

# **SKILL/JOB RECOMMENDATION APPLICATION**

## **PROJECT REPORT**

### **UNDER THE GUIDANCE OF**

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**APPLICATION DOMAIN:** Cloud App Development

**COLLEGE NAME :** S.M.K Fomra institute Of Technology

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# **1. INTRODUCTION**

## **1.1 Project Overview**

This app is a skill recommender solution through which the fresher or the skilled person can log in and find the jobs by using the search option or they can directly interact with the chatbot and get their dream job.

## **1.2 Purpose**

To develop an end-to-end web application capable of displaying the current job openings based on the user skillset. The user and their information are stored in the Database. An alert is sent when there is an opening based on the user skillset. Users will interact with the chatbot and can get the recommendations based on their skills. We can use a job search API to get the current job openings in the market which will fetch the data directly from the webpage.

# **2. LITERATURE SURVEY**

## **2.1 Existing problem and References**

Here, we will take a look at all previous solutions, attempts and implementations to the “SKILL JOB RECOMMENDER” or anything that is vaguely related to it.

## **LITERATURE SURVEY-1**

**TITLE** : Job Recommendation Based on Job Seeker Skills.

**AUTHOR** : Jorge Carlos Valverde-Rebaza, Ricardo Puma, Paul Bustios,  
Nathalia C Silva

**YEAR OF PUBLISHED** : 2018

In the last years, job recommender systems have become popular since they successfully reduce information overload by generating personalized job suggestions. Although in the literature exists a variety of techniques and strategies used as part of job recommender systems, most of them fail to recommending job vacancies that fit properly to the job seekers profiles. Thus, the contributions of this work are three fold, we:

- i) made publicly available a new dataset formed by a set of job seekers profiles and a set of job vacancies collected from different job search engine sites;
- ii) put forward the proposal of a framework for job recommendation based on professional skills of job seekers;
- iii) carried out an evaluation to quantify empirically the recommendation abilities of two state-of-the-art methods, considering different configurations, within the proposed framework. We thus present a general panorama of job recommendation task aiming to facilitate research and real-world application design regarding this important issue.

## **LITERATURE SURVEY-2**

**TITLE:** Job recommender systems

**AUTHOR:** Dhameliya, J. and Desai, N.

**YEAR OF PUBLISHED:** 2019

From the last two decades internet based recruiting platforms have become a primary channel in most companies for recruiting talents. Such portals decrease the advertisement cost, but they suffer from information overload problem. Job portals using traditional information retrieval techniques such as Boolean search methods are typically using simple word matching algorithms. The main issue of these portals is their inability to understand the complexity of matching between candidates' desires and organizations' requirements.

Hence, a vast amount of deserving candidates misses the opportunity to get an appropriate job. The recent recommender systems have achieved success in e-commerce applications. In order to improve the functionality of recruitment process, many recommendation systems approaches have been proposed. we present a survey of existing recommendation approaches that have been used for building the personalized recommendation systems for job seekers as well as recruiters. Also we have identified the challenges in building a job recruitment system as compared to recommendation systems in other domain.

## **LITERATURE SURVEY-3**

**TITLE:** Job Recommendation System based on Text Analysis

**AUTHOR:** D. Mhamdi, R. Moulouki, M.Y. El Ghoumari, M. Azzouazi

**YEAR OF PUBLISHED:**2020

This article presents a job recommender system suggesting pertinent candidates for an offer posted by a recruiter. To accomplish this task, the data is collected from job recruiting websites then it is prepared through the extraction of appropriate attributes such as job titles, skills and experiences required for the targeted occupation. In a simple way, a job offer can be considered as a document mainly composed of two parts: a title and a job description. The title summarizes the role or position offered by the employer. The description usually provides the position details, including all the required relevant skills, according to the employer specifications. The proposed recommender system is based on the classification of job profiles. We first extract meaningful features from data by transforming noisy and unstructured textual data into structured formats, so it can be handled more clearly using text analysis algorithms based on topic modeling approach. The structured and cleaned data from job offers is matched with the data from resumes and a weighting of main attributes is set up before rendering the result as sorted recommendations.

### **2.3 Problem Statement Definition**

Job, finding a job based on our skills is an very difficult thing we haveto go through a lot process, to overcome this and to save time we are introducing this “SKILL JOB RECOMMENDER" which helps us to know job opportunities of the companies through our profile were we will create an account and enter our skillsets in the profile. It automatically searches the job and suggest us jobs based on skills.

### **3. IDEATION & PROPOSED SOLUTION**

#### **3.1 Empathy Map Canvas**

[IBM-Project-54471-1662023911/Empathy Map Example.pdf at main · IBM-EPBL/IBM-Project-54471-1662023911 \(github.com\)](#)

#### **3.2 Ideation & Brainstorming**

[IBM-Project-54471-1662023911/Brainstrom.pdf at main · IBM-EPBL/IBM-Project-54471-1662023911 \(github.com\)](#)

### **3.3 PROPOSED SOLUTION**

#### **FEASIBILITY**

The project is feasible and can be implemented using flask framework, and the job API can be brought from third party service, and the software can be accessed from all over the world to meet job at all ends.

#### **BUSINESS MODEL**

Apart from job recommendation, a revenue is important for a organization, so the required revenue can be brought up by thirdparty ads like google ads.

#### **SOCIAL IMPACT**

This software solves the social impacts like making all job seekers or individuals to meet the job that meets their criteria, so this can solvesocial issue on job finding.

#### **SCALABILITY**

This software is based on SDLC, so the scalability of the software canbe changed according to the needs of customers in future.



### **3.3 Problem Solution fit**

#### **HOW CUSTOMERS MEET JOB?**

The software uses two types of account, one is vendor type another is customer type, so the job posted by vendors can be easily accessed by customers.

#### **HOW CUSTOMERS GET SUGGESTIONS?**

As the profile created for customers, all the experience and skill sets are gathered, so a special type of algorithm will provide suggestion about job that will match their profile.

#### **HOW CUSTOMERS CLARIFY THEIR PROBLEMS?**

The software uses customer support facility and chatter bot, so any questions are clarified both vendor and customer side.

#### **WHY JOB RECOMMENDATION APPLICATION?**

Many individuals in society are without job due to many reasons so, we come up with online application it is easy to use, and all individuals can apply for the job that fit for their skill.

#### **TIME AND MONEY?**

As it is an online platform, the time and money can be saved, comparing to offline platform.

## 4. REQUIREMENT ANALYSIS

### 4.1 Functional requirement

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Sign in / Login	Register with username, password
FR-2	Profile Registration	Register with username, password, email, qualification, skills. This data will be stored in a database.
FR-3	Job profile display	Display job profiles based on availability, location, skills.
FR-4	Chatbot	A chat on the webpage to solve user queries and issues.
FR-5	Job Registration	The company's registration/Description details will be sent to the registered email id of the user.
FR-6	Logout	Use logout option after completing job registration process.

## 4.2 Non-Functional requirements

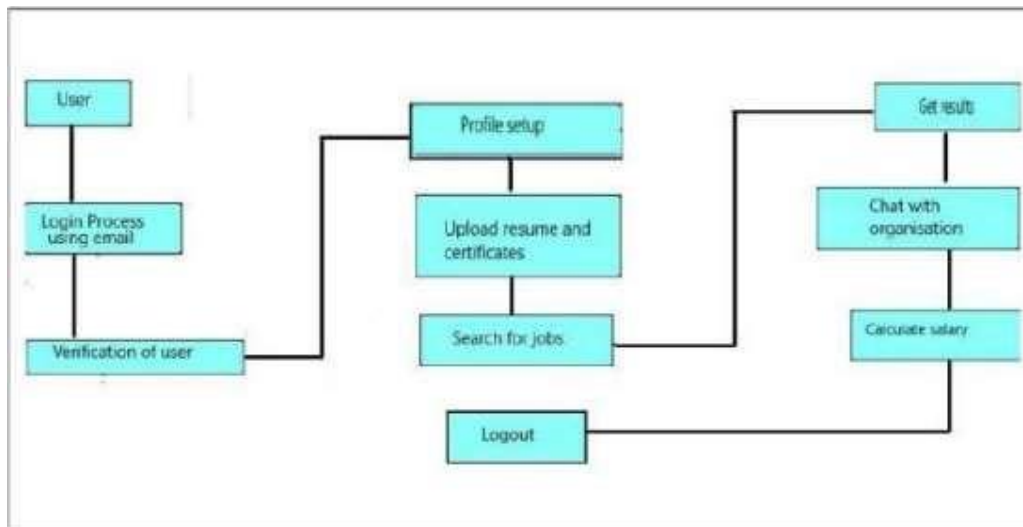
Following are the non-functional requirements of the proposed solution.

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	The webpage will be designed in such a way that any non-technical user can easily navigate through it and complete the job registration work. (easy and simple design)
NFR-2	Security	Using of python flask to cloud connect will provide security to the project. Database will be safely stored in DB2.
NFR-3	Reliability	To make sure the webpage doesn't go down due to network traffic.
NFR-4	Performance	Focus on loading the webpage as quickly as possible irrespective of the number of user/integrator traffic.
NFR-5	Availability	The webpage will be available to all users (network connectivity is necessary) at any given point of time.
NFR-6	Scalability	Increasing the storage space of database can increase the number of users. Add some features in future to make the webpage unique and attractive.

## 5. PROJECT DESIGN

### 5.1 Data Flow Diagrams

A Data Flow Diagram (DFD) is a traditional visual of the information flows a system. A neat and clear DFD can depict the amount of the system graphically. It shows how data enters and leaves the system, what and where data is stored



### 5.2 Solution & Technical Architecture

#### REQUIREMENTS

This project is done using the Flask framework for backend development, and other required packages like flask-login, flask SQL alchemy, flask-form, security packages etc.

For frontend development CSS, HTML, JavaScript is used along with CSS framework like bootstrap.

For API testing postman application is used, and For deployment IBM cloud service is used.

## **DESIGN**

All the requirements are used to design the software. The design and architecture of the software is done in a unique manner so the software can be reused and developed in future.

The routers are programmed in routers.py file, The forms used in the software are developed in forms.py file. The database model is created in model.py file, the testing is done in separate tests.py file.

Finally, HTML files are stored in templates folder and static file is stored in static folder

## **IMPLEMENTATION**

The designing process is done, and implementation is done by developing the logic by coding. All the required packages are imported and for each router specific logic is developed according to the use.

## **UNIT TESTING**

Each part of the software is developed by individual team members, and it is tested individually by the python unit testing package.

## **INTEGRATION AND TESTING**

After unit testing all parts of the software are integrated and tested finally, so the flask application can be run in any platform. The testing process includes Alpha testing and Beta testing.

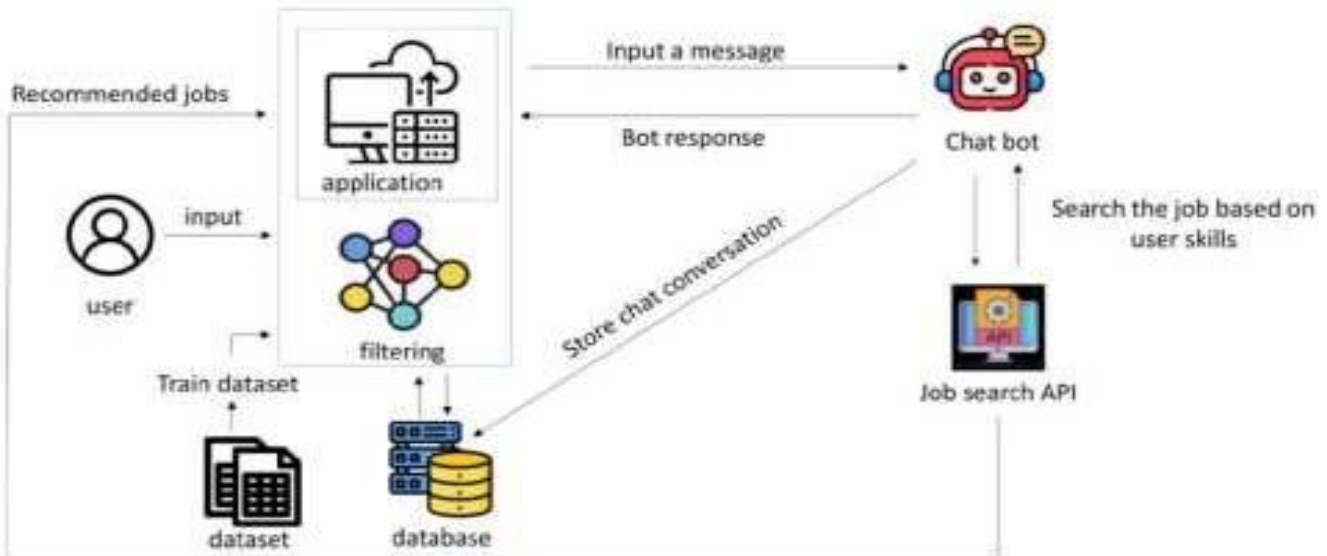
## **DEPLOYMENT**

flask application is finally deployed in IAAS platform like IBMcloud service, so it can be run in HTTPS protocol along with SSL.

In the deployment process a real time database is connected along with real time file storage.

## MAINTENANCE

After successful deployment, if there is a package update, it is implemented in the software.



## 5.3 User Stories

### User Stories

Use the below template to list all the user stories for the product.

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile user)	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	I can access my account / dashboard	High	Sprint-1
		USN-2	As a user, I will receive confirmation email once I have registered for the application.	I can receive confirmation email & click confirm	High	Sprint-1
		USN-3	As a user, I can register for the application through Facebook.	I can register & access the dashboard with Facebook Login	Low	Sprint-2
		USN-4	As a user, I can register for the application through Gmail.		Medium	Sprint-1
	Login	USN-5	As a user, I can log into the application by entering email & password.		High	Sprint-1
	Dashboard	USN-5	As a user, I can access my dashboard after signing in.	I can access my account / dashboard	High	Sprint-1
Customer (Web user)	Access	USN-6	As a user, I can setup a profile, and basic details by signing in.			
		USN-7	As a user, I will upload my resume, certificates, and other requirements.	I can perform several task in the application	Medium	Sprint-1
Customer Care Executive	Chatbot	USN-8	As a user, I can seek guidance from the customer care executive.		High	Sprint-1
Administrator	DBMS	USN-9	As a administrator, I can keep the applications of your organization relies on running.	I can perform various modifications in the applications.	High	Sprint-1

## 6. PROJECT PLANNING & SCHEDULING

### 6.1 Sprint Planning & Estimation

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Priority	Acceptance criteria
Sprint-1	UI Design	USN-1	As a user, I can see and experience an awesome user interface on the website	Medium	Better Impression about a website
Sprint -1	Registration	USN-2	As a user, I can register for the application by entering my email, password, and confirming my password.	High	I can access my account / dashboard
Sprint -1		USN-3	As a user, I can register for the application through Gmail	Medium	I can receive confirmation email & click confirm
Sprint -1	Login	USN-4	As a user, I can log into the application by entering email & password	High	I can access my account / dashboard
Sprint-1	Flask	USN-5	As a user, I can access the website in a second	High	I can access my account / dashboard
Sprint -1	Dashboard	USN-6	As a user, If I Logged incorrectly, I can view my dashboard and I can navigate to any pages which are already listed there.	High	I can access all the pages/ dashboard
Sprint -2	User Profile	USN-7	As a user, I can view and update my details	Medium	I can modify my details/data
Sprint -2	Database	USN-8	As a user, I can store my details and data in the website w	Medium	I can store my data

<b>Sprint-2</b>	Cloud Storage	USN-9	As a user, I can upload my photo, resume and much more in the website.	Medium	I can Upload my documents and details
<b>Sprint-2</b>	Chatbot	USN-10	As a user, I can ask the Chatbot about latest job openings, which will help me and show the recent job openings based on my profile	High	I can know the recent job openings
<b>Sprint-2</b>	Identity-Aware	USN-11	As a User, I can access my account by entering by correct login credentials. My user credentials is only displayed to me.	High	I can have my account safely
<b>Sprint-1</b>	Dashboard	USN-6	As a user, If I Logged in correctly, I can view my dashboard and I can navigate to any pages which are already listed there.	High	I can access all the pages/ dashboard
<b>Sprint-2</b>	User Profile	USN-7	As a user, I can view and update my details	Medium	I can modify my details/data
<b>Sprint-2</b>	Database	USN-8	As a user, I can store my details and data in the website w	Medium	I can store my data
<b>Sprint-2</b>	Cloud Storage	USN-9	As a user, I can upload my photo, resume and much more in the website.	Medium	I can Upload my documents and details
<b>Sprint-2</b>	Chatbot	USN-10	As a user, I can ask the Chatbot about latest job openings, which will help me and show the recent job openings based on my profile	High	I can know the recent job openings



<b>Sprint-2</b>	Identity-Aware	USN-11	As a User, I can access my account by entering by correct login credentials. My user credentials is only displayed to me.	High	I can have my account safely
<b>Sprint-3</b>	Learning Resource	USN-12	As a user, I can learn the course and I will attain the skills which will be useful for developing my technical skills.	High	I can gain the knowledge and skills
<b>Sprint-3</b>	Docker	USN-13	As a user, I can access the website in any device	High	I can access my account in any device
<b>Sprint-3</b>	Kubernetes	USN-14	As a user, I can access the website in any device	High	I can access my account in any device
<b>Sprint-3</b>	Deployment in cloud	USN-15	As a user, I can access the website in any device	High	I can access my account in any device
<b>Sprint-3</b>	Technical support	USN-16	As a user, I can get a customer care support from the website which will solve my queries.	Medium	I can tackle my problem & queries.
<b>Sprint-4</b>	Unit Testing	USN-17	As a user, I can access the website without any interruption	High	I can access the website
<b>Sprint-4</b>	Integration testing	USN-18	As a user, I can access the website without any interruption	High	I can access the website
<b>Sprint-4</b>	System testing	USN-19	As a user, I can access the website without any interruption	High	I can access the website
<b>Sprint-4</b>	Correction	USN-20	As a user, I can access the website without any interruption	High	I can access the website
<b>Sprint-4</b>	Acceptance testing	USN-21	As a user, I can access the website without any interruption	High	I can access the website

## 6.2 Sprint Delivery Schedule

<b>Sprint</b>	<b>Total Story Points</b>	<b>Duration</b>	<b>Sprint Start Date</b>	<b>Sprint End Date</b>	<b>Story Points</b>	<b>Sprint Release Date</b>
<b>Sprint-1</b>	20	6 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
<b>Sprint-2</b>	20	6 Days	31 Oct 2022	05 Nov 2022	20	05 Nov 2022
<b>Sprint-3</b>	20	6 Days	07 Nov 2022	12 Nov 2022	20	12 Nov 2022
<b>Sprint-4</b>	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov 2022

## 7. CODING & SOLUTIONING

### 7.1 Feature 1

Login and Register screen for users


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F-ing Jobs

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Login

SignUp

Sign in with Github 

or

email

password

LOGIN



## 7.2 Feature 2

### Dashboard and profile section

The screenshot displays a web browser window with multiple tabs. The active tab is titled 'Job Search' and shows a dashboard for 'F-ing Jobs'. The dashboard includes a 'Your Skills' section on the left, a search bar at the top, and a 'Recommended Jobs' section with three job listings. The Windows taskbar is visible at the bottom.

**Browser Tabs:** IBM, IBM-Project-54471-1662023911, Job Search

**Address Bar:** Not secure | 169.51.207.195:32478/#/dashboard

**Navigation Bar:** Booking.com, Gmail, YouTube, Maps, Translate, News, Utomik Games, Booking.com, Express VPN, LastPass password...

**Header:** F-ing Jobs

**Your Skills:**

- php (Remove)
- java (Add)
- python (Add)

(Include your skills in the search result)

**Search Bar:** Search

**Recommended Jobs:**

**Php developer, Php Programmer, php in laravel**  
MOSERP Technologies India Private Limited

PHP Developer Responsibilities: Conducting analysis of website and application requirements. Writing back-end code and building efficient PHP modules. Developing back-end portals with an optimized database. Troubleshooting application and code issues. Integrating data storage solutions. Responding to integration requests from front-end developers. Finalizing back-end features and testing web applications. Updating and altering application features to enhance performance. PHP Developer Requireme...

Apply

**PHP/ Sr PHP Developer( Cake PHP)**  
Megma Services

Designation / Position PHP/ Sr PHP Developer( Cake PHP) Job Description :ALeading Digitech requires PHP/ Sr PHP Developer( Cake PHP) - South delhi( East of Kailash) One of our client a Digitech platform & a business networking platform for senior professionals. The founders behind the startup have impeccable credentials, with over 50 years of combined experience in Digital , and have set up successful online businesses in hospitality, matrimony, property, gaming, (including JeevanSathi.com, MAg...

Apply

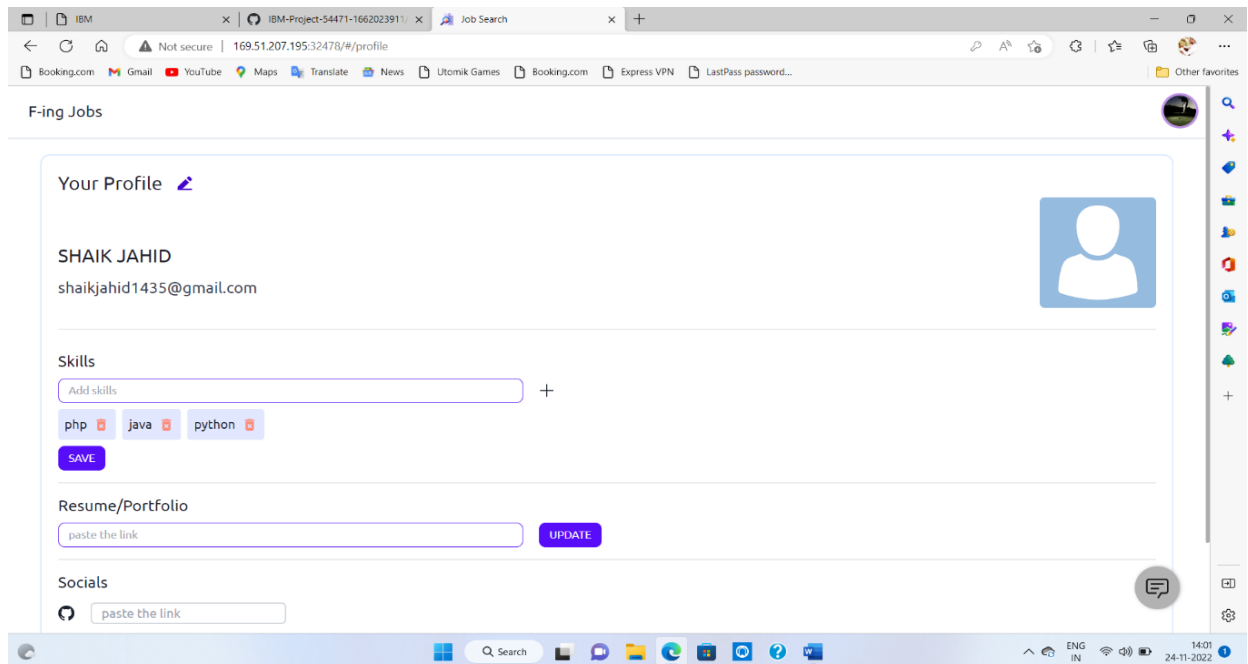
**PHP Developer, Php Programmer, Php MySQL, Php Engineer, Software developer, Php LAMP**  
E Solution India

The candidate should open to work from Gurgaon office Company is the fastest growing e-commerce enabler for brands in India. They offers end-to-end integrated solutions to address pain-points of retailers across e-commerce value chains so that they can focus on their core products and brand. Roles & Responsibilities: The ideal candidate will draw upon analytical, critical thinking and problem-solving skills, software development knowledge, and a passion for creating maintainable, highly reliabl...

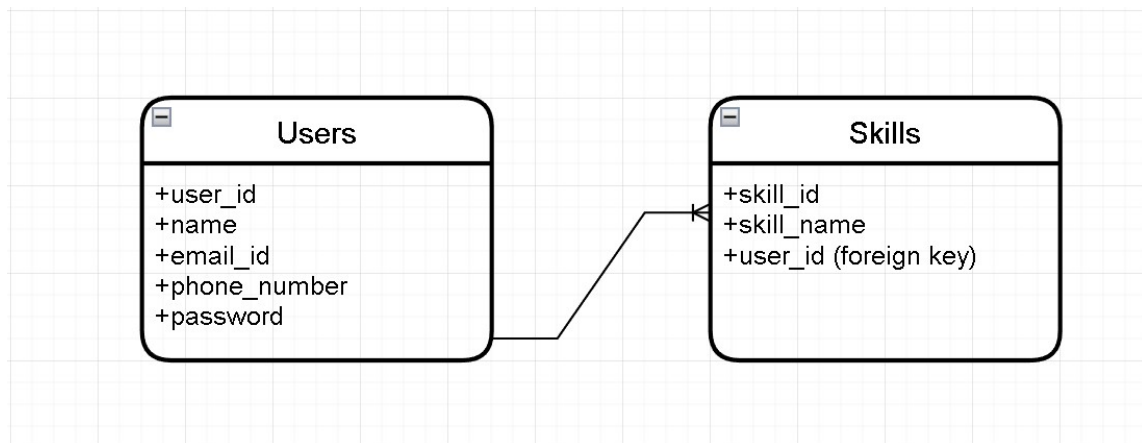
Apply

**Windows Taskbar:** Search, File Explorer, Edge, Task View, Settings, Help, Word

**System Tray:** ENG IN, 14:01, 24-11-2022



### 7.3 Database Schema (if Applicable)



## 8. TESTING

### 8.1 TestCases Test

#### Scenarios

1. Verify user can see login page
2. Verify user can login to application
3. Verify user can navigate to create your account page
4. Verify user can recovery password
5. Verify login page elements

## Search

1. Verify user can search by entering keywords in search box
2. Verify user can see suggestions based on keyword entered in search box
3. Verify user can see related auto suggestions displaying based on keyword entered in search box
4. Verify user can see no matches found message when no results are matching with entered keyword
5. Verify user can see search detailed page when nothing entered in textbox

## Sample test results

Test Scenario	Expected Result	Actual Result	Status
Verify that after registration users are navigated to login page	Users should be navigated to registration page	Working as expected	Pass
Verify the UI elements in Login/Signup popup	Users should be notified of login process	Not working	pass
Verify user can log into application with Valid credentials	User should be logged into website properly	Working as expected	Pass
Verify that categories of skills and jobs are shown in homepage	Categories of skills and jobs should be shown in homepage	Working as expected	Pass
Verify that jobs are displayed in homepage	jobs should be displayed in homepage	Working as expected	Pass

<b>Verify that when clicked on jobs it is redirected to correct page</b>	When clicked on job link it should be redirected to correct page	Working as expected	<b>Pass</b>
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## 8.2 User Acceptance Testing

### Defect Analysis

This report shows the number of resolved or closed bugs at each severity level, and how they were resolved.

Resolution	Severity1	Severity2	Severity3	Severity4	Subtotal
ByDesign	5	0	0	0	5
Duplicate	1	1	0	1	3
External	2	2	0	1	5
Fixed	8	3	0	2	13
NotReproduced	0	0	1	0	1
Skipped	0	0	0	0	0
Won'tFix	0	0	0	0	0
Totals	8	6	1	2	14

### Test Case Analysis

This report shows the number of test cases that have passed, failed, and untested

Section	TotalCases	NotTested	Fail	Pass
PrintEngine	7	0	1	6
ClientApplication	51	0	0	51
Security	4	0	2	2
OutsourceShipping	15	0	1	14
ExceptionReporting	9	0	0	9
FinalReportOutput	4	0	0	4
VersionControl	2	0	0	2

## 9. RESULTS

### 9.1 Performance Metrics

Scope/feature	Functional Changes	Hardware Changes	Software Changes	Impact of Downtime	Load/Volumen Changes	Risk Score
New	Moderate	No Changes	Moderate	Minimum	>5 to 10%	ORANGE
Existing	High	No Changes	Low	Minimum	No Changes	GREEN
Existing	No Changes	No Changes	No Changes	Moderate	>30 to 50 %	RED
New	Moderate	No Changes	High	Minimum	>10 to 30%	ORANGE

NFT - Detailed Test Plan				
S.No	Project Overview	NFT Test approach	Assumptions/Dependencies/Risks	Approvals/SignOff
	1 Skill/Job Recommender	User creates a new account	User does not have account	Yes
	2 Skill/Job Recommender	User adds skill	User is in profile page	Yes
	3 Skill/Job Recommender	User applies for job	User is in dashboard page	Yes
	4 Skill/Job Recommender	User logs out of app	User clicks logout button	Yes

## 10. ADVANTAGES & DISADVANTAGES

### Advantages

1. Users can filter jobs based on their skills.
2. Easier to find and apply for remote jobs.
3. Exposure to a wide range of opportunities in one single platform

### Disadvantages

1. Users cannot search jobs in particular location
2. Users must create an account to access application



## **11. CONCLUSION**

Thus, the application to recommend jobs to users based on their skills was developed and deployed successfully.

## **12. FUTURE SCOPE**

The demand for jobs is rising, and more skilled developers are emerging every day. Hence this application has a lot of room to improve in ways that enable the users to find jobs that suit their needs and align with their skills.

Here are some features that can be added/improved:

1. Integrate with other platforms such as Indeed or LinkedIn
2. Use data from users to train AI model that suggests suitable jobs for wide variety of skills.
3. Make the project open source and get feedback from the community.

## **13. APPENDIX**

Links for the references, source code and demo for the project can be found below.

**Application Live Link:** [Job Search- http://169.51.207.195:32478](http://169.51.207.195:32478)

### **13.1 Source Code**

[IBM-Project-54471-1662023911/Final deliverables/Project Code at main · IBM-EPBL/IBM-Project-54471-1662023911 \(github.com\)](https://github.com/IBM-EPBL/IBM-Project-54471-1662023911/Final%20deliverables/Project%20Code%20at%20main)

### **13.2 GitHub & Project Demo Link**

**GitHub:** <https://github.com/IBM-EPBL/IBM-Project-54471-1662023911> **Demo Link:** <https://youtu.be/poqa76xystc>