

PROJECT REPORT

TITLE : *SKILL & JOB RECOMMENDER*

TEAM ID : PNT2022TMID04056

TEAM MEMBERS :

Team Leader	Subash R
Team Member 1	Arun Santhosh B
Team Member 2	Mohamed Nasim A
Team Member 3	Mohammed Najumudeen S

INTRODUCTION:

Project overview:

This Project view provides an overview of the skill and job recommended for individuals interested in a career in any fields. It discusses the important role that any field plays in businesses and the various skills that are necessary for success in this field. It also outlines the different job opportunities available in any field and the different types of companies that employ any field professionals.

Purpose:

Having lots of skills but wondering which job will best suit you? Don't need to worry! we have come up with a skill recommender solution through which the fresher or the skilled person can login and find the jobs by using search option or they can directly interact with the chatbot and get their dream job. To develop an end to end web application capable of displaying the current job openings based on the skillset of the users. The users and their information are stored in the Database. An alert is sent when there is an opening based on the user skillset. User will interact with the chatbot and can get the recommendations based on his skills. We can use jobsearch API to get the current job openings in the market which will fetch the data directly from the webpage.

LITERATURE SURVEY

Existing problem:

1. Students/Job seekers find their desired job based on their skillset.
2. Integrating Intelligent CHATBOT for job recommendation application.
3. A study of LinkedIn as an Employment Tool for Job seeker & Recruiter.
4. Cloud storage and sharing services.

References:

Reference link:

1. https://www.researchgate.net/publication/272802616_A_survey_of_job_recommender_systems
2. https://www.researchgate.net/publication/360820692_Intelligent_Chatbot
3. Journal homepage: <http://www.ijrpr.com/> ISSN 2582-7421
4. <https://www.ijresm.com/>

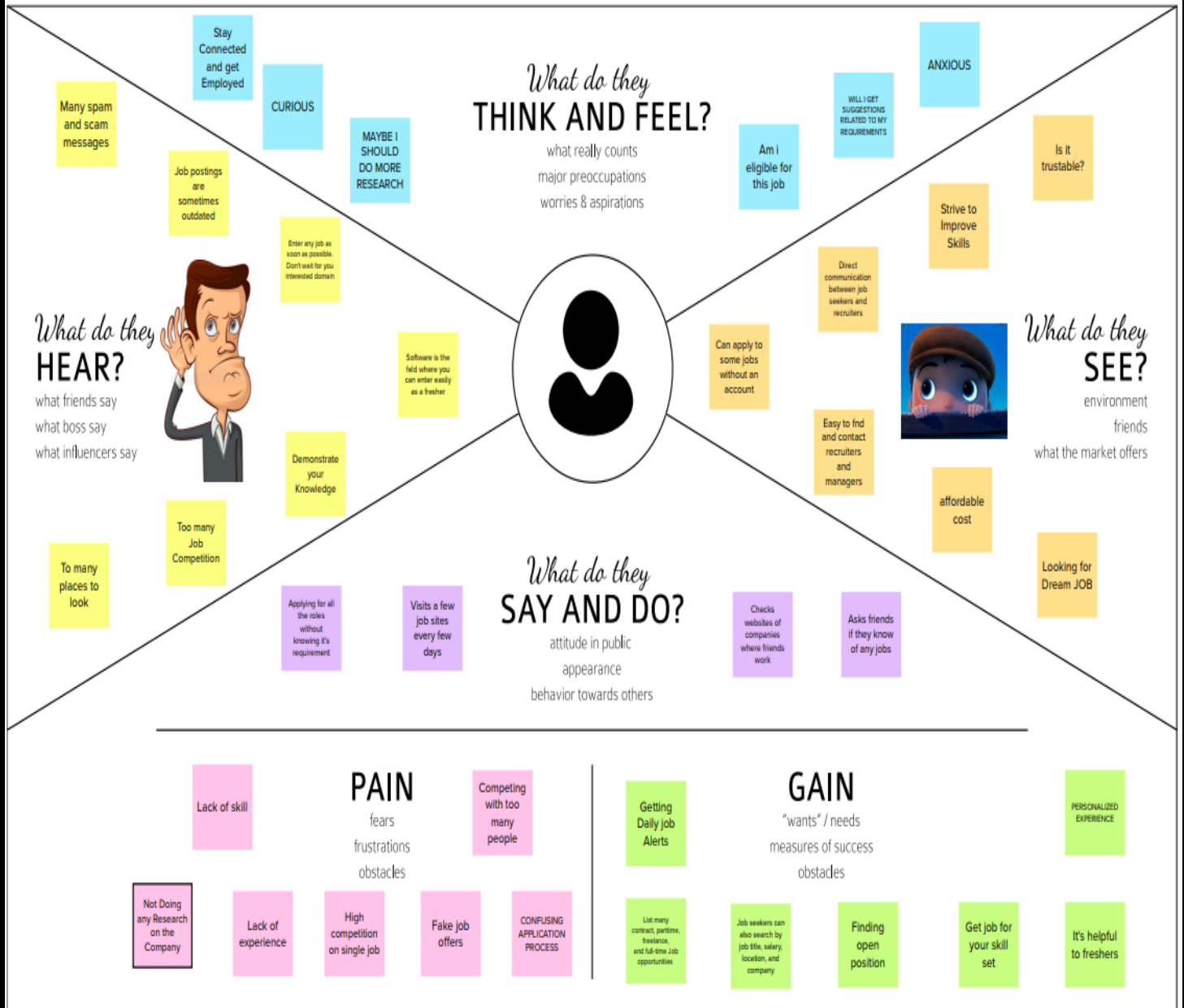
Problem Statement Definition:

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 recommend job vacancies that fit properly to the job seekers profiles. Thus, the contributions of this work are threefold, 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, put forward the proposal of a framework for job recommendation based on professional skills of job seekers, and 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 present a general panorama of job recommendation task aiming to facilitate research and real-world application design regarding this important issue. Job matching, job seeking, job search, job recommender systems.

Proposed a framework for job recommendation task. This framework facilitates the understanding of job recommendation process as well as it allows the use of a variety of text processing and recommendation methods according to the preferences of the job recommender system designer. Moreover, we also contribute making publicly available a new dataset containing job seekers profiles and job vacancies. Future directions of our work will focus on performing a more exhaustive evaluation considering a greater amount of methods and data as well as a comprehensive evaluation of the impact of each professional skill of a job seeker on the received job recommendation.

IDEATION & PROPOSED SOLUTION:

Empathy Map Canvas:



Ideation and Brainstorming:

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 in purpose
 1 hour in collaboration
 12 people recommended

Before you collaborate

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

- 10 minutes

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.

10 minutes

Brainstorm

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

10 minutes

Tip: You can start with sticky notes, or use a digital tool like Miro or FigJam.

Group ideas

Take ideas sharing your ideas into clustering similar or related notes as you go. In the last 10 minutes, give each cluster a sentence-like label. It's okay if bigger than sticky notes, try and use if you and break it up into smaller sub-groups.

10 minutes

Problem

You have a problem to solve. On the same page about which important meaning. Please show your ideas on the grid to prioritize which ideas are important and which are feasible.

10 minutes

After you collaborate

You can export the final as an image or pdf to share with members of your company who might not be in the room.

10 minutes

Brainstorm

Brainstorming is a key tool for generating ideas. It's a process where you and your team brainstorm ideas together.

10 minutes

Problem

You have a problem to solve. On the same page about which important meaning. Please show your ideas on the grid to prioritize which ideas are important and which are feasible.

10 minutes

Proposed Solution:

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	<ul style="list-style-type: none"> For job seekers, it is time-consuming to search for which job suits them based on their skill set. Job seekers have to check each recruiter's website in order to search for any job vacancies. Recruiters facing difficulties in advertising their job vacancies. Recruiters also find it difficult to verify that the person with the right skill set has applied for the job.
2.	Idea / Solution description	<ul style="list-style-type: none"> Recruiters can post for the job openings in our application. Use a job search API to get the current job openings in the market which will fetch the data directly from the webpage. User can interact with the chatbot via entering skills to the bot, it suggests some job based on entered skills. lists of jobs are uploaded into the database and the chatbot is also connected with the database once the user enters skills into the chatbot it will search for related jobs in the database then it displays various jobs related to skills. By using this web application job seekers directly choose their job related to their skills without needing help from someone.
3.	Novelty / Uniqueness	<ul style="list-style-type: none"> Search-based recommendation. Chatbot-based interaction, built using IBM Watson assistant
4.	Social Impact / Customer Satisfaction	<ul style="list-style-type: none"> The main aim of the project is to build an application that recommends jobs for job seekers. The user can search using a chatbot and the chatbot recommends the job. Even the application can send notifications based on matching jobs or upcoming jobs through e-mail.
5.	Business Model (Revenue Model)	<ul style="list-style-type: none"> Users who have bought the subscription can get job alerts prior to others. we can generate revenue by offering subscription-based applications to jobseekers.
6.	Scalability of the Solution	<ul style="list-style-type: none"> Even if the number of users increases, the system will perform well. Need to be responsive and able to react to changes as fast as possible.

Problem Solution Fit:

Problem-Solution Fit canvas

Purpose / Vision **Skill/Job Recommender Application**
PNT2022TMID04056

Version:

Define CS, fit into CL	1. CUSTOMER SEGMENT(S) CS Customers who are searching jobs with suitable skills	6. CUSTOMER LIMITATIONS CL <small>EG. BUDGET, DEVICES</small> Not having enough money for survival Do not have place to show their skills to recruiters	5. AVAILABLE SOLUTIONS AS <small>PROS & CONS</small> Using online sites for searching jobs which only includes their qualifications not showing their skills and also taking interviews in offcampus will not provide enough opportunities to be hired at their desired company	Explore AS, differentiate						
	2. PROBLEMS / PAINS + ITS FREQUENCY PR Existing job searching websites not provide enough opportunities to be hired by reputed companies Not enough opening for job preferences	9. PROBLEM ROOT / CAUSE RC Existing solution will not provide enough opportunities for our customer to be hired, and show their skills to recruiters and this leads to poverty and also causing to lose dignity in society due to unemployment	7. BEHAVIOR + ITS INTENSITY BE When Users apply for fraudulent jobs, they get unhappy due to wasted time When candidates with inadequate qualifications apply for a position, employers become irritated.		Focus on PR, tap into BE, understand RC					
Identify strong TR & EM	3. TRIGGERS TO ACT TR More opportunities for getting a job Get job for your skill set	10. YOUR SOLUTION SL Recruiters can post for the job openings in our application. Use a job search API to get the current job openings in the market which will fetch the data directly from the webpage. User can interact with the chatbot via entering skills to the bot, it suggests some job based on entered skills. lists of jobs are uploaded into the database and the chatbot is also connected with the database once the user enters skills into the chatbot it will search for related jobs in the database then it displays various jobs related to skills. By using this web application job seekers directly choose their job related	8. CHANNELS of BEHAVIOR CH ONLINE Apply for jobs Review job applications OFFLINE Final level interview Checkout location and infrastructure of company Finalize paperwork	Extract online & offline CH of BE						
	4. EMOTIONS EM <small>BEFORE / AFTER</small> <table border="1"> <thead> <tr> <th>BEFORE</th> <th>AFTER</th> </tr> </thead> <tbody> <tr> <td>Stressed</td> <td>Felling Connected</td> </tr> <tr> <td>Unsatisfaction</td> <td>Connected to the society</td> </tr> <tr> <td></td> <td>Reverence of Smartness</td> </tr> </tbody> </table>	BEFORE	AFTER		Stressed	Felling Connected	Unsatisfaction	Connected to the society		Reverence of Smartness
BEFORE	AFTER									
Stressed	Felling Connected									
Unsatisfaction	Connected to the society									
	Reverence of Smartness									



Problem-Solution fit canvas is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License. Designed by Daria Nepriakhina / IdeaHackers.nl - we tailor ideas to customer behaviour and increase solution adoption probability.



CODING & SOLUTIONING:

Feature 1:

IBM Cloud

IBM Watson

Platform IBM DB2

Container Registry

Kubernetes Cluster

Feature 2:

Login

Update Resume

Job Recommendations

TESTING AND RESULTS:

Test Cases:-

Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Comments
LoginPage_TC_001	Functional	Home Page	Verify user is able to see the Login/Signup popup when user clicked on My account button		1. Enter URL and click go 2. Click on My Account dropdown button 3. Verify login/Sign Up popup displayed or not	https://login.com/	Login/Signup popup should display	Working as expected	Pass	
LoginPage_TC_002	UI	Home Page	Verify the UI elements in Login/Signup popup		1. Enter URL and click go 2. Click on My Account dropdown button 3. Verify login/Signup popup with below UI elements: a.email text box b.password text box c.Login button d.New customer? Create account link e.Last password? Recovery password link	https://homepage.com/	Application should show below UI elements: a.email text box b.password text box c.Login button with orange color d.New customer? Create account link e.Last password? Recovery password link	Working as expected	Pass	Steps are not clear to follow
LoginPage_TC_003	Functional	Homepage	Verify user is able to log into application with Valid credentials		1. Enter URL(https://homepage.com/) and click go 2. Click on My Account dropdown button 3. Enter Valid username/email in Email text box 4. Enter valid password in password text box 5. Click on login button	Username: heinrichmandai@gmail.com password: heinrich@424	User should navigate to user account homepage	Working as expected		

LoginPage_TC_004	Functional	Login page	Verify user is able to log into application with Invalid credentials		1. Enter URL(https://login.com/) and click go 2. Click on My Account dropdown button 3. Enter Invalid username/email in Email text box 4. Enter valid password in password text box 5. Click on login button	Username: heinrichmandai@gmail.com password: abc	Application should show 'Incorrect email or password ' validation message.	Working as expected	Pass	
LoginPage_TC_004	Functional	Login page	Verify user is able to log into application with Invalid credentials		1. Enter URL(https://login.com/) and click go 2. Click on My Account dropdown button 3. Enter Valid username/email in Email text box 4. Enter Invalid password in password text box	Username: HEINRICH@gmail.com password: ys329	Application should show 'Incorrect email or password ' validation message.	Working as expected	Pass	
					5. Click on login button					
LoginPage_TC_005	Functional	Login page	Verify user is able to log into application with Invalid credentials		1. Enter URL(https://login.com/) and click go 2. Click on My Account dropdown button 3. Enter Invalid username/email in Email text box 4. Enter Invalid password in password text box 5. Click on login button	Username: heinrich@gmail.com password:ys329	Application should show 'Incorrect email or password ' validation message.	Working as expected	Pass	
LoginPage_TC_005	Functional	JOB vacancy	verify user is able to view the vacancies posted		1.Enter URL and click go 2.Click on dropdown button 3. Enter qualification and experiences search box 4. click on search button	Qualification: B.Tech Experience:Fresher	Application should show list of vacancies based on their qualification and experience	Working as expected	Pass	

User Acceptance Testing:

1.Purpose of Document

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

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	1	3	1	6
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	80

3. Test Case Analysis:

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

Section	Total Cases	Not Tested	Fail	Pass
Print Engine	7	0	1	7
Client Application	51	0	1	51
Security	2	0	2	2
Outsource Shipping	3	0	1	3
Exception Reporting	9	0	1	9
Final Report Output	4	0	1	4
Version Control	2	0	0	2

REQUIREMENT ANALYSIS:

Function Requirement:

Software Required:

Python, Flask, Docker

Non-Function Requirement:

System Required:

8GB RAM, Intel Core i3, OS-Windows/Linux/MAC,
Laptop or Desktop

Functional Requirements:

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.

Non-functional Requirements:

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

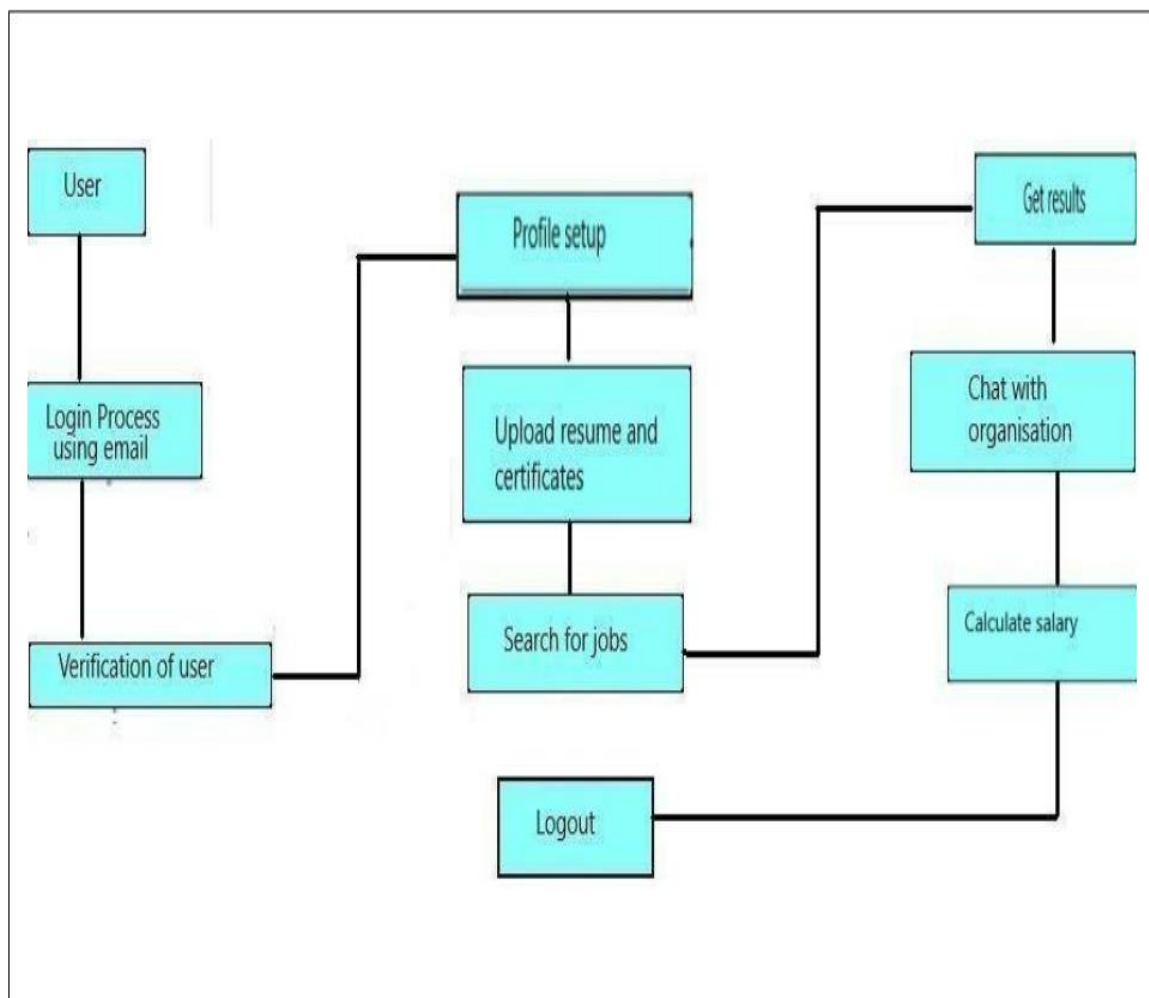
FR No.	Non-Functional Requirement	Description
NFR-1	Usability	The webpage will be designed in such a way that any non-technical user can easily navigate through it and complete the job registration work. (easy and simple design)
NFR-2	Security	Using of python flask to cloud connect will provide security 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.

PROJECT DESIGN:

Data Flow Diagrams:

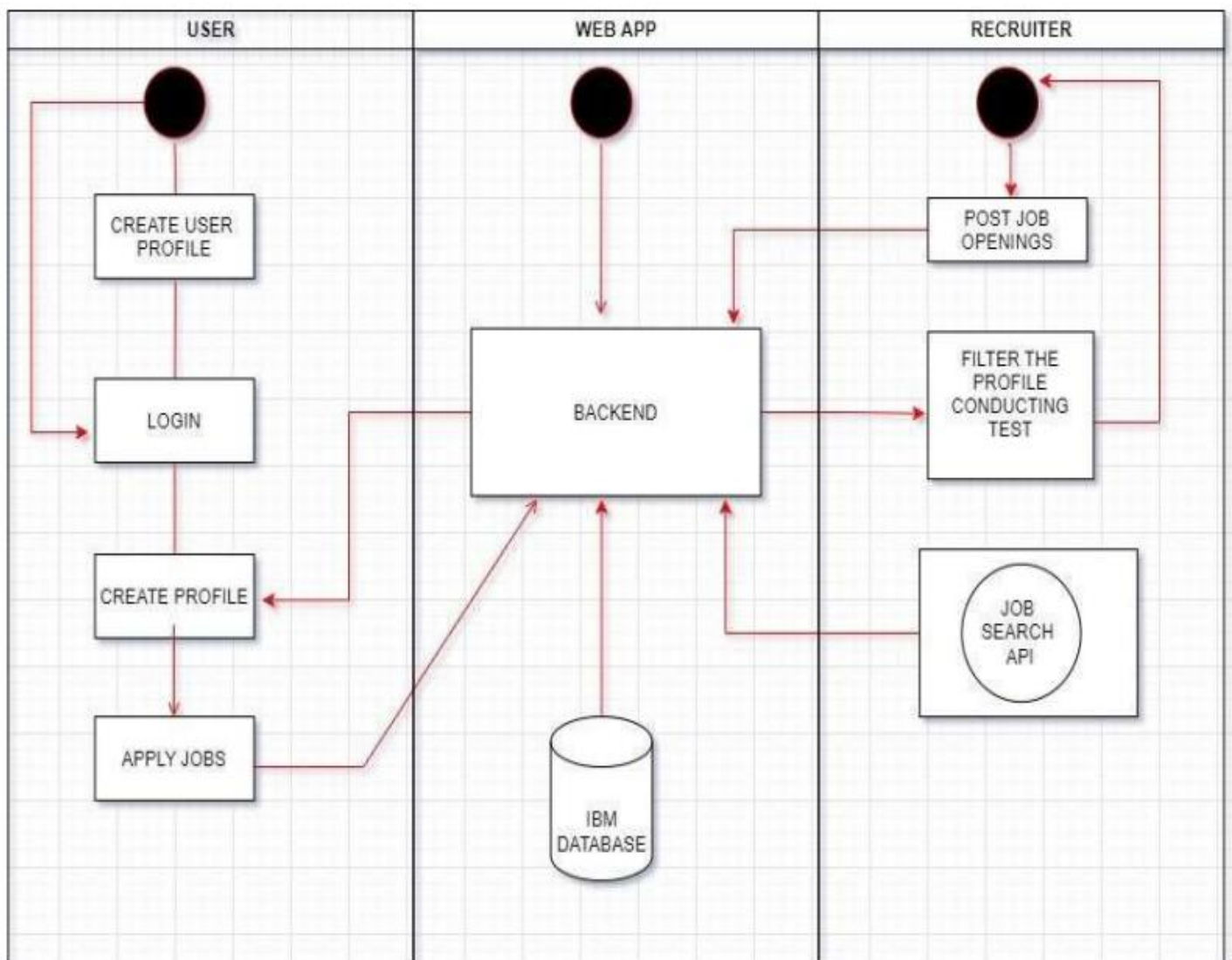
Data Flow Diagrams:

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 enter and leaves the system, what changes the information, and where data is stored.



SOLUTION & TECHNICAL ARCHITECTURE:

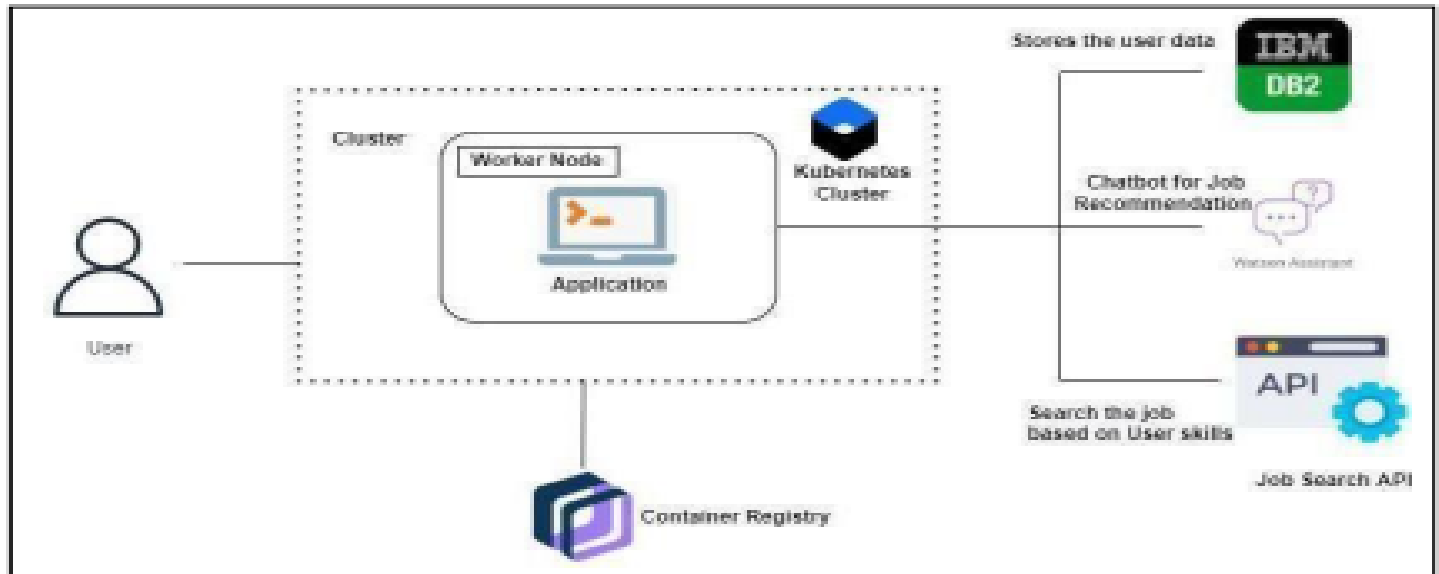
Solution Architecture:



Technical Architecture:

Technology Architecture:

Project shall full fill the following information in this technology architecture .



S.No.	Parameter	Description
1.	Is the System Robust?	Yes, it is partially buildable platform as the budget required will be more as cloud is a pay per use model and time taken will be quite.
2.	Is it highly modifiable?	Indeed, the framework is modifiable and it can own up to the progressions by recognizing blunders that requirements to be fixed and new functionalities. It is exceptionally receptive to the progressions.
3.	Is it Scalable?	Indeed, the framework proposed is exceptionally versatile as it can deal with the developing responsibility where great execution is likewise expected to effectively work. Organization of the stage has been finished utilizing different OS virtualization stage it will deal with the responsibility genuinely.

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	Chat bot	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

PROJECT PLANNING & SCHEDULING:

Sprint Planning & Estimation:

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	UI Creation Creating Registration page, Login page	10	Medium	ARUN SANTHOSH NASIM NAJUMUDEEN SUBASH
Sprint-1	Database Connectivity	USN-2	Viewing and applying jobs Connecting UI with Database	10	High	ARUN NASIM
Sprint-2	SendGrid Integration	USN-3	SendGrid Integration with Python Code	10	Low	SUBASH NAJUMUDEEN
Sprint-2	Chatbot Development	USN-4	Building a chatbot	10	High	ARUN SANTHOSH NASIM NAJUMUDEEN SUBASH

Sprint-3	Integration and Containerisation	USN-5	Integrating chatbot to the HTML page and containerizing the app.	20	Medium	ARUN SANTHOSH NASIM NAJUMUDEEN SUBASH
Sprint-4	Upload Image and deployment	USN-6	Upload the image to the IBM Registry and deploy it in the Kubernetes Cluster.	20	High	ARUN SANTHOSH NASIM NAJUMUDEEN SUBASH

Sprint Delivery Schedule:

Project Tracker, Velocity & Burndown Chart: (4 Marks)

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	20	6 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022		
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022		
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022		

Velocity:

Imagine we have a 10-day sprint duration, and the velocity of the team is 20 (points per sprint). Let's calculate the team's average velocity (AV) per iteration unit (story points per day)

$$AV = \frac{\text{sprint duration}}{\text{velocity}} = \frac{20}{10} = 2$$

RESULTS:

- The project has been completed as we expected.
- We ensured that Database was designed and well connected to our project.
- The Expected results were gotten.

ADVANTAGES & DISADVANTAGES:

Advantages:

- Person who looks for a job can easily find a suitable job based on their skill set.
- Person can check their eligibility by attending eligibility test.
- Most of the Recruiters find the suitable person based on the scores they have gotten in the eligibility.

Disadvantages:

- Person Job May get technical difficulty while taking the eligibility
- Job seeker may have trouble to contact recruiters directly.

CONCLUSION:

- The application has been developed to make job search easier.
- The application that we have developed is user friendly.
- User can find a job based on their skillset in the short period of time. The jobseeker certainly get benefit by using this application.
- In the addition, Chatbot Has been implemented with the help of IBM Watson. The chatbot helps jobseeker and organization when they experience the difficulties.

FUTURE SCOPE:

- The linked in the well known application to find a job and stay connected with professional and organization.
- The job seekers and organization use linked in to find a job.
- In the future, there are lots of possibilities to enhance our project similar to linked in.

GITHUB & PROJECT DEMO LINK:

- ✓ All the tasks of developing the application are uploaded inn the github.
- ✓ The github link is given below :

<https://github.com/IBM-EPBL/IBM-Project-25608-1659968522>