

## **Project Title: Job Market Analysis Platform**

### **Project Summary**

Our project is a web application that aggregates job postings, trends, and salary information and provides users with relevant insights into the job market. Our platform will aggregate data from multiple sources such as job boards, salary postings, and location data to show users where their resumes and skills can be applied. In addition, we will offer personalized resume and cover letter tailoring to help users get the jobs they desire.

### **Detailed Description**

#### *Problem and Overview*

Our job market analysis platform aims to solve the problem of fragmented job market data by consolidating various data points from job listings, skill requirements, and salaries into one platform. Many professionals, especially software engineers, find it relevant to see how their job market is doing. Our platform will aggregate data from many sources and provide users with a way to visualize their job market in real time.

The platform will offer users two main functionalities:

1. **Job Market Insights:** Users can view detailed reports on the current job market, such as which job titles are most in demand, which skills are required, and how salaries vary by region. This will also include a job “heat map” to see where jobs are being posted more frequently for a particular field.
2. **Resume Tailoring:** Users can input their resume and get tailored resumes and cover letters for different types of job listings.

#### *Components*

1. **Resume Tailoring:** The platform parses the user’s resume and compares it to job descriptions to suggest modifications (keywords, skills) that improve chances of getting noticed by applicant tracking systems.
2. **Cover Letter Generator:** Based on the job listing and tailored resume, the platform generates a custom cover letter highlighting the most relevant experiences and skills for the specific job.
3. **Job Parsing and Recommendations:** This app will recommend jobs after analyzing the user’s resume and matching it with active job listings using machine learning algorithms.
4. **Location-Based Job Heatmap:** Using a map API (Google Maps), the app will display job availability in various locations, shadowing clusters of job opportunities or high-demand

areas for specific roles. It will also recommend locations to explore based on the user's job preferences and cost-of-living data.

### *Usefulness*

The platform's goal will be to make job searching faster, more targeted, and location-informed, enabling job seekers to match their qualifications to available roles better while considering geographic preferences.

This platform could cater to people looking for both remote and on-site opportunities, simplifying the job search process while helping users stand out with highly relevant resumes and cover letters.

Users of the platform can view job market reports and trends, upload and tailor resumes for specific companies and job listings, generate customized cover letters, explore job opportunities on an interactive heatmap, and receive personalized job recommendations.

### *Similar platforms:*

1. LinkedIn: LinkedIn has job searching, professional networking, and some market insights, but our platform would provide more comprehensive market trends and personalized/customizable resume and cover letter generation and assistance.
2. Simplify: Simplify aims to streamline the job application process and offer job search and application tracking features. Our platform is more related to the research process before applying, enabling users to get market analysis, resume and cover letter tailoring, and a geographical visualization of job opportunities. Simplify's focus is more on automating the job application process, while our platform emphasizes market analysis and application optimization.

### *Creative Component:*

The creative component of this project will include two technically challenging features:

1. Resume and Cover Letter Tailoring: We will utilize an AI system to parse and create new versions of resumes and cover letters for specific job listings to optimize the user's application experience. We will also use our aggregated job data to suggest users with jobs to apply to.
2. Job Market Heat Map: This visual component will display real-time data on the demand for specific job roles across different locations. Using geographical heat mapping, users will be able to see where certain skills or job titles are most in demand, along with the associated salary trends.

### *Realness - Data Sources*

1. LinkedIn Job Postings from 2023 to 2024:

The main job posting dataset is in .csv format and has 123849 data samples with 31 features. The features are 'job\_id', 'company\_name', 'title', 'description', 'max\_salary', 'pay\_period', 'location', 'company\_id', 'views', 'med\_salary', 'min\_salary', 'formatted\_work\_type', 'applies', 'original\_listed\_time', 'remote\_allowed', 'job\_posting\_url', 'application\_url', 'application\_type', 'expiry', 'closed\_time', 'formatted\_experience\_level', 'skills\_desc', 'listed\_time', 'posting\_domain', 'sponsored', 'work\_type', 'currency', 'compensation\_type', 'normalized\_salary', 'zip\_code', 'fips', which includes information about salary, location, posted dates and deadlines. As well as the job posting lists, this set has datasets for companies, jobs, and mappings between them.

<https://www.kaggle.com/datasets/arshkon/linkedin-job-postings?resource=download>

2. US Job Postings on 5/24/2023:

This web scraping excerpt from Techmap.io MongoDB database is in .json format and has 33064 data samples from 29 job boards with 62 features including locations, descriptions, salary

<https://www.kaggle.com/datasets/techmap/us-job-postings-from-2023-05-05>

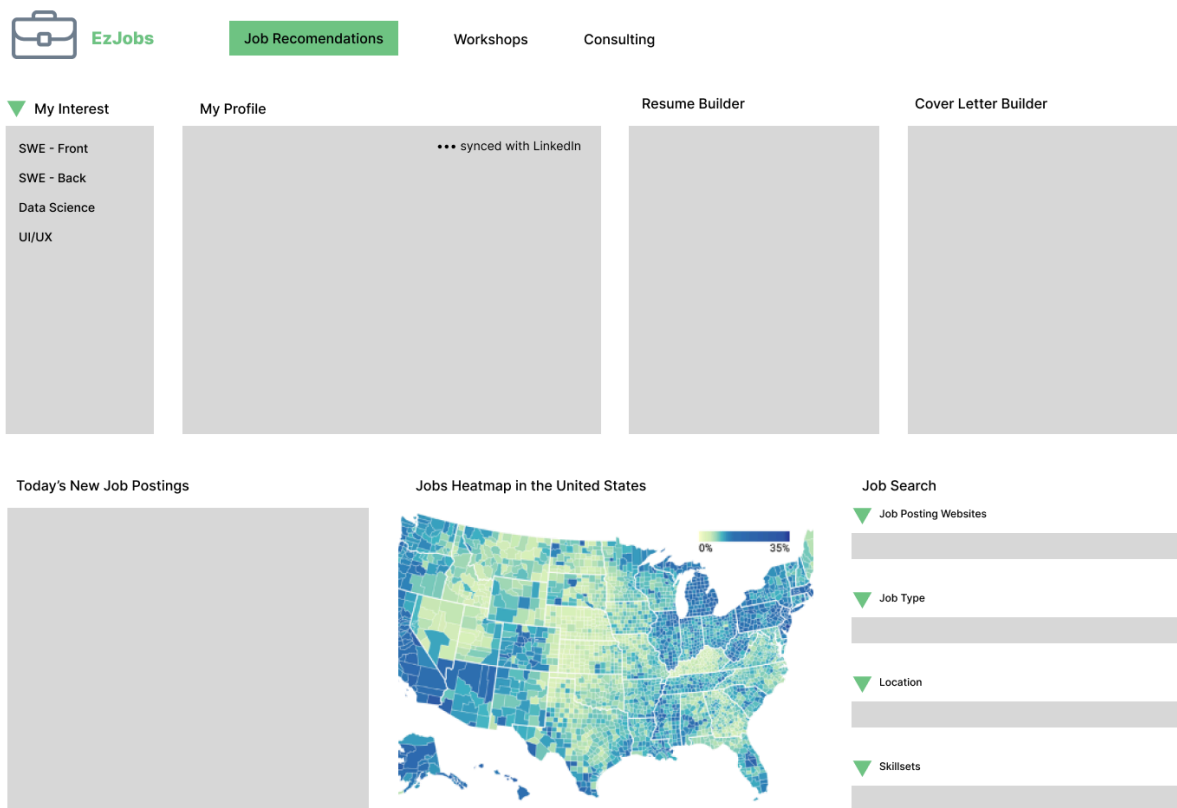
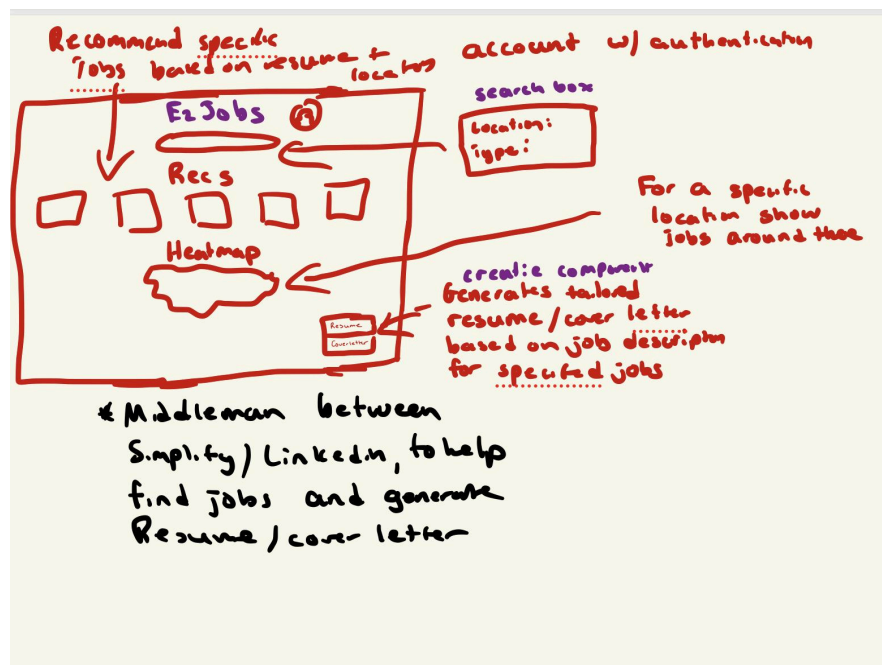
3. Additional web scraping:

We will do web scraping job posting information on LinkedIn and Simplify Jobs as needed

*Main functionality*

- Account authentication (save jobs)
- Recommendations system based on resume + locations with search
- Resume and cover letter generator based on the job (integrates multiple APIs)
- Heatmap of the jobs depending on location using google maps API

## UI Mock Up



\*\*Scale should be that of a 2880 x 1800 scale, recs and heatmap will be larger

*Project Distribution:*

- Aryan - Generating custom resumes and cover letters using linkedinAPI + simplify and maybe perplexity to get the most accurate resume + cover letter for posting. Authentication as well.
- Lin - Recommender system for pulling in jobs and search functionality, working with LinkedIn, Simplify API, and using parsed resume information to then recommend jobs accordingly.
- Niki - Recommender system for pulling in jobs and search functionality, working with LinkedIn, Simplify API, and using parsed resume information to then recommend jobs accordingly.
- Dhruv - Heatmap aggregating jobs using Google Maps API to get locations for the heatmap.