AI-Powered Career Companion: One-Stop Solution for Tailored Resumes, Job Tracking, and Mock Interview Prep

Group 3

Project Charter

Problem statement:

Job seekers often struggle with manually tailoring resumes for each job as it is time-consuming, prone to human error and requires a deep understanding of how to align their experience with job requirements. Additionally, tracking job applications can be overwhelming, especially for those applying to multiple companies. Without a structured system, applicants may lose track of applications, forget to follow up or fail to analyze rejection patterns for future improvements.

Despite these common struggles, no existing web app seamlessly integrates AI-driven resume generation, job tracking and interview preparation. Our AI-powered platform eliminates these inefficiencies by automating resume tailoring, providing a real-time application tracker and offering an AI-driven mock interview assistant—all in one place. This unique, end-to-end job search solution enhances efficiency, improves hiring success and streamlines the entire job application process.

Brief project description:

The goal of this project is to create a complete web-based platform that uses AI to personalize resumes, keep track of applications, and help people prepare for interviews. This will make the job application process easier. Through an integrated, AI-driven method, the system is meant to make job seekers more efficient, organized, and ready for work.

The platform consists of three core components:

1. *AI-Powered Resume Tailoring System*

   I. Users can upload their portfolio or resume once, and the system will generate a customized resume for each job description they provide.
   II. The backend, developed with FastAPI, integrates with OpenAI's API to process job descriptions and refine resumes accordingly, ensuring relevance and optimization.

III. The generated resumes are converted into PDF format and sent to the frontend, built with React, where users can download and review them.
IV. The system employs secure cloud storage (e.g., AWS S3, Firebase Storage) to manage and retrieve user resumes efficiently.

2. *Job Application Tracking Dashboard*

I. Provides an organized interface to monitor job applications, ensuring users stay on top of their opportunities.
II. Each entry includes:
- Company Name
- AI-Tailored Resume Download Link
- Application Status Checkboxes: "Applied" and "Rejected"
III. If marked as Rejected, the entry is automatically removed from the list to declutter and focus on active applications.
IV. Backend stores tracking data using PostgreSQL or MongoDB, ensuring persistence and scalability.
V. State management with Redux or React Context API ensures seamless data flow between components.

3. *AI-Driven Mock Interview Chatbot*

I. A conversational chatbot simulates real interview scenarios, helping users prepare for job interviews.
II. Features:
- Dynamic Questioning: Adjusts questions based on job role, industry, and experience level.
- Real-time Feedback: Provides suggestions on response improvement and delivery.
- Performance Analytics: Tracks user progress over multiple sessions.
III. Built using FastAPI for backend logic, WebSockets for real-time interaction, and OpenAI's GPT-based API for natural language processing.
IV. Chatbot UI integrates React with TailwindCSS for an intuitive and engaging user experience.

Tech Stack Overview:

1. *Frontend*: React, TypeScript, TailwindCSS, Redux/Context API
2. *Backend*: FastAPI, OpenAI API, WebSockets
3. *Database*: MySQL RDS, DynamoDb, Faiss
4. *Resume Parsing*: PyMuPDF, docx2txt, SpaCy
5. *Messaging Queues*: AWS SQS
6. *AI Resume Optimization*: OpenAI GPT, Langchain

7. *Cloud Storage & Deployment*: AWS services for hosting **(**AWS Lambda, S3**)**

Project deliverables:

This project aims to simplify and streamline the job application process by providing AI-generated tailored resumes, job tracking, and interview preparation. The key outcomes and deliverables include:

1. *Automated Tailored Resume Generation:*
   I. Users can submit job descriptions and receive AI-generated resumes in PDF format.
   II. The AI model analyzes the user's resume and tailors it based on the job description.
2. *Job Application Tracker:*
   I. Users can manage their job applications in one place.
   II. Download tailored resumes for each application.
   III. Mark applications as 'Applied' or 'Rejected' (rejected entries are removed).
3. *Mock Interview Chatbot:*
   I. A conversational chatbot to help users practice for interviews.
   II. Provides feedback on answers, suggests improvements, and tracks progress over multiple sessions.
4. *User-Friendly Interface & Backend Integration:*
   I. Frontend: React-based, ensuring a smooth and intuitive user experience.
   II. Backend: FastAPI-powered, efficiently handling AI queries and resume generation.
5. *Scalability & Extensibility:*
   I. Future scope for adding AI-based job matching, resume optimization tips, and personalized job recommendations and voice assistants for interview preparation.

Project team members and their roles:

To efficiently develop our project, we have divided ourselves into three sub-teams: Frontend, Backend, and AI/ML. Each team focuses on a specific aspect of the project to ensure smooth development and integration.

1. *Frontend Team* (*Sushma Shivani Nukala*, *Haritha Injam* and *Sai Aparanji Nemmani*): Responsible for building user interfaces, integrating APIs, and ensuring an intuitive and visually appealing user experience.
2. *Backend Team* (*Aishwarya Policherla Venkataramanaiah* and *Abhinav Ravichandran*): Handles API development, backend logic, and database management.
3. *AI/ML Team* (*Mrunaldhar Bathula*, *Sreenidhi Gurunathan* and *Manikanta Soma Aditya Kavuluri*): Works on integrating AI models, optimizing AI query responses, and handling AI-generated resume formatting.

Team Member	Role
Mrunaldhar Bathula	Software/AWS Architect
Sreenidhi Gurunathan	AI/ML Engineer
Manikanta Soma Aditya Kavuluri	Backend Engineer/ Scrum Master
Aishwarya Policherla Venkataramanaiah	API Developer
Abhinav Ravichandran	Backend Developer
Sushma Shivani Nukala	Database Engineer
Haritha Injam	UI/UX Developer
Sai Aparanji Nemmani	Frontend Developer

Timeline for completion:

1. ***Sprint 0 (Feb 10 - Feb 23)***

   Week 0 (Feb 10 - Feb 16)

   I. Brainstorm project requirements and finalize scope.
   II. Define tech stack
   III. Work on Proof of concept

   Week 1 (Feb 17 - Feb 23)

   I. Set up repository (GitHub/GitLab) and project management tools.
   II. Prepare initial project documentation & workflow plan.
   III. Research resumes tailoring methodologies & API usage.

2. ***Sprint 1 (Feb 24 - March 20)***

   Week 2 (Feb 24 - March 2)

   I. Kick-off: Define project scope, roles and architecture.
   II. Set up FastAPI backend and React frontend.
   III. Research and integrate OpenAI API for resume tailoring.

   Week 3 (March 3 - March 9)

   I. Implement backend API for resume upload and job description input.
   II. Generate tailored resumes and return them as PDFs.
   III. Design UI for resume upload and job description input.

   Week 4 (March 10 - March 16)

I. Optimize AI query and PDF generation pipeline.
II. Implement error handling and feedback mechanism.
III. Start developing the job tracking page UI.

Week 5 (March 17 - March 20)

I. Test resume generation and tracking features.
II. Debug and refine UI/UX for better usability.
III. Prepare and submit Sprint 1 deliverable.

3. Sprint 2 (March 21 - April 10)

Week 6 (March 21 - March 27)

I. Develop database and backend API for job application tracking.
II. Implement tracking page UI with applied/rejected checkboxes.
III. Enable to store and update job application status.

Week 7 (March 28 - April 3)

I. Finalize tracking system with job-wise resume storage.
II. Implement logic to remove rejected job applications.
III. Improve UI responsiveness and backend efficiency.

Week 8 (April 4 - April 10)

I. End-to-end testing of resume generation and tracking features.
II. Debug, refine, and polish UI/UX.
III. Prepare and submit Sprint 2 deliverable.

4. Sprint 3 (April 11 - May 1)

Week 9 (April 11 - April 17)

I. Develop AI-powered chatbot for interview preparation.
II. Implement basic chat UI and backend API.
III. Train chatbot with common interview questions and responses.

Week 10 (April 18 - April 24)

I. Improve chatbot accuracy and conversation flow.

II. Test chatbot with different job roles and responses.
III. Optimize backend for chatbot performance.

Week 11 (April 25 - May 1)

I. Final testing and debugging across all features.
II. Document project and prepare final submission.
III. Deploy, review and present the final deliverable.

Communication plan for the team:

1. *Weekly Online Meetings*: Scheduled on Friday via Microsoft Teams to review progress, address challenges, and refine the sprint backlog.
2. *In-Person Work Sessions:* Scheduled on Mondays after class to focus on troubleshooting, refining implementations and ensuring alignment on complex tasks.
3. *Daily Communication:* A brief check-in to share progress, resolve blockers, and maintain coordination we would do this in Microsoft Teams call or have a short update on progress on the WhatsApp group chat.
4. *Coding & Version Control*: Collaboration will take place on GitLab, ensuring proper version control, structured code reviews and smooth integration of contributions.
5. *Sprint Planning & Retrospective*: Planning at the start of each sprint to define objectives and allocate tasks, followed by a retrospective to evaluate progress and improvements.

The Case for the System

Need for the System:

This AI-powered Resume & Interview Assistant helps job seekers create optimized resumes from their portfolios and prepare for interviews using AI chatbot. It ensures resumes pass through ATS (Applicant Tracking Systems) and gives real-time feedback on interview skills. The purpose is to improve job seekers' chances of landing their desired jobs by making the job application process more effective.

The Job Application Tracking Dashboard allows users to keep track of their job applications in an organized manner. Each entry logs the company name, provides an AI-tailored resume download link and includes application status checkboxes.

The main stakeholders and end users of this system include job seekers, students and fresh graduates. The system helps users tailor their resumes to specific job applications, track them and practice for interviews, improving their confidence and presentation skills.

This product is designed as a website rather than a mobile app to ensure accessibility across devices. A web platform allows users to access their resumes and interview preparation tools from any device

without downloading an app. It also provides easy file handling, enabling users to upload, edit, and download resumes seamlessly. The website interface allows instant access through a browser without consuming storage space.

Current Market:

There are several tools available in the market that assist job seekers with resume optimization and interview preparation. Platforms like Resume Worded provide resume and LinkedIn profile feedback, helping users improve their job application materials. Grammarly for Resumes offers writing assistance but focuses more on grammar and clarity rather than ATS optimization. Big Interview is designed to help candidates practice interviews through training and mock interview sessions. Hiration provides resume-building features with templates and customization options to enhance job applications. These tools cater to various aspects of the job search process, offering varying levels of automation and AI-driven assistance.

Resume worded provides resume feedback, but it relies on keyword matching rather than truly optimizing based on your portfolio and resume. Hiration provides resume-building tools, but it focuses more on templates rather than AI-driven optimization. Big Interview offers mock interviews and structured training, but it is not interactive enough. The platform relies on pre-recorded videos and set scripts, which can feel rigid and unengaging compared to a dynamic AI-powered chatbot that responds in real-time. Jobright lacks real time, chat-based AI interview that provides feedback. While it provides resume analysis, it primarily focuses on format and keyword optimization rather than deeply analyzing a candidate's experience through their portfolio and resume.

Competitive analysis:

The idea of resume optimization and interview preparation is not new, but the way this system approaches it is. Most existing tools either help users format resumes, score them based on ATS compatibility, or provide generic interview training. This system takes things a step further by integrating AI-driven resume optimization with real-time interactive chat-based interview coaching in one seamless experience. Instead of just scoring resumes, it rewrites and optimizes them based on AI-powered insights tailored to specific job descriptions and your portfolio. It also introduces an integrated job application tracking system, which many existing platforms lack, allowing users to track applications, download tailored resumes, and stay organized throughout their job search. Instead of watching pre-recorded interview tips, users can actively engage with an AI chatbot that simulates real interview scenarios, providing immediate feedback on responses, clarity, confidence and other factors.

This system is not just another resume builder or interview guide; it's a personalized job preparation assistant that evolves with the user. Unlike traditional platforms that focus on static resume templates or basic keyword matching, this AI analyzes resumes through your entire portfolio, ensuring they align with job postings while improving readability and matching it with the job description. The Job Application Tracking Dashboard ensures users stay on top of their job applications, removing rejected

applications automatically to maintain focus on active opportunities. The AI interview chatbot makes mock interview prep feel more natural and interactive compared to passive video lessons or script-based training. Everything is designed to be intuitive, efficient, and tailored and help users not just prepare for the job market but stand out in it.

System Description

Technical, Business or Administrative Problem Addressed:

The AI-Powered Career Companion addresses significant inefficiencies in the job-seeking process by incorporating resume customization, job monitoring, and AI-enhanced interview preparation into a cohesive experience. The obstacles encountered by job seekers nowadays stem from technical, business, and administrative deficiencies that hinder an effective and organized employment search.

Technical Problems Addressed:

1. *Inefficient resume optimization*: Conventional resume customization is labor-intensive, time-consuming, and susceptible to errors, frequently falling short of Applicant Tracking System (ATS) specifications. The AI-driven system automates resume enhancement by scrutinizing job descriptions, improving keyword utilization, and guaranteeing ATS compatibility.
2. *Disjointed job application tracking:* Candidates pursuing many job applications frequently lose oversight of their submissions, resulting in overlooked follow-ups and diminished prospects. Current solutions necessitate human input, complicating the effective management of several applications. The AI-driven assistant offers automated monitoring, instantaneous alerts, and predictive analysis regarding application status.
3. *Fragmented interview preparation tools:* Numerous job seekers depend on disparate resources, including internet videos, interview preparation platforms, and coaching services, resulting in a disorganized preparation process. The AI-powered interview coach provides organized, immediate feedback by utilizing speech analysis, response enhancement, and sector-specific practice questions to enhance candidate performance.
4. *Lack of data-driven insights on rejections:* Job applicants receive scant or no feedback upon rejection, hindering their ability to enhance their strategies. The AI-driven solution examines rejection trends and offers practical suggestions for enhancing resume alignment, job selection, and interview efficacy.

Business Problems Addressed:

1. *Job search fatigue and inefficiency:* As competition in the job market intensifies, people submit applications for several positions without effective tracking or feedback mechanisms. The AI-Powered Career Companion optimizes the process by providing customized job

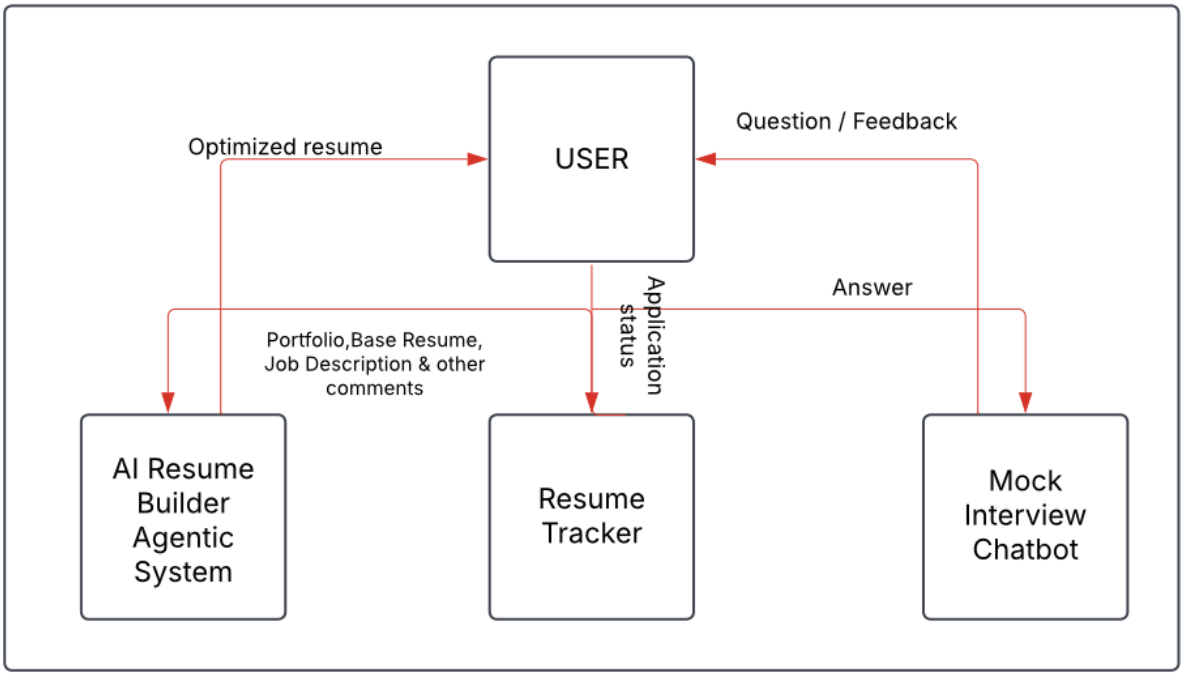
recommendations, resume customization, and automated follow-ups, hence enhancing success rates.

2. *Lack of affordable career guidance:* A significant number of job searchers lack the financial means for expert resume evaluations or interview coaching. The AI-driven service offers economical career support, democratizing access to superior job search resources.
3. *Limited employer-candidate matching efficiency:* Employers see a substantial influx of unoptimized applications, complicating the identification of suitable personnel. The AI-driven solution enhances application relevance by optimizing resumes to align with job specifications, hence augmenting recruiter engagement and recruiting efficiency.
4. *Revenue challenges for job portals and career services:* Conventional employment platforms depend on advertisements and subscriptions, lacking value-added services for job searchers. The AI-driven system offers novel monetization prospects via collaborations with job boards, recruiters, and career services, providing AI-generated hiring insights and candidate-job alignment.

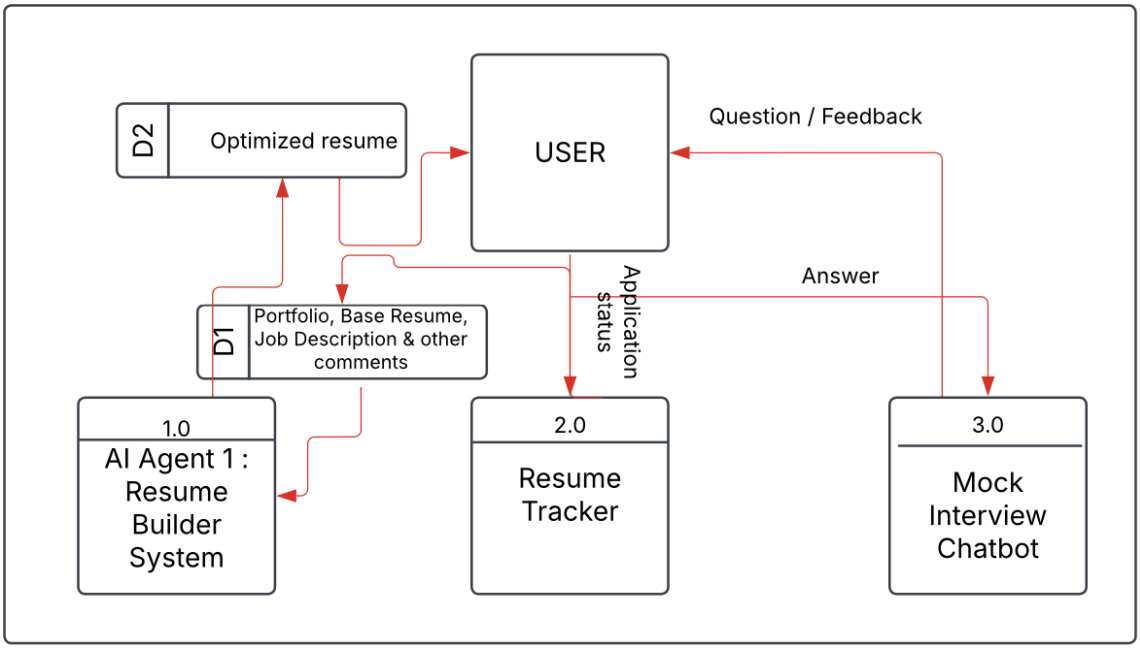
Administrative Problems Addressed:

1. *Manual job search techniques are time-consuming:* Candidates invest considerable time revising resumes, monitoring applications in spreadsheets, and preparing for interviews without professional support. The AI-Powered Career Companion streamlines these processes, significantly reducing the administrative burden linked to job searches.
2. *Lack of consistency in resume formats:* Resume requirements vary between industries, complicating individuals' ability to tailor their applications effectively. The AI tool autonomously adjusts formatting, language, and content to comply with industry-specific standards.
3. *Inefficient networking and follow-ups:* Due to erratic monitoring, numerous job seekers inadequately follow up with recruiters in a strategic manner. The AI-driven solution automates follow-up reminders, proposes tailored outreach messages, and enhances networking strategies to boost participation.
4. *Compliance with data privacy regulations:* Managing job seeker data requires compliance with the CCPA and other data protection regulations. The platform facilitates safe data storage, consent-driven tracking, and compliance with job application data protection regulations.

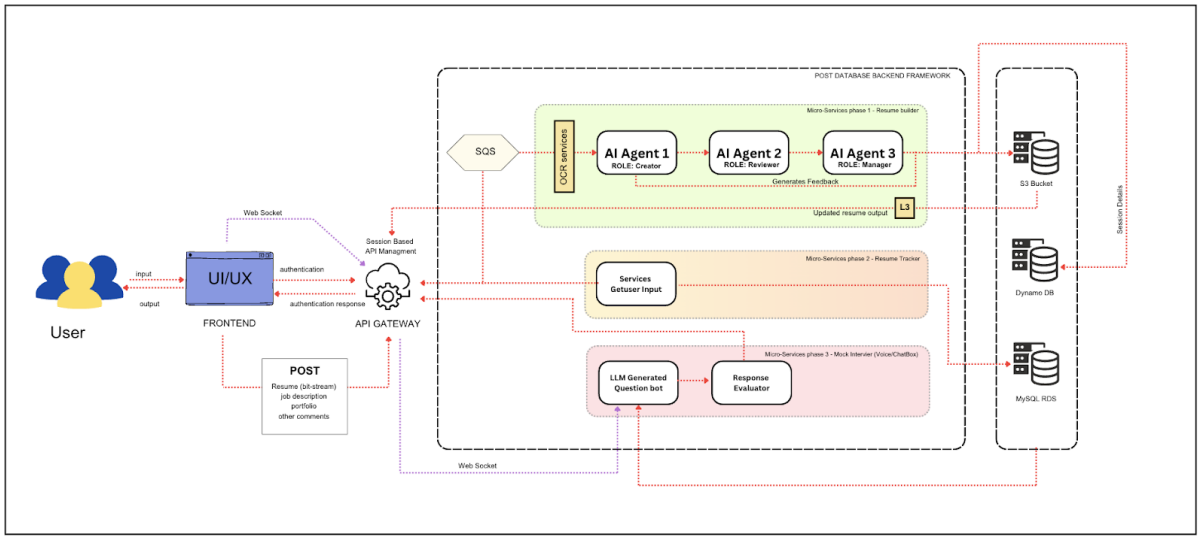
Dataflow Diagram:



Context Diagram



Level 0 Diagram



System Architecture Diagram

Here's a simplified description of the system's architecture, designed to help job seekers efficiently manage applications and prepare for interviews:

1. *User Interface*: Job seekers use a straightforward interface to upload their resumes and job descriptions. This front end communicates with the backend system via a secure and scalable API gateway.
2. *Routing and Services*: A central API Gateway directs incoming requests to specific services. This includes services for optical character recognition (OCR) and various AI modules that handle tasks such as creating, reviewing, and managing resumes, providing custom feedback to the user.
3. *Storage Solutions*: The system incorporates AWS services for data handling; S3 buckets store resumes while DynamoDB and MySQL RDS manage detailed data about job applications and user interactions.
4. *Interview Preparation Tools:* The platform includes an advanced question bot, designed to help users practice for interviews. This bot generates questions and evaluates responses, offering feedback to enhance the user's preparation.
5. *Efficient Data Handling:* The AWS Simple Queue Service (SQS) is used to manage data flow, ensuring the system can handle multiple requests at once without delays, making the resume processing and feedback generation both smooth and efficient.
6. *Tracking and Management:* After users submit their resumes and job details, these are processed to create optimized resumes which are then available for download. The system also tracks the status of applications, helping users manage their job search effectively.

This structure uses the latest in cloud technology and artificial intelligence to create a user-friendly experience that helps job seekers enhance their employment prospects by streamlining the application process and improving interview readiness.

Assumptions and Risks:

Assumptions:

1. Users will provide structured input
    I. It is assumed that users will upload resumes in standard formats (PDF, DOCX) and provide job descriptions in a structured manner.
    II. OCR and text processing tools will handle minor inconsistencies, but highly unstructured input may affect accuracy.
2. AI agents will generate meaningful and relevant feedback
    I. The AI agents (Creator, Reviewer, and Manager) are expected to accurately assess resumes and provide contextually relevant feedback for optimization.
    II. The AI models will be trained on diverse datasets to ensure fairness and avoid biases.
3. Seamless integration between microservices
    I. The platform assumes low-latency, high-availability communication between resume builder, resume tracker, and interview preparation microservices.
    II. Kafka/SQS will efficiently handle event-driven processes without significant delays.

4. Storage and security compliance
    I. User data will be securely stored in S3, DynamoDB, and MySQL RDS, with appropriate access control mechanisms.
    II. The system assumes GDPR and CCPA compliance for handling personal data.
5. Web sockets will support real-time interactions
    I. The UI/UX will rely on web sockets for instant updates, assuming stable network connections on the user's end.
6. Scalability and cloud infrastructure will handle peak loads
    I. The AI-powered solution assumes cloud-native deployment that can scale dynamically based on usage.
    II. Load balancing and caching will ensure smooth operations even during high user activity.
7. LLM-based mock interview system will interpret responses effectively
    I. The system assumes that the LLM-generated question bot and response evaluator will accurately assess user answers based on textual responses, evaluating clarity, coherence, relevance, and completeness of the answers.

Risks:

1. Data privacy and security vulnerabilities
    I. Storing and processing user resumes, job descriptions, and interview responses poses security risks if not properly encrypted.
    II. Potential data breaches could expose sensitive user information.
2. Bias in AI-generated feedback
    I. AI-driven resume evaluations may inherit biases from training data, leading to unintended discrimination or inaccurate feedback.
    II. Continuous bias detection and mitigation strategies must be implemented.
3. Dependency on external APIs and cloud services
    I. The system relies on AWS services (S3, DynamoDB, MySQL RDS) and message queues (Kafka/SQS), which could fail or experience downtime, affecting service availability.
    II. Contingency plans such as failover mechanisms and alternative service providers must be in place.
4. Performance bottlenecks with real-time processing
    I. Handling large volumes of resume data, AI evaluations, and job tracking events could create latency issues in real-time feedback and tracking.
    II. Efficient caching, indexing, and optimized queries are necessary to maintain performance.
5. User adoption and learning curve
    I. The AI-powered career companion may require users to adjust to new workflows, potentially reducing adoption rates.
    II. Clear user onboarding, tutorials, and UX optimizations will be needed to ensure ease of use.

6. Limited adaptability to non-standard resumes
    I. AI resume optimizers may struggle with highly creative or unconventional resume formats, leading to inaccurate recommendations.
    II. Additional training and flexible parsing mechanisms will be needed for diverse resume styles.
7. Challenges in tracking external job applications
    I. Job seekers may apply through different portals (LinkedIn, company websites, third-party job boards), making automated tracking difficult.
    II. Solutions like browser extensions, email parsing, or manual entry options must be explored.
8. Scalability and cost management
    I. Running multiple AI agents and microservices incurs high computation and storage costs, especially as the user base grows.
    II. Cost-optimized cloud solutions, usage-based pricing models, and efficient infrastructure scaling strategies need to be in place.
9. Accuracy of AI-based interview preparation
    I. The LLM-based mock interview system may not perfectly simulate real interview dynamics.
    II. Variability in human responses could lead to misinterpretation or incorrect feedback without continuous model refinement.
10. Compliance with employment regulations
    I. AI-driven career guidance may need to adhere to fair hiring guidelines to prevent biased job recommendations.
    II. Clear terms of use, disclaimers, and ethical AI guidelines must be established.

Team Dynamic:

Below are the skills that each sub-team possesses:

1. *Frontend Development:*

    I. *Figma* – Proficiency in UI/UX design, creating wireframes, and defining user stories.
    II. *React, TypeScript, and JavaScript* – Expertise in building scalable and responsive user interfaces.
    III. *CSS* – Experience in styling responsive and clean UI components for an intuitive user experience.
    IV. *State Management (Redux, Context API)* – Strong understanding of efficiently managing application state to ensure seamless data flow and performance optimization.

2. *Backend Development:*

   I. *FastAPI & Python: Hands-on experience in building high-performance APIs with* FastAPI for handling backend logic and requests efficiently.
   II. *RESTful API Design: Ability to create well-structured API endpoints that ensure smooth interaction between the frontend and backend.*
   III. *Database Management*: Proficiency in MySQL (using Amazon RDS) and MongoDB (using Amazon DynamoDB) for storing user and job tracking data while ensuring data integrity and scalability.

3. *AI & Natural Language Processing (NLP):*

   I. *OpenAI API Integration:* Experience in integrating AI-powered text generation to dynamically customize resumes and generate personalized recommendations.
   II. *Chatbot Development:* Knowledge of building AI-powered conversational agents using WebSockets for real-time interaction and enhanced user engagement.

4. *Cloud & Deployment:*

   Experience in deploying applications in cloud environments and utilizing AWS services such as:

   I. *AWS Lambda:* Serverless computing for handling backend logic efficiently
   II. *Amazon RDS (MySQL):* Managed relational database service for scalable and reliable data storage.
   III. *Amazon DynamoDB:* NoSQL database service for high-performance, low-latency data access.
   IV. *Amazon S3:* Secure and scalable object storage used for storing PDFs.
   V. *Amazon API Gateway:* Secure and scalable API management for frontend-backend communication.
   VI. *Amazon SQS:* Message queuing service for decoupling and scaling microservices or event-driven processes.

To successfully execute the project, the team needs to acquire expertise in the following areas:

1. *TailwindCSS:* Mastering utility-first CSS for rapid UI development and improved styling efficiency.
2. *Advanced AI Customization:* Fine-tuning AI models for better resume personalization, chatbot interactions and improved accuracy of AI-generated responses.
3. *WebSockets for Real-Time Communication:* Gaining deeper insights into WebSockets to ensure smooth and efficient chatbot responses with real-time updates.
4. *Frontend Deployment:* Learning best practices for deploying frontend applications efficiently using platforms like Vercel and Netlify, integrating AWS Lambda for serverless backend interactions, and implementing CI/CD pipelines for continuous deployment.

5. *CloudWatch:* Understanding how to use AWS CloudWatch for monitoring logs, tracking application performance, and gaining real-time insights into cloud resources.
6. Failure Management: Implementing AWS SQS timeout handling, failover strategies, fault tolerance mechanisms, and handling unexpected failures to ensure high availability and system resilience.

We plan to obtain such missing skills by learning from online courses and documentation like:

1. *TailwindCSS:* Learning from official documentation and YouTube tutorials to understand its utility-based styling approach.
2. *AI & NLP*: Exploring FastAI, OpenAI API documentation and Coursera's *Deep Learning Specialization* to gain hands-on experience in AI model fine-tuning.
3. *WebSockets:* Studying Mozilla's WebSockets Guide and FastAPI WebSockets tutorials to develop expertise in real-time communication.
4. *Frontend Deployment:* Learning from Vercel Docs and Netlify Docs to understand serverless functions, automatic deployments, and performance optimizations.
5. *Official AWS CloudWatch Documentation:* Deep dive into AWS CloudWatch Logs, Metrics & Alarms to monitor application performance, detect anomalies, and set up alerting mechanisms.
6. *Failure Management:* Studying the AWS SQS Best Practices and experimenting with dead-letter queues (DLQs), visibility timeout, and message retention policies.

We also plan to leverage mentorship and community engagement by seeking guidance from AI/ML experts through GitHub discussions, AI/ML subreddits, Stack Overflow, and other relevant developer communities to troubleshoot challenges and refine our solutions.