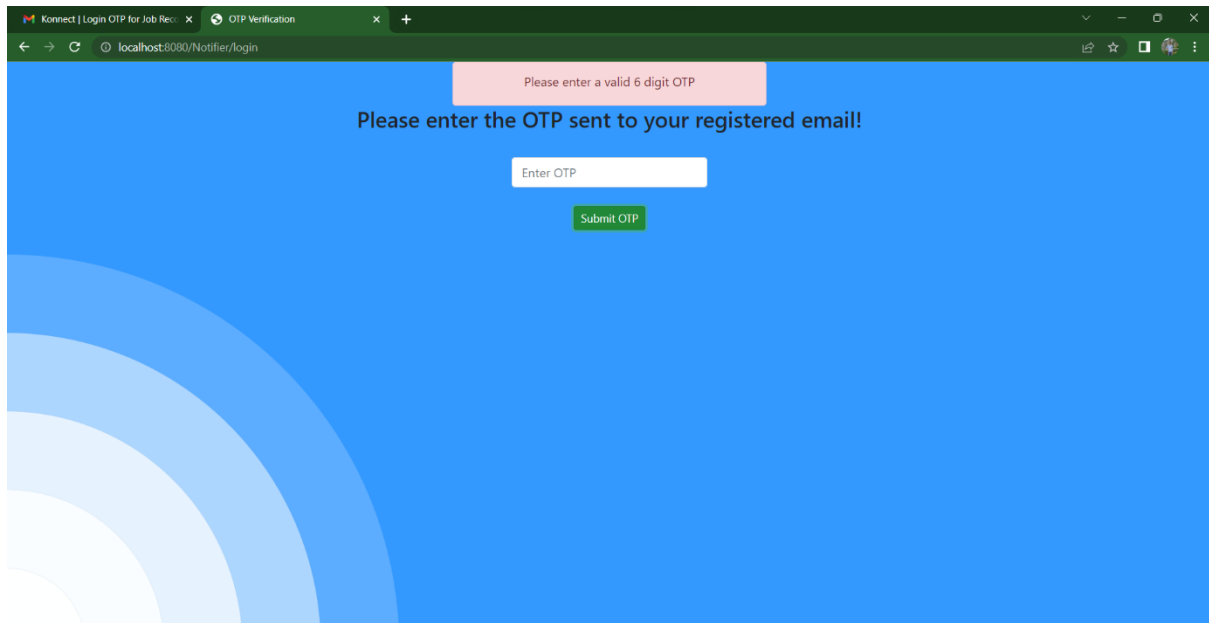


Figure 32 OTP validation error

(Source: draw.io)

5.5 Non-functional testing

Different non-functional testing techniques are used to validate the performance, scalability and reliability of the web-based system. The web site is tested under various environments like operating systems and web browsers. Non-functional testing validates the software and hardware compatibility issues. In general job recommendation system web site is accessible by the global users and users from different domains will register and login into the application. The users or job providers will upload the profile which can be accessible by the job providers.

CHAPTER -6: Conclusion

Job portal web sites are widely used across distributed computing environment. Various companies are maintaining job portal web sites to fulfil the gap between job seekers and job providers, but getting a right job in the right time to the right person becoming challenging day to day in the competitive world. Most advanced search options are required to categorize the

profiles with different job opportunities. The project concludes providing a complete solution for job recommendation system. In this research study a complete pervasive computing system is provided through most advanced web designing and content management application. The implemented system provides search option to the users to match their profiles with different requirements based on criteria. The job providers will be posting the opening's based on the new and current requirements. Seekers will upload the profiles with experiences and CTC details in order to get the better opportunities to achieve the higher goals and getting placed in the top most companies. The system has been developed in such a manner can identify the best possible and feasible requirements that matches profiles and jobs. It has been concluded that new web technologies of the proposed system have provided feasible ways to achieve the project objectives.

Reference

- Dillahunt, T.R., Lam, J., Lu, A. and Wheeler, E., 2018, June. Designing future employment applications for underserved job seekers: a speed dating study. In Proceedings of the 2018 Designing Interactive Systems Conference (pp. 33-44). Available at <https://dl.acm.org/doi/pdf/10.1145/3196709.3196770>
- Huang, Q., Xia, X., Xing, Z., Lo, D. and Wang, X., 2018, September. API method recommendation without worrying about the task-API knowledge gap. In 2018 33rd IEEE/ACM International Conference on Automated Software Engineering (ASE) (pp. 293-304). IEEE. Available at https://ink.library.smu.edu.sg/cgi/viewcontent.cgi?article=5300&context=sis_research
- Singrodia, V., Mitra, A. and Paul, S., 2019, January. A review on web scrapping and its applications. In 2019 international conference on computer communication and informatics (ICCCI) (pp. 1-6). IEEE. Available at https://www.researchgate.net/profile/Subrata-Paul-7/publication/335577015_A_Review_on_Web_Scrapping_and_its_Applications/links/6346f5b776e39959d6baa2c0/A-Review-on-Web-Scrapping-and-its-Applications.pdf
- Syaifudin, Y.W., Funabiki, N., Kuribayashi, M., Mentari, M., Saputra, P.Y., Yunhasnawa, Y. and Ulfa, F., 2021, February. Web application implementation of Android programming learning assistance system and its evaluations. In IOP Conference Series: Materials Science

and Engineering (Vol. 1073, No. 1, p. 012060). IOP Publishing. Available at <https://iopscience.iop.org/article/10.1088/1757-899X/1073/1/012060/pdf>

Kuusisto, R.H., 2018. Transition from java applet to modern web application. Available at https://www.theseus.fi/bitstream/handle/10024/153049/Kuusisto_Riku-Hermanni.pdf?sequence=2

Trevisan, M., Giordano, D., Drago, I., Mellia, M. and Munafo, M., 2018, December. Five years at the edge: Watching internet from the isp network. In Proceedings of the 14th International Conference on Emerging Networking EXperiments and Technologies (pp. 1-12). Available at https://www.researchgate.net/profile/Martino-Trevisan/publication/329259783_Five_years_at_the_edge_watching_internet_from_the_ISP_network/links/5f763f0da6fdcc00864feafb/Five-years-at-the-edge-watching-internet-from-the-ISP-network.pdf

Mohammadi, V., Rahmani, A.M., Darwesh, A.M. and Sahafi, A., 2019. Trust-based recommendation systems in Internet of Things: a systematic literature review. *Human-centric Computing and Information Sciences*, 9(1), pp.1-61. Available at <https://ieeexplore.ieee.org/abstract/document/8646645/>

Jackson, D. and Tomlinson, M., 2020. Investigating the relationship between career planning, proactivity and employability perceptions among higher education students in uncertain labour market conditions. *Higher education*, 80(3), pp.435-455. Available at <https://link.springer.com/article/10.1007/s10734-019-00490-5>

Boranbayev, S.N. and Kabdulkarimov, 2022. Y.Z., DEVELOPING AN APPLICATION FOR FACIAL IDENTIFICATION IN THE JAVA PROGRAMMING LANGUAGE. *Chief Editor- Andrew Adams, Doctor of Technical Sciences, Massachusetts Institute of Technology, Boston, USA Assistant Editor-Samanta Brown, Doctor of Physical Sciences, American Institute of Physics, Maryland, USA*, p.21. Available at https://american-issue.info/wp-content/uploads/2019/12/american_32_2_dec_2019-3.pdf#page=21

Manelli, L. and Zambon, G., 2020. *Beginning Jakarta EE Web Development: Using JSP, JSF, MySQL, and Apache Tomcat for Building Java Web Applications*. Apress. Available at <https://link.springer.com/book/10.1007/978-1-4842-5866-8>

Dietrich, J., Gauthier, F. and Krishnan, P., 2018, November. Driver generation for java ee web applications. In *2018 25th Australasian Software Engineering Conference (ASWEC)* (pp. 121-125). IEEE. Available at <https://ieeexplore.ieee.org/abstract/document/8587295/>

Nazihovna, Y.G., 2022. CREATING A PLATFORM USING HTML, CSS AND JAVA SCRIPT METHODS AND STRENGTHENING EDUCATION WITH THIS STEAM. *Confrencea*, 5(5), pp.17-38. Available at <https://confrencea.org/index.php/confrenceas/article/download/125/125>

Sari, I.P., Azzahrah, A., Qathrunada, I.F., Lubis, N. and Anggraini, T., 2022. Perancangan Sistem Absensi Pegawai Kantoran Secara Online pada Website Berbasis HTML dan CSS. *Blend Sains Jurnal Teknik*, 1(1), pp.8-15. Available at <https://jurnal.ilmubersama.com/index.php/blendsains/article/view/66>

Dhika, H., Isnain, N. and Tofan, M., 2019. Manajemen Villa Menggunakan Java Netbeans Dan Mysql. *ikraith-informatika*, 3(2), pp.104-110. Available at <http://journals.upi-yai.ac.id/index.php/ikraith-informatika/article/view/324>

Ardian, D., Larasati, P.D. and Irawan, A., 2018. Perancangan Sistem Informasi Aplikasi Rental Mobil Menggunakan Java Netbeans dan MySQL pada Perusahaan Dean's Car Rent. *Applied Information Systems and Management*, 1(1), p.338051. Available at https://www.academia.edu/download/58098715/Perancangan_Sistem_Informasi_Aplikasi_Rental_Mobil_Menggunakan_Java_Netbeans_dan_MySQL_Pada_Perusahaan_Deans_Car_Rent.pdf

Code Snippets

OPT module:-

The following code is used by the administrator to automatically send an email to users requesting two-factor authentication and a one-time password (OTP) for login and also used for forget password.

```
public class SendOTP {  
    public static String getRandomNumberString() {  
        Random rnd = new Random();  
        int number = rnd.nextInt(9999999);  
        return String.format("%06d", number);  
    }  
    public static String SendMail(String email, String otp, String type) {  
        final String username = "harshavardhanraju12@gmail.com";  
        final String password = "zdtaglzgwfqvcncw";  
        System.out.println("type: " + type);  
        String user = "";  
        String body = "Dear ";  
        if (type.equals("Employee"))  
            user = "Job Seeker";  
        else if (type.equals("Employer"))  
            user = "Job Provider";  
        else if (type.equals("Admin"))  
            user = "Admin";  
        body += "\n\nUse the following OTP to complete your login process.\n";  
        body += "OTP: <b>" + otp + "</b>";  
        body += "\n\nRegards,";  
        body += "\nKonnnect";  
  
        Properties props = new Properties();  
        props.put("mail.smtp.auth", "true");  
        props.put("mail.smtp.starttls.enable", "true");
```

```

        props.put("mail.smtp.host", "smtp.gmail.com");
        props.put("mail.smtp.port", "587");
        props.put("mail.smtp.ssl.protocols", "TLSv1.2");
        Session session = Session.getInstance(props, new javax.mail.Authenticator() {
            protected PasswordAuthentication getPasswordAuthentication() {
                return new PasswordAuthentication(username, password);
            }
        });
        try {
            Message message = new MimeMessage(session);
            message.setFrom(new InternetAddress(username));
            message.setRecipients(Message.RecipientType.TO,
InternetAddress.parse(email));
            message.setSubject("Konnect | Login OTP for Job Recommendation
System");
            message.setText(body);
            message.setContent("<p>Dear " + user + ",</p>"
+ "<p>Use the following OTP to complete your login
process.</p>"
+ "<p style=\"padding: 6px 8px; width: 100px; text-
align: center; background: blue; color: white;\">"
+ otp + "</p>" + "<p>Regards,</p>" + "<h2
style='color: blue'>Konnect</h2>", "text/html");
            Transport.send(message);
            System.out.println("Done");
        } catch (MessagingException e) {
            throw new RuntimeException(e);
        }
        return "done";
    }
}

```

Recommended jobs:-

This section of the code is utilized for recommendation and filtration functions. The job type, company type, location, and skill criteria are used. The user can filter the jobs depending on their preferences using these functionalities.

```
private void rcmdjobs(HttpServletRequest request, HttpServletResponse response)
    throws ServletException, IOException, SQLException {
    String companytype = request.getParameter("companytype");
    String jobtype = request.getParameter("jobtype");
    String location = request.getParameter("location");
    String skill = request.getParameter("skill");
    int id = Integer.parseInt(request.getParameter("id"));
    List<String> ctypes = new ArrayList<>();
    List<String> jtypes = new ArrayList<>();
    System.out.println("ctype:" + companytype);
    System.out.println("jtype:" + jobtype);
    List<Job> jobs = null;

    if (companytype != null && !companytype.isEmpty() && jobtype != null &&
!jobtype.isEmpty()
        && skill != null
        && !skill.isEmpty() && location != null &&
!location.isEmpty()) {
        String[] c = companytype.split(",");
        for (String ch : c)
            ctypes.add("'" + ch + "'");
        String[] j = jobtype.split(",");
        for (String ch : j)
            jtypes.add("'" + ch + "'");
        jobs = dao.getRcmdJobsByCompanyTypeAndJobType(ctypes, jtypes,
id, skill, location);
    } else if (companytype != null && !companytype.isEmpty() && skill != null
```

```

        && !skill.isEmpty() && location != null &&
!location.isEmpty()) {
            String[] c = companytype.split(",");
            for (String ch : c)
                ctypes.add("'" + ch + "'");
            jobs = dao.getRcmdJobsByCompanyType(ctypes, id, skill, location);
        } else if (jobtype != null && !jobtype.isEmpty() && skill != null
            && !skill.isEmpty() && location != null &&
!location.isEmpty()) {
            String[] c = jobtype.split(",");
            for (String ch : c)
                jtypes.add("'" + ch + "'");
            jobs = dao.getRcmdJobsByJobType(jtypes, id, skill, location);
        } else {
            jobs = dao.getRcmdJobs(id);
        }
        System.out.println("id " + request.getParameter("id"));
        System.out.println("rcmdjobs: " + jobs);
        request.setAttribute("jobs", jobs);
        request.getRequestDispatcher("home.jsp").forward(request, response);
    }

```

Filtering jobs based on company type, job type, skills and location are stored

```

public List<Job> getJobsByCompanyTypeAndJobType(List<String> ctypes, List<String>
jtypes, int empid, String skills,
        String loc) throws SQLException {

    String sql = "select * from job where jobtype in (";
    for (String type : jtypes)
        sql += type + ",";
    sql += "'"') and companytype in (";
    for (String type : ctypes)
        sql += type + ",";

```



```

        sql += ""') and location like '%" + loc + "%' and skills like '%" + skills + "%'";
    if (empid != 0)
        sql += " and empid = ?;";
    else
        sql += ";";

    System.out.println("sql: "+sql);
    PreparedStatement stmt = jdbcConnection.prepareStatement(sql);
    if (empid != 0)
        stmt.setInt(1, empid);
    ResultSet rs = stmt.executeQuery();
    List<Job> jobs = new ArrayList<>();
    while (rs.next()) {
        Job j = new Job(rs.getInt(1), rs.getString(2), rs.getString(3),
rs.getString(4), rs.getFloat(5),
                                rs.getFloat(6), rs.getString(7), rs.getString(8),
rs.getInt(9), rs.getString(10), rs.getString(11),
                                rs.getString(12), rs.getInt(13));
        jobs.add(j);
    }
    return jobs;

```

Recommended jobs:-

In in order to provide the job seeker with relevant job, the recommendation process collects the job seeker's information, compares it to the jobs added by organizations, and matches it to the job seeker's skills and years of experience.

```

public List<Job> getRcmdJobs(int id) throws SQLException {
    List<Job> jobs = getJobs();
    List<Job> rcmdjobs = new ArrayList<>();
    Employee emp = getEmployee(id);
    String skills = emp.getSkills();
    float exp = emp.getExperience();
    List<String> skillslist = new ArrayList<>();

```

```

        for (String skill : skills.split(", "))
            skillstlist.add(skill);
        System.out.println("skills: " + skillstlist.toString());

        for (Job job : jobs) {
            for (String skill : skillstlist) {
                if (job.getSkills().toLowerCase().contains(skill.toLowerCase())
&& exp >= job.getMinexperience()) {
                    if (!rcmdjobs.contains(job)) {
                        System.out.println("found: " +
job.getJobname());
                            rcmdjobs.add(job);
                        }
                    }
                }
            }
        }
        // System.out.println("rcmdjobs: " + rcmdjobs.toString());
        return rcmdjobs;

```