# SKILL JOB RECOMMENDER

## NALAIYATHIRAN PROJECT REPORT

### SUBMITTED BY

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**TEAM ID : PNT2022TMID29762**

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# 1 INTRODUCTION

## 1.1 Project Overview

This Project view provides an overview of the skill and job recommended for individuals interestedin a career in any fields. It discusses the important role that any field plays in businesses and the variousskills 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.

## 1.2 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 whichthe 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.

## 2. LITERATURE SURVEY

## 2.1 Existing problem

1. Students/Job seekers find their desired job based on their skillset.

2. Integrating Intelligent CHATBOT for jobrecommendation application.

3. A study of LinkedIn as an Employment Tool for Job seeker & Recruiter.

4. Cloud storage and sharing services.

## 2.2 References

**1. " Priming Jobs as Skill Development Opportunities and Responses to Job Postings"**

Drewery, David & Pretti, T. & Nettinga, Jamie. (2022). Priming Jobs as Skill Development Opportunities and Responses to Job Postings. Canadian Journal of Career Development. 21. 4-16. 10.53379/cjcd.2022.337.

Many inexperienced job seekers adopt a focused job search strategy in which they disregard job postings that seem unrelated to their interests. Yet, many of the jobs that they disregard during their job search could have been relevant to such interests because they offer opportunities for skill development. Counterintuitively, an exploratory job search can help such job seekers find and pursue more relevant jobs. In an experiment (N = 122), we examined the effect of priming seemingly irrelevant jobs as skill development opportunities on inexperienced job seekers' responses to job postings. Compared to those who did not receive the prime, those who received the prime reported higher perceived job relevance and, in turn, perceived job attractiveness for subsequently viewed job postings. The results suggest that career educators could use peer-to-peer learning, or public reflection, to encourage students to share insights with each other, reframe the meanings of job relevance, and pursue more relevant jobs.

**2."An Automated Recommendation Approach to Selection in Personnel Recruitment"**

Färber, Frank & Weitzel, Tim & Keim, Tobias. (2003). An Automated Recommendation Approach to Selection in Personnel Recruitment.. 302.

Many online recruitment platforms suffer from the inappropriateness of Boolean search methods for matching candidates with job requirements. While such platforms have so far been a successful means for decreasing personnel advertising cost, the huge amount of electronic candidate profiles has not yet been exploited to optimize search quality. In this paper, using findings from an empirical survey on modern recruitment practices among Germany's top 1,000 enterprises and supported by findings from personnel selection theory, we identify a gap between the actual requirements of matching people with jobs and current e-recruitment procedures. Based on information systems research and drawing from selection and assessment theory, a framework for developing new matching methods is proposed. We describe the elements of a matching method using a probabilistic automated recommendation

approach and then present first quite promising results from applying the algorithm to synthetic data.

### 3." Job Recommendation based on Job Profile Clustering and Job Seeker Behavior"

Mhamdi, D. & Moulouki, R. & Ghoumari, M. & Azzouazi, M. & Moussaid, L.. (2020). Job Recommendation based on Job Profile Clustering and Job Seeker Behavior. Procedia Computer Science. 175. 695-699. 10.1016/j.procs.2020.07.102.

This article presents a recommender system that aims to help job seekers to find suitable jobs. First, job offers are collected from job search websites then they are prepared to extract meaningful attributes such as job titles and technical skills. Job offers with common features are grouped into clusters. As job seeker like one job belonging to a cluster, he will probably find other jobs in that cluster that he will like as well. A list of top n recommendations is suggested after matching data from job clusters and job seeker behavior, which consists on user interactions such as applications, likes and rating.
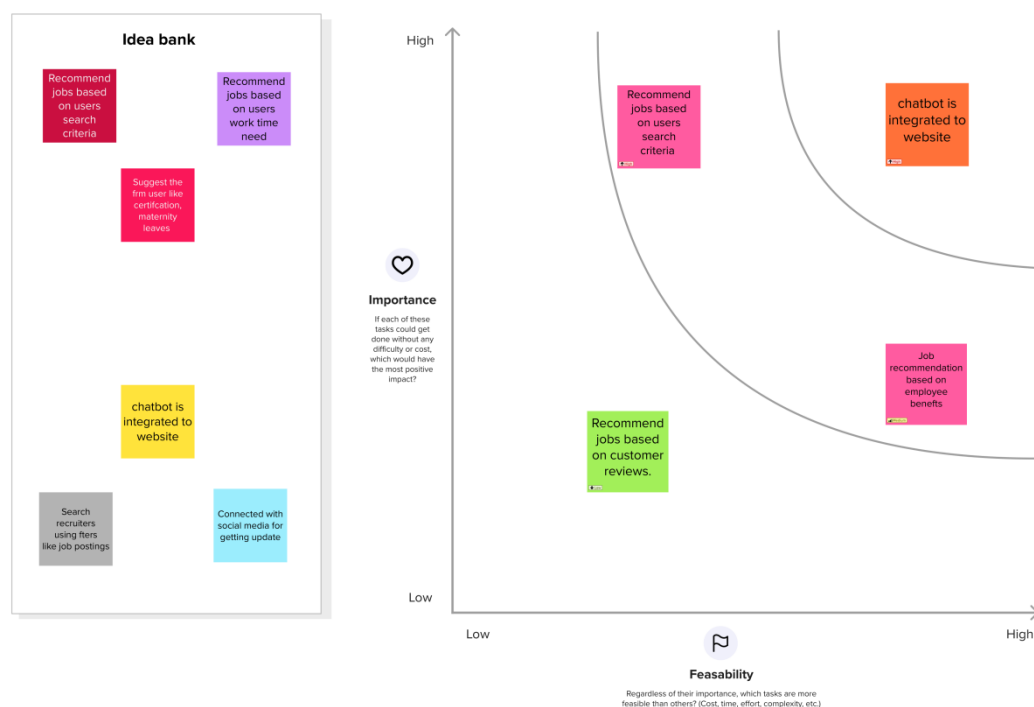
### 4." Job Recommendation System based on Text Analysis"

D. Mhamdi, R. Moulouki, M. Y. El Ghoumari, and M. Azzouazi. (2020) "Job Recommendation System based on Text Analysis." Jour of Adv Research in Dynamical & Control Systems, Vol. 12, 04-Special Issue

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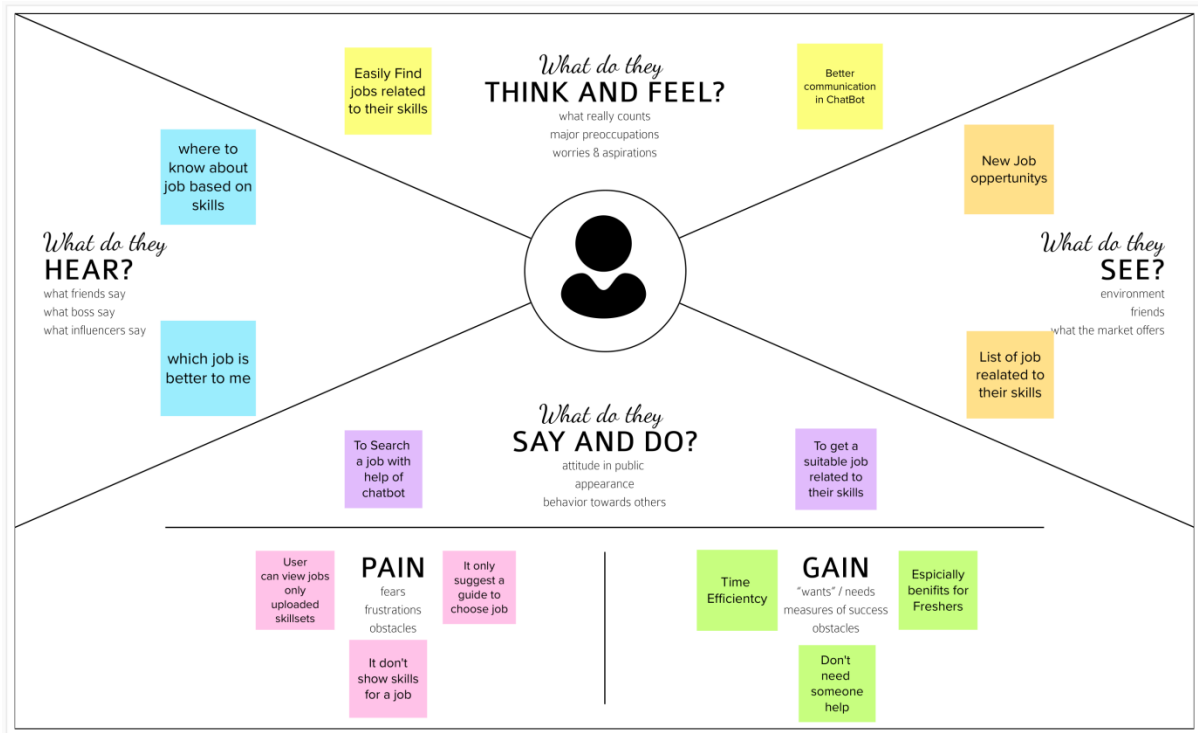
## 2.3 Problem Statement Definition

We have come up with new inovation solution through which you can directly choose your job related to your skills without need help from someone. You can search a job based on your skills and also chat with chatbot for get recommendation of list of jobs related to specified skillsets. We 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. User can login into application and search a job othewise intract with chatbot via entering skills to the bot, it suggest some job based on entered skills and also it update latest jobs everyday, lists of jobs are uploaded into database and the chatbot also connected with database once user enter skills into chatbot it will search related job in database then it disply various jobs related to skills.

## 3 IDEATION & PROPOSED SOLUTION

## 3.1 Empathy Map Canvas



# 3.2 Proposed Solution

| S. No | Parameter | Description |
|-------|-----------|-------------|
| 1. | Problem Statement (Problem to be solved) | Recommend the suitable job related to their skills |
| 2. | Idea / Solution description | We have come up with new inovation solution through which you can directly choose your job related to your skills without need help from someone. You can search a job based on your skills and also chat with chatbot for get recommendation of list of jobs related to specified skillsets. We 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. 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. User can login into application and search a job othewise intract with chatbot via entering skills to the bot, it suggest some job based on entered skills and also it update latest jobs everyday, lists of jobs are uploaded into database and the chatbot also connected with database once user enter skills into chatbot it will search related job in database then it disply various jobs related to skills. |
|---|---|---|---|
| 3. | | Novelty / Uniqueness | In this appication we provide extra link- feature for applying a job that recommened by application |
| 4. | | Social Impact / Customer Satisfaction | Job and skill recommended Application which is helpful for people who had lot of skills and choose an best field or job related to skills |
| 5. | | Business Model (Revenue Model) | Revenue can be generated by selling the whole kit.The revenue can also be obtained by ad service where they can inspect the system, for that service they can charge the customers. |
| 6. | | Scalability of the Solution | Whatever Skill may be given but skill/job application don't fail to give recommendation |

## 3.3 Problem Solution Fit

Project Title: Skill/Job recommender     Project Design Phase-I - Solution Fit     Team ID: PNT2022TMID29762

**1. CUSTOMER SEGMENT(S)** — CS

Define CS, fit into CC

Who is your customer?
i.e. working parents of 0-5 y.o. kids

The main customers for our project are :

- Persons who are seeking employment
- Persons that recruit job candidates

**6. CUSTOMER CONSTRAINTS** — CC

What constraints prevent your customers from taking actions or limit their choices of solutions? i.e. spending power, budget, no cash, network connection, available devices.

- Concern about misuse of personal information
- Worry about unreliable connections
- Inadequate product knowledge
- Potential Scam
- Time consuming

**5. AVAILABLE SOLUTIONS** — AS

Explore AS, differentiate

Which solutions are available to the customers when they face the problem or need to get the job done? What have they tried in the past? What pros & cons do these solutions have? i.e. pen and paper is an alternative to digital notetaking

| Pros | Cons |
|---|---|
| Promotion of people's skillset | Delivering false information |
| Marketing of company infrastructure | Occurrence of fraudulent activity |
| Cultivate commercial relationship | Intense competition |

**2. JOBS-TO-BE-DONE / PROBLEMS** — J&P

Focus on J&P, tap into

Which jobs-to-be-done (or problems) do you address for your customers? There could be more than one, explore different sides.

- Create a platform to facilitate job searching
- A platform to make it simpler to identify people with the necessary skills
- Make the job-filtering process simpler
- Profile with safe personal data

**9. PROBLEM ROOT CAUSE** — RC

What is the real reason that this problem exists? What is the back story behind the need to do this job? i.e. customers have to do it because of the change in regulations.

- Jobs that are listed on unreliable platforms may be fraudulent
- Companies fail to disclose their true infrastructure
- Some job portals want payment in advance of the job starting.
- Users post false credentials
- Users pretend to have expertise in a skillset they lack

**7. BEHAVIOUR** — BE

Focus on J&P, tap int   C

What does your customer do to address the problem and get the job done? i.e. directly related: find the right solar panel installer, calculate usage and benefits; indirectly associated: customers spend free time on volunteering work (i.e. Greenpeace)

- When Users apply for fraudulent jobs, they get unhappy due to wasted time
- Users were not satisfied when platforms allowed hirers to post jobs that were not real
- Cheating during online recruitment process
- When candidates with inadequate qualifications apply for a position, employers become irritated.

**3. TRIGGERS**

Identify strong TR & EM

What triggers customers to act? i.e. seeing their neighbour installing solar panels; reading about a more efficient solution in the news.

- Employment opportunities
- Endorsement and connections

**4. EMOTIONS: BEFORE / AFTER** — EM

How do customers feel when they face a problem or a job and afterwards?

**10. YOUR SOLUTION**

If you are working on an existing business, write down your current solution first, fill in the canvas, and check how much it fits reality.

To develop an end-to-end web application which in default have a lot of current job openings through job search API out of which appropriate job will be recommended based on user skill set. At the same time students can develop their skills side by side with various courses and webinars offered by reputed organization. In addition to this a smart chat bot will be available for 24*7 which can help users in finding the right job.

**8. CHANNELS of BEHAVIOUR** — CH

Extract online & offline CH of BE

**8.1 ONLINE**
What kind of actions do customers take online? Extract online channels from #7

- Apply for jobs
- Review job applications
- Attend initial level assessment

**8.2 OFFLINE**
What kind of actions do customers take offline? Extract offline channels from #7 and use them for customer development.

- Final level interview
- Checkout location and infrastructure of company
- Finalize paperwork

# 4 REQUIREMENT ANALYSIS

## 4.1 Functional requirement

Function Requirement: Software Required: Python, Flask, Docker

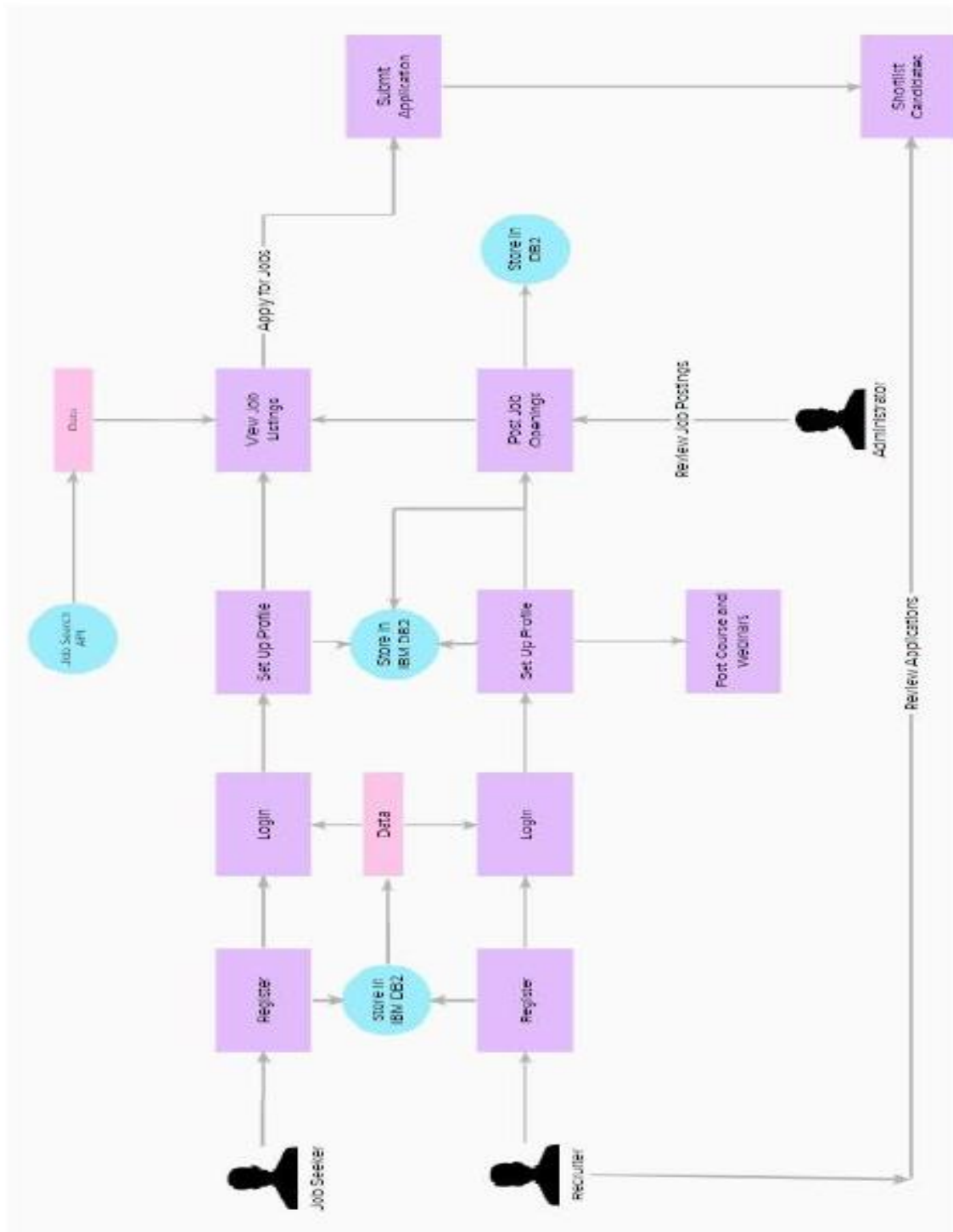| FR No. | Functional Requirement (Epic) | Sub Requirement (Story / Sub-Task) |
|--------|-------------------------------|-------------------------------------|
| FR-1 | Sign in / Login | Register with username, password |
| FR-2 | Profile Registration | Register with username, password, email, qualification,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

## 4.2 Non-Functional requirements

| 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 itand complete the job registration work. (easy and simple design) |
| NFR-2 | Security | Using of python flask to cloud connect will providesecurity 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. |

# 5. PROJECT DESIGN

## 5.1 Data Flow Diagrams

## 5.2 Solution & Technical Architecture
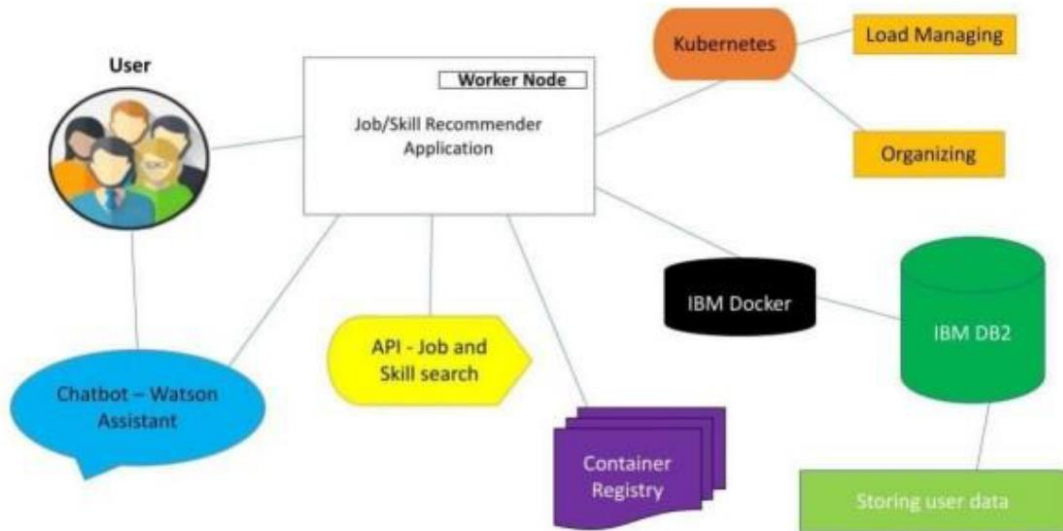


## 5.3 User Stories

| User Type | Functional Requirement (Epic) | User Story Number | User Story / Task | Acceptance criteria | Priority | Release |
|---|---|---|---|---|---|---|
| Customer (Web User) | Registration | USN-1 | As a user, I can register for the application by entering my username, email, password, confirming my password and specifying myself as Job seeker or Recruiter. | I can register & access my account / dashboard | High | Sprint-1 |
| | | USN-2 | As a user, I will receive verification email once I have registered for the application | I can receive verification email & click verify | High | Sprint-1 |
| | | USN-3 | As a user, I can register for the application through Google Signup | I can register & access my account / dashboard with Google Login | Low | Sprint-2 |
| | | USN-4 | As a user, I can register for the application through Sign In with LinkedIn | I can register & access my account / dashboard with Google Login | Low | Sprint-1 |
| | Login | USN-5 | As a user, I can log into the application by entering registered email & correct password | I can access my account / dashboard | High | Sprint-1 |
| | | USN-6 | As a user, I can log into the application using google sign in option | I can access my account / dashboard | Low | Sprint-2 |
| | | USN-7 | As a user, I can log into the application using LinkedIn Login | I can access my account / dashboard | Low | Sprint-1 |
| | Profile Setup | USN-8 | As a fresh user I need to setup my profile by filling required details to easily apply to any jobs | I will be ready to apply for jobs | High | Sprint-2 |
| | | USN-9 | As a fresh recruiter I need to setup profile for my company by filling required details so as to post jobs on the website | I will be ready to post job openings | High | Sprint-2 |
| | Applying | USN-10 | As a Job Seeker I can explore on various jobs listed f rom Google Job Search API as well as jobs directly posted by recruiters in the platform and apply with single click. | I can apply for any jobs listed in the Home Page | High | Sprint-3 |
| | Posting | USN-11 | As a Recruiter I can post various job openings | I can post jobs | High | Sprint-1 |
| | | USN-12 | As a Recruiter I can post courses and webinars | I can post courses and webinars | Low | Sprint-4 |

| User Type | Functional Requirement (Epic) | User Story Number | User Story / Task | Acceptance criteria | Priority | Release |
|---|---|---|---|---|---|---|
| | Shortlisting | USN-13 | As a Recruiter I can Shortlist Candidates based on applications received. | I can choose efficient candidate | Medium | Sprint-4 |
| | Chatbot | USN-14 | As a User I can access chatbot to avail any kind of guidance in the website | I can avail chatbot help | High | Sprint-3 |
| Administrator | Review Jobs | USN-15 | As a administrator I can review posted jobs and publish them in the website | I review job Postings | Low | Sprint-4 |

# 6. 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. | 20 | High | Bharathvaj Aashiq Anand Meyyzhaghan |
| Sprint-1 | Verification | USN-2 | As a user, I will receive confirmation email once I have registered for the application | 20 | High | Bharathvaj Aashiq Anand Meyyzhaghan |
| Sprint-2 | Login | USN-3 | As a user, I can log into the application by entering email & password | 20 | Low | Bharathvaj Aashiq Anand Meyyzhaghan |
| Sprint-2 | Verification | USN-4 | After click login button, It verify the login credatials wether entered details are correct or not. | 20 | Medium | Bharathvaj Aashiq Anand Meyyzhaghan |
| Sprint-3 | Dashboard | USN-5 | As a user, I can access my dashboard after signing in. | 20 | High | Bharathvaj Aashiq Anand Meyyzhaghan |

| Sprint | Functional Requirement (Epic) | User Story Number | User Story / Task | Story Points | Priority | Team Members |
|---|---|---|---|---|---|---|
| Sprint-3 | Profile | USN-6 | As a user, I can set up a profile, and basic details. | 20 | High | Bharathvaj Aashiq Anand Meyyzhaghan |
| Sprint-4 | ChatBot | USN-7 | As a user, I can access the chatbot for job recommendation. | 20 | High | Bharathvaj Aashiq Anand Meyyzhaghan |
| Sprint-4 | Salary | USN-8 | As a user, I will be able to know the salary for my job | 20 | High | Bharathvaj Aashiq Anand Meyyzhaghan |

**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 | 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)

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

## 7. CODING & SOLUTIONING

### 7.1 Feature 1:

- IBM Cloud

- IBM Watson

- PlatformIBM DB2

- Container Registry

- Kubernetes Cluster

### 7.2 Feature 2:

- Login

- Update Resume

- Job Recommendations

**App.py**

```
from turtle import st

from flask import Flask, render_template, request, redirect, url_for, session

from markupsafe import escape

import ibm_db

conn = ibm_db.connect("DATABASE=bludb;HOSTNAME=3883e7e4-18f5-4afe-be8c-
fa31c41761d2.bs2io90l08kqb1od8lcg.databases.appdomain.cloud;PORT=31498;SECURITY=SSL;S
SLServerCertificate=DigiCertGlobalRootCA.crt;UID=nvc66176;PWD=mJ8bip8lv31naRX3","","")
```

```python
app = Flask(__name__)

@app.route('/')
def index():
    return render_template('index.html')


@app.route('/reco')
def recomender():
    return render_template('recomender.html')


@app.route('/login')
def login():
    return render_template('signin.html')


@app.route('/signup')
def signup():
    return render_template('signup.html')


@app.route('/addrec',methods = ['POST', 'GET'])
def addrec():
 if request.method == 'POST':

   name = request.form['name']
   mail = request.form['email']
   password = request.form['pass']
   password2 = request.form['pass2']
```

```python
    sql = "SELECT * FROM login WHERE name =?"

    stmt = ibm_db.prepare(conn, sql)

    ibm_db.bind_param(stmt,1,name)

    ibm_db.execute(stmt)

    account = ibm_db.fetch_assoc(stmt)


    if account:

        return render_template('list.html', msg="You are already a member, please login using your details")

    else:

        insert_sql = "INSERT INTO login VALUES (?,?,?,?)"

        prep_stmt = ibm_db.prepare(conn, insert_sql)

        ibm_db.bind_param(prep_stmt, 1, name)

        ibm_db.bind_param(prep_stmt, 2, mail)

        ibm_db.bind_param(prep_stmt, 3, password)

        ibm_db.bind_param(prep_stmt, 4, password2)

        ibm_db.execute(prep_stmt)


    return render_template('result.html', msg="Register successfuly..")



@app.route('/auth',methods=['GET','POST'])

def auth():


    if request.method=='POST':

        email=request.form['your_name']


        password=request.form['your_pass']

        sql="SELECT * FROM login WHERE mail=? AND password=?"

        stmt=ibm_db.prepare(conn,sql)

        ibm_db.bind_param(stmt,1,email)

        ibm_db.bind_param(stmt,2,password)

        ibm_db.execute(stmt)
```

```
        account=ibm_db.fetch_assoc(stmt)

        print(account)

        if account:

            return redirect(url_for('recomender'))

        else:

            return render_template('result.html', msg="incorrect username or password")

    elif request.method=='GET':

        return render_template('signin.html')


if __name__ == "__main__":

    db.create_all()

    app.run(debug=True)
```
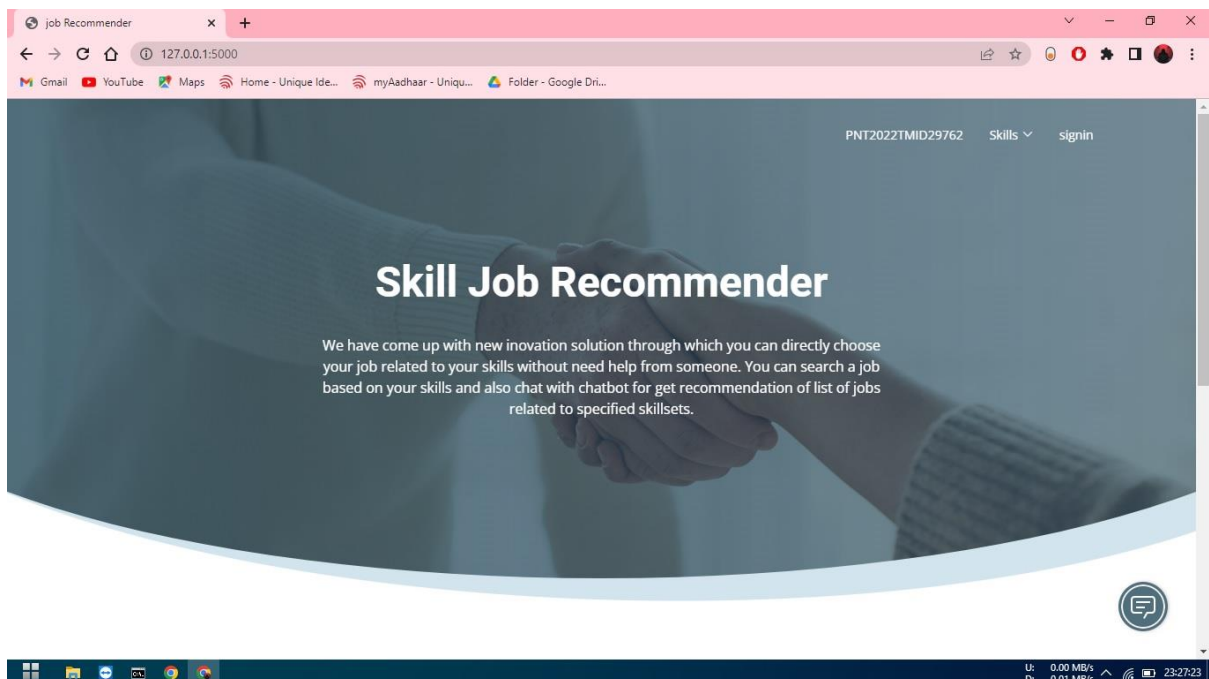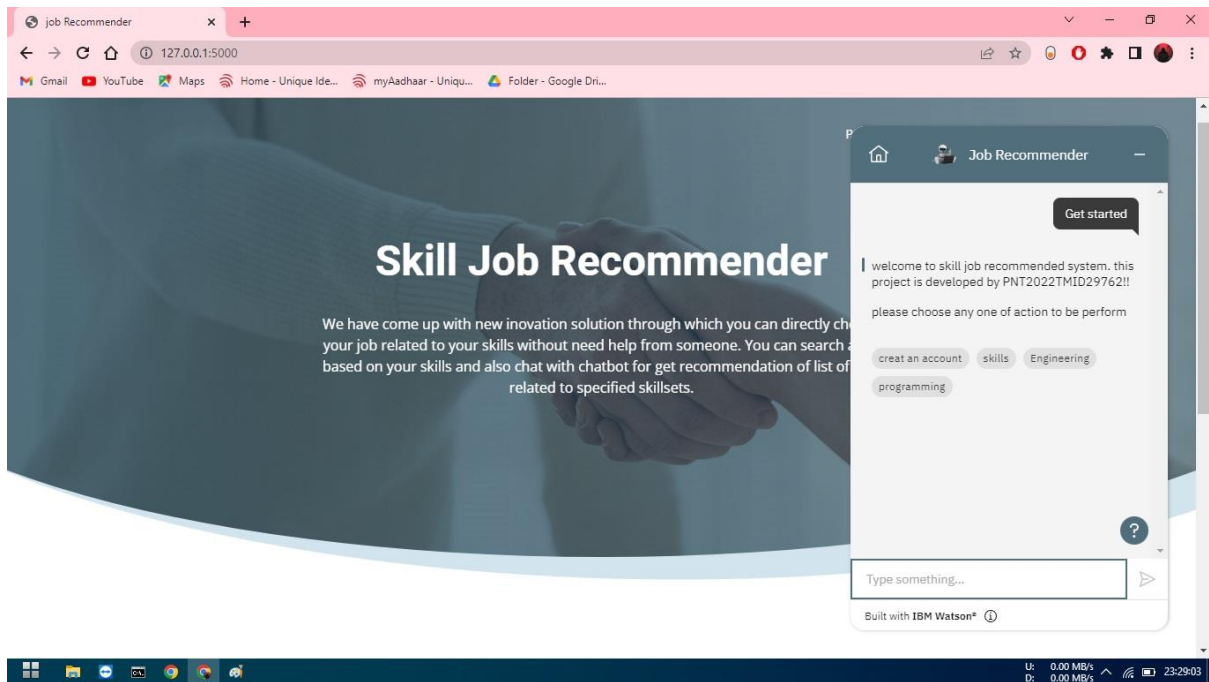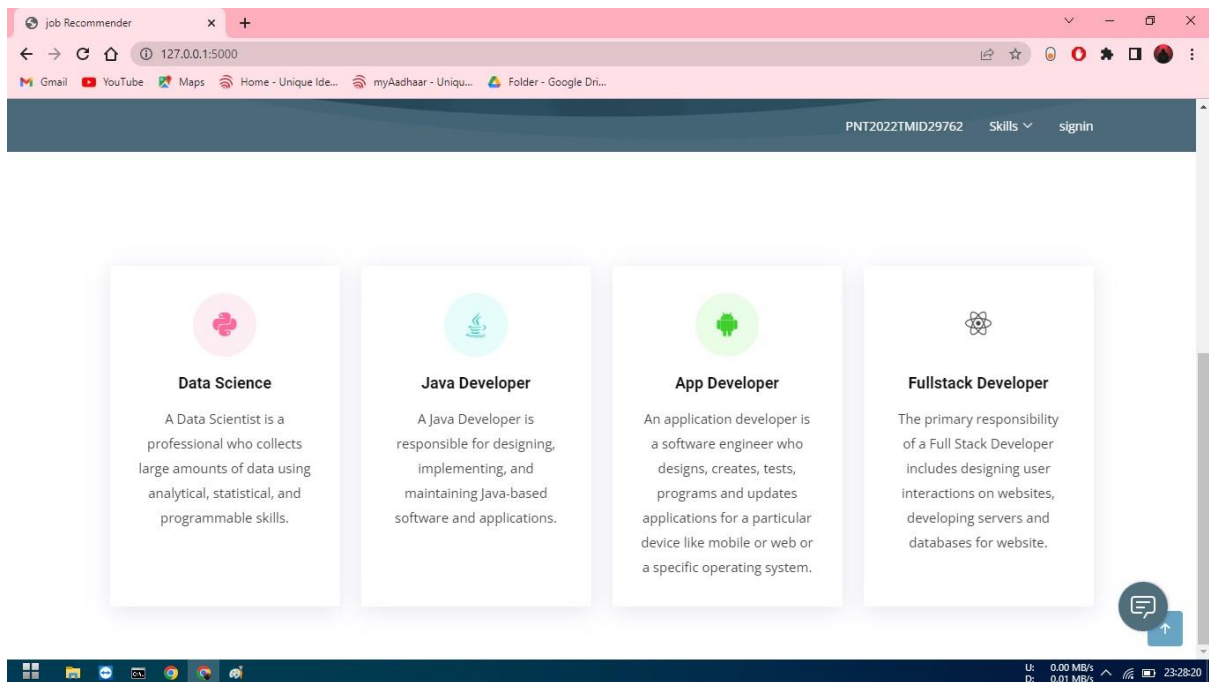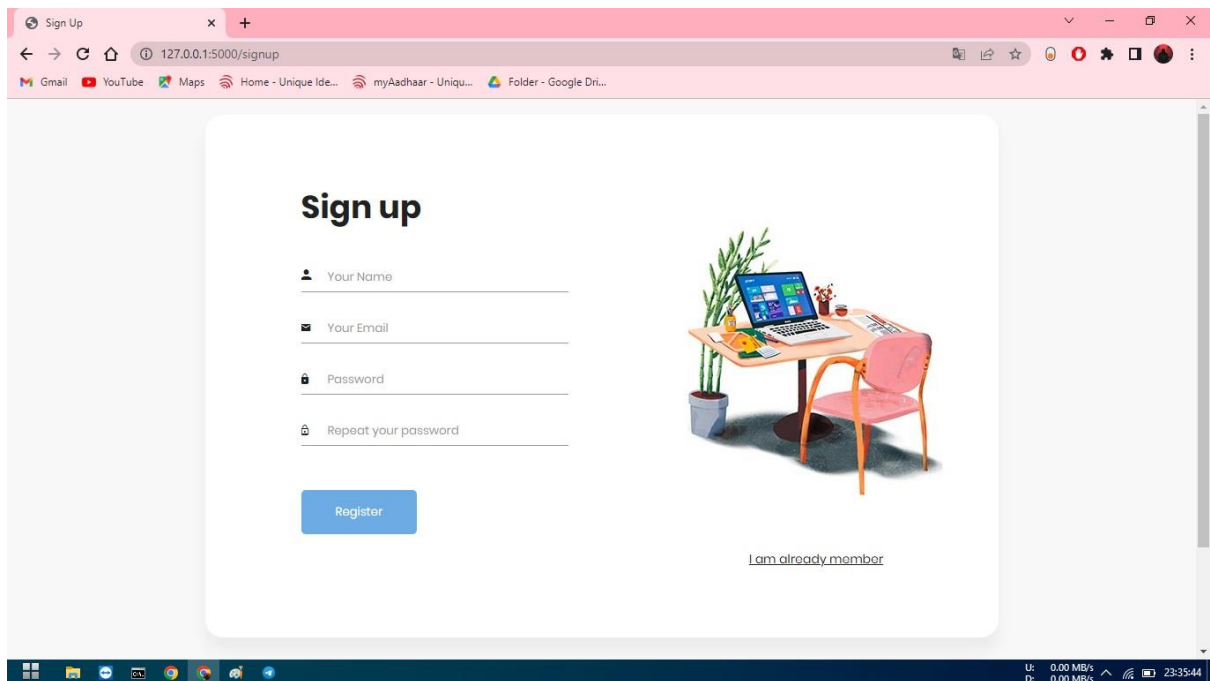
## 8. TESTING AND RESULTS:

# Build Your Career

| Skills, Designation, Companies | Experience ⌄ | Select Category ⌄ | SUBMIT |

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# Find Popular Jobs

### IOS Developer
💼 Google    📍 Bengaluru, Karnataka    💰 ₹9.8L                    `Full Time`

### Back-End developer
💼 Microsoft    📍 Chennai, Tamilnadu    💰 ₹3.5L                    `Part Time`

### UI/UX Designer
💼 Centizen    📍 Tirunelveli, Tamilnadu    💰 ₹4.0L                    `Freelance`

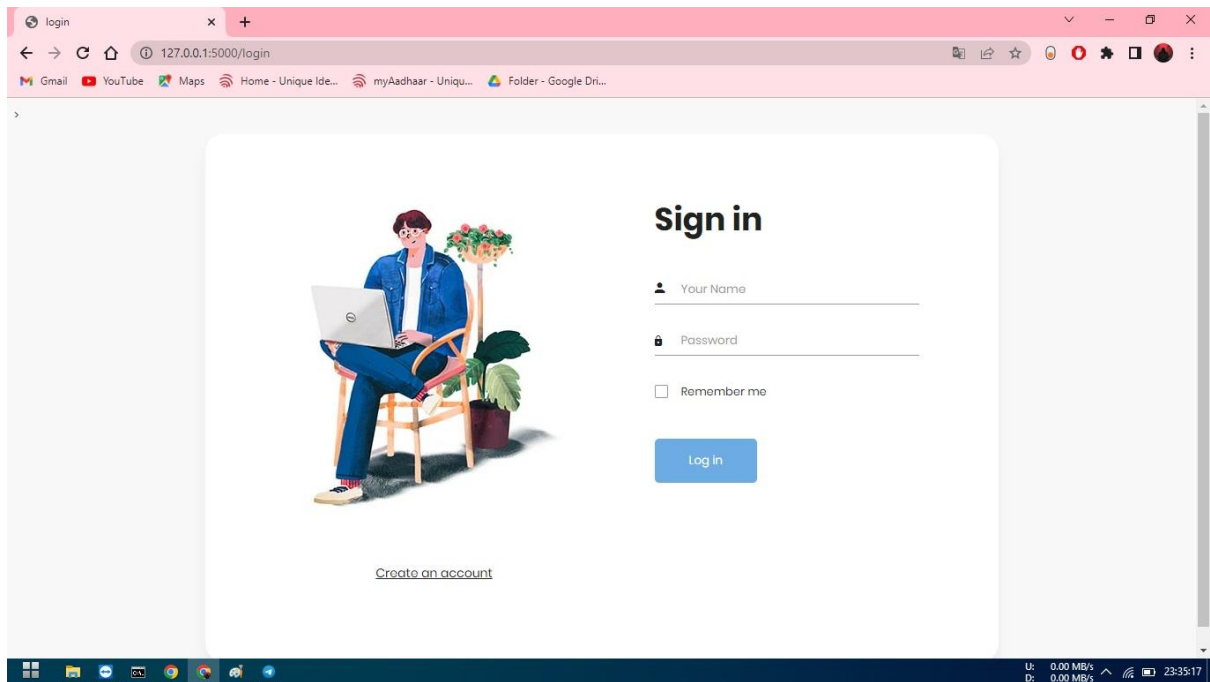### IOS developer
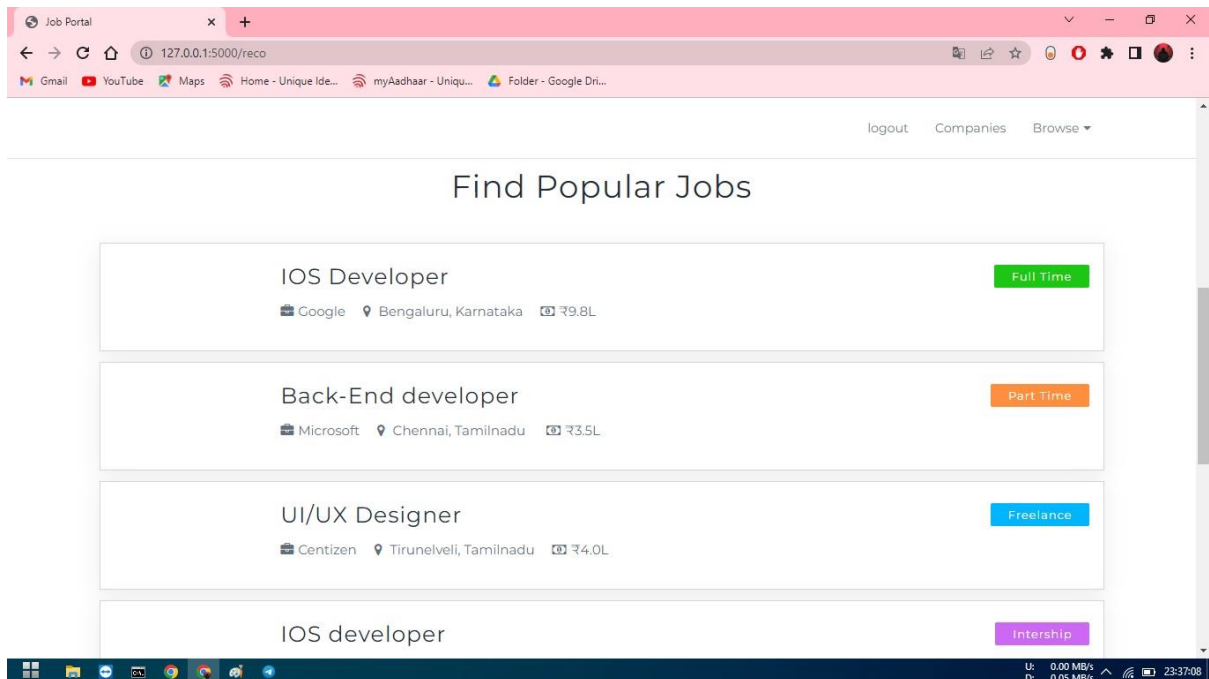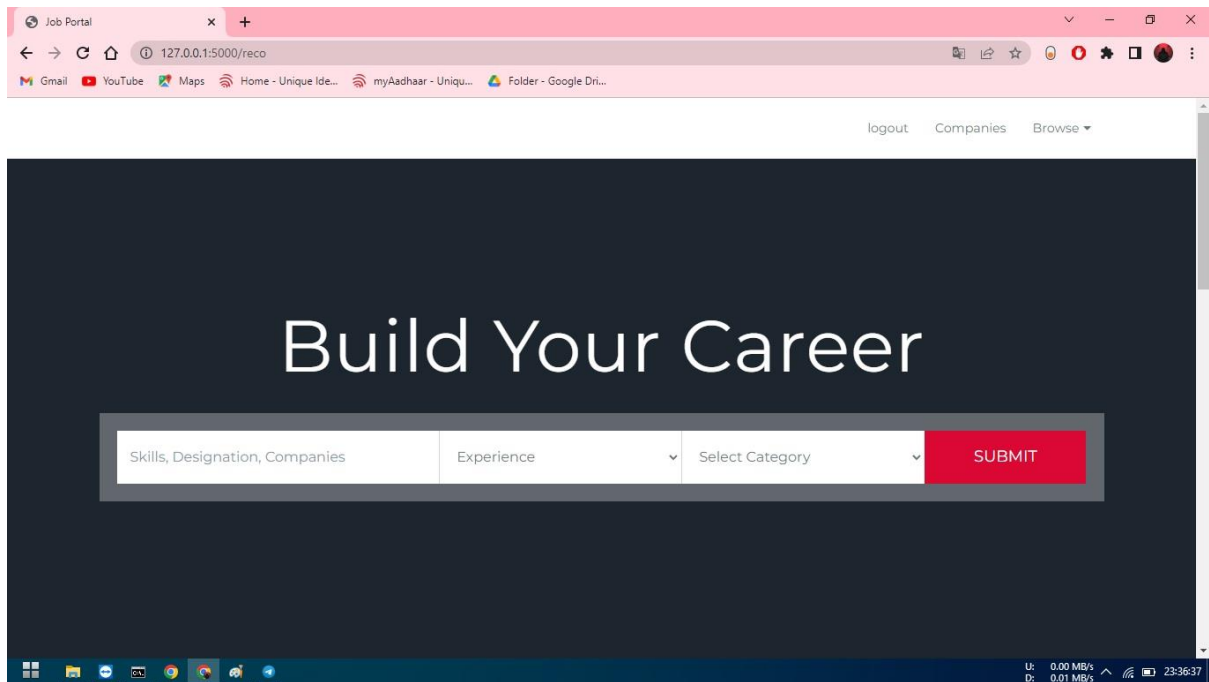                                                                        `Intership`

## 9. 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.

## 10. 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

## 11. CONCLUSION:

- The application has been developed to make job searcheasier.

- The application that we have developed is user friendly.

- User can find a job based on their skillset in the short periodof time. The jobseeker certainly get benefit by using this application.

- In the addition, Chatbot Has been implemented with the helpof IBM whatson. The chatbot helps jobseeker and organization when they experience the difficulties.

**FUTURE SCOPE:**

- The linked in the well known application to find a joband 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 LINK**

https://github.com/IBM-EPBL/IBM-Project-36405-1660294902