# SWE 350 Final Project Report

## GradGuide—A Job & Career Guidance Platform

### Submitted by:

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# 1. Introduction

In today's fast-paced and dynamic job market, students and professionals struggle to stay updated with evolving industry needs, job opportunities, and academic advancement options. "GradGuide" is designed to solve this problem by offering an AI-powered platform for job search, career planning, skill development, and research guidance. It leverages real-time data, expert advice, and personalized recommendations to help users make informed career decisions.

# 2. Problem Statement

GradGuide is a platform that will use AI and real-time data to help students, and job seekers explore job opportunities, research programs, PhD options, and career paths. It keeps users updated with current industry trends, job market insights, and emerging skills. By gathering data from various sources, GradGuide will provide personalized guidance for career planning, further studies, and skill development, helping users stay competitive and informed. It also offers users with:

- Job listings across multiple portals
- Recommends skill improvements
- Provides PhD and research suggestions
- Offers real-time trends and expert insights
- Self-evaluation with real time tests

### 3. Workflow & System Architecture

Our development followed an iterative, Agile-inspired process, integrating frontend, backend, and AI/ML components seamlessly:

- **User Registration & Profile Setup:** Users create accounts, input educational background, work experience, and preferences.
- **Opportunity Exploration:** Users browse curated job listings, research programs, and PhD options tailored to their profiles.
- **Personalized Notifications:** Based on user interests and market trends, relevant updates and alerts are sent in real-time.

- **Self-Evaluation & Skill Testing:** Users choose topics, undertake assessments, and receive instant feedback to identify skill gaps.

- **AI-Powered Support:** A chatbot provides instant answers, resume tips, and career advice, simulating expert guidance.

- **Analytics & Insights:** Users receive detailed reports and visualizations on their progress and market demand trends.

# 4. Implementation

## Key Features Implemented:

- **Job Scraper:** Scrapes and stores job data with filters (location, salary, etc.)

- **Career Path Guidance:** Suggests paths and resources based on user profile

- **AI Career Coach:** Chatbot gives resume tips, career advice, and queries related to specific domains.

- **User Dashboard:** Allows users to update profiles, upload resumes, and view matches

- **Notifications:** Real-time updates, e.g., email for jobs and certifications

- **Test Integration:** Compares user skills with market demand and recommends upskilling

## Tech Stack Used:

| Component | Technology |
| --- | --- |
| Frontend | React.js, Next.js |
| Backend | Node.js, Express.js |
| Database | PostgreSQL |
| AI & ML | Python, AI APIs |
| Auth & Security | JWT, Bcrypt.js |
| Real-Time | Socket.IO |
| Hosting | Vercel, Heroku |

## 5. Website Demonstration

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## 6. Results and Analysis

- **Job Matching Accuracy:** The initial AI model achieves approximately **75% accuracy** in matching users with relevant job opportunities based on skills and preferences.
- **Response Time:** Average page load times are under **1 second**, with backend API responses averaging **150 milliseconds**, ensuring a smooth user experience.
- **User Feedback:** Test users found career path suggestions helpful and the interface easy to use.
- **Data Visualization:** Real-time graphs showed demand shifts across industries (e.g., AI, data science).

# 7. Challenges and Limitations

- **Scraping Restrictions:** Some job platforms block scrapers or limit requests.
- **AI Model Limitation:** Initial models were limited by training data and response quality.
- **Integration Complexity:** Synchronizing frontend, backend, and AI modules required thorough debugging.
- **Data Volume:** Handling large real-time data sets needed optimization in queries and database design.

# 8. Conclusion

GradGuide demonstrates the potential of AI-integrated platforms in career planning and job search. With scalable architecture and modular design, the system supports real-time updates. intelligent suggestions, and user-friendly interaction. The project helped us gain hands-on experience in full