IBM – NALAIYA THIRAN PROJECT

SKILL JOB RECOMMENDER APPLICATION

ABSTRACT

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 threefold, 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; and 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.

There has been a sudden boom in the technical industry and an increase in the number of good startups. Keeping track of various appropriate job openings in top industry names has become increasingly troublesome. This leads to deadlines and hence important opportunities being missed. Through this research paper, the aim is to automate this process to eliminate this problem. To achieve this, IBM cloud services like db2, Watson assistant, cluster, Kubernetes have been used. A hybrid system of Content-Based Filtering and Collaborative Filtering is implemented to recommend these jobs. The intention is to aggregate and recommend appropriate jobs to job seekers, especially in the engineering domain. The entire process of accessing numerous company websites hoping to find a relevant job opening listed on their career portals is simplified. The proposed recommendation system is tested on an array of test cases with a fully functioning user interface in the form of a web application. It has shown satisfactory results, outperforming the existing systems. It thus testifies to the agenda of quality over quantity.

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1. INTRODUCTION

1.1 PROJECT OVERVIEW

There has been a sudden boom in the technical industry and an increase in the number of good startups. Keeping track of various appropriate job openings in top industry names has become increasingly troublesome. This leads to deadlines and hence important opportunities being missed. Through this research paper, the aim is to automate this process to eliminate this problem. To achieve this, IBM cloud services like db2, Watson assistant , cluster, kubernetes have been used. A hybrid system of Content-Based Filtering and Collaborative Filtering is implemented to recommend these jobs. The intention is to aggregate and recommend appropriate jobs to job seekers, especially in the engineering domain. The entire process of accessing numerous company websites hoping to find a relevant job opening listed on their career portals is simplified. The proposed recommendation system is tested on an array of test cases with a fully functioning user interface in the form of a web application. It has shown satisfactory results, outperforming the existing systems. It thus testifies to the agenda of quality over quantity**.**

1.2 PURPOSE

With an increasing number of cash-rich, stable, and promising technical companies/startups on the web which are in much demand right now, many candidates want to apply and work for these companies. They tend to miss out on these postings because there is an ocean of existing systems that list millions of jobs which are generally not relevant at all to the users. There is an abundance of choices and not much streamlining. On the basis of the actual skills or interests of an individual, job seekers often find themselves unable to find the appropriate employment for themselves. This system, therefore, approaches the idea from a data point of view, emphasizing more on the quality of the data than the quantity.

2. LITERATURE SURVEY

2.1 EXISTING PROBLEM:

Existing system is not very efficient, it does not benefit the user in maximum way, so the proposed system uses IBM cloud services like db2, Watson virtual assistant, cluster, Kubernetes and docker for containerization of the application.

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2.2 REFERENCES:

1. Shaha T Al-Otaibi and Mourad Ykhlef. “A survey of job recommender systems”. In: International Journal of the Physical Sciences 7.29 (2012), pp. 5127–5142. issn: 19921950. doi: 10.5897/IJPS12. 482
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2.3 PROBLEM STATEMENT DEFINITION

"Can an efficient recommender system be modelled for the Job seekers which recommend Jobs with the user’s skill set and job domain and also addresses the issue of cold start?".

In current situation recruitment s done manually for lakhs of students in which many talented students may lose their opportunities due to different reasons since it is done manually, and company also need the highly talented people from the mass group for their growth. So we have built a cloud application to do this process in a efficient manner.

3. IDEATION & PROPOSED SOLUTION

In this project you will be working on two modules:

1. Admin and
2. User

ADMIN:

The role of the admin is to check out the database about the stock and have a track of all the things that the users are purchasing.

USER:

The user will login into the website and go through the products available on the website. Instead of navigating to several screens the user can directly talk to Chatbot. Get the recommendations based on information provided by the user.

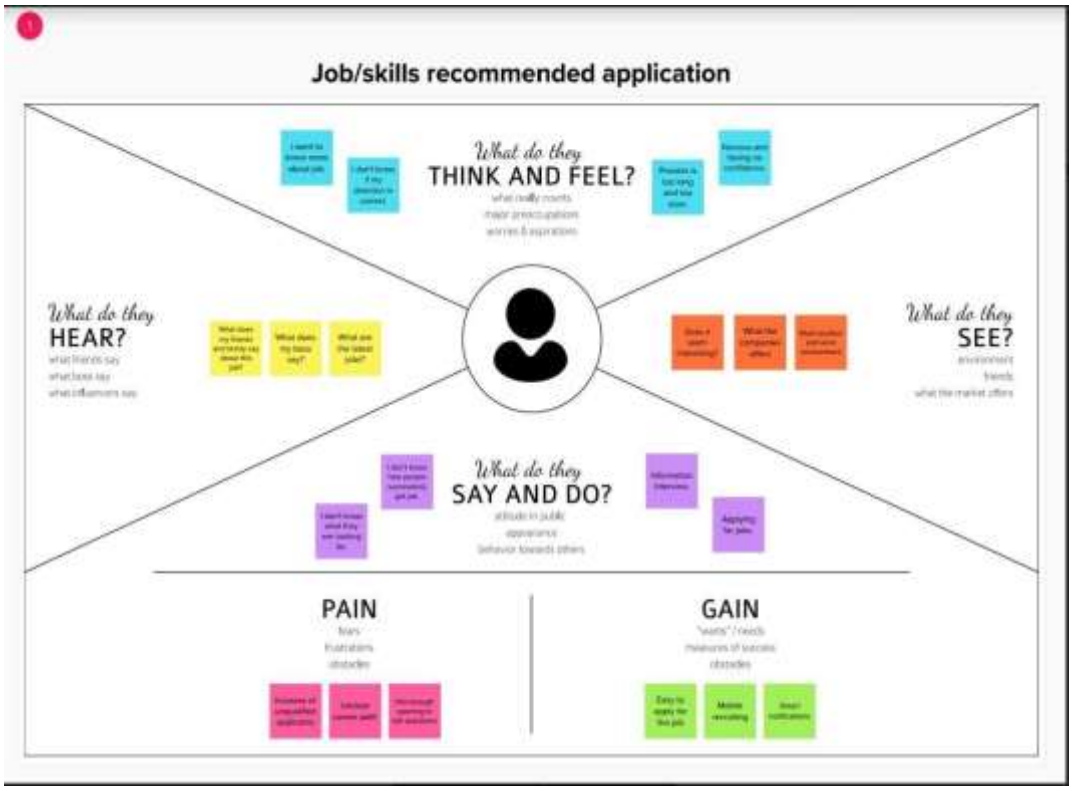
FEATURES OF CHATBOT:

- Using chatbot we can manage user's choices and orders.
- The chatbot can give recommendations to the users based on their interests.
- It can promote the best deals and offers on that day.
- It will store the customer's details and orders in the database.
- The chatbot will send a notification to customers if the order is confirmed.
- Chatbots can also help in collecting customer feedback.

3.1 EMPATHY MAP CANVAS:

Empathy Map Canvas: An empathy map is a simple, easy-to-digest visual that captures knowledge about a user’s behaviours and attitudes. It is a useful tool to helps teams better understand their users. Creating an effective solution requires understanding the true problem and the person who is experiencing it. The exercise of creating the map helps participants consider things from the user’s perspective along with his or her goals and challenges.

example:



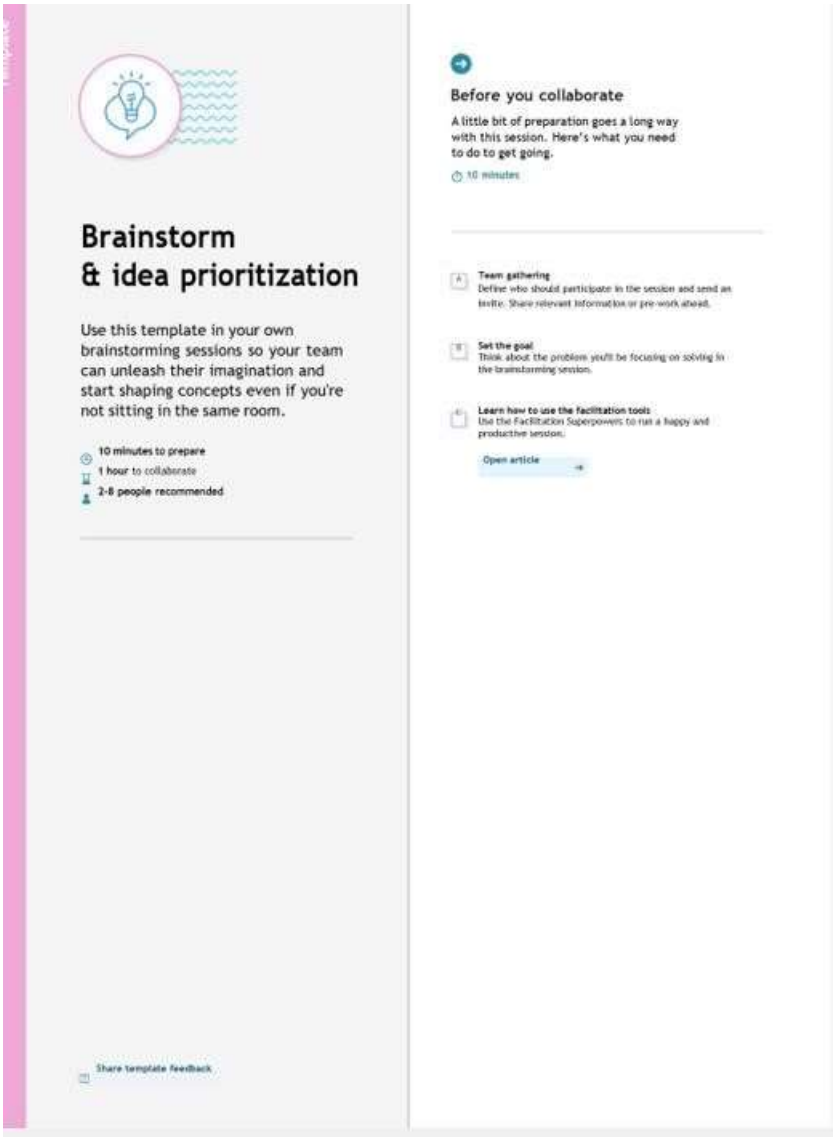
3.2 IDEATION & BRAINSTROMING:

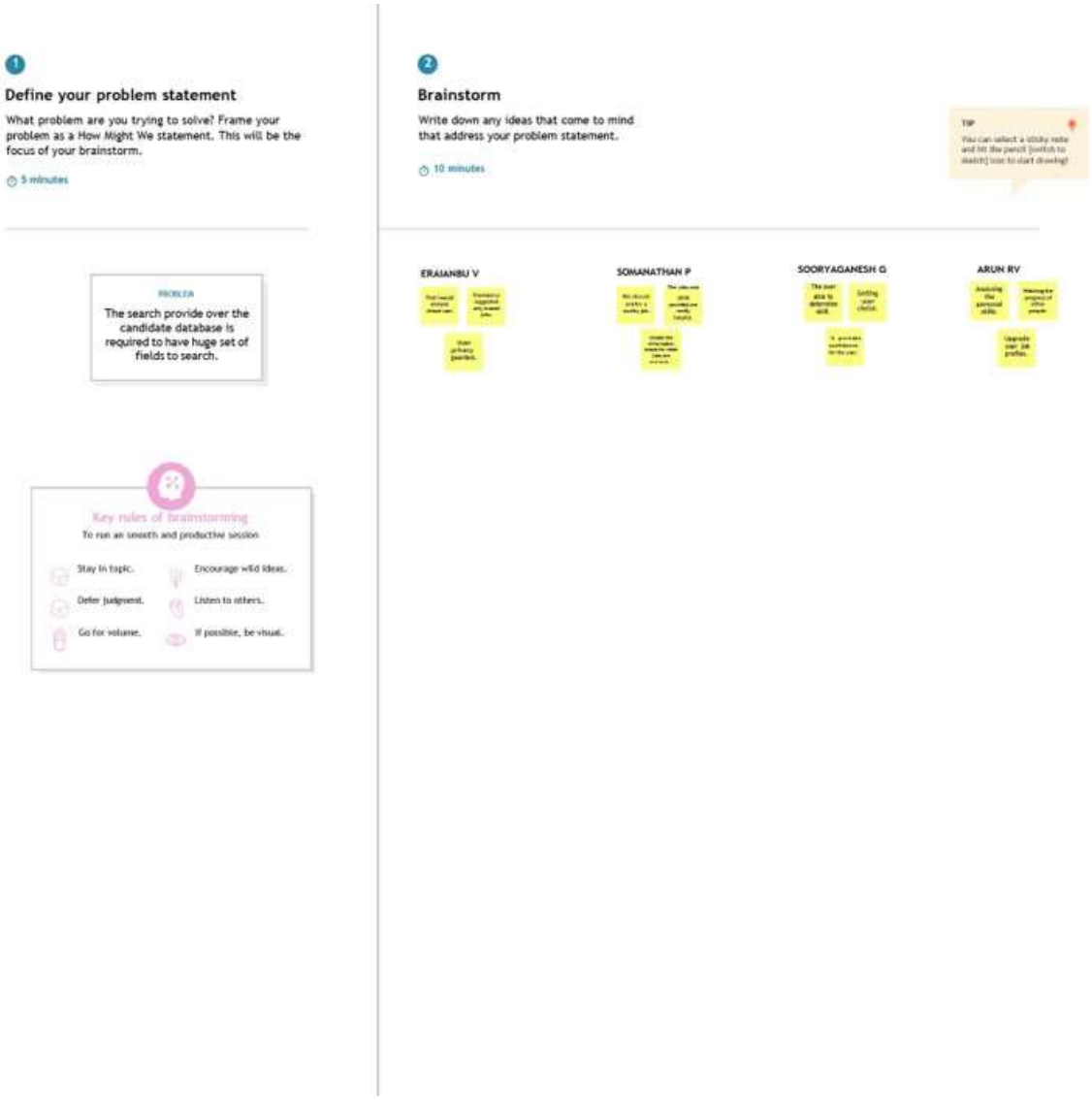
Brainstorm & Idea Prioritization Template:

Brainstorming provides a free and open environment that encourages everyone within a team to participate in the creative thinking process that leads to problem solving. Prioritizing volume over value, out-of-the-box ideas are welcome and built upon, and all participants are encouraged to collaborate, helping each other develop a rich number of creative solutions. 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.

STEP 1:

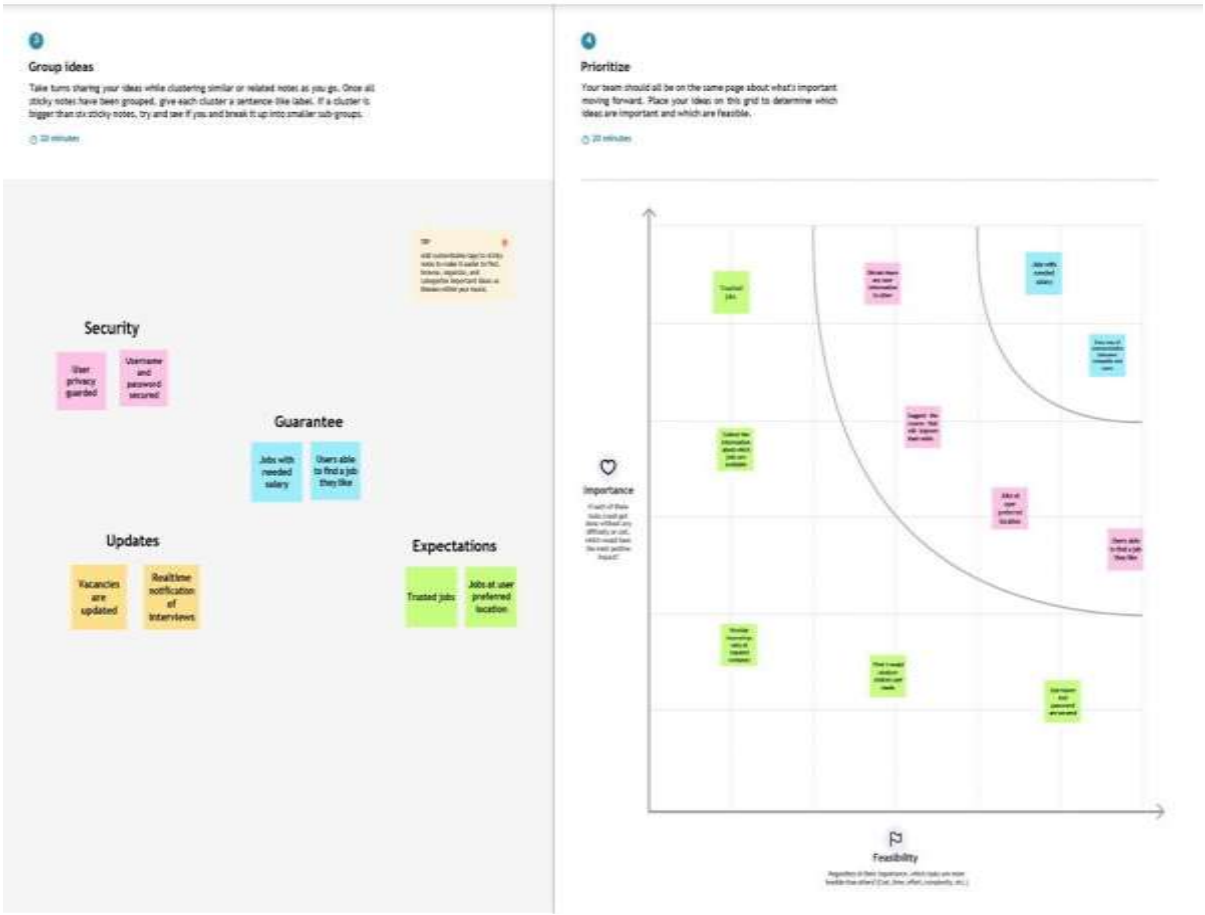
Team Gathering, Collaboration and Select the Problem Statement





STEP 2:

Brainstorm, Idea Listing and Grouping


Group ideas
Take turns sharing your ideas while clustering similar or related notes as you go. Once all sticky notes have been grouped, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you and break it up into smaller sub-groups.
20 minutes
Security
User privacy guarded
Username and password secured
Guarantee
Jobs with needed salary
Users able to find a job they like
Updates
Vacancies are updated
Realtime notification of interviews
Expectations
Trusted jobs
Jobs at user preferred location
Prioritize
Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.
20 minutes
Importance
Feasibility


After you collaborate
You can export the mural as an image or pdf to share with members of your company who might find it helpful.
Quick add-ons
Share the mural
Export the mural
Keep moving forward
Strategy blueprint
Open the template
Customer experience journey map
Open the template
Open the template
Share template feedback

3.3 PROPOSED SOLUTION:

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 log in and find the jobs by using the 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 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.

3.4 PROBLEM SOLUTION FIT

4. REQUIREMENT ANALYSIS

4.1 FUNCTIONAL REQUIREMENT:

Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
User Registration	Registration through Form Registration through Gmail
User Confirmation	Confirmation via Email Confirmation via OTP
Chat Bot	A Chat Bot will be there in website to solve user queries and problems related to applying a job, search for a job and much more.
User Login	Login through Form Login through Gmail
User Search	Exploration of Jobs based on job filters and skill recommendations.
User Profile	Updation of the user profile through the login credentials
User Acceptance	Confirmation of the Job.

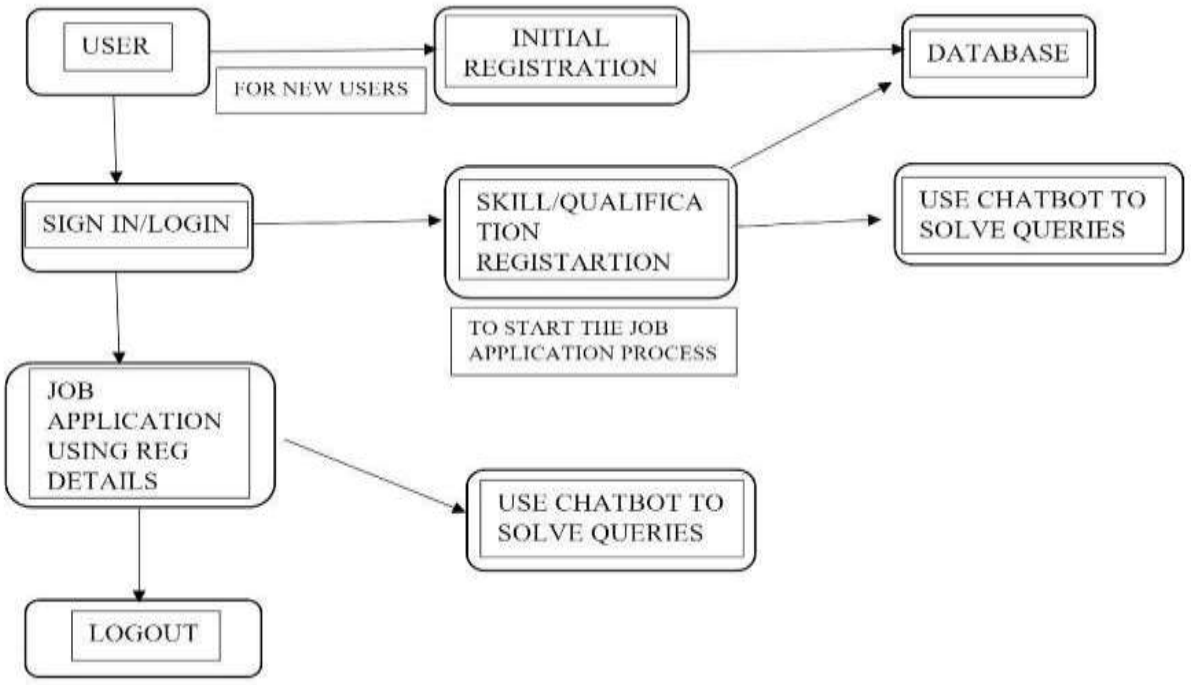
4.2 NON-FUNCTIONAL REQUIREMENTS:

1. Usability
2. Security
3. Reliability
4. Performance
5. Availability
6. Scalability

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.



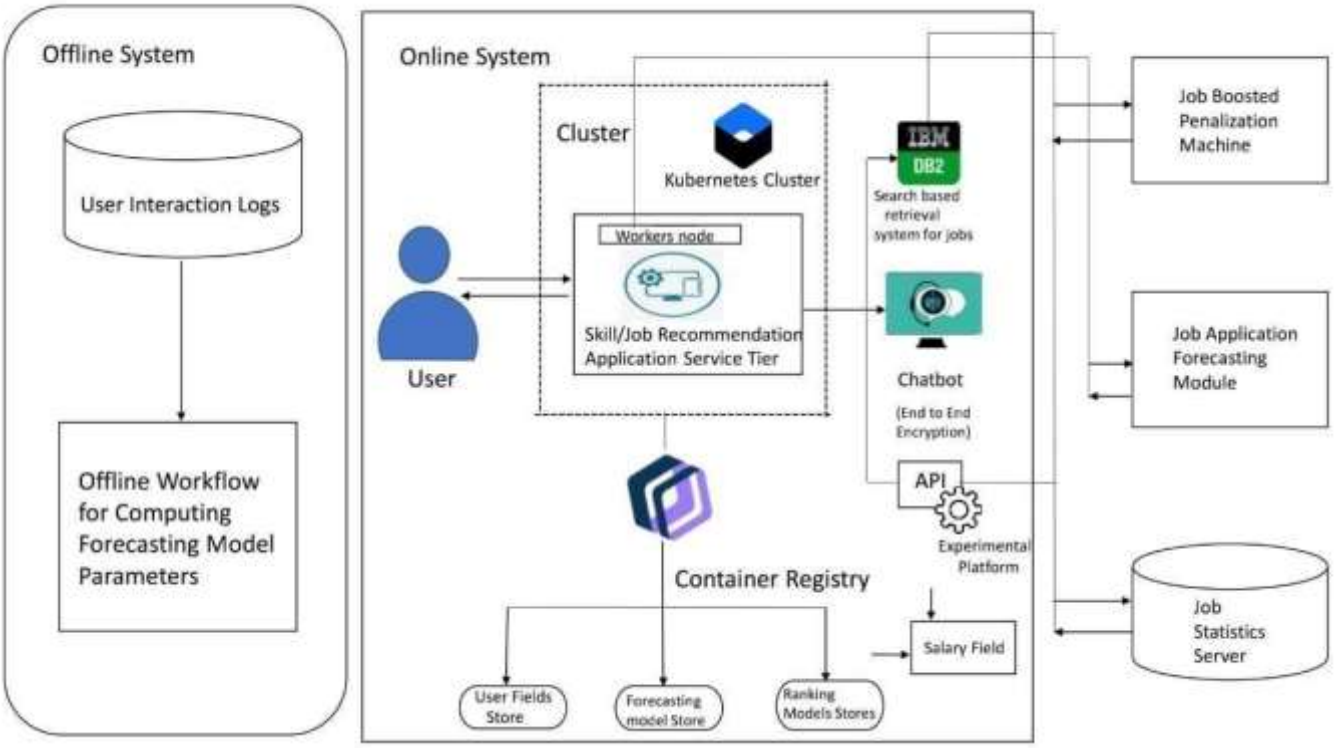
5.2 SOLUTION & TECHNICAL ARCHITECTURE:

Solution architecture is a complex process – with many sub-processes – that bridges the gap between business problems and technology solutions. Its goals are to:

- Find the best tech solution to solve existing business problems.
- Describe the structure, characteristics, behaviour, and other aspects of the software to project stakeholders.
- Define features, development phases, and solution requirements.

- Provide specifications according to which the solution is defined, managed and delivered.

- Provide the best business require recommend by using the optimised and efficient algorithm
- Differentiate the fake job recommend by fake sites and be aware from the Scammers



5.3USER 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	I can access my data by login	High	Sprint-1
	Dashboard	USN-6	As a user , I can view the dashboard and by products		High	Sprit -2
Customer (Web user)	Registration / Login	USN-7	As a user, I can register for the application by entering my email, password, and confirming my password.	I can access my account / dashboard		Sprint -1
Customer Care Executive	Contact with Customers	USN-8	As a Customer customers care executive, I solve the customer Requirements and feedback	I can receive calls from customers	High	Sprint-1

Administrator	Check stock and Price , orders	USN_9	As a Administrator , I can Check the database And stock details and buying and selling prices	I am the administrator of the company	High	Sprint -2

6. PROJECT PLANNING & SCHEDULE

6.1 SPRINT PLANNING & ESTIMATION:

Milestones	Activities	Description
Project Development Phase	Delivery of Sprint – 1,2,3,4	To develop the code and submit the developed code by testing it
Setting up App environment	Create IBM Cloud account	Signup for an IBM Cloud account
	Create flask project	Getting started with Flask to create project
	Install IBM Cloud CLI	Install IBM Command LineInterface
	Docker CLI Installation	Installing Docker CLI on laptop
	Create an account in send grid	Create an account in sendgrid. Use the service as email integration to our application for sending emails
Implementing web Application	Create UI to interact with Application	Create UI • Registration page • Login page • View products page • Add products page
	Create IBM DB2 & connect with python	Create IBM DB2 service in IBM Cloud and connect with python code with DB
Integrating sendgrid service	Sendgrid integration with python	To send emails form the application we need to integrate the Sendgrid service
Developing a chatbot	Building a chatbot and Integrate to application	Build the chatbot and Integrate it to the flask application
Deployment of App in IBMCloud	Containerize the App	Create a docker image of your application and push it to the IBM container registry
	Upload image to IBM container registry	Upload the image to IBM container registry
	Deploy in kubernetes cluster	Once the image is uploaded to IBM Container registry deploy the image to IBM Kubernetes cluster

Milestones	Activities	Description
Ideation Phase	Literature Survey	Literature survey on the selected project & information gathering
	Empathy Map	Prepare Empathy map to capture the user Panis & Gains, prepare list of problem statement
	Ideation	Organizing the brainstorming session and priorities the top 3 ideas based on feasibility & Importance
Project Design Phase I	Proposed Solution	Prepare proposed solution document which includes novelty, feasibility of ideas, business model, social impact, Scalability of solution
	Problem Solution Fit	Prepare problem solution fit document
	Solution Architecture	Prepare solution architecture document
Project Design Phase II	Customer Journey	Prepare customer journey map to understand the user interactions & experience with the application
	Functional requirement	Prepare functional & non functional requirement document
	Data Flow Diagram	Prepare Data Flow Diagramand user stories
	Technology architecture	Draw the technology architecture diagram
Project Planning Phase	Milestones & Activity list	Prepare milestones and activity list of the project
	Sprint Delivery Plan	Prepare sprint delivery plan

6.2 SPRINT DELIVERY SCHEDULE:

Sprint-4	Identity-Aware	USN-7	Open, public access, User-authenticated access, Employee- restricted access.	Company public website. App running on the company intranet. App with access to customer private information.	High	Eraianbu Sooryaganesh Somanathan RV Arun

Sprint-1	Communication	USN-8	A customer care executive is a professional responsible for communicating the how's and why's regarding service expectations within a company.	For how totackle customer queries.	Medium	Eraianbu Sooryaganesh Somanathan RV Arun
Sprint-3	Device management	USN-9	You can Delete/Disable/Enable devices in Azure Active Directory but you cannot Add/Remove Users in the directory.	Ease of use.	Medium	Eraianbu Sooryaganesh Somanathan RV Arun

Sprint Delivery planning:

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	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.	I can access my account / dashboard	High	Eraianbu Sooryaganesh Somanathan RV Arun
FSprint-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	Eraianbu Sooryaganesh Somanathan RV Arun
Sprint-2		USN-3	As a user, I can register for the application through Facebook	I can register & access the dashboard with Facebook Login	Low	Eraianbu Sooryaganesh Somanathan RV Arun
Sprint-3		USN-4	As a user, I can register for the application through Gmail	I can receive confirmation email & click confirm	Medium	Eraianbu Sooryaganesh Somanathan RV Arun
Sprint-2	Login	USN-5	As a user, I can log into the application by entering email & password	I can access my account / dashboard	High	
Sprint-2	Dashboard	USN-6	Create a model set that contains those models, then assign it to a role.	Assign that group to the appropriate roles on the Roles page	High	Eraianbu Sooryaganesh Somanathan RV Arun

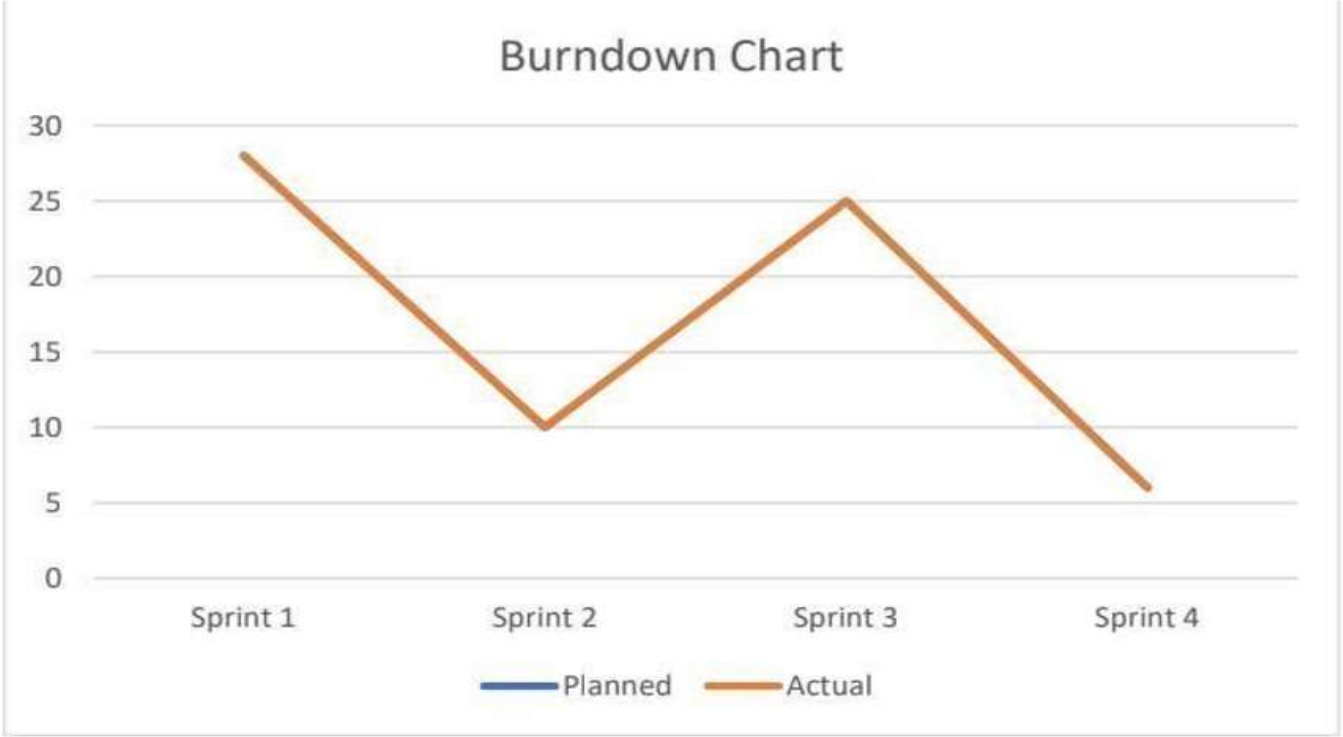
Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date(Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date(Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	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)

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

6.3 REPORTS FROM JIRA:



7. CODING & SOLUTIONING

7.1 FEATURE-1:

INDEX.HTML:

```
<html>
<title>Home - Job recommender</title>
<link rel="stylesheet" href="https://cdn.jsdelivr.net/npm/bootstrap@5.2.2/dist/css/bootstrap.min.css">
<link rel="stylesheet" href="https://cdn.jsdelivr.net/npm/bootstrap@5.2.2/dist/css/bootstrap.min.css">
<link rel="stylesheet" href="https://cdn.jsdelivr.net/npm/boot">
    <nav class="navbar navbar-light navbar-expand-md fixed-top navbar-shrink py-3" id="mainNav">
        <div class="container"><a class="navbar-brand d-flex align-items-center" href="/"></a><button data-bs-toggle="collapse" class="navbar-toggler" data-bs-target="#navcol-1"><span class="visually-hidden">Toggle navigation</span><span class="navbar-toggler-icon"></span></button>
            <a href="/" ><img src="C:\Users\somuv\OneDrive\Pictures\Camera Roll\Screenshot 2022-11-17 185852.png" width="135" height="135"></a>
            <die navbar-collapse" id="navcol-1">
                <ul class="navbar-nav mx-auto">
                    <li class="nav-item"><a class="nav-link active" href="index.html">Home</a></li>
                    <li class="nav-item"><a class="nav-link" href="#">Discover</a></li>
                    <li class="nav-item"><a class="nav-link" href="contacts.html">Contacts</a></li>
                    <li class="nav-item"><a class="nav-link" href="login.html#">Log in</a></li>
                </ul><a class="btn btn-primary shadow" role="button" href="signup.html">Sign up</a>
            </div>
        </div>
    </nav>
    <header class="pt-5">
        <div class="container pt-4 pt-xl-5">
            <div class="row pt-5">
```

```
            <div class="col-md-8 text-center text-md-start mx-auto">
                <div class="text-center">
                    <h1 class="display-4 fw-bold mb-5">Get your dream Job within a&amp;nbsp;<span class="underline">month</span>.</h1>
                    <p class="fs-5 text-muted mb-5">Welcome to Job Genie</p>
                    <form class="d-flex justify-content-center flex-wrap" method="post">
                        <div class="shadow-lg mb-3"><input class="form-control" type="email" name="email" placeholder="Find Jobs"></div>
                        <div class="shadow-lg mb-3"><button class="btn btn-primary" type="submit">Search</button></div>
                    </form>
                </div>
            </div>
            <div class="col-12 col-lg-10 mx-auto">
                <div class="text-center position-relative"><img class="img-fluid" src="static/img/illustrations/web-development.svg" style="width: 800px;"></div>
            </div>
        </div>
    </div>
</header>
<section>
    <div class="container py-4 py-xl-5">
        <div class="row gy-4 row-cols-1 row-cols-md-2 row-cols-lg-3">
            <div class="col">
                <div class="card border-light border-1 d-flex justify-content-center p-4">
                    <div class="card-body">
                        <div class="bs-icon-lg bs-icon-rounded bs-icon-secondary d-flex flex-shrink-0 justify-content-center align-items-center d-inline-block mb-4 bs-icon"><svg xmlns="http://www.w3.org/2000/svg" width="1em" height="1em" viewBox="0 0 24 24" fill="none">
                                <path fill-rule="evenodd" clip-rule="evenodd" d="M14 3V3.28988C16.8915 4.15043 19 6.82898 19 10V17H20V19H4V17H5V10C5 6.82898 7.10851 4.15043 10 3.28988V3C10 1.89543 10.8954 1 12 1C13.1046 1 14 1.89543 14 3ZM7 17H17V10C17 7.23858 14.7614 5 12 5C9.23858 5 7 7.23858 7 10V17ZM14 21V20H10V21C10 22.1046 10.8954 23 12 23C13.1046 23 14 22.1046 14 21Z" fill="currentColor"></path>
```

```
                    </svg></div>
                <div>
                    <h4 class="fw-bold">Personalized Recommendation</h4>
                    <p class="text-muted">Get a&amp;nbsp; recommendation regarding skills enhancement for a particular job.</p><button class="btn btn-sm px-0" type="button">Go to Page&amp;nbsp;<svg xmlns="http://www.w3.org/2000/svg" width="1em" height="1em" fill="currentColor" viewBox="0 0 16 16" class="bi bi-arrow-right">
                            <path fill-rule="evenodd" d="M1 8a.5.5 0 0 1 .5-.5h11.793l-3.147-3.146a.5.5 0 0 1 .708-.708l4 4a.5.5 0 0 1 0 .708l-4 4a.5.5 0 0 1-.708-.708L13.293 8.5H1.5A.5.5 0 0 1 1 8z"></path>
                        </svg><br></button>
                </div>
            </div>
        </div>
        <div class="col">
            <div class="card border-light border-1 d-flex justify-content-center p-4">
                <div class="card-body">
                    <div class="bs-icon-lg bs-icon-rounded bs-icon-secondary d-flex flex-shrink-0 justify-content-center align-items-center d-inline-block mb-4 bs-icon"><svg xmlns="http://www.w3.org/2000/svg" width="1em" height="1em" viewBox="0 0 24 24" stroke-width="2" stroke="currentColor" fill="none" stroke-linecap="round" stroke-linejoin="round" class="icon icon-tabler icon-tabler-school">
                            <path stroke="none" d="M0 0h24v24H0z" fill="none"></path>
                            <path d="M22 9l-10 -4l-10 4l10 4l10 -4v6"></path>
                            <path d="M6 10.6v5.4a6 3 0 0 0 12 0v-5.4"></path>
                        </svg></div>
                    <div>
                        <h4 class="fw-bold">Gain on-demand skills</h4>
                        <p class="text-muted">Learn new skills or technology used by top MNC companies.</p><button class="btn btn-sm px-0" type="button">Learn Skills&amp;nbsp;<svg xmlns="http://www.w3.org/2000/svg" width="1em" height="1em" fill="currentColor" viewBox="0 0 16 16" class="bi bi-arrow-right">
                                <path fill-rule="evenodd" d="M1 8a.5.5 0 0 1 .5-.5h11.793l-3.147-3.146a.5.5 0 0 1 .708-.708l4 4a.5.5 0 0 1 0 .708l-4 4a.5.5 0 0 1-.708-.708L13.293 8.5H1.5A.5.5 0 0 1 1 8z"></path>
                            </svg><br></button>
                    </div>
```

```
                </div>
            </div>
        </div>
        <div class="col">
            <div class="card border-light border-1 d-flex justify-content-center p-4">
                <div class="card-body">
                    <div class="bs-icon-lg bs-icon-rounded bs-icon-secondary d-flex flex-shrink-0 justify-content-center align-items-center d-inline-block mb-4 bs-icon"><i class="la la-book"></i></div>
                    <div>
                        <h4 class="fw-bold">learning resources</h4>
                        <p class="text-muted">Learn at your own pace, with life-time access.</p><button class="btn btn-sm px-0" type="button">Learn More <svg xmlns="http://www.w3.org/2000/svg" width="1em" height="1em" fill="currentColor" viewBox="0 0 16 16" class="bi bi-arrow-right">
                                <path fill-rule="evenodd" d="M1 8a.5.5 0 0 1 .5-.5h11.793l-3.147-3.146a.5.5 0 0 1 .708-.708l4 4a.5.5 0 0 1 0 .708l-4 4a.5.5 0 0 1-.708-.708L13.293 8.5H1.5A.5.5 0 0 1 1 8z"></path>
                            </svg><br></button>
                    </div>
                </div>
            </div>
        </div>
    </div>
</section>
<section></section>
<section>
    <div class="container py-4 py-xl-5">
        <div class="row gy-4 gy-md-0">
            <div class="col-md-6 text-center text-md-start d-flex d-sm-flex d-md-flex justify-content-center align-items-center justify-content-md-start align-items-md-center justify-content-xl-center">
                <div><img class="rounded img-fluid fit-cover" style="min-height: 300px;" src="static/img/illustrations/register.svg" width="800"></div>
            </div>
            <div class="col">
```

```
            <div style="max-width: 450px;">
                <h3 class="fw-bold pb-md-4">Features that will make you gain any <span class="underline">Job</span></h3>
                <p class="text-muted py-4 py-md-0">Learning resource is provided to all users, It will improve her knowledge and skills to crack any dream job.</p>
                <div class="row gy-4 row-cols-2 row-cols-md-2">
                  <div class="col">
                    <div><span class="fs-2 fw-bold text-primary bg-warning">10+</span>
                      <p class="fw-normal text-muted">Technical Course</p>
                    </div>
                  </div>
                  <div class="col">
                    <div><span class="fs-2 fw-bold text-primary bg-warning">20+</span>
                      <p class="fw-normal text-muted">Job recommendation</p>
                    </div>
                  </div>
                  <div class="col">
                    <div><span class="fs-2 fw-bold text-primary bg-warning">1+</span>
                      <p class="fw-normal text-muted">Resume Builder</p>
                    </div>
                  </div>
                  <div class="col">
                    <div><span class="fs-2 fw-bold text-primary bg-warning">30+</span>
                      <p class="fw-normal text-muted">Job Ideas</p>
                    </div>
                  </div>
                </div>
              </div>
            </div>
          </div>
        </div>
      </section>
```

```
<section class="py-4 py-xl-5">
    <div class="container">
        <div class="bg-primary border rounded border-0 border-primary overflow-hidden">
            <div class="row g-0">
                <div class="col-md-6 d-flex flex-column justify-content-center">
                    <div class="text-white p-4 p-md-5">
                        <h2 class="fw-bold text-white mb-3">Let's gets started to achieve your dream<br><br></h2>
                        <div class="my-3"><a class="btn btn-warning me-2 mt-2" role="button" href="signup">Sign up<br></a><a class="btn btn-light mt-2" role="button" href="#">Contact us</a></div>
                    </div>
                </div>
                <div class="col-md-6 order-first order-md-last" style="min-height: 250px;"><img class="w-100 h-100 fit-contain pt-5 pt-md-0" src="static/img/illustrations/desk.svg"></div>
            </div>
        </div>
    </div>
</section>
<section class="py-5"></section>
<section class="py-4 py-xl-5 mb-5">
    <div class="container">
        <div class="row mb-2">
            <div class="col-md-8 col-xl-6 text-center mx-auto">
                <h2 class="display-6 fw-bold mb-5"><span class="pb-3 underline">FAQ<br></span></h2>
                <p class="text-muted mb-5">Commonly asked questions</p>
            </div>
        </div>
        <div class="row mb-2">
            <div class="col-md-8 mx-auto">
                <div class="accordion text-muted" role="tablist" id="accordion-1">
                    <div class="accordion-item">
```

```
<h2 class="accordion-header" role="tab"><button class="accordion-button collapsed" type="button" data-bs-toggle="collapse" data-bs-target="#accordion-1 .item-1" aria-expanded="false" aria-controls="accordion-1 .item-1">What is Job Genie? How does it work?</button></h2>

<div class="accordion-collapse collapse item-1" role="tabpanel" data-bs-parent="#accordion-1">

<div class="accordion-body">

<p><br><span style="color: rgb(32, 33, 36);">Job Genie is </span><strong><span style="color: rgb(32, 33, 36);">the startup professional networking platform</span></strong><span style="color: rgb(32, 33, 36);">. It's also one of the most influential social media networks, with more than 200 members. That's a lot of potential contacts! Members use the site to keep in touch with business associates, clients, and co-workers.</span><br><br><br></p>

</div>

</div>

</div>

<div class="accordion-item">

<h2 class="accordion-header" role="tab"><button class="accordion-button collapsed" type="button" data-bs-toggle="collapse" data-bs-target="#accordion-1 .item-2" aria-expanded="false" aria-controls="accordion-1 .item-2"><strong><span style="color: var(--bs-accordion-active-color); background-color: var(--bs-accordion-active-bg);">What are the 5 most important things in Job Genie?</span></strong></button></h2>

<div class="accordion-collapse collapse item-2" role="tabpanel" data-bs-parent="#accordion-1">

<div class="accordion-body">

<p class="mb-0"><span style="color: rgb(32, 33, 36);"> 1) Professional photo.                       
                         
                         
                         
     2) Compelling summary.             
                         
                         
                         
         3) Summary of industry experience, expertise and education. 
                         
           4) List of skills for endorsements.     
                         
                         
                         
     5) Strong headline.</span><br></p>

</div>
```

```
                    </div>
                </div>
                <div class="accordion-item">
                    <h2 class="accordion-header" role="tab"><button class="accordion-button" type="button" data-bs-toggle="collapse" data-bs-target="#accordion-1 .item-3" aria-expanded="true" aria-controls="accordion-1 .item-3">Does it cost money to be on Job Genie?</button></h2>
                    <div class="accordion-collapse collapse show item-3" role="tabpanel" data-bs-parent="#accordion-1">
                        <div class="accordion-body">
                            <p class="mb-0"><strong><span style="color: rgb(32, 33, 36);">We offer a free account as well as Premium Subscriptions, which can be tried free for one month</span></strong><span style="color: rgb(32, 33, 36);">. With a free account, you can: Find and reconnect with colleagues and classmates.</span><br><br></p>
                        </div>
                    </div>
                </div>
            </div>
        </div>
    </section>
    <section class="py-4 py-xl-5">
        <div class="container">
            <div class="text-white bg-primary border rounded border-0 border-primary d-flex flex-column justify-content-between flex-lg-row p-4 p-md-5">
                <div class="pb-2 pb-lg-1">
                    <h2 class="fw-bold text-warning mb-2">Find the best job for your career?</h2>
                    <p class="mb-0">Still confusing about your career.</p>
                </div>
                <div class="my-2"><a class="btn btn-light fs-5 py-2 px-4" role="button" href="contacts">Contact us</a></div>
            </div>
        </div>
    </section>
```

```
<footer>
  <div class="container py-4 py-lg-5">
    <div class="row row-cols-2 row-cols-md-4">
      <div class="col-12 col-md-3">
        <div class="fw-bold d-flex align-items-center mb-2"><span>Job Genie</span></div>
        <p class="text-muted"><span style="color: rgb(32, 33, 36);">The most powerful platform for job seekers as well as recruiter</span><br><br><br><br></p>
      </div>
      <div class="col-sm-4 col-md-3 text-lg-start d-flex flex-column">
        <h3 class="fs-6 fw-bold">Discover</h3>
        <ul class="list-unstyled">
          <li><a href="#">Web design</a></li>
          <li><a href="#">Development</a></li>
          <li><a href="#">Hosting</a></li>
        </ul>
      </div>
      <div class="col-sm-4 col-md-3 text-lg-start d-flex flex-column">
        <h3 class="fs-6 fw-bold">About</h3>
        <ul class="list-unstyled">
          <li><a href="#">Company</a></li>
          <li><a href="#">Team</a></li>
          <li><a href="#">Legacy</a></li>
        </ul>
      </div>
      <div class="col-sm-4 col-md-3 text-lg-start d-flex flex-column">
        <h3 class="fs-6 fw-bold">Careers</h3>
        <ul class="list-unstyled">
          <li><a href="#">Job openings</a></li>
          <li><a href="#">Employee success</a></li>
          <li><a href="#">Benefits</a></li>
        </ul>
```

```
    </div>
  </div>
  <hr>
  <div class="text-muted d-flex justify-content-between align-items-center pt-3">
    <p class="mb-0"><strong>Copyright © 2022 Job Genie</strong> </p>
    <p class="mb-0"><strong>Contributers:</strong>
      <br>
      Mugesh M  </p>
    <ul class="list-inline mb-0">
      <li class="list-inline-item"><svg xmlns="http://www.w3.org/2000/svg" width="1em"
height="1em" fill="currentColor" viewBox="0 0 16 16" class="bi bi-facebook">
        <path d="M16 8.049c0-4.446-3.582-8.05-8-8.05C3.58 0-.002 3.603-.002 8.05c0 4.017
2.926 7.347 6.75 7.951v-5.625h-2.03V8.05H6.75V6.275c0-2.017 1.195-3.131 3.022-3.131.876 0 1.791.157
1.791.157v1.98h-1.009c-.993 0-1.303.621-1.303 1.258v1.51h2.218l-.354 2.326H9.25V16c3.824-.604 6.75-
3.934 6.75-7.951z"></path>
      </svg></li>
      <li class="list-inline-item"><svg xmlns="http://www.w3.org/2000/svg" width="1em"
height="1em" fill="currentColor" viewBox="0 0 16 16" class="bi bi-twitter">
        <path d="M5.026 15c6.038 0 9.341-5.003 9.341-9.334 0-.14 0-.282-.006-.422A6.685
6.685 0 0 0 16 3.542a6.658 6.658 0 0 1-1.889.518 3.301 3.301 0 0 0 1.447-1.817 6.533 6.533 0 0 1-
2.087.793A3.286 3.286 0 0 0 7.875 6.03a9.325 9.325 0 0 1-6.767-3.429 3.289 3.289 0 0 0 1.018
4.382A3.323 3.323 0 0 1 .64 6.575v.045a3.288 3.288 0 0 0 2.632 3.218 3.203 3.203 0 0 1-.865.115 3.23
3.23 0 0 1-.614-.057 3.283 3.283 0 0 0 3.067 2.277A6.588 6.588 0 0 1 .78 13.58a6.32 6.32 0 0 1-.78-
.045A9.344 9.344 0 0 0 5.026 15z"></path>
      </svg></li>
      <li class="list-inline-item"><svg xmlns="http://www.w3.org/2000/svg" width="1em"
height="1em" fill="currentColor" viewBox="0 0 16 16" class="bi bi-instagram">
        <path d="M8 0C5.829 0 5.556.01 4.703.048 3.85.088 3.269.222 2.76.42a3.917 3.917 0 0
0-1.417.923A3.927 3.927 0 0 0 .42 2.76C.222 3.268.087 3.85.048 4.7.01 5.555 0 5.827 0 8.001c0 2.172.01
2.444.048 3.297.04.852.174 1.433.372 1.942.205.526.478.972.923 1.417.444.445.89.719 1.416.923.51.198
1.09.333 1.942.372C5.555 15.99 5.827 16 8 16s2.444-.01 3.298-.048c.851-.04 1.434-.174 1.943-.372a3.916
3.916 0 0 0 1.416-.923c.445-.445.718-.891.923-1.417.197-.509.332-1.09.372-1.942C15.99 10.445 16
10.173 16 8s-.01-2.445-.048-3.299c-.04-.851-.175-1.433-.372-1.941a3.926 3.926 0 0 0-.923-1.417A3.911
3.911 0 0 0 13.24.42c-.51-.198-1.092-.333-1.943-.372C10.443.01 10.172 0 7.998 0h.003zm-.717
1.442h.718c2.136 0 2.389.007 3.232.046.78.035 1.204.166
1.486.275.373.145.64.319.92.599.28.28.453.546.598.92.11.281.24.705.275 1.485.039.843.047 1.096.047
3.231s-.008 2.389-.047 3.232c-.035.78-.166 1.203-.275 1.485a2.47 2.47 0 0 1-.599.919c-.28.28-.546.453-
.92.598-.28.11-.704.24-1.485.276-.843.038-1.096.047-3.232.047s-2.39-.009-3.233-.047c-.78-.036-1.203-
.166-1.485-.276a2.478 2.478 0 0 1-.92-.598 2.48 2.48 0 0 1-.6-.92c-.109-.281-.24-.705-.275-1.485-.038-
```

.843-.046-1.096-.046-3.233 0-2.136.008-2.388.046-3.231.036-.78.166-1.204.276-1.486.145-.373.319-.64.599-.92.28-.28.546-.453.92-.598.282-.11.705-.24 1.485-.276.738-.034 1.024-.044 2.515-.045v.002zm4.988 1.328a.96.96 0 1 0 0 1.92.96.96 0 0 0 0-1.92zm-4.27 1.122a4.109 4.109 0 1 0 0 8.217 4.109 4.109 0 0 0 0-8.217zm0 1.441a2.667 2.667 0 1 1 0 5.334 2.667 2.667 0 0 1 0-5.334z"></path>

</svg>

</footer>

<script src="https://cdn.jsdelivr.net/npm/@popperjs/core@2.11.6/dist/umd/popper.min.js" integrity="sha384-oBqDVmMz9ATKxIep9tiCxS/Z9fNfEXiDAYTujMAeBAsjFuCZSmKbSSUnQlmh/jp3" crossorigin="anonymous"></script>

<script src="https://cdn.jsdelivr.net/npm/bootstrap@5.2.2/dist/js/bootstrap.min.js" integrity="sha384-IDwe1+LCz02ROU9k972gdyvl+AESN10+x7tBKgc9I5HFtuNz0wWnPclzo6p9vxnk" crossorigin="anonymous"></script>

<html>

INTEGRATING CHATBOT WITH HTML PAGE (SOURCE CODE) :

```
<html>
   <title>Services - Job recommender</title>
   <link rel="stylesheet" href="https://cdn.jsdelivr.net/npm/bootstrap@5.2.2/dist/css/bootstrap.min.css">
   <link rel="stylesheet"
href="https://fonts.googleapis.com/css?family=Raleway:300italic,400italic,600italic,700italic,800italic,400,
300,600,700,800&amp;display=swap">


   <nav class="navbar navbar-light navbar-expand-md fixed-top navbar-shrink py-3" id="mainNav">
      <div class="container"><a class="navbar-brand d-flex align-items-center" href="/"></a><button data-
bs-toggle="collapse" class="navbar-toggler" data-bs-target="#navcol-1"><span class="visually-
hidden">Toggle navigation</span><span class="navbar-toggler-icon"></span></button>
         <a href="/" ><img src="C:\Users\somuv\OneDrive\Pictures\Camera Roll\Screenshot 2022-11-17
185852.png" width="135" height="135"></a>
         <div class="collapse navbar-collapse" id="navcol-1">
            <ul class="navbar-nav mx-auto">
               <li class="nav-item"><a class="nav-link" href="index.html">Home</a></li>
               <li class="nav-item"></li>
               <li class="nav-item"></li>
               <li class="nav-item"><a class="nav-link" href="#">Discover</a></li>
               <li class="nav-item"><a class="nav-link" href="contacts.html">Contacts</a></li>
               <li class="nav-item"><a class="nav-link" href="login.html#">Log in</a></li>
            </ul><a class="btn btn-primary shadow" role="button" href="signup.html">Sign up</a>
         </div>
      </div>
   </nav>
   <section class="py-5 mt-5">
      <div class="container py-4 py-xl-5">
         <div class="row gy-4 gy-md-0">
            <div class="col-md-6 text-center text-md-start d-flex d-sm-flex d-md-flex justify-content-center
align-items-center justify-content-md-start align-items-md-center justify-content-xl-center">
```

```
            <div style="max-width: 350px;">
              <h1 class="display-5 fw-bold mb-4">Skyrocket your productivity with our&amp;nbsp;<span class="underline">tools</span>.</h1>
              <p class="text-muted my-4">Tincidunt laoreet leo, adipiscing taciti tempor. Primis senectus sapien, risus donec ad fusce augue interdum.</p><a class="btn btn-primary btn-lg me-2" role="button" href="#">Button</a><a class="btn btn-outline-primary btn-lg" role="button" href="#">Button</a>
            </div>
          </div>
          <div class="col-md-6">
            <div><img class="rounded img-fluid w-100 fit-cover" style="min-height: 300px;" src="static/img/illustrations/startup.svg"></div>
          </div>
        </div>
      </div>
    </section>
    <section class="py-5">
      <div class="container py-5">
        <div class="row row-cols-1 row-cols-md-2 mx-auto" style="max-width: 900px;">
          <div class="col mb-5"><img class="rounded img-fluid" src="static/img/illustrations/data-management.svg"></div>
          <div class="col d-md-flex align-items-md-end align-items-lg-center mb-5">
            <div>
              <h5 class="fs-3 fw-bold mb-4">Data management&amp;nbsp;tools</h5>
              <p class="text-muted mb-4">Erat netus est hendrerit, nullam et quis ad cras porttitor iaculis. Bibendum vulputate cras aenean.</p><a class="fw-bold link-primary mb-3" href="#">Browse tools&amp;nbsp;<svg xmlns="http://www.w3.org/2000/svg" width="1em" height="1em" viewBox="0 0 24 24" stroke-width="2" stroke="currentColor" fill="none" stroke-linecap="round" stroke-linejoin="round" class="icon icon-tabler icon-tabler-arrow-narrow-right fs-3">
                  <path stroke="none" d="M0 0h24v24H0z" fill="none"></path>
                  <line x1="5" y1="12" x2="19" y2="12"></line>
                  <line x1="15" y1="16" x2="19" y2="12"></line>
                  <line x1="15" y1="8" x2="19" y2="12"></line>
                </svg></a>
              <div class="d-flex">
```

```
                <div class="bs-icon-sm bs-icon-rounded bs-icon-secondary d-flex flex-shrink-0 justify-content-center align-items-center d-inline-block bs-icon me-2"><svg xmlns="http://www.w3.org/2000/svg" width="1em" height="1em" viewBox="0 0 24 24" stroke-width="2" stroke="currentColor" fill="none" stroke-linecap="round" stroke-linejoin="round" class="icon icon-tabler icon-tabler-school">
                        <path stroke="none" d="M0 0h24v24H0z" fill="none"></path>
                        <path d="M22 9l-10 -4l-10 4l10 4l10 -4v6"></path>
                        <path d="M6 10.6v5.4a6 3 0 0 0 12 0v-5.4"></path>
                    </svg></div>
                <div class="bs-icon-sm bs-icon-rounded bs-icon-secondary d-flex flex-shrink-0 justify-content-center align-items-center d-inline-block bs-icon me-2"><svg xmlns="http://www.w3.org/2000/svg" width="1em" height="1em" viewBox="0 0 24 24" stroke-width="2" stroke="currentColor" fill="none" stroke-linecap="round" stroke-linejoin="round" class="icon icon-tabler icon-tabler-school">
                        <path stroke="none" d="M0 0h24v24H0z" fill="none"></path>
                        <path d="M22 9l-10 -4l-10 4l10 4l10 -4v6"></path>
                        <path d="M6 10.6v5.4a6 3 0 0 0 12 0v-5.4"></path>
                    </svg></div>
                <div class="bs-icon-sm bs-icon-rounded bs-icon-secondary d-flex flex-shrink-0 justify-content-center align-items-center d-inline-block bs-icon me-2"><svg xmlns="http://www.w3.org/2000/svg" width="1em" height="1em" viewBox="0 0 24 24" stroke-width="2" stroke="currentColor" fill="none" stroke-linecap="round" stroke-linejoin="round" class="icon icon-tabler icon-tabler-school">
                        <path stroke="none" d="M0 0h24v24H0z" fill="none"></path>
                        <path d="M22 9l-10 -4l-10 4l10 4l10 -4v6"></path>
                        <path d="M6 10.6v5.4a6 3 0 0 0 12 0v-5.4"></path>
                    </svg></div>
            </div>
        </div>
    </div>
</div>
<div class="row row-cols-1 row-cols-md-2 mx-auto" style="max-width: 900px;">
    <div class="col order-md-last mb-5"><img class="rounded img-fluid" src="static/img/illustrations/javascript.svg"></div>
    <div class="col d-md-flex align-items-md-end align-items-lg-center mb-5">
        <div class="ms-md-3">
            <h5 class="fs-3 fw-bold mb-4">Data management&nbsp;tools</h5>
```

```
    <p class="text-muted mb-4">Erat netus est hendrerit, nullam et quis ad cras porttitor iaculis. Bibendum vulputate cras aenean.</p><a class="fw-bold link-primary" href="#">Browse tools&nbsp;<svg xmlns="http://www.w3.org/2000/svg" width="1em" height="1em" viewBox="0 0 24 24" stroke-width="2" stroke="currentColor" fill="none" stroke-linecap="round" stroke-linejoin="round" class="icon icon-tabler icon-tabler-arrow-narrow-right fs-3">
        <path stroke="none" d="M0 0h24v24H0z" fill="none"></path>
        <line x1="5" y1="12" x2="19" y2="12"></line>
        <line x1="15" y1="16" x2="19" y2="12"></line>
        <line x1="15" y1="8" x2="19" y2="12"></line>
      </svg></a>
    <div class="d-flex">
      <div class="bs-icon-sm bs-icon-rounded bs-icon-secondary d-flex flex-shrink-0 justify-content-center align-items-center d-inline-block bs-icon me-2"><svg xmlns="http://www.w3.org/2000/svg" width="1em" height="1em" viewBox="0 0 24 24" stroke-width="2" stroke="currentColor" fill="none" stroke-linecap="round" stroke-linejoin="round" class="icon icon-tabler icon-tabler-school">
          <path stroke="none" d="M0 0h24v24H0z" fill="none"></path>
          <path d="M22 9l-10 -4l-10 4l10 4l10 -4v6"></path>
          <path d="M6 10.6v5.4a6 3 0 0 0 12 0v-5.4"></path>
        </svg></div>
      <div class="bs-icon-sm bs-icon-rounded bs-icon-secondary d-flex flex-shrink-0 justify-content-center align-items-center d-inline-block bs-icon me-2"><svg xmlns="http://www.w3.org/2000/svg" width="1em" height="1em" viewBox="0 0 24 24" stroke-width="2" stroke="currentColor" fill="none" stroke-linecap="round" stroke-linejoin="round" class="icon icon-tabler icon-tabler-school">
          <path stroke="none" d="M0 0h24v24H0z" fill="none"></path>
          <path d="M22 9l-10 -4l-10 4l10 4l10 -4v6"></path>
          <path d="M6 10.6v5.4a6 3 0 0 0 12 0v-5.4"></path>
        </svg></div>
      <div class="bs-icon-sm bs-icon-rounded bs-icon-secondary d-flex flex-shrink-0 justify-content-center align-items-center d-inline-block bs-icon me-2"><svg xmlns="http://www.w3.org/2000/svg" width="1em" height="1em" viewBox="0 0 24 24" stroke-width="2" stroke="currentColor" fill="none" stroke-linecap="round" stroke-linejoin="round" class="icon icon-tabler icon-tabler-school">
          <path stroke="none" d="M0 0h24v24H0z" fill="none"></path>
          <path d="M22 9l-10 -4l-10 4l10 4l10 -4v6"></path>
          <path d="M6 10.6v5.4a6 3 0 0 0 12 0v-5.4"></path>
        </svg></div>
```

```
            </div>
          </div>
        </div>
      </div>
      <div class="row row-cols-1 row-cols-md-2 mx-auto" style="max-width: 900px;">
        <div class="col mb-5"><img class="rounded img-fluid"
src="static/img/illustrations/report.svg"></div>
        <div class="col d-md-flex align-items-md-end align-items-lg-center mb-5">
          <div>
            <h5 class="fs-3 fw-bold mb-4">Data management tools</h5>
            <p class="text-muted mb-4">Erat netus est hendrerit, nullam et quis ad cras porttitor iaculis.
Bibendum vulputate cras aenean.</p><a class="fw-bold link-primary" href="#">Browse tools <svg
xmlns="http://www.w3.org/2000/svg" width="1em" height="1em" viewBox="0 0 24 24" stroke-width="2"
stroke="currentColor" fill="none" stroke-linecap="round" stroke-linejoin="round" class="icon icon-tabler
icon-tabler-arrow-narrow-right fs-3">
                <path stroke="none" d="M0 0h24v24H0z" fill="none"></path>
                <line x1="5" y1="12" x2="19" y2="12"></line>
                <line x1="15" y1="16" x2="19" y2="12"></line>
                <line x1="15" y1="8" x2="19" y2="12"></line>
              </svg></a>
            <div class="d-flex">
              <div class="bs-icon-sm bs-icon-rounded bs-icon-secondary d-flex flex-shrink-0 justify-
content-center align-items-center d-inline-block bs-icon me-2"><svg xmlns="http://www.w3.org/2000/svg"
width="1em" height="1em" viewBox="0 0 24 24" stroke-width="2" stroke="currentColor" fill="none"
stroke-linecap="round" stroke-linejoin="round" class="icon icon-tabler icon-tabler-school">
                <path stroke="none" d="M0 0h24v24H0z" fill="none"></path>
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              </svg></div>
            <div class="bs-icon-sm bs-icon-rounded bs-icon-secondary d-flex flex-shrink-0 justify-
content-center align-items-center d-inline-block bs-icon me-2"><svg xmlns="http://www.w3.org/2000/svg"
width="1em" height="1em" viewBox="0 0 24 24" stroke-width="2" stroke="currentColor" fill="none"
stroke-linecap="round" stroke-linejoin="round" class="icon icon-tabler icon-tabler-school">
                <path stroke="none" d="M0 0h24v24H0z" fill="none"></path>
                <path d="M22 9l-10 -4l-10 4l10 4l10 -4v6"></path>
```

```
                        <path d="M6 10.6v5.4a6 3 0 0 0 12 0v-5.4"></path>
                    </svg></div>
                <div class="bs-icon-sm bs-icon-rounded bs-icon-secondary d-flex flex-shrink-0 justify-content-center align-items-center d-inline-block bs-icon me-2"><svg xmlns="http://www.w3.org/2000/svg" width="1em" height="1em" viewBox="0 0 24 24" stroke-width="2" stroke="currentColor" fill="none" stroke-linecap="round" stroke-linejoin="round" class="icon icon-tabler icon-tabler-school">
                        <path stroke="none" d="M0 0h24v24H0z" fill="none"></path>
                        <path d="M22 9l-10 -4l-10 4l10 4l10 -4v6"></path>
                        <path d="M6 10.6v5.4a6 3 0 0 0 12 0v-5.4"></path>
                    </svg></div>
            </div>
        </div>
    </div>
</section>
<footer>
    <div class="container py-4 py-lg-5">
        <div class="row row-cols-2 row-cols-md-4">
            <div class="col-12 col-md-3">
                <div class="fw-bold d-flex align-items-center mb-2"><span>Job Genie</span></div>
                <p class="text-muted"><span style="color: rgb(32, 33, 36);">The most powerful platform for job seekers as well as recruiter</span><br><br><br><br></p>
            </div>
            <div class="col-sm-4 col-md-3 text-lg-start d-flex flex-column">
                <h3 class="fs-6 fw-bold">Discover</h3>
                <ul class="list-unstyled">
                    <li><a href="#">Web design</a></li>
                    <li><a href="#">Development</a></li>
                    <li><a href="#">Hosting</a></li>
                </ul>
            </div>
```

```
            <div class="col-sm-4 col-md-3 text-lg-start d-flex flex-column">
                <h3 class="fs-6 fw-bold">About</h3>
                <ul class="list-unstyled">
                    <li><a href="#">Company</a></li>
                    <li><a href="#">Team</a></li>
                    <li><a href="#">Legacy</a></li>
                </ul>
            </div>
            <div class="col-sm-4 col-md-3 text-lg-start d-flex flex-column">
                <h3 class="fs-6 fw-bold">Careers</h3>
                <ul class="list-unstyled">
                    <li><a href="#">Job openings</a></li>
                    <li><a href="#">Employee success</a></li>
                    <li><a href="#">Benefits</a></li>
                </ul>
            </div>
        </div>
        <hr>
        <div class="text-muted d-flex justify-content-between align-items-center pt-3">
            <p class="mb-0"><strong>Copyright © 2022 Job Genie</strong> </p>
            <p class="mb-0"><strong>Contributers:</strong>
                <br>
                Mugilvannan P  </p>
            <ul class="list-inline mb-0">
                <li class="list-inline-item"><svg xmlns="http://www.w3.org/2000/svg" width="1em"
height="1em" fill="currentColor" viewBox="0 0 16 16" class="bi bi-facebook">
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1.791.157v1.98h-1.009c-.993 0-1.303.621-1.303 1.258v1.51h2.218l-.354 2.326H9.25V16c3.824-.604 6.75-
3.934 6.75-7.951z"></path>
                    </svg></li>
                <li class="list-inline-item"><svg xmlns="http://www.w3.org/2000/svg" width="1em"
height="1em" fill="currentColor" viewBox="0 0 16 16" class="bi bi-twitter">
```

<path d="M5.026 15c6.038 0 9.341-5.003 9.341-9.334 0-.14 0-.282-.006-.422A6.685 6.685 0 0 0 16 3.542a6.658 6.658 0 0 1-1.889.518 3.301 3.301 0 0 0 1.447-1.817 6.533 6.533 0 0 1-2.087.793A3.286 3.286 0 0 0 7.875 6.03a9.325 9.325 0 0 1-6.767-3.429 3.289 3.289 0 0 0 1.018 4.382A3.323 3.323 0 0 1 .64 6.575v.045a3.288 3.288 0 0 0 2.632 3.218 3.203 3.203 0 0 1-.865.115 3.23 3.23 0 0 1-.614-.057 3.283 3.283 0 0 0 3.067 2.277A6.588 6.588 0 0 1 .78 13.58a6.32 6.32 0 0 1-.78-.045A9.344 9.344 0 0 0 5.026 15z"></path>

</svg>

<li class="list-inline-item"><svg xmlns="http://www.w3.org/2000/svg" width="1em" height="1em" fill="currentColor" viewBox="0 0 16 16" class="bi bi-instagram">

<path d="M8 0C5.829 0 5.556.01 4.703.048 3.85.088 3.269.222 2.76.42a3.917 3.917 0 0 0-1.417.923A3.927 3.927 0 0 0 .42 2.76C.222 3.268.087 3.85.048 4.7.01 5.555 0 5.827 0 8.001c0 2.172.01 2.444.048 3.297.04.852.174 1.433.372 1.942.205.526.478.972.923 1.417.444.445.89.719 1.416.923.51.198 1.09.333 1.942.372C5.555 15.99 5.827 16 8 16s2.444-.01 3.298-.048c.851-.04 1.434-.174 1.943-.372a3.916 3.916 0 0 0 1.416-.923c.445-.445.718-.891.923-1.417.197-.509.332-1.09.372-1.942C15.99 10.445 16 10.173 16 8s-.01-2.445-.048-3.299c-.04-.851-.175-1.433-.372-1.941a3.926 3.926 0 0 0-.923-1.417A3.911 3.911 0 0 0 13.24.42c-.51-.198-1.092-.333-1.943-.372C10.443.01 10.172 0 7.998 0h.003zm-.717 1.442h.718c2.136 0 2.389.007 3.232.046.78.035 1.204.166 1.486.275.373.145.64.319.92.599.28.28.453.546.598.92.11.281.24.705.275 1.485.039.843.047 1.096.047 3.231s-.008 2.389-.047 3.232c-.035.78-.166 1.203-.275 1.485a2.47 2.47 0 0 1-.599.919c-.28.28-.546.453-.92.598-.28.11-.704.24-1.485.276-.843.038-1.096.047-3.232.047s-2.39-.009-3.233-.047c-.78-.036-1.203-.166-1.485-.276a2.478 2.478 0 0 1-.92-.598 2.48 2.48 0 0 1-.6-.92c-.109-.281-.24-.705-.275-1.485-.038-.843-.046-1.096-.046-3.233 0-2.136.008-2.388.046-3.231.036-.78.166-1.204.276-1.486.145-.373.319-.64.599-.92.28-.28.546-.453.92-.598.282-.11.705-.24 1.485-.276.738-.034 1.024-.044 2.515-.045v.002zm4.988 1.328a.96.96 0 1 0 0 1.92.96.96 0 0 0 0-1.92zm-4.27 1.122a4.109 4.109 0 1 0 0 8.217 4.109 4.109 0 0 0 0-8.217zm0 1.441a2.667 2.667 0 1 1 0 5.334 2.667 2.667 0 0 1 0-5.334z"></path>

</svg>

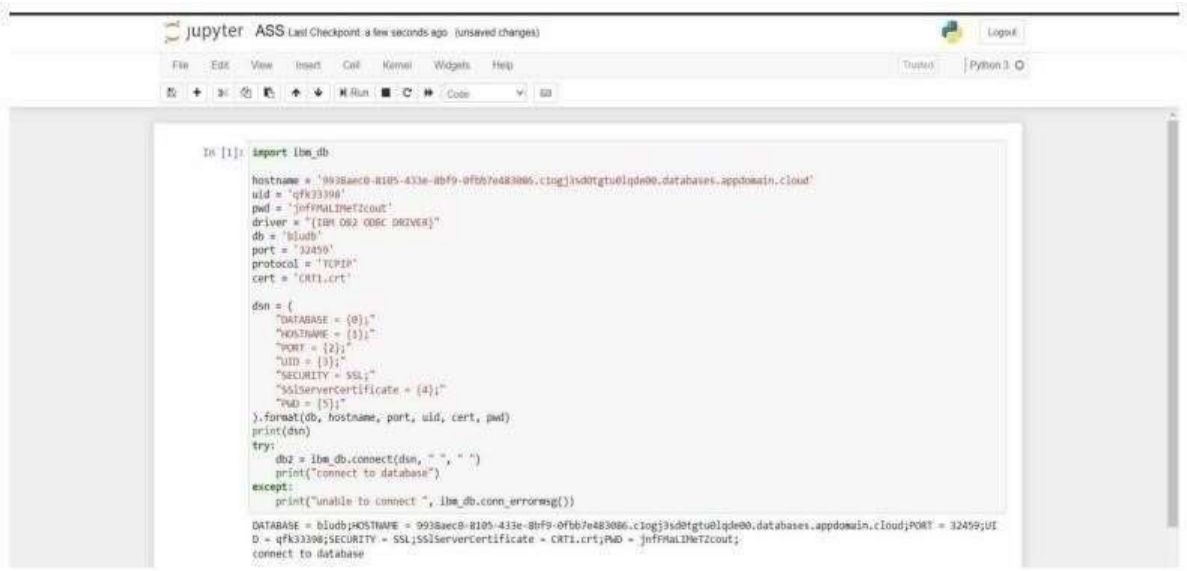
</footer>

<script src="https://cdn.jsdelivr.net/npm/bootstrap@5.2.2/dist/js/bootstrap.bundle.min.js"></script>

<script src="static/js/script.min.js"></script>

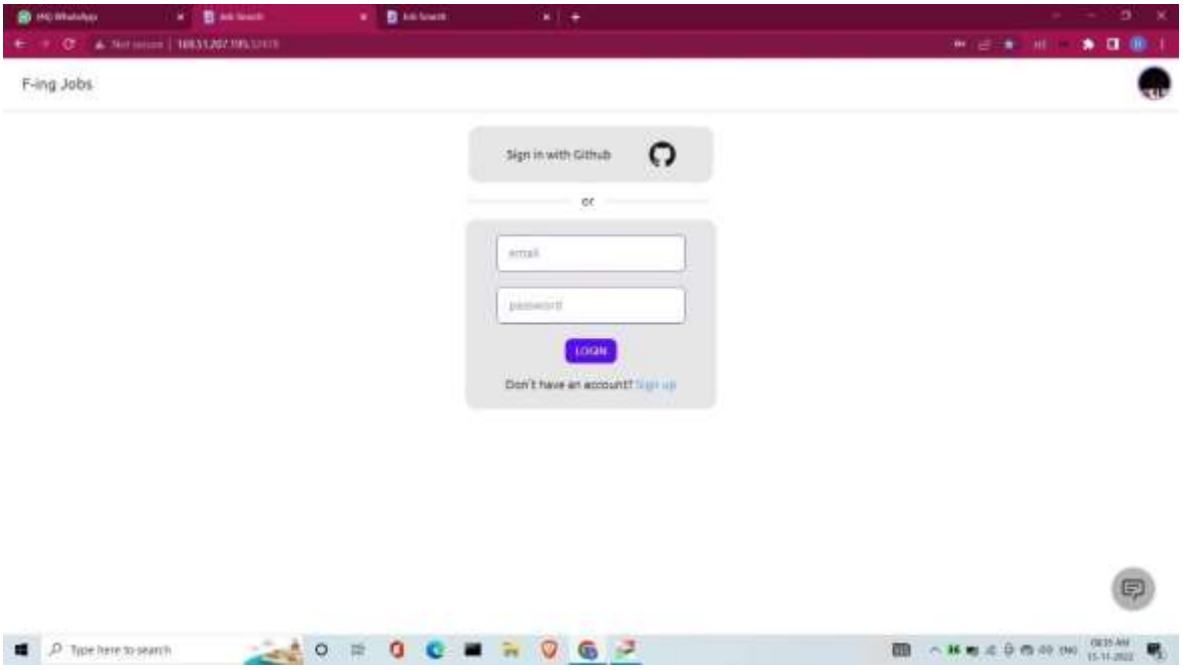
</html>

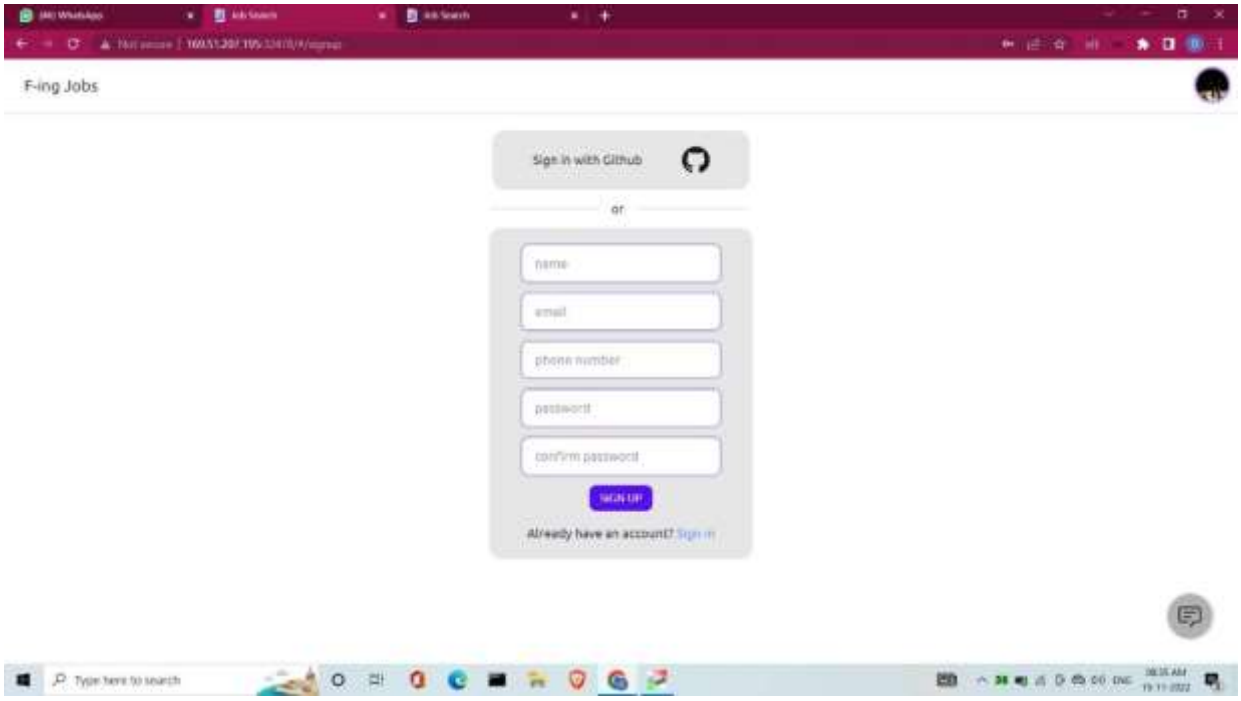
7.2 DATABASE SCHEMA:

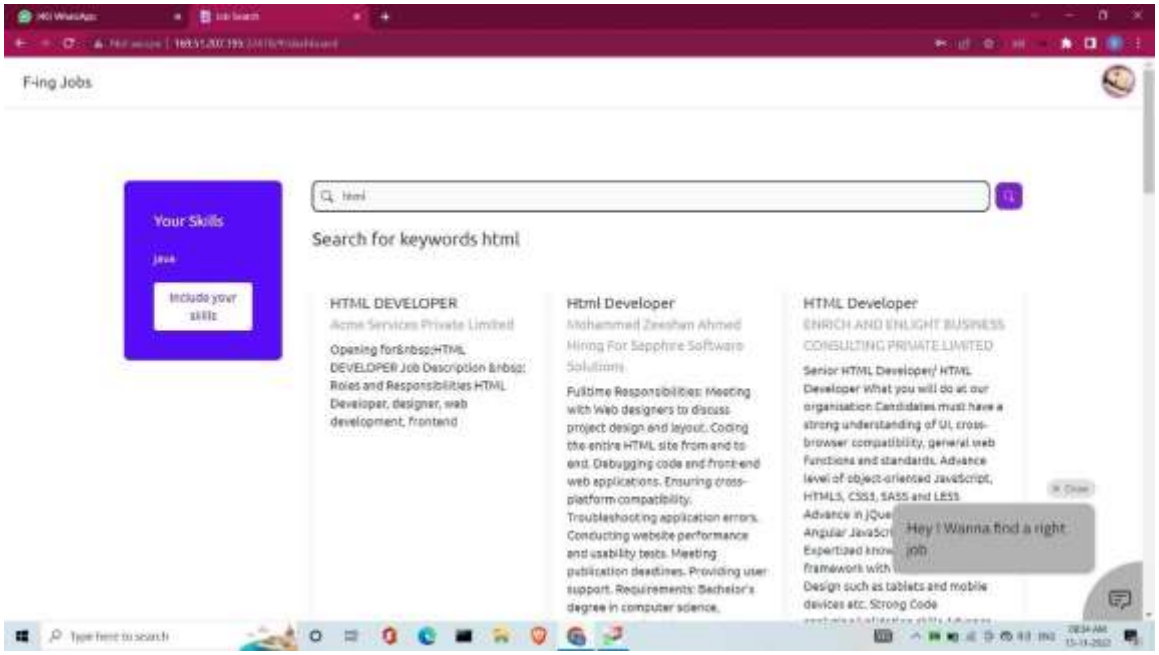


8. TESTING

8.1 TEST CASES:






F-ing Jobs
Your Skills
java
Include your skills
Search for keywords html
HTML DEVELOPER
Acme Services Private Limited
Opening for HTML DEVELOPER Job Description   Roles and Responsibilities HTML Developer, designer, web development, frontend
Html Developer
Mohammed Zeeshan Ahmed
Hiring For Sapphire Software Solutions
Fulltime Responsibilities: Meeting with Web designers to discuss project design and layout. Coding the entire HTML site from end to end. Debugging code and front-end web applications. Ensuring cross-platform compatibility. Troubleshooting application errors. Conducting website performance and usability tests. Meeting publication deadlines. Providing user support. Requirements: Bachelor's degree in computer science,
HTML Developer
ENRICH AND ENLIGHT BUSINESS CONSULTING PRIVATE LIMITED
Senior HTML Developer/ HTML Developer What you will do at our organisation Candidates must have a strong understanding of UI, cross-browser compatibility, general web functions and standards. Advance level of object-oriented JavaScript, HTML5, CSS3, SASS and LESS
Hey ! Wanna find a right job

9. RESULTS

9.1 PERFORMANCE METRICS:

The performance of a recommendation algorithm is evaluated by using some specific metrics that indicate the accuracy of the system. The type of metric used depends on the type of filtering technique. Root Mean Square Error (RMSE), Receiver Operating Characteristics (ROC), Area Under Cover (AUC), Precision, Recall and F1 score is generally used to evaluate the performance or accuracy of the recommendation algorithms.

Root-mean square error (RMSE). RMSE is widely used in evaluating and comparing the performance of a recommendation system model compared to other models. A lower RMSE value indicates higher performance by the recommendation model. RMSE, as mentioned by [61], can be as represented as follows:

$$RMSE = \sqrt{\frac{1}{N_p}\sum_{u,i}(p_{ui} - r_{ui})^2} \quad (1)$$

where, N_p is the total number of predictions, p_{ui} is the predicted rating that a user u will select an item i and r_{ui} is the real rating.

Precision. Precision can be defined as the fraction of correct recommendations or predictions (known as True Positive) to the total number of recommendations provided, which can be as represented as follows:

$$Precision = \frac{True\ Positive\ (TP)}{True\ Positive\ (TP) + False\ Positive\ (FP)} \quad (2)$$

It is also defined as the ratio of the number of relevant recommended items to the number of recommended items expressed as percentages.

Recall. Recall can be defined as the fraction of correct recommendations or predictions (known as True Positive) to the total number of correct relevant recommendations provided, which can be as represented as follows:

$$Recall = \frac{True\ Positive\ (TP)}{True\ Positive\ (TP) + False\ Negative\ (FN)} \quad (3)$$

It is also defined as the ratio of the number of relevant recommended items to the total number of relevant items expressed as percentages.

F1 Score. F1 score is an indicator of the accuracy of the model and ranges from 0 to 1, where a value close to 1 represents higher recommendation or prediction accuracy. It represents precision and recall as a single metric and can be as represented as follows:

$$F1\ score = 2 \times \frac{Precision * Recall}{Precision + Recall} \quad (4)$$

Coverage. Coverage is used to measure the percentage of items which are recommended by the algorithm among all of the items.

Accuracy. Accuracy can be defined as the ratio of the number of total correct recommendations to the total recommendations provided, which can be as represented as follows:

$$Accuracy = \frac{TP + FN}{TP + FN + TN + FP} \quad (5)$$

Intersection over union (IoU). It represents the accuracy of an object detector used on a specific dataset [62].

$$IoU = \frac{TP}{TP + FN + FP} \quad (6)$$

ROC. ROC curve is used to conduct a comprehensive assessment of the algorithm's performance [57].

AUC. AUC measures the performance of recommendation and its baselines as well as the quality of the ranking based on pairwise comparisons [5].

Rank aware top-N metrics. The rank aware top-N recommendation metric finds some of the interesting and unknown items that are presumed to be most attractive to a user [63]. Mean reciprocal rank (MRR), mean average precision (MAP) and normalized discounted cumulative gain (NDCG) are three most popular rank aware metrics.

MRR. MRR is calculated as a mean of the reciprocal of the position or rank of first relevant recommendation [64][65]. MRR as mentioned by [64][65] can be expressed as follows:

$$MRR = \frac{1}{N_u} \sum_{u \in N_u} \frac{1}{L_u^n [k] \in R_u} \quad (7)$$

where u, N_u and R_u indicate specific user, total number of users and the set of items rated by the user, respectively. L indicates list of ranking length (n) for user (u) and k represents the position of the item found in the he lists L.

MAP: MAP is calculated by determining the mean of average precision at the points where relevant products or items are found. MAP as mentioned by [65] can be expressed as follows.

$$MAP = \frac{1}{N_u |R_u|} \sum_{k=1}^{n} \mathbb{1}(L_u^n [k] \in R_u) P_u @k \quad (8)$$

where P_u represents precision in selecting relevant item for the user. NDCG: NDCG is calculated by determining the graded relevance and positional information of the recommended items, which can be expressed as follows [65].

$$NDCG_u = \frac{\sum_{k=1}^{n} G(u, n, k) D(k)}{\sum_{k=1}^{n} G^*(u, n, k) D(k)} \quad (9)$$

where D (k) is a discounting function, G (u, n, k) is the gain obtained recommending an item found at k-th position from the list L and G^* (u, n, k) is the gain related to k-th item in the ideal ranking of n size for u user.

10. ADVANTAGES & DISADVANTAGES

ADVANTAGES:

- It helps candidates to search the job which perfectly suites them and make them aware of all the job openings.
- It helps recruiters of the company to choose the right candidates for their organisations with appropriate skills.
- Since it is cloud application, it does require any installation of software and is portable.

DISADVANTAGES:

- Privacy concerns.
- Too many choices.
- Cold-start problem.
- It is costly.
- Uninterrupted internet connection is required for smooth functioning of application.

11. CONCLUSION

we have used IBM cloud services like db2, cloud registry, Kubernetes , Watson assistant to create this application , which will be very useful for candidates who are searching for job and as well as for the company to select the right candidate for their organization In this paper, we have considered the job recommender system (JRS) literature from several perspectives. These include the influence of data science competitions, the effect of data availability on the choice of method and validation, and ethical considerations in job recommender systems. Furthermore, we branched the large class of hybrid recommender systems to obtain a better view on how these hybrid recommender systems differ. Both this multi-perspective view, and the new taxonomy of hybrid job recommender systems has not been discussed by previous reviews on job recommender systems. Application-oriented challenges in were already highlighted in early JRS contributions, though, still most literature does not take these into account. Contributions that do take different views on the JRS problem, however, do show that such views can have considerable benefits. These benefits may include improved model performance (temporal perspective), improved distribution of candidates over a set of homogeneous vacancies (reciprocal perspective), or ensuring algorithm fairness (ethical perspective).

Currently, most attention goes out to how to represent the substantial amount of textual data from both candidate profiles and vacancies to create job recommendations, for which recently especially deep representations have shown promising results. However, this focus may also create the illusion that this is the only perspective that is relevant. Especially in terms of fairness, such a single perspective can be considerably harmful. Although we are not aware of algorithm audits on job recommender systems, an audit on the candidate search engines of Indeed CareerBuilder, and Monster, did show significant results for both individual and group unfairness in terms of gender. The increased scientific attention towards algorithm fairness, however, does provide algorithms and metrics that can be applied to measure and ensure algorithm fairness. Hence, there is a research opportunity to study how these can be transferred to the job recommender system domain.

12. FUTURE SCOPE

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. We can use machine learning technicques to recommend data in a efficient way.