

SKILL/JOB RECOMMENDER APPLICATION

A PROJECT REPORT BY TEAM PNT2022TMID28874

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Category :

Cloud App Development

SKILL/JOB RECOMMENDER APPLICATION

INDEX

1. INTRODUCTION

- 1.1 Project Overview
- 1.2 Purpose

2. LITERATURE SURVEY

- 2.1 Existing problem
- 2.2 References
- 2.3 Problem Statement Definition

3. IDEATION & PROPOSED SOLUTION

- 3.1 Empathy Map Canvas
- 3.2 Ideation & Brainstorming
- 3.3 Proposed Solution
- 3.4 Problem Solution fit

4. REQUIREMENT ANALYSIS

- 4.1 Functional requirement
- 4.2 Non-Functional requirements

5. PROJECT DESIGN

- 5.1 Data Flow Diagrams
- 5.2 Solution & Technical Architecture
- 5.3 User Stories

6. PROJECT PLANNING & SCHEDULING

- 6.1 Sprint Planning & Estimation
- 6.2 Sprint Delivery Schedule
- 6.3 Reports from JIRA

7. CODING & SOLUTIONING

7.1 Feature 1

7.2 Feature 2

8. TESTING

8.1 Test Cases

8.2 User Acceptance Testing

9. RESULTS

9.1 Performance Metrics

10. ADVANTAGES & DISADVANTAGES

11. CONCLUSION

12. FUTURE SCOPE

13. APPENDIX

Source Code

GitHub & Project Demo Link

1.INTRODUCTION

1.1 PROJECT OVERVIEW

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.

1.2 PURPOSE

The main idea is to match jobseeker's skills to job. It is also to classify certain group of jobs' candidates according to the feature requirements and recommend jobs that match their features. The recommender systems are being used to figure out the interested items for a certain user by employing a variety of information resources that is related to the users and items. All young aspirants have lot of skills, but are not aware of the numerous fields that are having great demand. There is an indispensable need to make people aware of the vast job fields available. Hence making people match their skill to job. This platform serves as a bridge, helping aspirants choose their passionate job and thereby love their profession.

2. LITERATURE SURVEY

2.1 EXISTING PROBLEM

There are various disadvantages such as less secure, can build native apps only, etc that overcomes using the proposed system.

- Less secure

The concerns regarding security in Job recommender apps still persists due to several reasons. First major cause is due to its open source property, which means that the possible code vulnerabilities become common knowledge after they have been found. The second reason regarding its security is the low entry barrier for novice programmers. As a result, a number of websites and apps are developed by inexperienced coders, trainees, or even hobbyists. The shoddy results of their work contribute to the rumors and facts regarding overall bad security and performance.

- Data Storage

The memory consumption and data overhead incase of existing systems are very high. For memory intensive tasks such as online shopping rather than preferring languages like php, python, etc web stacks can be preferred. As Structured Query Language (sql) is being used, storing unstructured and semistructured data is quite a tedious process. As the efficiency of an e-commerce app relies on the efficient management of databases, these traditional existing apps lack this property.

- Longer time

The time taken to build a full stack e-commerce application is way more large when compared while creating with web stacks such as MERN, MEAN, etc. The various phases involved in creating a web app needs to be properly planned and executed. Our proposed solution will enhance the time taken in building and releasing the webapp. Releasing the app without any defects is another major goal, hence properly planned building and timely delivery are being implemented by the proposed system

- Native apps

Native apps are built for a specific operating system. A native app developed for the iOS operating system won't work on Android devices and vice- versa. If an app is developed for iOS, it will remain exclusive to that operating system. If at all the app has to support the Android version, a new app has to be built again for the Android operating system. Software's used to develop native apps generally would be Objective-C or Swift for iOS, Java and ADT for Android operating system and NET(C#) for Windows operating system.

2.2 REFERENCES

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doi: [https://doi.org/10.](https://doi.org/10.1016/0306-4573(88)90021-0)

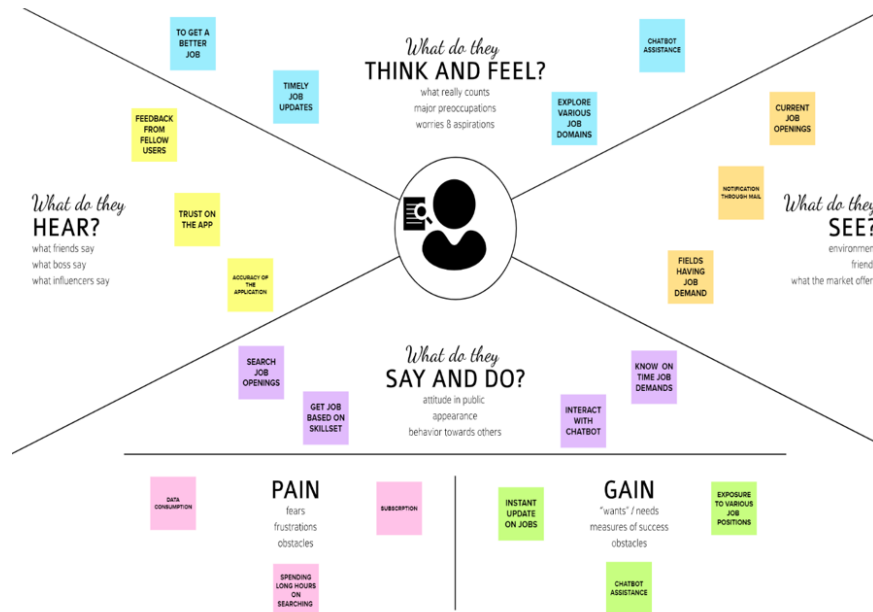
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[http://www.sciencedirect.com/science/article/pii/](http://www.sciencedirect.com/science/article/pii/S0306457388900210)
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2.3 PROBLEM STATEMENT DEFINITION

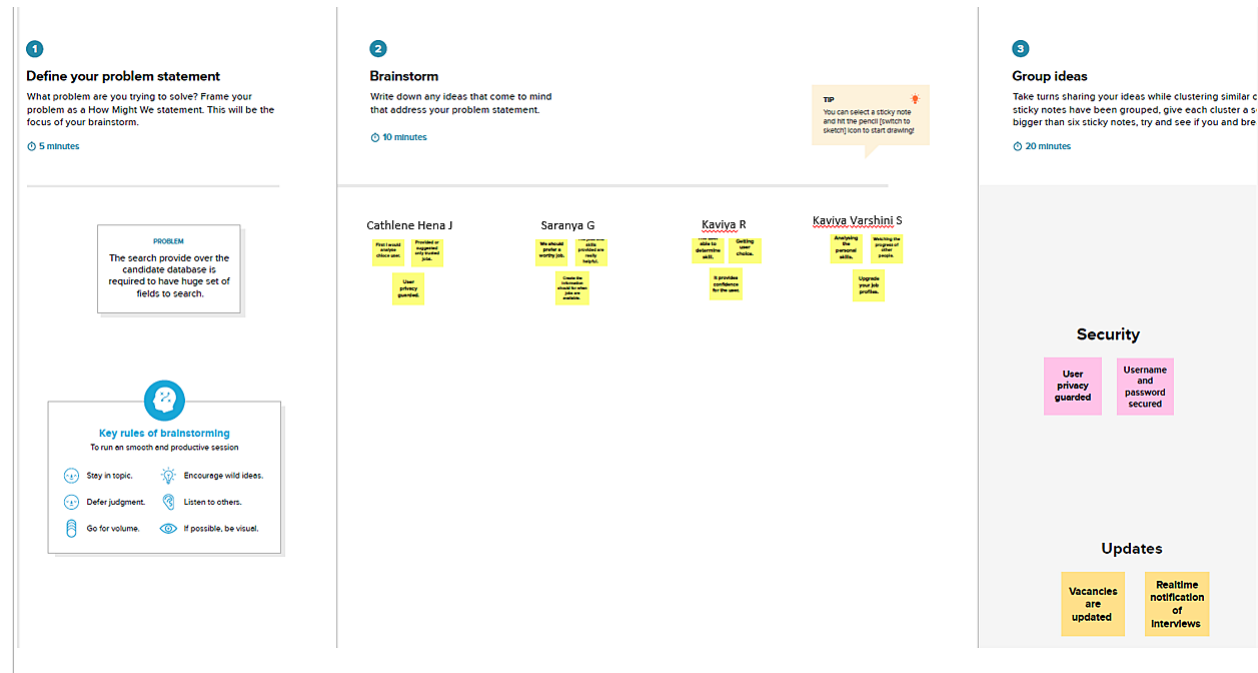
Having lots of skills but wondering which job will best suit you? Don't need to worry! We have come up with a skill recommender solution through which the fresher or the skilled person can log in and find the jobs by using the search option or they can directly interact with the chatbot and get their dream. 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. IDEATION AND PROPOSED SOLUTION

3.1 EMPATHY MAP CANVAS



3.2 IDEATION AND BRAINSTORMING



3.3 PROPOSED SOLUTION

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	<p>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.</p> <p>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.</p>
2.	Idea / Solution description	<p>The solution proposed is that a new data set will be formed based on the skill sets of the job seekers and the set of job vacancies. Thus by matching the skills set of people to the requirements, job seekers are recommended jobs. Thus aspirant's skills are matched to their preferred domains, thereby exploring various job fields. Even chatbot assistance is provided.</p>

4.	Social Impact / Customer Satisfaction	This helps aspirants explore the unexplored fields which actually has demand. Every skills are matched to their corresponding requirements. The companies in here will be verified so job seekers feel safe and secured.
5.	Business Model (Revenue Model)	We can share the details of the job seekers to companies with the permission of users, thereby generate revenue. We can even allocate certain honours to subscribed users, resulting in income.
6.	Scalability of the Solution	Requests per second can be handled by load balancers. Any number of users can be handled, though vast number of users simultaneously request access to data.

3.4 PROPOSED SOLUTION FIT

Define CS, fit into CC	1. CUSTOMER SEGMENT(S) CS Customer are mainly the officials from Bank sector who will approve the loan to the customer. It may also include who loan lender/bank account user, and credit/debit users.	6. CUSTOMER CONSTRAINTS CC The Choices of solutions are limited by their budget, knowledge that required to use the solution, database access, database connectivity, etc.	5. AVAILABLE SOLUTIONS AS The current mechanism for evaluating the loan application is done by paperwork and based credit score. They require lot of effort and time but also not able to cover all the parameters to consider.	Explore AS, differentiate
Focus on J&P, tap into BE, understand RC	2. JOBS-TO-BE-DONE / PROBLEMS J&P To validate whether the customer is eligibility for availing the loan scheme from bank. It may take long time check the eligibility manually.	9. PROBLEM ROOT CAUSE RC One of the major factor in increasing trend of banking sector that affect countries economy is credit system handled by banks. Increased rate of credit defaulter is a difficult task as credit risk evaluation is very crucial.	7. BEHAVIOUR BE Verify whether the loan requested person is eligible for loan based on the different parameter like person economic potential, property support, financial performance, etc.	Focus on J&P, tap into BE, understand RC
Identify strong TR & EM	3. TRIGGERS TR Financial situation of the user. Credit score rates. Low interest rates are also some of the trigger. Customers are triggered from the need to standardise the loan process and make their work more customer-friendly.	10. YOUR SOLUTION SL Based on the previous loan log of the bank's generated machine learning model which is used for evaluating the loan applicant eligibility. The proposed solution is the prediction of credit defaulters using classification algorithms such as Decision tree, Random forest and detect the credit risk evaluation. We use classification algorithms such as KNN and XGBOOST algorithms that forecast the loan defaulters and predict loan approval.	8. CHANNELS of BEHAVIOUR CH 8.1 ONLINE Customers can easily predict their eligibility through a user interface. Proper Document verification Customer background verification The applicant details are collected and cross verified. The verified data is given to the system for the evaluation. 8.2 OFFLINE <ul style="list-style-type: none"> Submission of document It is time consuming process It is complex 	Extract online & offline CH of BE
	4. EMOTIONS: BEFORE / AFTER EM While evaluating the loan applicant the bankers struggle in deciding how to evaluate the loan applicant, which are the things to be considered and what are the criteria level needed to be checked. If the loan borrowers are not paying back the loan at specified intervals then the bank's are not able to generate income which is necessary for maintaining the bank and providing the interest for the depositors.			

4. REQUIREMENT ANALYSIS

4.1 FUNCTIONAL REQUIREMENT

Following are the functional requirements of the proposed solution

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

4.2 NON FUNCTIONAL REQUIREMENT

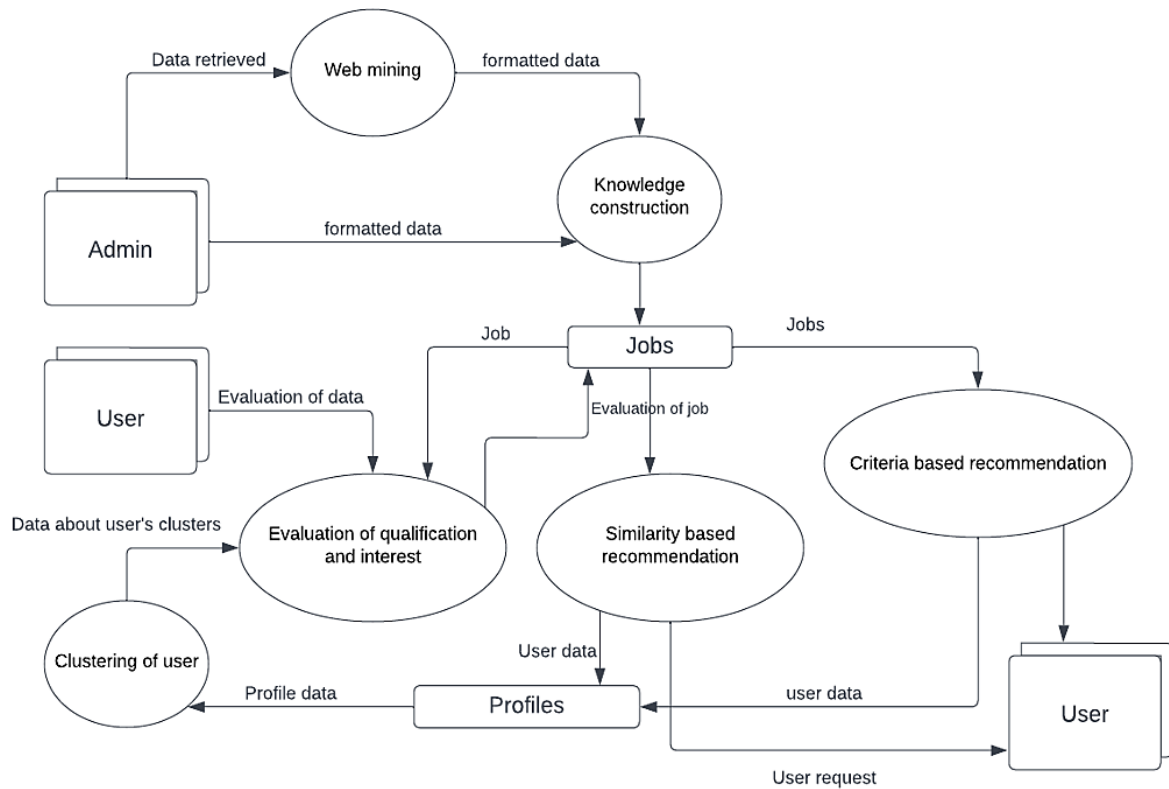
Following are the non-functional requirements of the proposed solution

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

5. PROJECT DESIGN

5.1 DATA FLOW DIAGRAMS



5.2 SOLUTION AND TECHNICAL ARCHITECTURE

S.No	Component	Description	Technology
1.	User Interface	How user interacts with application e.g. Web UI, Mobile App, Chatbot etc.	HTML, CSS, JavaScript
2.	Application Logic-1	Logic for a process in the application	Python
3.	Application Logic-2	Logic for a process in the application	IBM Watson STT service

4.	Application Logic-3	Logic for a process in the application	IBM Watson Assistant
5.	Database	Data Type, Configurations etc.	MySQL
6.	Cloud Database	Database Service on Cloud	IBM DB2
7.	File Storage	File storage requirements	IBM Block Storage or Other Storage Service
8.	External API-1	Purpose of External API used in the application	Job search API, IBM registry
9.	Infrastructure (Server / Cloud)	Application Deployment on Local System / Cloud Local Server Configuration: Cloud Server Configuration :	Local, Cloud Foundry, Kubernetes, Docker.

Application Characteristics

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	List the open-source frameworks used	Python-Flask

2.	Security Implementations	List all the security / access controls implemented, use of firewalls etc.	IAM Controls
3.	Scalable Architecture	Justify the scalability of architecture (3 - tier, Micro-services)	IBM DB2
4.	Availability	Justify the availability of application (e.g. use of load balancers, distributed servers etc.)	IBM Cloud Load Balancers

User Type	5.	Performance	Design consideration for the performance of the application (number of requests per sec, use of Cache, use of CDN's) etc.	Auto Scaling on Cloud server	Priority	Release

Customer (Mobile user)	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	I can access my account / dashboard	High	Sprint-1
		USN-2	As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm	High	Sprint-1
		USN-3	As a user, I can register for the application through Facebook	I can register & access the dashboard with Facebook Login	Low	Sprint-2
		USN-4	As a user, I can register for the application through Gmail		Medium	Sprint-1
	Login	USN-5	As a user, I can log into the application by entering email & password		High	Sprint-1

	Dashboard	USN-5	As a user, I can access my dashboard after signing in.	I can access my account / dashboard	High	Sprint-1
Customer (Web user)	Access	USN-6	As a user, I can setup a profile, and basic details by signing in.			
		USN-7	As a user, I will upload my resume, certificates, and other requirements.	I can perform several task in the application	Medium	Sprint-1
Customer Care Executive	Chatbot	USN-8	As a user, I can seek guidance from the customer care executive.		High	Sprint-1
Administrator	DBMS	USN-9	As a administrator, I can keep the applications of your organization relies on running.	I can perform various modifications in the applications.	High	Sprint-1

5.3 USER STORIES

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	UI Creation, Creating Registration page, Login page.	10	Medium	CATHLENE HENA J KAVIYA VARSHINI S KAVIYA R SARANYA G
Sprint-2	Chatbot Development	USN-4	Building chatbot.	10	High	CATHLENE HENA SARANYA G
Sprint-3	Integration and Containerization	USN-5	Integrating chatbot to the HTML page and containerizing the app.	20	Medium	CATHLENE HENA J KAVIYA VARSHINI S KAVIYA R SARANYA G
Sprint-4	Upload Image and deployment	USN-6	Upload the image to the IBM Registry and deploy it in the Kubernetes Cluster.	20	High	KAVIYA R SARANYA G

6.PROJECT PLANNING & SCHEDULING

a.SPRINT PLANNING & ESTIMATION

Project Tracker, Velocity & Burndown Chart

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

Velocity:

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

Burndown Chart:













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

measurable progress over time.

a. **SPRINT DELIVERY PLAN**

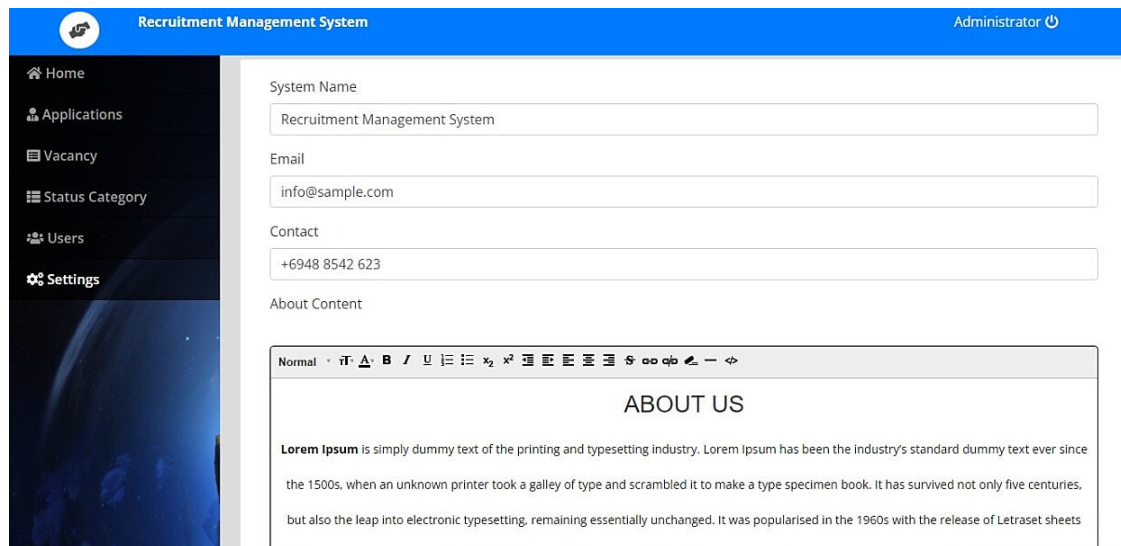
Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	UI Creation, Creating Registration page, Login page.	10	Medium	CATHLENE HENA J KAVIYA VARSHINI S KAVIYA R SARANYA G
Sprint-1	Database Connectivity	USN-2	Viewing Products and Connecting UI with Database.	10	High	KAVIYA R CATHLENE HENA J
Sprint-2	SendGrid Integration	USN-3	Send Grid Integration with python code.	10	Low	CATHLENE HENA J KAVIYA VARSHINI S
Sprint-2	Chatbot Development	USN-4	Building chatbot.	10	High	CATHLENE HENA SARANYA G
Sprint-4	Upload Image and deployment	USN-6	Upload the image to the IBM Registry and deploy it in the Kubernetes Cluster.	20	High	KAVIYA R SARANYA G

6.3 REPORTS FROM JIRA

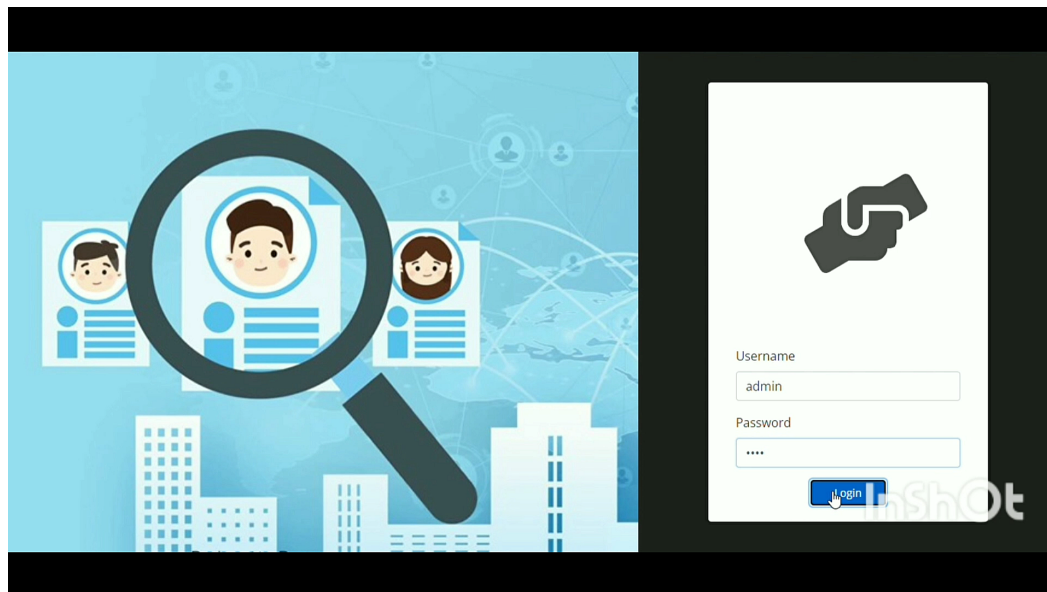
	OCT	NOV				DEC
Sprints		SJC...	SJC...	SJC...	SJC...	
▼  SJC-8 Registration						
 SJC-10 Database connecti... DONE G.SARANYA...						
▼  SJC-11 SendGrid Integration						
 SJC-12 Chatbot Development DONE CATHLENE...						
 SJC-13 Integration Containerization						
 SJC-14 Upload image deployment						

7.CODING & SOLUTIONING

1. FEATURE 1- Register & Login



The screenshot shows the administrator interface of the Recruitment Management System. The top navigation bar is blue with a logo on the left, the text "Recruitment Management System" in the center, and "Administrator" with a power icon on the right. A dark sidebar on the left contains menu items: Home, Applications, Vacancy, Status Category, Users, and Settings. The main content area has a light blue background and contains several form fields: "System Name" (filled with "Recruitment Management System"), "Email" (filled with "info@sample.com"), "Contact" (filled with "+6948 8542 623"), and "About Content". Below these fields is a rich text editor with a toolbar and the text "ABOUT US" followed by a paragraph of Lorem Ipsum text.



Jobseekers can register using their credentials, which will be saved in IBM DB2 cloud. So, whenever the user wants to visit the application he/she just can login using the saved credentials.

2. FEATURE 2: Admin & Status

Recruitment Management System
Administrator

Home
Applications
Vacancy
Status Category
Users
Settings

Status Form
Status
Save Cancel

#	Status Category	Action
1	For Initial Interview	Edit Delete
2	PASSED II	Edit Delete
3	FAILED II	Edit Delete
4	For Final Interview	Edit Delete
5	PASSED FI	Edit Delete
6	FAILED FI	Edit Delete
7	FOR POOLING	Edit Delete
8	Job Offer	Edit Delete
9	Hired	Edit Delete

Vacancy List
+ New Vacancy

Show 10 entries
Search:

#	Vacancy Information	Availability	Status	Action
1	Position : WEB DEVELOPER URGENT HIRING!!Our company is looking for 10 new Web developer.Requirements:PHP Knowledgeable,Wordpress Knowledgeable,node.js Knowledgeable,reactjs Knowledgeable,MySQL...	10	Active	View Edit Delete
2	Position : Sample Job DescriptionLorem ipsum is simply dummy text of the printing and typesetting industry. Lorem ipsum has been the industry’s standard dummy text ever since the 1500s, when an unknown printer took a galley of...	20	Closed	View Edit Delete
3	Position : Vacancy Job DescriptionLorem ipsum is simply dummy text of the printing and typesetting industry. Lorem ipsum has been the industry’s standard dummy text ever since the 1500s, when an unknown printer took a galley of...	5	Active	View Edit Delete
4	Position : Receptionist Job DescriptionLorem ipsum is simply dummy text of the printing and typesetting industry. Lorem ipsum has been the industry’s standard dummy text ever since the 1500s, when an unknown printer took a galley of...	2	Active	View Edit Delete

Another added feature is that the status of each applicant can be accessed by the admin, that status will be sent to the jobseeker through their respective mail. The users can check their application status using their login.

8. TESTING

8.1 TEST CASES

Test case ID	Feature Type	Component	Test Scenario
LoginPage_TC_OO1	Functional	Home Page	Verify user is able to see the Login/Signup popup when user clicked on My account button
LoginPage_TC_OO2	UI	Home Page	Verify the UI elements in Login/Signup popup
LoginPage_TC_OO3	Functional	Home page	Verify user is able to log into application with Valid credentials
LoginPage_TC_OO4	Functional	Login page	Verify user is able to log into application with Invalid credentials

LoginPage_TC_OO4	Functional	Login page	Verify user is able to log into application with InValid credentials
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LoginPage_TC_OO5	Functional	Login page	Verify user is able to log into application with InValid credentials
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Pre-Requisite	Steps To Execute	Test Data
	1.Enter URL and click go 2.Click on My Account dropdown button 3.Verify login/Singup popup displayed or not	index.html

	<p>1.Enter URL and click go</p> <p>2.Click on My Account dropdown button</p> <p>3.Verify login/Singup popup with below UI elements:</p> <p>a.email text box</p> <p>b.password text box</p> <p>c.Login button</p> <p>d.New customer? Create account link</p> <p>e.Last password? Recovery password link</p>	<p>index.html</p>
	<p>1.Enter URL(index.html) and click go</p> <p>2.Click on My Account dropdown button</p> <p>3.Enter Valid username/email in Email text box</p> <p>4.Enter valid password in password text box</p> <p>5.Click on login button</p>	<p>Username: saranyaganesan156@gmail.com</p> <p>password: Testing123</p>

	1.Enter URL(index.html) and click go 2.Click on My Account dropdown button 3.Enter Invalid username/email in Email text box 4.Enter valid password in password text box 5.Click on login button	Username: cathy56hena@gmail password: Testing123
	1.Enter URL(index.html) and click go 2.Click on My Account dropdown button 3.Enter Valid username/email in Email text box 4.Enter Invalid password in password text box 5.Click on login button	Username: varskaav589@gmail.com password: Testing1236786867868768 76

	1.Enter URL(index.html) and click go 2.Click on My Account dropdown button 3.Enter Invalid username/email in Email text box 4.Enter Invalid password in password text box	Username: kaviyaram@gmail.com password: Testing1236786867868768 76
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	5.Click on login button	
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Expected Result	Actual Result	Status	Comments
Login/Signup popup should display	Working as expected	Pass	
Application should show below UI elements: a.email text box b.password text box c.Login button with orange colour d.New customer? Create account link e.Last password? Recovery password link	Working as expected	Pass	
User should navigate to user account homepage	Working as expected	Pass	

Application should show 'Incorrect email or password ' validation message.	Working as expected		
Application should show 'Incorrect email or password ' validation message.	Working as expected	Pass	

Application should show 'Incorrect email or password ' validation message.	Working as expected	Pa ss	
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TC for Automation(Y/N)	BUG ID	Executed By
Y		Kaviya.R, Saranya.G

Y		Saranya.G, Kaviya Varshini.S
Y		Cathlene Hena.J, Kaviya Varshini.S
Y		Cathlene Hena.J, Kaviya.R
Y		Saranya.G, Kaviya Varshini.S

Y		Cathlene Hena.J, Saranya.G
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Acceptance Testing

UAT Execution & Report Submission

Purpose of Document

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

Section	Total Cases	Not Tested	Fail	Pass
Print Engine	7	0	0	7
Client Application	51	0	0	51
Security	2	0	0	2
Outsource Shipping	3	0	0	3

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

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

Totals	24	14	13	26	77
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Test Case Analysis

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

Exception Reporting	9	0	0	9
Final Report Output	4	0	0	4
Version Control	2	0	0	2

9. RESULTS

9.1 PERFORMANCE METRICS

Response Time (ms)

Total OK KO

Min

50th percentile

75th percentile

95th percentile

99th percentile

Max

Mean

Standard Deviation

Response Time (ms)

	Total	OK	KO
Min			
50th percentile			
75th percentile			
95th percentile			
99th percentile			
Max			
Mean			
Standard Deviation			

Executions	Response Time (ms)	Total	OK	KO	% KO	Cnt/s	Min	50th pct	75th pct	95th pct	99th pct	Max	Mean	Std Dev
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Gatling Version Version: 3.8.4 Released: 2022-09-13

Run Information

Date: 2022-11-17 08:58:09 GMT Duration: 1m 11s Description: fhg

StatsFixed heightFull size

Expand all groups Collapse all groups

Reques ts	Executions					Response Time (ms)							
	Total	OK	KO	% KO	Cnt /s	Min	50th pct	75th pct	95th pct	99th pct	Max	Mean	Std Dev

10. ADVANTAGES AND DISADVANTAGES

ADVANTAGES:

- Probabilistic hybrid approach
- Proactive job recommender system.
- Semantic matchmaking for job recruitment
- Fuzzy multiple criteria method for recruitment.
- Adaptive system.
- Use many attributes.
- Use ontology to categorize jobs and as a knowledge base to define features

DISADVANTAGES:

- Key words search method.
- One way recommendation.
- Knowledge acquisition and knowledge engineering problems.
- No relational aspects are included.
- Binary representation only.
- Less attributes used.
- No perfect measures
- No relational aspects are included.
- Scalability, ramp-up, and data sparsity problems.

11. CONCLUSION

This framework facilitates the understanding of job recommendation process as well as it allows the use of a variety of text processing and recommendation. Its indispensable to have an application that matches our skills to job. Our application does that using job recommender API. Jobseekers are benefitted by knowing various job fields that would suite their skillset. On the other side, Organizations can recruit people who are knowledgeable and skilful. Users can upload their CV and input skill-set to find job postings requiring similar skill-set. To facilitate user input, the skill-set input bar is categorized into different buckets, including education, major, programming skills, business intelligence and big data skills.

12. FUTURE SCOPE

Incorporating 'time' into a recommender system is important, because there are often preference seasonal effects. For example, it is likely that in December, more people are going to be watching holiday-themed movies and buying home decorations. To see what would happen if a customer was shown a sub-optimal recommendation. This is taking a reinforcement learning approach, since the goal in this case would be to show jobseekers a recommendation, and then record what the jobseeker does. At times, jobseekers can be recommended something that does not seem like the best option, just to see how the jobseeker reacts which will improve the learning in the long-term. Some of the applications include being able to anticipate seasonal purchases based on recommendations, determine important notifications, and give better recommendations to users, which can increase retention and brand loyalty.

13.APPENDIX

Source Code(Git Hub): <https://github.com/IBM-EPBL/IBM-Project-12037-1659367523.git>

Demo:

<https://drive.google.com/file/d/1kupq95Uht4jtj9WICAr2Wo5vleyjVY76/view?usp=sharing>