

SKILL AND JOB RECOMMENDER

A PROJECT REPORT

Submitted by

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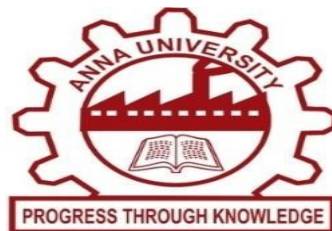
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1. INTRODUCTION

1.1 Project Overview

Nowadays, job search is a task commonly done on the Internet using job search engine sites like LinkedIn, Indeed, and others. Commonly, a job seeker has two ways to search a job using these sites: doing a query based on keywords related to the job vacancy that he/she is looking for, or creating and/or updating a professional profile containing data related to his/her education, professional experience, professional skills and other, and receive personalized job recommendations based on this data. But their recommendations are less accurate than those of the sites using profile data. The skill and job recommender extract the skills from the job seeker's profile. Finding the right job in today's era is at the stroke of a pen. However, finding relevant jobs based on one's skill set is going to be a bit tricky. People will keep changing their careers from one field to another, but it can be difficult to find that one ideal position. Although there are many career opportunities outside, being able to see suggestions based on one's preferences will ease the job search process. An individual's expectations will change on a regular basis. One might have preferences to start their career in a Start-up, take up a work from home, or choose a job based on their unique skill set. This recommendation system will serve the purpose of refining and showing job profiles based on one's skill set.

1.2 Purpose

The main purpose of this system is to recommend the suitable job for the job seeker based on various criteria unlike other applications. The user can directly

apply to the desired job from the skill and job recommender portal. This system also serves the purpose of helping the job seekers filter out the suitable jobs. It is also to make the interaction between user and the application by integrating a chatbot.

2. LITERATURE SURVEY

1. Amber Nigam, Aakash Roy, Hartaran Singh, Harsimran Waila, “Job Recommendation through Progression of Job Selection”-Georgia Institute of Technology, Atlanta, GA, USA.

This paper, describes about a novel machine learning model that uses the candidates’ job preference over time to incorporate the dynamics associated with highly volatile job market. It produces best outcomes like generating serendipitous recommendations and solve the cold-start problem for new jobs and new candidates .

2. Imane khaouja, Ismail kassou, and Mounir ghogho, (Fellow IEEE) “A Survey on Skill Identification From Online Job Ads”-TicLab, College of Engineering and Architecture, International University of Rabat, Sale 11103, Morocco.

This survey reviews the current research on skill identification from job ads and discuss es possible future research directions. It has reviewed 108 research articles. This survey evaluates and classifies the prior work aiming to identify the skill bases used for analyzing job market needs; the type of extracted skills; the skill identification methods; the studied sector and the skill identification granularity.

This project presents the key challenges and discuss recent trends.

3. Shaha T, Al-Otaibi , Mourad Ykhlef “A survey of job recommender systems”-International Journal of the Physical Sciences Vol. 7(29), pp. 51275142, 26 July, 2012.

In this survey they have described about the recommender system technology that help users to finds items that match their personnel interests; it has a successful usage in e-commerce applications to deal with problems related to information overload efficiently. To improve the e-recruiting functionality, many recommender system approaches have been proposed. This article will present a survey of erecruiting process and existing recommendation approaches for building personalized recommender systems for candidates/job matching.

4. Shibbir Ahmed, Mahamudul Hasan t, Md. Nazmul Hoq, and Muhammad Abdullah Adna” User Interaction Analysis to Recommend Suitable Jobs in Career-Oriented Social Networking Sites”-Bangladesh University of Engineering and Technology, University of Dhaka, Dhaka, Bangladesh

This paper describes about online job hunting websites to predict suitable job postings that are likely to be relevant to the user. Here, they have considered all possible factors related to users as well as job items available in a publicly available partial big data set of a widely used international job hunting website. It has also splited the interaction data into training and test data for the purpose of evaluating the proposed system. It uses Collaborative Filtering (CF) algorithm separately for user-user and item-item based approach and for hybrid approach, it also have calculated the intersection between user-user and item-item based

recommended list and select top-k job items as recommended lists from the intersection. Finally they found that hybrid approach performs better than user-user and item-item based approach for entire 90% sparsity of the training data.

5. Amber Nigam, Aakash Roy, Arpan Saxena, Hartaran Singh” Job Recommendation: Leveraging Progression of Job Applications- IEEE International Conference on Cloud Computing and Intelligence Systems(CCIS)

In this paper, the recommendation is composed of several other subrecommendations that contribute to at least one of a) making recommendations serendipitous for the end user b) overcoming cold-start for both candidates and jobs. One of the unique selling propositions of this methodology is the way they have used skills as embedded features and derived latent competencies from them, thereby attempting to expand the skills of candidates and jobs to achieve more coverage in the skill domain. For recommending jobs through machine learning that forms a significant part in this recommendation, the best results achieved through BiLSTM with attention.

6. Mohamed Amine Barrak, Bram Adams, Amal Zouaq,”Toward a traceable, explainable, and fairJD/Resume recommendation system”

Here Different JD/Resume matching model architectures have been proposed to select relevant candidates for the required job positions. In this proposal, we can see that how modern language models (based on transformers) can be combined with knowledge bases and ontologies to enhance the JD/Resume matching process. This system aims at using knowledge bases and features to

support the explain ability of the JD/Resume matching. Finally, given that multiple software components, datasets, ontology, and machine learning models will be explored, we aim at proposing a fair, ex-plain able, and traceable architecture for a Resume/JD matching purpose.

7. Jorge Valverde-Rebaza,Ricardo Puma,Nathalia C Siva,Paul Bustios, “Job Recommendation based on Job Seeker Skills: An Empirical Study” First Workshop on Narrative Extraction From Text (Text2Story 2018) co-located with 40th European Conference on Information Retrieval (ECIR 2018)

In this paper they 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; and also put forward the proposal of a framework for job recommendation based on professional skills of job seekers; and then they carried out an evaluation to quantify empirically the recommendation abilities of two state-of-the-art methods, considering different configurations, within the proposed framework. Thus this paper present a general panorama of job recommendation task aiming to facilitate research and real-world application design.

8. unitavathi, Shinu , Siva Kumar , Vidhya Priya , “Online Job and Candidate Recommendation System”- INTERNATIONAL RESEARCH JOURNAL OF MULTIDISCIPLINARY TECHNOVATION (IRJMT)

Here by using Professional Social Recommender (PSR) and Text field filtering the recommendation of jobs and candidates will be classified. Three tier architecture designs have been implemented for efficient data retrieval and data transfer. Here the primary architecture will be the job seeker interface, in followed

with candidate recruitment interface and Recommendation database will be interconnected. The professional social recommender will work as a third party agent and the agent will retrieve all the recommended job and candidate profiles. A panel is designed for displaying the recommended job and candidate details.

9. JEEVANKRISHNA “Job Recommendation System Using Machine Learning And Natural Language Processing” Dublin Business School-May 2020

In this paper they recommend the top-n job to the user by analyzing and measuring similarity between the user preference and explicit features of job listing using Content-based filtering, which is devised in support of natural language processing and cosine similarity. The Recommender System is then evaluated using precision, recall, and F1 score (Barrón-Cedeno et al., 2009). The top-n recommendation made to the user is presented in the third tier of the design, a web app deployed in the local server. The presentation layer web-app is developed using Plotly's dash web framework.

10. Atakan Kara,F.Serhan Danis ,Gunce Keziban Orman,Sultan N.Turhan “Job Recommendation Based on Extracted Skill Embedding”

In this paper, they have extracted skill phrases from unformatted and unstructured CVs and Job Descriptions. Here two approaches with different similarity metrics, namely Word Mover's Distance and Cosine Similarity is used. The selected TF-IDF with Cosine Similarity as a baseline used to evaluate the method on the real data from an online recruitment company, Kariyer.net. This paper results shows that the previously unstudied Word Mover's Distance-based

approach outperforms Cosine Similarity-based approaches and gives promising results in the job recommendation domain.

2.1 Existing Problem

To many choices and evaluating different solutions can be enormously time consuming. Privacy is also a big issue in recommender systems. As the number of user increases, system needs more resources and that cannot be provided by system. So the number of users accessing the system decreases and low rating is provided. Recommendation is not accurate.

2.2 References

1. Aritra Ghosh, Beverly Woolf, Shlomo Zilberstein, Andrew Lan,” Skill-based Career Path Modeling and Recommendation” 2020 IEEE International Conference on Big Data (Big Data),March 2020.
2. Juhi Dhameliya, Nikita Desai”Job Recommender Systems: A Survey” IEEE Innovations in Power and Advanced Computing Technologies(i-PACT) ,March-2019.
3. Amber Nigam, Aakash Roy, Hartaran Singh, Harsimran Waila, “Job Recommendation through Progression of Job Selection”-Georgia Institute of Technology, Atlanta, GA, USA.
4. Imane khaouja, Ismail kassou, and Mounir ghogho, (Fellow IEEE) “A Survey on Skill Identification From Online Job Ads”-TicLab, College of Engineering and

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International Journal of Physical Science Vol 7(29), August 2018.

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9. Punitavathi, Shinu, Siva Kumar, Vidhya Priya , “Online Job and Candidate Recommendation System”- INTERNATIONAL RESEARCH JOURNAL OF MULTIDISCIPLINARY TECHNOVATION (IRJMT).

10. JEEVANKRISHNA “Job Recommendation System Using Machine Learning and Natural Language Processing” Dublin Business School-May 2020

2.3 Problem Statement Definition

In recent days job seeking has become one of the hardest tasks to accomplish. Job seekers are unaware of the jobs available. Even if there are plenty of jobs available, finding the right job that suits us is even more difficult. In order to overcome these difficulties in choosing the suitable job, the skill and job recommender helps the job seekers in finding the right job by matching details like educational qualifications, skills and work experience with that of the eligibility criteria of the jobs posted by the recruiters, while decreasing the recruitment time for the companies and minimizing the time used by the job seekers in searching for a job using the traditional methods. The system thus matches the details provided by the job seeker to the jobs available and prioritizes the jobs based on the level of eligibility met by the job seeker. The user can further filter the recommended jobs based on the salary package and location of the job. Thus, the system provides the job seekers in finding the suitable job for their skills.

3. IDEATION & PROPOSED SOLUTION

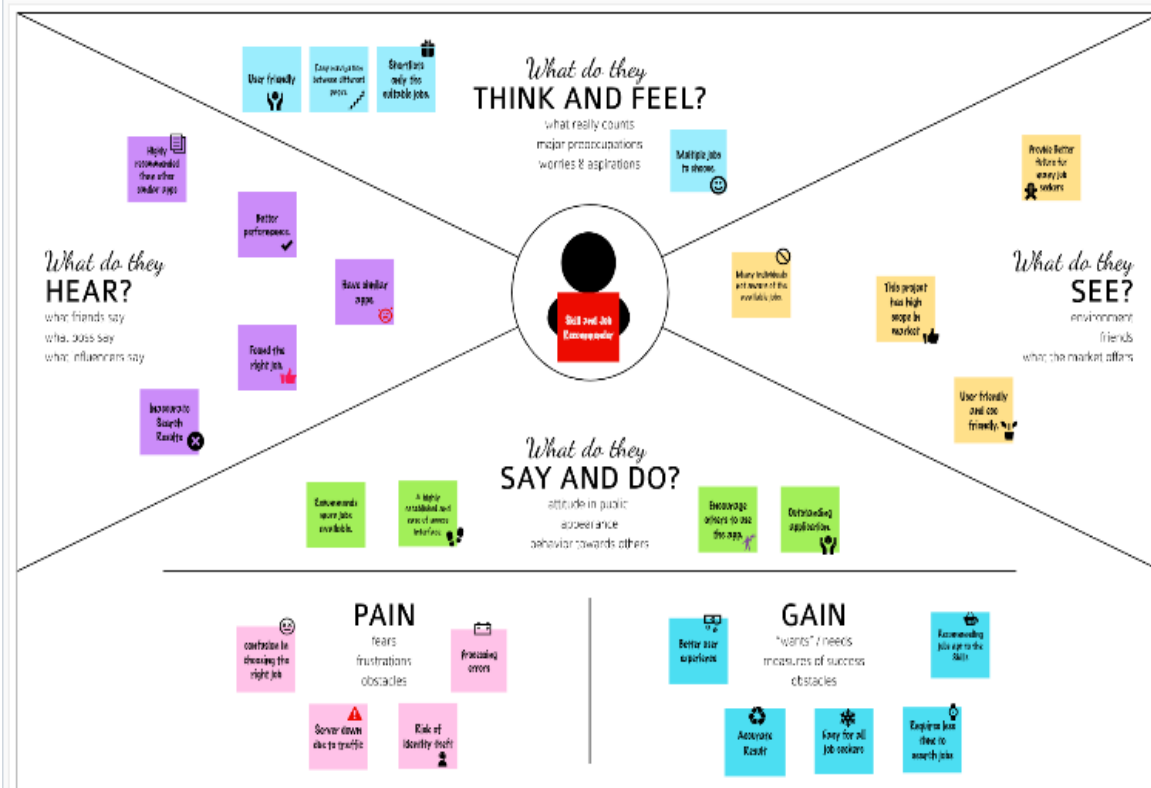
3.1 Empathy Map Canvas

Empathy Map Canvas

Gain insight and understanding on solving customer problems.

1


Build empathy and keep your focus on the user by putting yourself in their shoes.



Share your feedback

3.2 Ideation & Brainstorming

i. Defining the Problem Statement



Brainstorm & idea prioritization

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.

⌚ 10 minutes to prepare
🕒 1 hour to collaborate
👥 2-8 people recommended

➔

Before you collaborate

A little bit of preparation goes a long way with this session. Here's what you need to do to get going.

⌚ 10 minutes

A Team gathering
Define who should participate in the session and send an invite. Share relevant information or pre-work ahead.

B Set the goal
Think about the problem you'll be focusing on solving in the brainstorming session.

C Learn how to use the facilitation tools
Use the Facilitation Superpowers to run a happy and productive session.

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1

Define your problem statement

What problem are you trying to solve? Frame your problem as a *How Might We* statement. This will be the focus of your brainstorm.

⌚ 5 minutes

PROBLEM

A webpage that centers its attention in helping the job seekers to search for suitable jobs that values their skills by making accurate recommendations by matching their skills from the details given by them with the jobs available and posted by the recruiters.

ii. Brainstorming the Ideas

2

Brainstorm

Write down any ideas that come to mind that address your problem statement.

⌚ 10 minutes

TIP You can select a sticky note and hit the pencil [switch to sketch] icon to start drawing!

Krithiga

- Complete profile by giving educational details and skills.
- Shortlist based on educational qualification and skills.
- Recommend jobs based on range of salary, location and timing.
- Filter the list based on job position.
- Chat box to converse with recruiters.
- External pages to view job description, profile and reviews.
- Job application can be filled out from the website itself.
- Top ten matching results will be shown.

Genusha

- Fill out the resume form after signing in.
- Shortlist based on educational qualification.
- Recommend jobs based on the available job location.
- Filter based on salary range.
- Chat bot to make searches easier.
- Search bar on top of the page.
- External website to fill out job application.
- Maintain a profile page for all the users.

Dharshini

- Upload resume in pdf format.
- Shortlist based on educational qualification and other courses done.
- Recommend and prioritize jobs nearby.
- Filters the jobs based on job title.
- Chat box to chat with recruiters.
- Can view recruiters details.
- Recruiters can create application form in the website.
- Most relevant jobs given more priority.

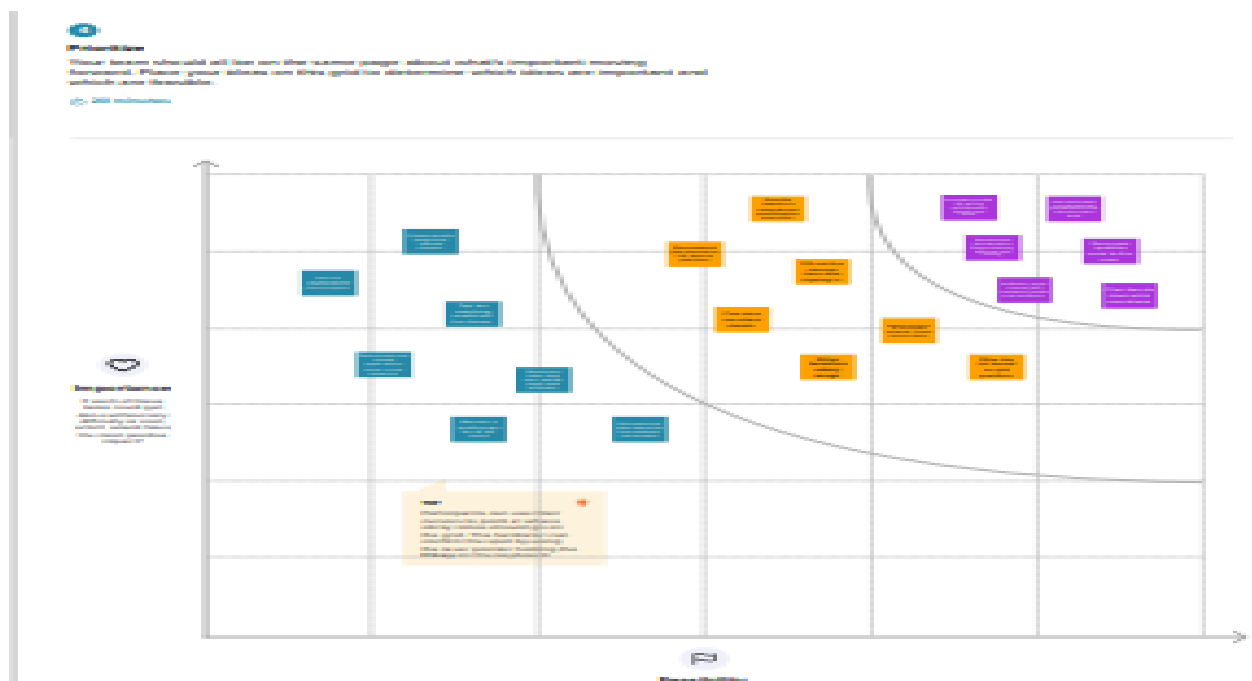
Jeba Danita

- Create profile page and upload resume.
- Complete profile by giving educational details and skills.
- Recommend jobs based on full time or part time.
- Filter the recommended jobs based on job description.
- Chat bot to search jobs.
- Navigate to other pages from the home page.
- New post updates send to the user.
- Recruiters have their own profile page and priorities.

iii. Grouping the ideas



iv. Idea Prioritization



3.3 Proposed Solution

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	To find the suitable job among the sea of jobs and to make the job seeker aware of all the available jobs around the world.
2.	Idea / Solution description	A webpage that centres its attention in helping the job seekers to search for suitable job that values their skills by making accurate recommendations by matching their skills from the details given by them with the jobs posted by the recruiters.
3.	Novelty / Uniqueness	Based on the commonality found between the job description and the skills of the job seeker, the application shows the percentage of match found for each and every job.
4.	Social Impact / Customer Satisfaction	Reduces time of job seeking. Makes job seekers aware of many jobs.
5.	Business Model (Revenue Model)	A free platform with attractive features. It will be used by most of the students and adults and therefore will have a high market value.

6.	Scalability of the Solution	Additional features can be added often. Any number of users can access it all at once.
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3.4 Problem Solution fit

Project Title: Skill and Job Recommender			Project Design Phase-I - Solution Fit Template			Team ID: PNT2022TMID34851		
Define CS, fit into CC	1. CUSTOMER SEGMENT(S) CS <ul style="list-style-type: none">Job seekersRecruiters		6. CUSTOMER CONSTRAINTS CC <ul style="list-style-type: none">Availability of other similar applications not doing a good job.A fear of their time being wasted by unsuitable recommendations.		5. AVAILABLE SOLUTIONS AS <ul style="list-style-type: none">In the past, the customers used other job recommenders which recommends jobs for the job seekers.Pros: Recommends many jobs.Cons: Does not recommend suitable jobs. Jobs may not match with that of the job seekers eligibility.		Explore AS, differentiate	
	2. JOBS-TO-BE-DONE / PROBLEMS J&P <ul style="list-style-type: none">Choosing the right job from many available jobs by recommending the suitable job.Customer being unaware of the available job.		9. PROBLEM ROOT CAUSE RC <ul style="list-style-type: none">A recruiter cannot go around the world to recruit people. They recruit people nearby. A person who is far away may not know about the recruitment and so they cannot attend the interview.Lot of applications doing a poor job in finding the suitable job.		7. BEHAVIOUR BE <ul style="list-style-type: none">Use the skill and job recommender application which we develop for better recommendations.		Focus on J&P, tap into BE, understand RC	
Identify strong TR & EM	3. TRIGGERS TR <p>Seeing others get a job while the customer being unemployed and being unaware of the job opportunities.</p>		10. YOUR SOLUTION SL <ul style="list-style-type: none">Recommending jobs not only based on the educational qualifications but also based on many other criteria.Showing the percentage of match between the job and the details provided by the job seeker.		8. CHANNELS of BEHAVIOUR CH <ul style="list-style-type: none">Download the application.Search for the suitable job.		Identify strong TR & EM	
	4. EMOTIONS: BEFORE / AFTER EM <p>Customer feels depressed and confused before getting a good recommendation. And they feel satisfied and happy after knowing about the vast opportunities.</p>							

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	User Registration	Registration through Form Registration through Gmail Registration through LinkedIn
FR-2	User Confirmation	Confirmation via Email
FR-3	User Login	Login using credentials like username and password.
FR-4	User Search	Search using skills, job location, and company.
FR-5	User Profile	Complete the user profile by providing personal details and also by uploading the resume.
FR-6	User Application	The user applies for the perfectly matched job.

4.2 Non-Functional requirements

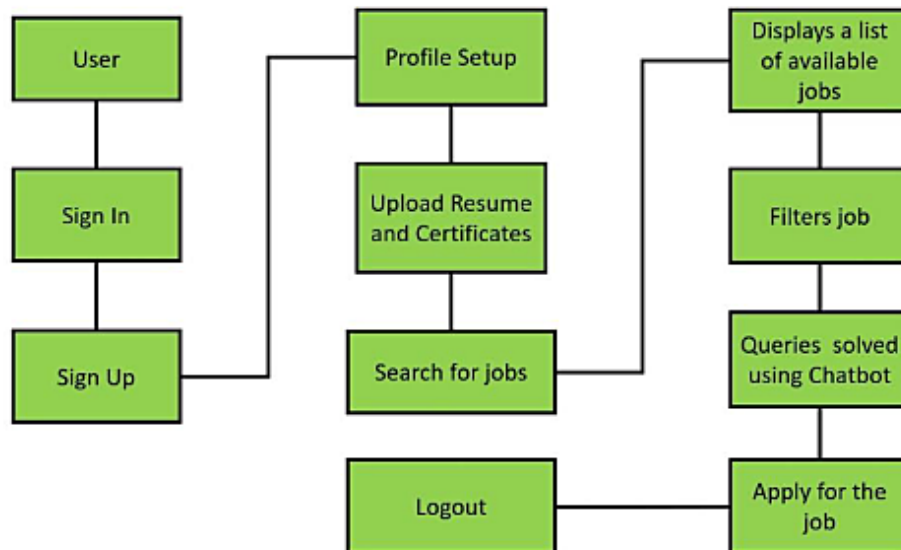
Following are the non-functional requirements of the proposed solution.

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	Filters for the acquired results.
NFR-2	Security	Two-step verification
NFR-3	Reliability	Applicants can access their resumes 98% of the time without failure. Shows highly matched jobs based on the percentage of matches.
NFR-4	Performance	The website's loading time should be less than 5 seconds.
NFR-5	Availability	Companies can post jobs on the website throughout the week at any time during the day.
NFR-6	Scalability	The solution shall be able to support an annual growth of 10% in new customers

5. PROJECT DESIGN

5.1 Data Flow Diagrams

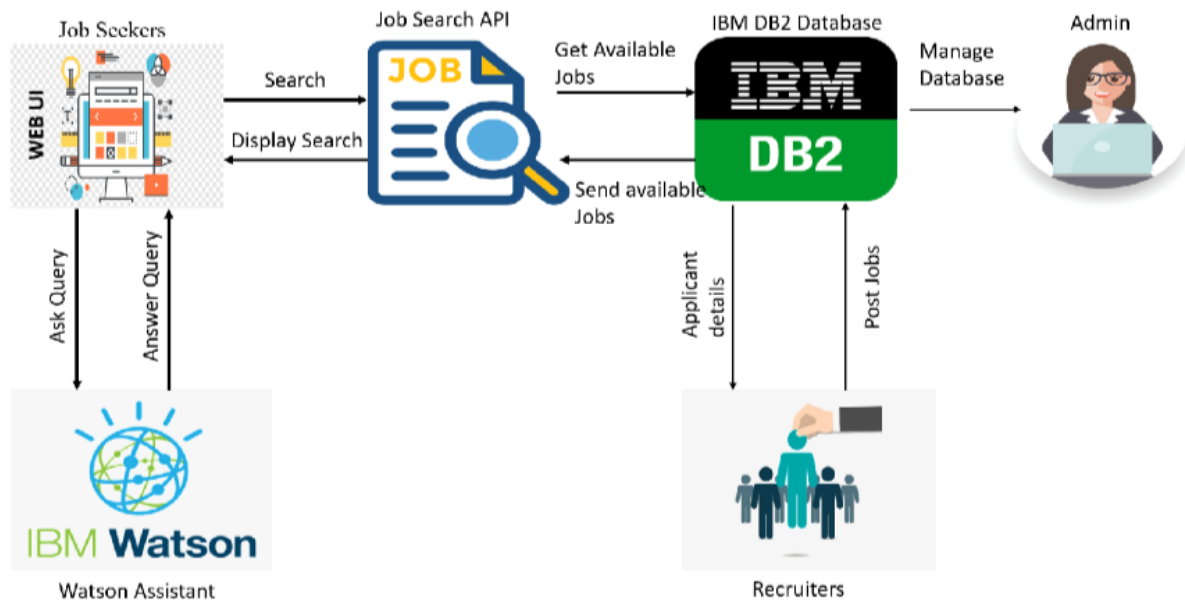
A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored.



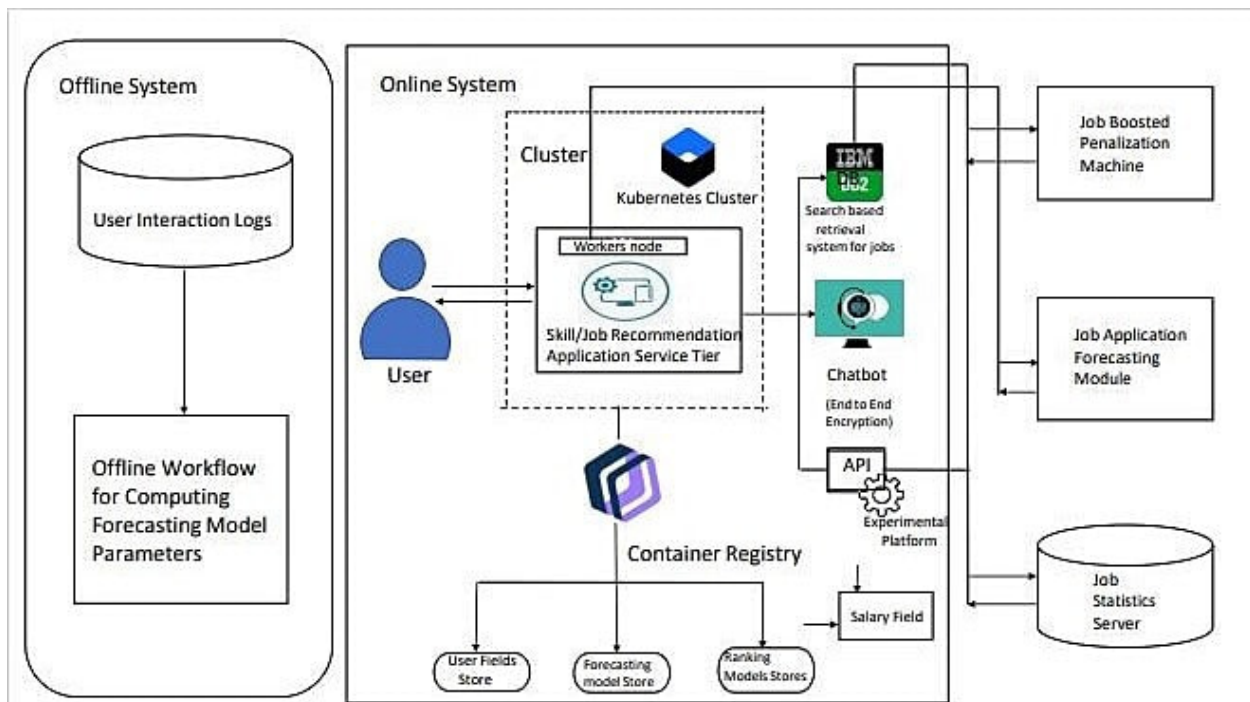
5.2 Solution & Technical Architecture

The data set that contains the information about previous years' admission criteria was collected and fed in the system for preprocessing as a .CSV file. Then with the help of the data set, the model is trained and tested for expected input values by methods like KNN algorithm and regression. Finally, with the help of the user interface, inputs from the user are obtained and prediction is done by the model and output is given.

5.2.1. Technical Architecture



Solution Architecture



5.2.2. Technology Stack

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Python Flask microframework is used	Python Flask
2.	Security Implementations	Mandatory Access Controls (MAC) and Preventive Security Control is used	Eg: SHA-256, Encryptions, IAM Controls, OWASP etc.
3.	Scalable Architecture	3 – Tier Architecture	Web Server – HTML, CSS, JavaScript Application Server – Python Database Server = IBM DB2
4.	Availability	Use of load balancing to distribute network traffic across servers	IBM Load Balancer
5.	Performance	The number of requests per sec, use of Cache, use of CDN, etc.	IBM Content Delivery Network


S.No	Component	Description	Technology
1.	User Interface	Web UI and Chatbot	HTML, CSS, JavaScript
2.	Search	Search jobs and use a hybrid filter to filter the required job.	Python
3.	Chat	Watson Assistant is used as a chatbot.	IBM Watson Assistant
4.	User Application	Job seekers can apply for a suitable job.	Python Flask
5.	Cloud Database	Database Services based on Cloud	IBM DB2
6.	Job search API	Using Job Search API relevant results searched is obtained	Google Job Search API
7.	Infrastructure (Server / Cloud)	Application Deployment on Local System / Cloud Local Server Configuration: Cloud Server Configuration	Local, Cloud Foundry, Kubernetes, etc

5.3 User Stories

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, and password, and confirming my password.	I can access my account/dashboard	High	Sprint-1
		USN-2	As a user, I will receive a confirmation email once I have registered for the application	I can receive a 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 my 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 set up 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 tasks 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 an administrator, I can keep the applications your organization relies on running.	I can perform various modifications in the applications.	High	Sprint-1

5.3.1. Customer Experience Journey Map


Project Statement and Entice Step



Customer experience journey map

Use this framework to better understand customer needs, motivations, and obstacles by illustrating a key scenario or process from start to finish. When possible, use this map to document and summarize interviews and observations with real people rather than relying on your hunches or assumptions.

Created in partnership with

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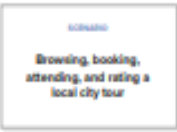




















SKILL AND JOB RECOMMENDER

A software model that focuses on helping job seekers find a suitable job by matching the skills of the job seeker with the eligibility criteria of the available jobs posted by the recruiters.





[Share template feedback](#)

Document an existing experience

Narrow your focus to a specific scenario or process within an existing product or service. In the **Steps** row, document the step-by-step process someone typically experiences, then add detail to each of the other rows.

 <p>Scenario</p> <p>Browsing, booking, attending, and rating a local city tour</p>	 <p>Entice</p> <p>How does someone initially become aware of this process?</p>
 <p>Steps</p> <p>What does the person (or group) typically experience?</p>	 Using other job apps  Visit website or app  Search by keywords, tags and related content  Browse available jobs
 <p>Interactions</p> <p>What interactions do they have at each step along the way?</p> <ul style="list-style-type: none">• People: Who do they see or talk to?• Places: Where are they?• Things: What digital touchpoints or physical objects would they use?	 Job seekers interact with the recruiters  Recruiters can find the perfect candidates
 <p>Goals & motivations</p> <p>At each step, what is a person's primary goal or motivation? ("Help me..." or "Help me avoid...")</p>	 Job Seeker To get a job offer  Recruiters To make the hiring process easier
 <p>Positive moments</p> <p>What steps does a typical person find enjoyable, productive, fun, motivating, delightful, or exciting?</p>	 Users able to apply to the desired company  Recruiters can find the perfect candidates
 <p>Negative moments</p> <p>What steps does a typical person find frustrating, confusing, angering, costly, or time-consuming?</p>	 Recruiters Process
 <p>Areas of opportunity</p> <p>How might we make each step better? What ideas do we have? What have others suggested?</p>	 Clear explanation of the job description  [idea]

Enter , Engage , Exit and Extend Steps:

 Enter What do people experience as they begin the process?	 Engage In the core moments in the process, what happens?	 Exit What do people typically experience as the process finishes?	 Extend What happens after the experience is over?
<div>Subst. particular job</div> <div>job experience complete</div> <div>Financial security</div>	<div>Get all job options available</div> <div>Get knowledge about the other jobs</div> <div>Know more about the skills</div>	<div>Realization</div> <div>Knowledge about the job</div> <div>Getting ready for the transition</div>	<div>Draw experience</div> <div>Reconnect the app</div>
<div>Explicit description</div> <div>Services are from the partner's perspective</div>	<div>Ready for job in the website</div> <div>Learn on how job</div> <div>Get used to application conditions</div>	<div>Working for other jobs</div> <div>From the experience with the app</div>	<div>Work with colleagues</div> <div>Interact with the managers</div>
<div>Get more help for the job</div> <div>Get more help for the job</div>	<div>Get knowledge about the conditions</div> <div>Get more help for the job</div> <div>Get more help for the job</div>	<div>Get more help for the job</div> <div>Get more help for the job</div>	<div>Get more help for the job</div> <div>Get more help for the job</div>
<div>Get more help for the job</div> <div>Get more help for the job</div>	<div>Get more help for the job</div> <div>Get more help for the job</div>	<div>Get more help for the job</div> <div>Get more help for the job</div>	<div>Get more help for the job</div> <div>Get more help for the job</div>
<div>Get more help for the job</div> <div>Get more help for the job</div>	<div>Get more help for the job</div> <div>Get more help for the job</div>	<div>Get more help for the job</div> <div>Get more help for the job</div>	<div>Get more help for the job</div> <div>Get more help for the job</div>
<div>Get more help for the job</div> <div>Get more help for the job</div>	<div>Get more help for the job</div> <div>Get more help for the job</div>	<div>Get more help for the job</div> <div>Get more help for the job</div>	<div>Get more help for the job</div> <div>Get more help for the job</div>
<div>Get more help for the job</div> <div>Get more help for the job</div>	<div>Get more help for the job</div> <div>Get more help for the job</div>	<div>Get more help for the job</div> <div>Get more help for the job</div>	<div>Get more help for the job</div> <div>Get more help for the job</div>
<div>Get more help for the job</div> <div>Get more help for the job</div>	<div>Get more help for the job</div> <div>Get more help for the job</div>	<div>Get more help for the job</div> <div>Get more help for the job</div>	<div>Get more help for the job</div> <div>Get more help for the job</div>
<div>Get more help for the job</div> <div>Get more help for the job</div>	<div>Get more help for the job</div> <div>Get more help for the job</div>	<div>Get more help for the job</div> <div>Get more help for the job</div>	<div>Get more help for the job</div> <div>Get more help for the job</div>

PROJECT PLANNING & SCHEDULING

6.1 Sprint Planning & Estimation

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	5	High	2
Sprint-1	Login	USN-2	As a user, I can log into the application by entering email & password	3	High	1
Sprint-1	DB Connectivity	USN-3	As a admin, I would like to fetch the user details to recommend content to users and improve the user experience.	5	Low	2
Sprint-2	Job Details	USN-4	As a admin, I must have to fetch current job opening details from the web portal.	8	Medium	3
Sprint-2	Job Details	USN-5	As a user, I can interact with application to know about current job openings in the market.	8	High	3
Sprint-2	Chatbot	USN-6	As a user, I have some queries about the application Chatbot can help to answer FAQ's.	11	High	4
Sprint-3	Sendgrid	USN-7	As a user, I would like to get a notification through email, whenever there is a job opening that matches on the user skill sets	9	High	4
Sprint-3	Update Profile	USN-8	As a admin,I can verify the user entered details.	5	Low	2
Sprint-4	Job Search API	USN-9	As a user, I preferred to choose my dream job so API provides me a desired job to apply and send notifications related to my interests.	7	Medium	3
Sprint-4	Job Alert	USN-10	Various modules triggers job alert notification is sent to the user whenever there is a job opening based on the users skill set.	7	Medium	3

6.2 Sprint Delivery Schedule

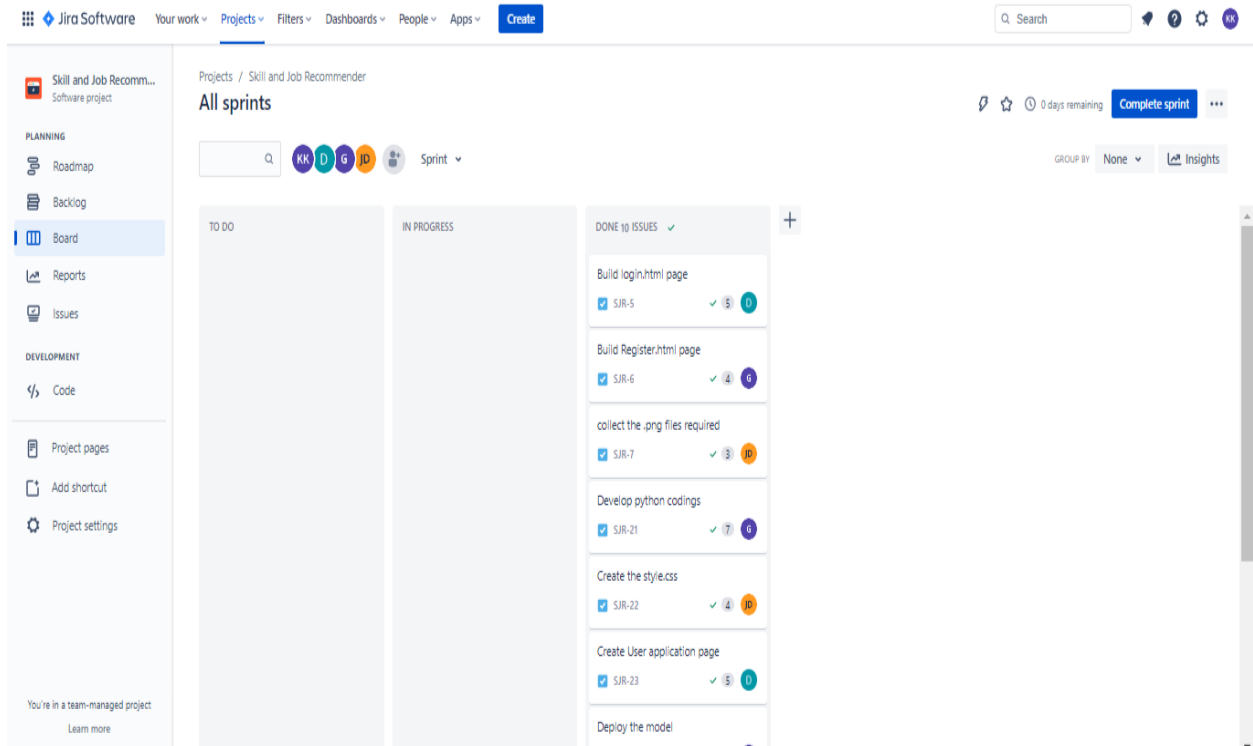
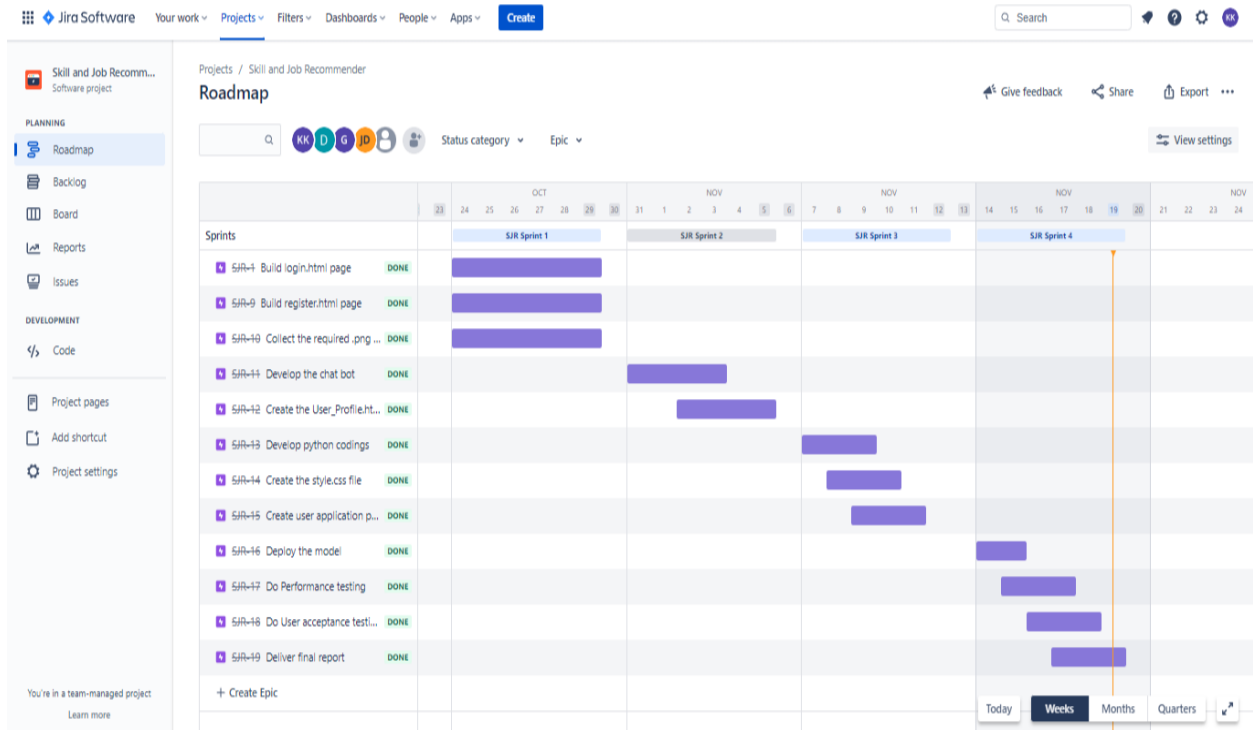
Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	13	6 Days	24 Oct 2022	29 Oct 2022	13	29 Oct 2022
Sprint-2	25	6 Days	31 Oct 2022	05 Nov 2022	25	05 Nov 2022
Sprint-3	16	6 Days	07 Nov 2022	12 Nov 2022	16	12 Nov 2022
Sprint-4	14	6 Days	14 Nov 2022	19 Nov 2022	14	19 Nov 2022

6.2.1. Velocity

$$AV = \frac{\text{Sprint Duration}}{\text{velocity}}$$

SPRINT	STORY POINTS	DURATION	AVREAGE VELOCITY
Sprint-1	13	6 Days	$\frac{13}{6} = 2.167$
Sprint-2	25	6 Days	$\frac{25}{6} = 4.167$
Sprint-3	16	6 Days	$\frac{16}{6} = 2.67$
Sprint-4	14	6 Days	$\frac{14}{6} = 2.44$
OVERALL	68	24 Days	$\frac{68}{24} = 2.83$

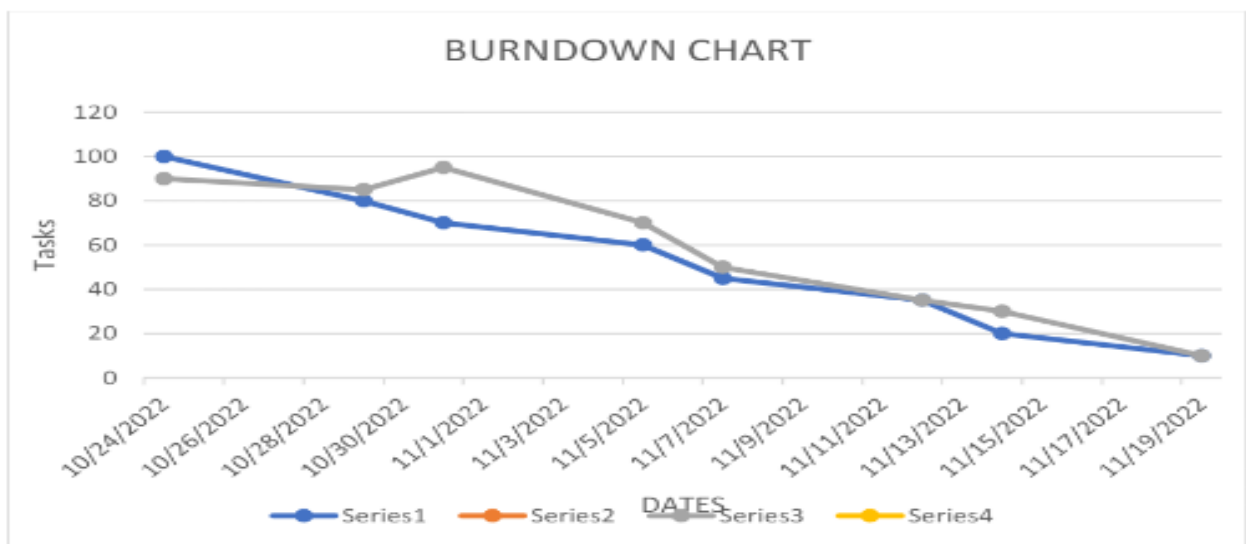
6.3 Report from JIRA



6.3.1.Burndown chart:

A burn down chart is a graphical representation of work left to do versus time. It is often used in agile software development methodologies such as Scrum. However, burn down charts can be applied to any project containing measurable progress over time.

BURNDOWN CHART		
DATES	PLANNED TASKS	ACTUAL TASKS
24-10-2022	100	90
29-10-2022	80	85
31-10-2022	70	95
05-11-2022	60	70
07-11-2022	45	50
12-11-2022	35	35
14-11-2022	20	30
19-11-2022	10	10



7. CODING & SOLUTIONING

7.1 CODING

main.py:

```
from backend import create_app
import os
app = create_app()
port = os.environ.get("PORT", 5000)
if __name__ == '__main__':

    from waitress import serve

    serve(app, port=port)
```

Signup.jsx:

```
import React, { useContext, useEffect, useState } from "react";
import { useNavigate } from "react-router-dom";
import { AppContext } from "../context/AppContext";
import { registerUser } from "../proxies/backend_api";
import { emailRegex } from "../utils/helper";
const SignUp = () => {
  const { setUser } = useContext(AppContext);
  const navigate = useNavigate();
  const [inputs, setInputs] = useState({
    name: "",
    email: "",
    phone_number: "",
    password: "",
    confirm_password: "",
  });
```

```
const [error, setErrors] = useState({
  name: "",
  email: "",
  phone_number: "",
  password: "",
  confirm_password: "",
});
const handleChange = ({ target: { name, value } }) => {
  setErrors((prev) => {
    return { ...prev, [name]: "" };
  });
  setInputs((prev) => ({ ...prev, [name]: value }));
};
const checkInputErrors = () => {
  let status = true;
  if (inputs.email.trim() === "" || !emailRegex.test(inputs.email.trim())) {
    setErrors((prev) => {
      return { ...prev, email: "Enter a valid email" };
    });
    status = false;
  }
  if (inputs.name.trim() === "") {
    setErrors((prev) => {
      return { ...prev, name: "Enter a valid name" };
    });
    status = false;
  }
  if (inputs.phone_number.trim() === "") {
    setErrors((prev) => {
```

```
return { ...prev, phone_number: "Enter a valid phone number" };
});
status = false;
}
if (inputs.confirm_password.trim() === "") {
  setErrors((prev) => {
    return { ...prev, confirm_password: "Enter a valid password" };
  });
  status = false;
}
if (inputs.password.trim() === "") {
  setErrors((prev) => {
    return { ...prev, password: "Enter a valid password" };
  });
  status = false;
}
if (inputs.password.trim().length < 6) {
  setErrors((prev) => {
    return { ...prev, password: "Minimum 6 characters" };
  });
  status = false;
}
if (inputs.password.trim() !== inputs.confirm_password.trim()) {
  setErrors((prev) => {
    return { ...prev, confirmPassword: "Password don't match" };
  });
  status = false;
}
return status;
```

```
};  
const handleSignUp = async () => {  
  if (checkInputErrors()) {  
    const data = await registerUser(inputs);  
    if (data.error) {  
      toast({  
        title: data.error,  
        status: "error",  
        duration: 3000,  
        isClosable: true,  
        variant: "left-accent",  
        position: "top",  
      });  
      return;  
    }  
    setUser(data);  
    toast({  
      title: `Your journey starts here ${data.name}`,  
      status: "success",  
      duration: 3000,  
      isClosable: true,  
      variant: "left-accent",  
      position: "top",  
    });  
    localStorage.setItem("user", JSON.stringify(data));  
    navigate("/profile");  
  }  
};
```

```
return (  
<>  
<div>  
<button className="bg-base-300 rounded-box flex flex-row justify-evenly items-  
center gap-10 px-10 py-5 w-fit mx-auto">  
<span>Sign in with Github</span>  
<img src={`github-dark.png`} alt="github" width="14%" />  
</button>  
<div className="divider max-w-xs">or</div>  
<div className="card bg-base-300 rounded-box flex flex-col justify-center items-  
center gap-3 px-10 py-5 w-fit mx-auto">  
<div>  
<input  
value={inputs.name}  
type="text"  
name="name"  
placeholder="name"  
className="input input-bordered input-primary w-full"  
onChange={handleChange}  
/>  
{error.name !== "" && (  
<p className="text-sm text-red-500 font-medium">{error.name}</p>  
)}  
</div>  
<div>  
<input  
value={inputs.email}  
type="text"  
name="email"
```



```

placeholder="email
className="input input-bordered input-primary w-full"
onChange={handleChange}
/>
{error.email !== "" && (
<p className="text-sm text-red-500 font-medium">{error.email}</p>
)}
</div>
<div>
<input value={inputs.phone_number}
type="text"
name="phone_number"
placeholder="phone number"
className="input input-bordered input-primary w-full"
onChange={handleChange} />
{error.phone_number !== "" && (
<p className="text-sm text-red-500 font-medium">
{error.phone_number}
</p>
)}
</div>

```

index.html:

```

<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8" />
  <link rel="icon" type="image/svg+xml" href="cv.png" />
  <meta name="viewport" content="width=device-width, initial-scale=1.0" />

```

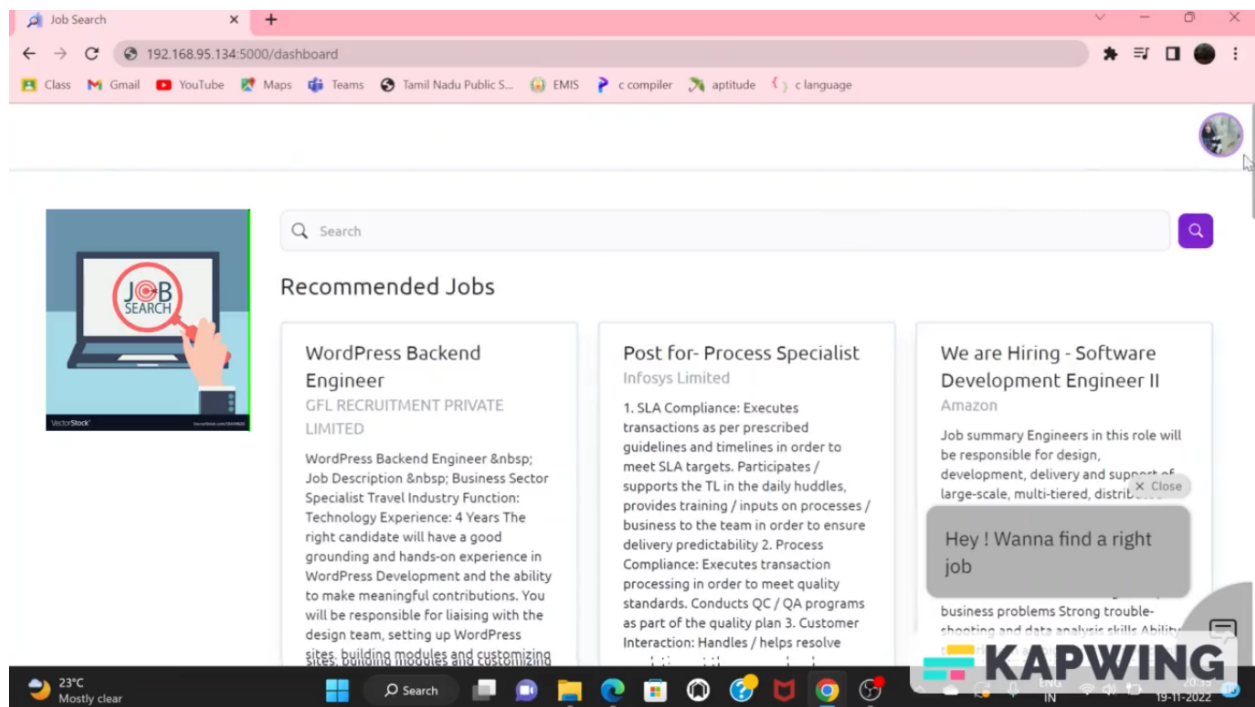
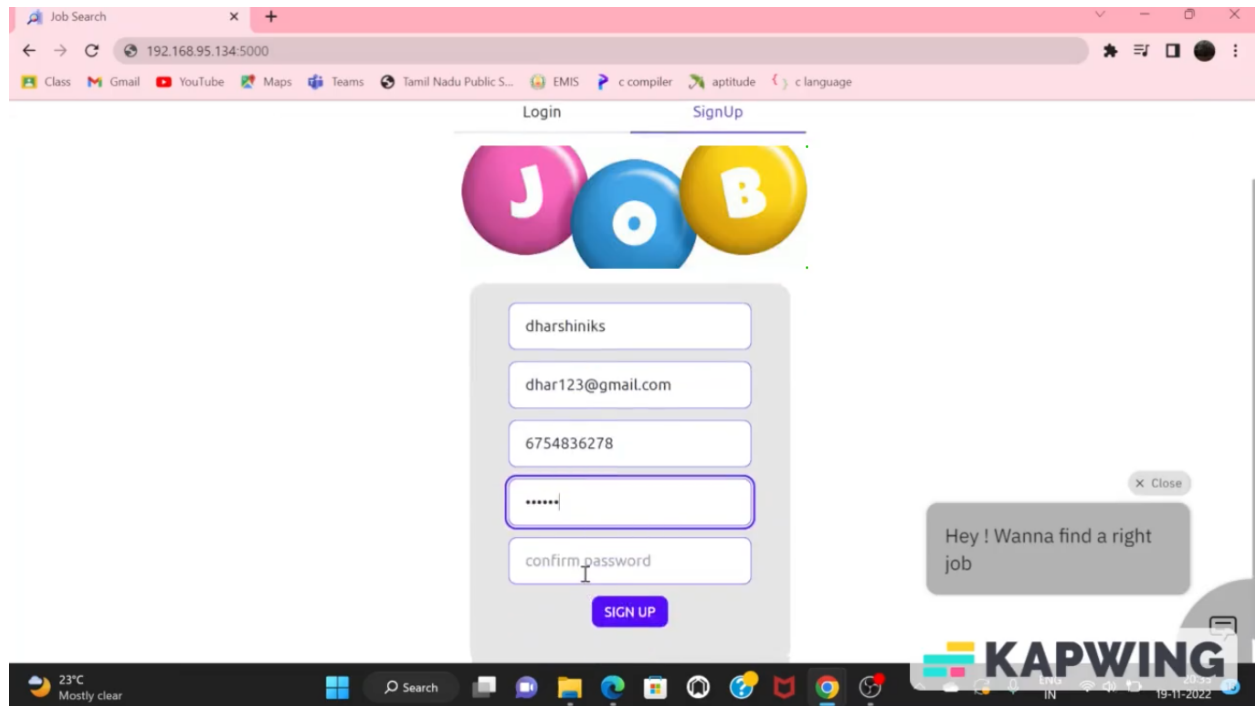
```
<title>Job Search</title>
</head>
<body>
  <div id="root"></div>
  <script type="module" src="/src/main.jsx"></script>
</body>
</html>
```

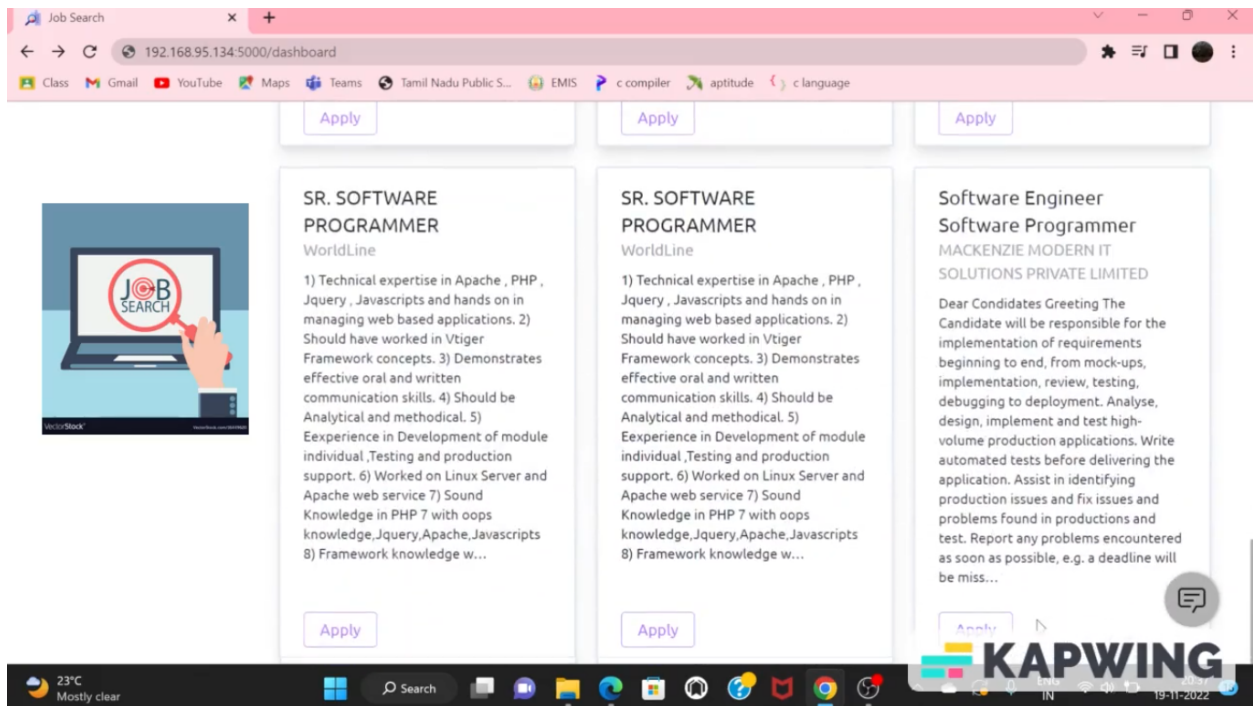
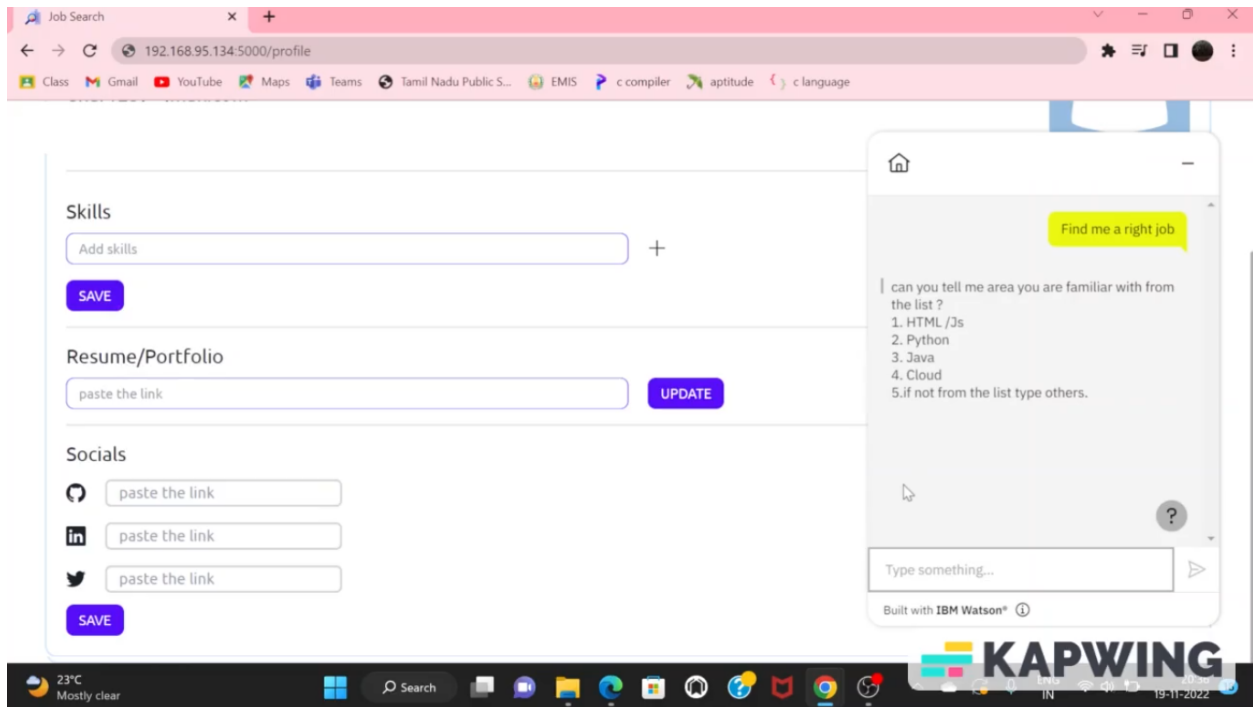
Dockerfile:

```
# Build step #1: build the React front end
FROM node:16-alpine as react-builder
WORKDIR /app
ENV PATH /app/node_modules/.bin:$PATH
COPY package.json ./
COPY ./src ./src
COPY ./public ./public
COPY ./index.html ./vite.config.js ./postcss.config.cjs ./tailwind.config.cjs ./env ./
RUN npm install
RUN npm run build

# Build step #2: build the API with the client as static files
FROM python:3.10
WORKDIR /app
COPY --from=react-builder /app/dist ./dist
COPY main.py ./main.py
RUN mkdir ./backend
COPY backend/ ./backend/
RUN pip install -r ./backend/requirements.txt
EXPOSE 5000
ENTRYPOINT ["python","main.py"]
```

SOLUTIONING





8. TESTING

8.1 Test Cases

Test case ID	Feature Type	Component	Test Scenario	Pre-Requsite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Comments	TC for Automation(Y/N)	BUG ID	Executed By
LoginPage_TC_001	UI	Home Page	Verify the UI elements in login/signup popup	Username & Password	1. Open the website 2.Enter details and press login 3.Verify that users are notified of login process		Users should be notified of login process	Working as expected	Pass	Good	N	BUG 12	GENUSHA S
LoginPage_TC_003	Functional	Home page	Verify user is able to log into application with valid credentials		1. Open the website 2.Enter details and press login 3.Verify that users are logged into website properly	Username:admin@gmail.com password: admin	User should be logged into website properly	Working as expected	Pass	Good	N		JEBA DANITA S
HomePage_TC_001	Functional	Home Page	Verify that categories of skills and jobs are shown in homepage		1. Open the website 2.Enter details and press login 3.Verify that categories of are showing Jobs shown in homepage		Categories of skills and jobs should be shown in homepage	Working as expected	Pass	Good	N	BUG 14	DHARSHINI S
HomePage_TC_002	Functional	Home page	Verify that jobs are displayed in homepage		1. Open the website 2.Enter details and press login 3.Verify that jobs are displayed in homepage		Jobs should be displayed in homepage	Working as expected	Pass	Good	N		KRITHIGA T K
HomePage_TC_003	Functional	Home page	Verify that when clicked on jobs it is redirected to correct page		1. Open the website 2.Enter details and press login 3.Verify that when clicked on jobs it is redirected to correct page		When clicked on job link it should be redirected to correct page	Working as expected	Pass	Excellent	N		GENUSHA S

8.2 User Acceptance Testing

8.2.1. Purpose of Document

The purpose of this document is to briefly explain the test coverage and open issues of the Skill and Job Recommender project at the time of the release to User Acceptance Testing (UAT).

8.2.2. Defect Analysis

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

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	10	4	2	3	20
Duplicate	1	0	3	0	4
External	2	3	0	1	6
Fixed	11	2	4	20	37
Not Reproduced	0	0	1	0	1
Skipped	0	0	1	1	2
Won't Fix	0	5	2	1	8
Totals	24	14	13	26	77

8.2.3. Test Case Analysis

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

Section	Total Cases	Not Tested	Fail
Print Engine	7	0	0
Client Application	51	0	0
Security	2	0	0
Outsource Shipping	3	0	0
Exception Reporting	9	0	0
Final Report Output	4	0	0
Version Control	2	0	0

9. RESULTS

9.1 Performance Metrics

o	Project Name	Scope/feature	Changes	Hardware Changes	Software Changes	Impact of Downtime	Load/Volume Changes	Risk Score
1	Skill and Job Recommender	New	Low	No Changes	Moderate	Yes, 2hrs	>10 to 30%	GREEN

S.No	Project Overview	NFT Test approach	Assumptions/Dependencies/Risks	Approvals/SignOff
1	Login Page	1) Open the Skill and Job Recommender Application 2) Login with User Credentials	No Risks	N/A
2	Register Page	1) Open the Skill and Job Recommender Application 2) Enter the Details and Create a new User	No Risks	N/A
3	Dsahboard	1) Log in to Skill and Job Recommender Application 2) Dashboard contain job search,view and can submit resume	No Risks	N/A
4	Submit Resume	1) Log in to Skill and Job Recommender Application 2) Can submit the resume	No Risks	N/A
5	Search jobs	1) Log in to Skill and Job Recommender Application 2) Search the jobs	No Risks	N/A
6	View jobs	1) Skill and Job Recommender filters jobs based on the skill set	No Risks	N/A

End Of Test Report								
S.No	Project Overview	NFT Test approach	NFR - Met	Test Outcome	GO/NO-GO decision	Recommendations	Identified Defects (Detected/Closed/Open)	Approvals/SignOff
1	Skill and Job Recommender Application	1) Log in to Skill and Job Recommender Application 2) Test for all Testcases 3) Log out to Skill and job Recommender Application	YES	Test Passed	GO/NO-GO decision	N/A	None	N/A

10. ADVANTAGES & DISADVANTAGES

Advantages

The most obvious goal of a recommendation system is to recommend relevant product to the user and in this system it is to recommended suitable job for the job seekers. That is the recommender system will assign required jobs based on their skill set.

Matching recommendations can help to improve overall user satisfaction, which makes it more likely for the consumer to use the website or app again and again.

It is adaptive. The system captures changes in user's interests and recommends jobs based on their current field of interest.

Disadvantages

This system cannot produce recommendations when there is not enough information to build a user profile.

This system cannot recommend products to new users who have not had any interaction yet

This system cannot recommend an item that users never selected before. It can recommend jobs only based on their skills and educational qualification and not based on their interest.

11. CONCLUSION

The results showed that the proposed system might be useful in real- world online recruitment and ranking of resumes, and it will have a better recommendation precision and efficiency than currently existing systems. It will be helpful for both the recruiters and the job seekers, making both their jobs easier.

12. FUTURE SCOPE

In the future, we attempt to investigate the useful information about job recruiting and extract as much as possible information to implement an enriched candidate recommendation system with better performance and accuracy. We also plan to utilize the extracted information applicant resumes to dynamically generate user profiles to be further used for recommending a job to job seekers. Also this system can be extended by including aptitude tests. This system can further be modified for displaying the percentage of match between the job seekers eligibility with that of the eligibility criteria of the jobs available in the application. Therefore, future scope is vast.

13. APPENDIX

Source Code Link :

https://drive.google.com/file/d/12etU_84PI7U2tRP6PZUGh7lehpRsdPom/view?usp=sharing

GitHub Link :

<https://github.com/IBM-EPBL/IBM-Project-33496-1660221955>

PROJECT DEMO VIDEO LINK

Youtube Link:

<https://youtu.be/qgB0aGa0J78>