International Journal of Creative and Open Research in Engineering and Management
ISSN: **3108-1754 (Online)**
Volume 02 Issue 05 May-2026 | Impact Factor: 3.5

AI Career Navigator

An AI-Driven Platform for Resume Analysis, Alumni Networking and Career Roadmap Generation

Shriyasha Thakur, Rutuja Thakur, Atharva Shinde

Prof. Namrata Singh

Department of Information Technology, Terna Engineering College,
Navi Mumbai, India
Shriyashathakur2223@ternaengg.ac.in
Rutujathakur2223@ternaengg.ac.in
Atharvashinde2223@ternaengg.ac.in
namratasingh@ternaengg.ac.in

Abstract— The AI Career Navigator research paper introduces a unified platform that uses AI to analyze resumes, plan careers, and network among alumni. The platform leverages natural language processing (NLP) technology to score applications against ATS systems, while retrieval-augmented generation is used for creating personalized roadmaps, guided by a chatbot. In this research paper, we will discuss the creation of the platform using Next.js and Neon PostgreSQL.

Keywords— Resume analysis, career guidance, alumni networking, NLP, roadmap generation, RAG.

I. INTRODUCTION

The employability gap is a significant challenge because the requirements in the industrial field are changing very quickly nowadays. Though students possess knowledge in their respective areas of expertise, there exists a problem when choosing appropriate job opportunities and acquiring necessary skills for these positions along with submitting resumes to prospective employers. Thus, there exists a gap between academic education and employment referred to as the “Employability Gap.” In today's competitive professional environment, it is difficult for students to optimize their resumes using ATS and outline the steps needed to achieve their career goals, which impacts negatively on their employability

Currently, there exists a “fragmented ecosystem" of career development. Indeed, students need to work with different systems based on their needs. For example, LinkedIn provides career advice, some websites offer resume construction services while others use artificial intelligence algorithms to answer students' questions about job hunting. Nevertheless, the aforementioned services do not specialize in helping students with their career development in the context of institutions of higher learning. Currently available services only assist in solving career development problems independently. It leads to the existence of a fragmented ecosystem of career development, which does not allow personalization and systematic skill development because students lack industry insight.

To solve the issue discussed above and fill the gap caused by existing career development systems, the author suggests creating the “AI Career Navigator.” Such innovation would become a groundbreaking invention that allows developing a comprehensive ecosystem of career development in institutions. It will be implemented thanks to integrating four technical modules into this product. These modules include the “Resume Analyzer," “AI Chatbot,” “Roadmap Generator,” and “Alumni Connect” systems.

II. LITERATURE REVIEW

[1] Modern academic research on automation in the recruitment process tends to focus heavily on NER and NLP algorithms used to generate ATS scores. However, according to recent systematic literature reviews, such research implies a substantial Research Gap due to the fact that current resume screeners are primarily one-directional diagnostic systems. Most modern applications cannot provide conversational support and do not give candidates an opportunity to obtain a detailed explanation of how to improve their skill set through conversational feedback in real time.

[2] Traditionally, alumni social networks are seen as static institutional repositories that allow searching for former students manually. According to available evidence from literature, fragmented alumni networks tend to fail because they lack AI-powered similarity matching between profiles. Although some contemporary social networking tools include basic filtering features, there is currently no system in place that employs ML models to find students mentors considering their deep profile clusters, year delta, and industrial affiliation.

[3] Despite the fact that current career guidance engines effectively use document embeddings in order to match students' resumes to job offers, they usually give unstructured advice in the form of simple list recommendations. Current research findings clearly indicate that students lack understanding regarding what actions should be taken. It seems evident that there is a great demand for structured visual recommendations, which can be implemented via React Flow technology.

[4] With the advent of Conversational AI and chatbot technology, modern systems started employing knowledge bases to interact with users. However, there is no solution to the problem of lack of Smart Context Integration in these systems. In particular, there is no evidence of use cases of RAG in career guidance, which require a context ceiling of the latest information from students' resume and roadmap to generate deterministic answers.

[5] Recent literature reveals that current career recommendation engines solve the issue of providing advice concerning job positions individually but still fail to create comprehensive preparational workflows for students. As shown above, most available career guidance engines are built as general-purpose tools and lack end-to-end integration. Therefore, an application designed specifically for institutions like Terna Engineering College would benefit greatly from implementing all aspects mentioned above.

III. PROPOSED SYSTEM

The design of this proposed AI Career Navigator tool enables several different AI tools to be included in the tool. This proposed AI Career Navigator tool is a modular tool that has been created using the full-stack AI technology. The proposed AI Career Navigator tool will have various different AI tools available that will help the students develop their own career path.

In the proposed AI Career Navigator tool, the user's data is collected and analyzed using the workflow which includes the following: first of all, the Clerk Layer is used for user authentication after which the data is stored in the Neon Serverless PostgreSQL database. Drizzle ORM acts as the main tool through which the data is interacted with type-safely.

A. Resume Analyzer (NLP Engine)

The Resume Analyzer is the primary diagnostic tool being considered here. The Resume Analyzer makes use of NLP techniques in order to analyze the resumes uploaded by the users in PDF format. NLP techniques help in analyzing the resumes of the users.

This tool analyzes the ATS Compatibility Score of the user by comparing the relevant keywords in the uploaded resumes of the users with those in standard job description for the respective career path selected by the student. In this way, the students receive instant feedback about the keywords and formatting used by them in line with contemporary tools.

B. Smart Context AI Chatbot (RAG Implementation)

The most unique feature of this proposed AI Career Navigator tool is Context-Aware AI Chatbot. This tool offers personalized advice to the users through the use of RAG pipelines. What does it mean? Here, the chatbot does not look at patterns for retrieving information but rather looks at the user's database for information before using this information as part of the chatbot prompt. This is likely to cause information overload for the users. High inference accuracy for the users is achieved through the presence of a “Smart Context Ceiling.”

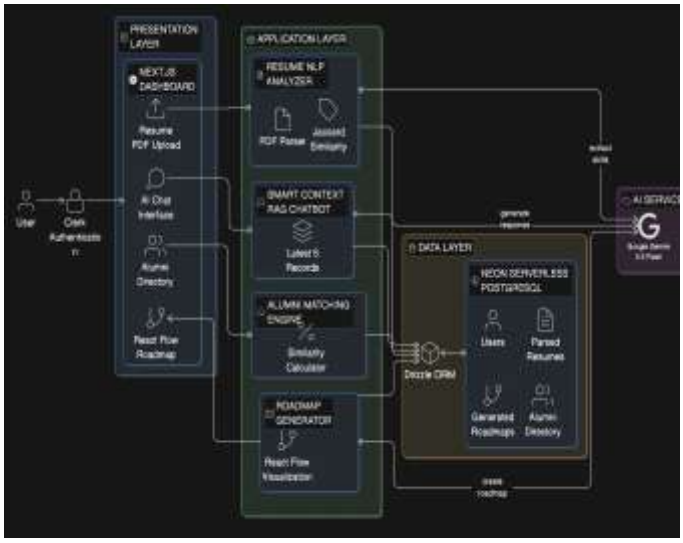

Figure 1: System Architecture

Indexed Retrieval: Rather than retrieving the information on the basis of the entire user database, this system will retrieve information from the latest five entries for analyzed resumes and roadmaps.

Recency Bias Tagging: In order to facilitate the reasoning logic of this model, the Item #1 will have [CURRENT/LATEST] tags in its metadata. As a result, the Gemini 2.5 Flash model can focus on current aspirations of the user while taking into consideration their past growth pattern.

C. Career Roadmap Generator

The Roadmap Generator helps in converting the aspirations of the students into an actionable learning strategy. This tool utilizes visual mapping technology which makes use of React Flow in order to develop an interactive as well as non-linear student learning strategy. This tool will have various milestones, skills, projects, and time frames that show a chronological progression of the students' professional aspirations.

D. Alumni Connect Module

Alumni Connect module helps in enabling institutional networking through giving access to the database of alumni of the college to the students. The students can connect with other people from the alumni database on the basis of their company name, profession, and graduation year. This module takes advantage of the domain similarity logic to let the students network with potential mentors as per their respective roadmaps.

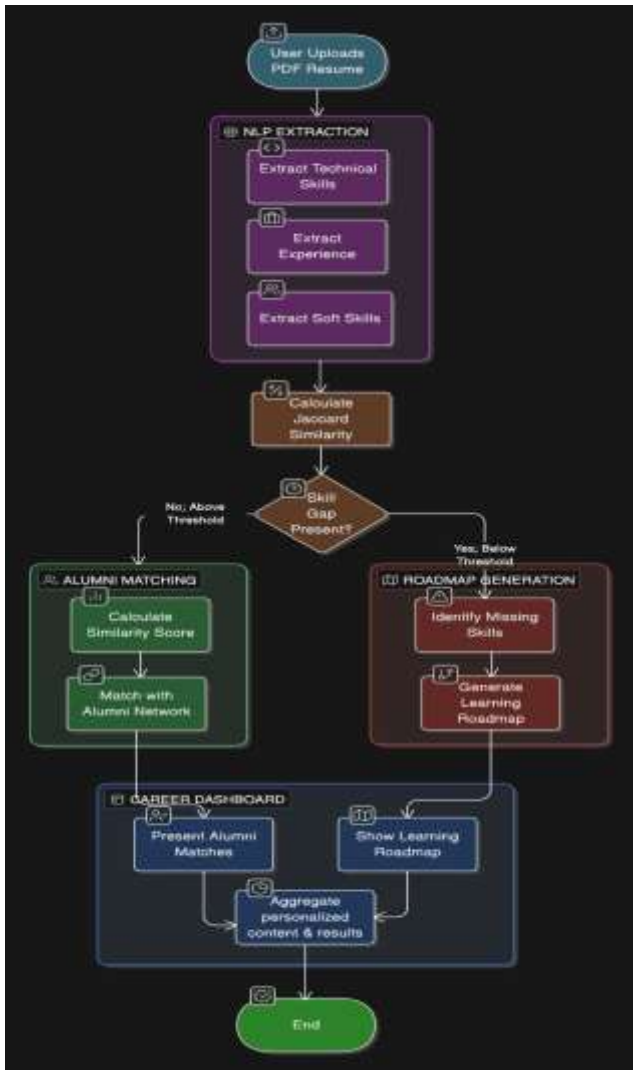

Figure 2: Functional Block Diagram

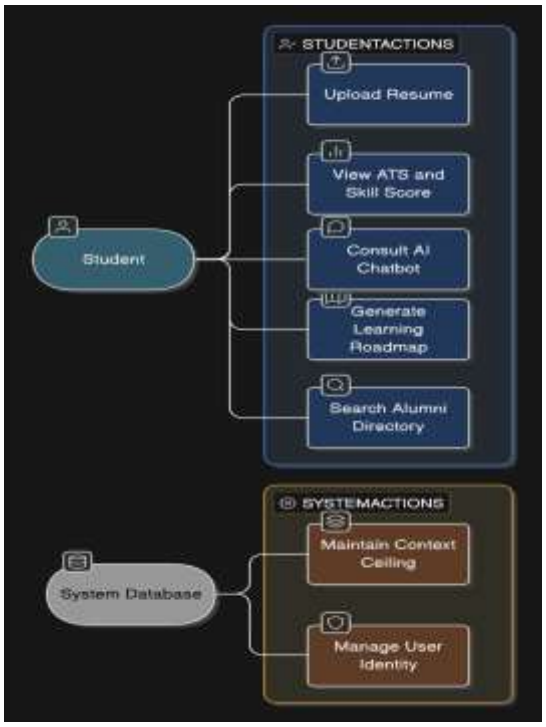

Figure 3: Use Case Diagram

IV. Mathematical Modelling

In order to create a more objective basis of decision making in the processes that the platform has, mathematical models have been developed for each of the AI modules. Thus, recommendations will be guaranteed to be deterministic and objective, whether it concerns connecting with other alumni, optimizing the resume, or providing chatbot context.

A. Alumni Similarity Score

To define the degree of relevance of the senior in question in relation to the profile of the student within the Alumni Connect module, the weighted similarity model was introduced. It consists of the following formula: categorical matches + chronological proximity:

$$S_{alumni} = w_1 \cdot \text{Match}(D) + w_2 \cdot \text{Sim}(R) + w_3 \cdot f(\Delta Y)$$

Where :

- Match(D): A binary operation where a value of 1 implies a match in professional domain (e.g., Software Engineering), while a value of 0 implies otherwise.
- Sim(R): A similarity coefficient between the student's target role and the alumnus current role, calculated via string distance or embedding proximity.
- f(ΔY): A decay function for the graduation year difference ($\Delta(Y) = Y_{alumni} - Y_{student}$) Prioritizing recent graduates who have the most relevant entry-level market insights.
- ω1,ω2,ω3: Coefficients used for scaling individual features to optimize the performance of the recommendation engine.

B. ATS Compatibility Score (ATS) Score

The Resume Analyzer calculates how well the student's resume (SR) corresponds to the job description (SJD) they wish to apply to. This is done by calculating the Jaccard Similarity Coefficient based on the extraction of technical terms from both sets:

$$ATS_{score} = \frac{|S_R \cap S_{JD}|}{|S_R \cup S_{JD}|} \times 100$$

Where :

- S_R: Set of skills and other keywords found in the candidate's resume.
- S_{JD}: Set of skills and other keywords found in the job description targeted by the user.

C. RAG Context Relevance Score (R)

For the AI Chatbot's Smart Context Ceiling, the algorithm injects into the LLM prompt a list of documents (d) based on a certain ranking of relevance that consists of the degree of semantic similarity and recency bias factor:

$$R_{context}(d) = \alpha \cdot \text{CosSim}(q, d) + \beta \cdot \left(\frac{1}{T_{current} - T_d}\right)$$

Where :

- CosSine(q,d): Cosine similarity between the query of the user and document vector (d).
- $T_{current} - T_d$: Time difference between current session and document timestamp.

V. SYSTEM IMPLEMENTATION

The AI Career Navigator has been created in a modular and scalable approach, using up-to-date web development techniques for optimal real-time performance of the AI. Below are the technologies and environments used for implementing the described system.

A. Tech Stack and Frameworks

Frontend/Backend: The AI system uses Next.js as the framework to implement Server-side rendering (SSR) and API routing simultaneously.

Database Management: Neon Serverless PostgreSQL was chosen for storing data, and Drizzle ORM for managing database requests.
Authentication: Clerk provides authentication for user management and role-based access control and provides a robust library of integrations, such as OAuth.
AI Engine: The primary AI engine is Google Gemini 2.5 Flash for natural language understanding (NLU), and React Flow for visualization of career roadmap.

B. Database Schema and Persistence

Database Layer: The database layer was designed to store data for each of the four pillars mentioned above. Using Drizzle ORM, we have created schemas for users, resumes, career roadmaps, and alumni data to make all AI-based recommendations searchable.

C. Deployment and Background Workflows

Inngest: Background processing is handled using Inngest, which includes parsing the resume, as well as generating an AI-based career roadmap.
Vercel: All code of the AI system runs on the Vercel edge server infrastructure.

VI. RESULTS AND DISCUSSION

The developed AI Career Navigator tool has been successful in offering the proof of concept for all the features in order to create seamless user experience for the guided career preparation workflows. The effectiveness of the career ecosystem in combining all the fragmented career tools into one place has been validated through the application of real-life use case scenarios for resume uploading, roadmap generation by AI and alumni search.

Figure 1: The Dashboard Overview showing the 4 Pillars.

Figure 2: Resume Analyzer

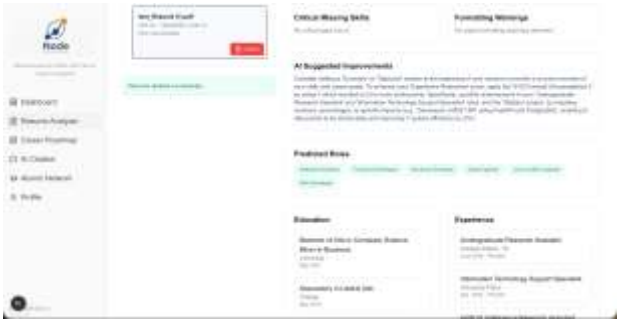

Figure 3: Resume Analyzer

Figure 4: Career Roadmap Generator

Figure 5: RAG-based Chat Response showing context injection.

Figure 6: The Alumni Directory with global search filtering by Role, Domain, and Class.

VII. CONCLUSION

The developed AI Career Navigator has been successful in overcoming the "Employability Gap" within the system. The research conducted by the authors has highlighted the importance of the employability gap between resume uploads and professional networking in ensuring the success of the new age graduates. Integration of NLP diagnostics, generation of the visual roadmap and conversational intelligence through RAG technique has helped the system overcome fragmentation of tools available in the market in order to provide end-to-end experience to the user. Implementation of smart context ceiling has helped the system ensure determinism of the generated AI advice along with personalizing the advice provided to students of Terna Engineering College.

ACKNOWLEDGEMENT

The authors sincerely thank **Prof. Namrata Singh** for her assistance in the conduct of this study. We would like to extend our gratitude towards the Department of IT of Terna Engineering College.

REFERENCES

[1] E. Kesim, Named Entity Recognition in Resumes for Automated ATS Scoring, arXiv preprint, 2023.

[2] E. Loganathan et al., "AI-Powered Alumni Portal: Connect, Learn, Thrive," International Research Journal on Advanced Science Hub, vol. 7, no. 1, 2025.

[3] A. Gugnani et al., "Implicit Skills Extraction Using Document Embedding and Its Use in Job Recommendation," in Proc. AAAI Conf. on Artificial Intelligence (IAAI-20), 2020.

[4] M. Rashid et al., A Comprehensive Review of Career Guidance Systems using Machine Learning, IEEE Access, vol. 9, pp. 63406-63439, 2021.

[5] V. Muralidhar et al., Alumni Association Platform Using Machine Learning, International Journal of Advanced Research in Computer and Communication Engineering (IJARCCE), vol. 14, no. 3, 2025.