

IntelliCareer Navigator: A Smart Career Recommendation Framework

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Abstract— IntelliCareer Navigator is a job readiness and career guidance system that is powered by AI to provide personalized career advice, resume writing assistance, and interview preparation. It is a combination of career classification that is based on machine learning and an Applicant Tracking System (ATS) analyzer that is used to assess the employability of a user in various sectors. Logistic Regression model is a model used to predict the right career paths according to skills, experience, assessment scores, and quality of resumes. The platform enhances a prospect of success in employment application as it provides automated resume analysis, matching by key words and industry optimization. The system is built as a Next.js-based scalable web application using Prisma ORM, PostgreSQL, and cloud-based AI services offering customized mock interviews and industry trends and AI-generated resumes and cover letters. The results of testing indicate a high degree of confidence and low prediction delays.

Index Terms— Artificial Intelligence, Machine Learning, personalized career guidance, mock interview system, career prediction and Applicant Tracking System (ATS).

I. INTRODUCTION

In today's job market, competition has increased a lot, and applicants need to have a properly structured resume, a cover letter that matches the job they are applying for, and good interview skills if they want to get the right job opportunity. Hiring has grown more difficult and complicated, largely due to the widespread use of Applicant Tracking Systems (ATS), shifting demands in the job market, and the rising importance of both technical and soft skills. However, most existing career tools offer little beyond basic tips and generic templates, which often fail to address the specific goals of each individual job seeker. Our system, in contrast, aims to provide a more complete solution that draws on machine learning, Natural Language Processing (NLP), and Large Language Models (LLMs) to tackle these challenges. Additionally, it offers AI-generated resumes, cover letter analysis, career prediction tools, and smart mock interviews, all designed to help users prepare as effectively as possible. Logistic Regression could indicate that the system may predict relevant career opportunities based on the user profiles. Moreover, the NLP techniques might demonstrate that these approaches analyze resumes and job descriptions so that the important matches appear better with the ATS systems. Furthermore, the large language models may suggest that personalized professional documents and interview questions could provide important support, which appears to help users improve the job applications and perform well in the interviews. Given that the system offers data-backed recommendations and personalized career guidance, the findings might indicate that users could increase their overall chances of getting selected and landing the job they want. System shows users land jobs.

II. LITERATURE REVIEW

This paper discusses the latest developments in using Artificial Intelligence (AI) for career guidance. It explains how Natural Language Processing (NLP) and Large Language Models (LLMs) are used to analyze resumes, assist in writing cover letters, and prepare users for job interviews. The paper also describes important techniques such as transfer learning, domain adaptation, and few-shot learning. These techniques help overcome the lack of labeled data in the career guidance field and improve performance across different job sectors [1].

Different online job platforms are examined in this study, and the quality of resumes, ATS compatibility, user engagement, and overall usability are evaluated. Some systems also give instant feedback and helpful tips. This brings out the necessity of smarter, interactive solutions [2].

The article by Ying Zheng on semantic analysis points to the ways of enhancing the process of candidate-job match. These plans result in the accuracy of skill mapping and recommendations. The major techniques in question are entity linking, the use of natural language inference, and similarity-based clustering. All these enhance the accuracy of career recommendations implemented by robots [3].

Another paper offers a system which roots NLP-based point grading on student resumes and cover letters via AI. This system takes a hybrid of OCR-based extraction and transformer models such as BERT and GPT to comprehend and summarise the content. It compares the results of its outputs with the expert assessment and demonstrates the high level of its compliance with the human judgment. It, however, struggles with indistinct capabilities and cross-domain experiences, demonstrating a provision of enhanced contextual thinking [4].

Studies on NLP based recommendation engine to optimize content give effective approaches to career sites. Such techniques are semantic clustering and hierarchical classification. Advantages are increased engagement as well as more accurate career predictions, and more personalization to users [5].

A. Workflow Diagram / Process Flow Diagram

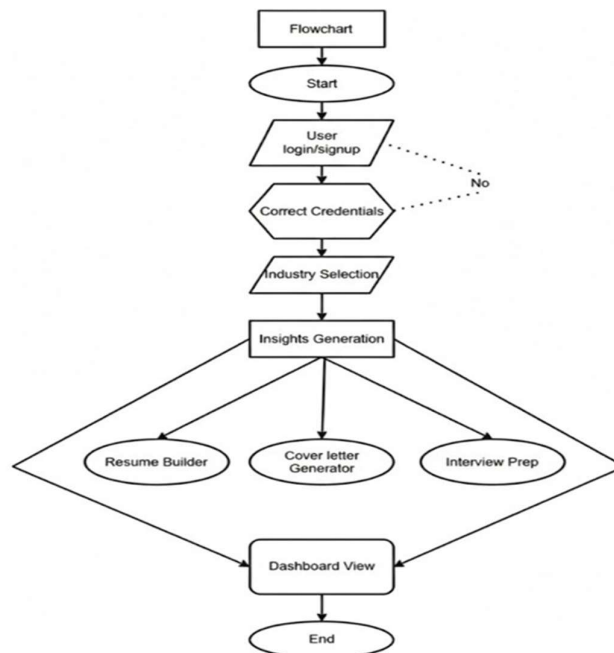


Fig. 1 Flowchart of IntelliCareer Navigator

In this case, the platform is used by the user who initiates the interaction. In the User login/ Sign up stage, the system reminds whether the user is a registered user or whether he/she needs a new account. Judging by this analysis, the platform can be divided into three key modules, namely Resume Builder that assists in creating optimized and professional resumes, Cover Letter Generator that creates personalized cover letters with the help of AI, and Interview Preparation that offers mock interviews and advice on the questions. Finally, there is the Dashboard View where the results are gathered. It is an interactive visualization of proposals, gains, and suggested improvements. The last node of the workflow is the End node showing the completion of user session and providing meaningful information to undertake career development.

III. METHODOLOGY/EXPERIMENTAL

IntelliCareer Navigator platform is built in form of module that provides career guidance, assists in enhancing resumes, and equip the users with interview preparation. The process starts when a user logs in and creates their profile. Candidates need to provide information like their education, skills, work experience, and career goals. This data is used to give personalized feedback.

The Career Insights Engine is a tool that looks at the user's profile and compares it to information about jobs in the market. It then suggests possible career options and points out any skills the user might need to develop. The Interview Preparation Module creates question banks and mock interview scenarios, which are made possible through the use of large language models.

The system's frontend is developed with Next.js (v15.1.4) and utilizes its App Router structure. React (v19) is employed to create a dynamic user interface. The entire interface is built using components and is designed to be responsive. For styling, Tailwind CSS (v3) is used, which follows a utility-first method.

The user interface and client side logic can be developed in a common framework using this set up. All their application logic e.g. career prediction, calculating ATS score, resume analysis and cover letter generation, interview processing and also industry insights are all done through secure API endpoints.

Background processing of event driven background tasks built into Inngest (v3.29.3). This attribute promises to be able to execute AI intensive resource intensive operations and evaluations asynchronously.

The Career prediction service uses a custom built Logistic Regression model, which is represented by JavaScript. The model of the normalized input features has four features:

- Number of skills
- Years of professional experience
- Assessment score
- Resume ATS score

Specific keyword matching of industry and specialization has been applied to provide additional weighted values to improve the accuracy of classifications. The classifier produces the probability scores of 15 industries and more than 200 specializations. Deterministic confidence scoring model signifies the reliability of prediction.

Applicant Tracking System Resume evaluation will be performed using a custom ATS (Applicant Tracking System) score calculator. This calculator assesses:

- Job description keyword coverage
- Industry-specific keyword relevance
- Resume structure and standard headings
- Quantifiable achievements

The ATS module creates a rating of between 0 and 100 and specific improvement recommendations.

The Google Gemini API drives the features of generative AI. Gemini models facilitate:

- AI-based resume generation
- AI-assisted cover letter creation
- Interview question generation and feedback
- Personalized career recommendations

Any interaction between the AI is secure, all done through the backend API routes by use of secured environment variables.

The system of IntelliCareer Navigator is currently being developed in a local development environment (Next.js development server). Prisma will access the PostgreSQL database in development mode. Secure API keys are also tested in development to ensure Clerk authentication and Gemini AI services.

The composable API, stateless, and event-based processing of the background enable the system to be suitable in the future to be deployed to the cloud without making major structural modifications.

The system works based on multi stage processing pipeline. First, users post their resume and use a selection of target job description. During the parsing phase, the system identifies text and section headings, skills and ontological items with the help of NLP techniques.

IV. TECHNOLOGY USED

As shown in Fig. 2, the technology stack of IntelliCareer Navigator is led by the frontend (Next.js, React, Tailwind CSS) at 30%, followed by the backend (API routes and Prisma ORM) at 25%. The database layer (PostgreSQL) and AI/ML components (Google Gemini API and the custom Logistic Regression model) each contribute 15%, while the authentication and infrastructure tools such as (Clerk, Inngest) take for 10%, and

development tools (ESLint, Turbopack) make up the remaining 5%. This distribution indicates that the system is primarily focused on the user interface and client-side components. However, despite its smaller contribution, the AI component continues to play a significant role in generating career recommendations.

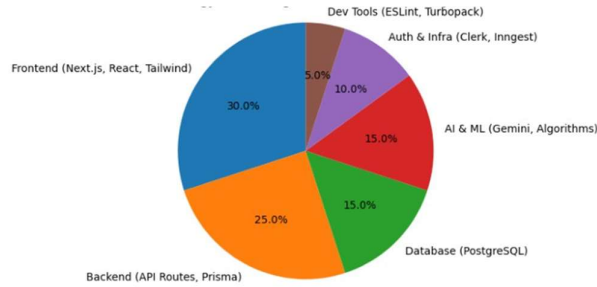


Fig. 2 Tech Stack used in IntelliCareer Navigator

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V. RESULTS



Fig. 3 Domestic Interface of IntelliCareer Navigator

The Home Screen of IntelliCareer Navigator is shown below. The Home Screen acts as the main entry point for the site that provides easy access to a number of tools for the user such as Career Exploration, Resume Assistance, Cover Letter Assistance, and Interview Preparation. Due to this easy-to-use design the user can quickly find the tool they need so they will be better prepared for their job search.

VI. CONCLUSION

Moreover, IntelliCareer Navigator suggests that a complete shift is underway for users planning their professional paths with comprehensive AI-based career guidance. Additionally, IntelliCareer Navigator demonstrates that machine learning, NLP and Large Language Models are providing substantial additional support beyond what typical tools can deliver. The key findings suggest that the system provides personalized suggestions based on actual data; looking at the user’s skill, experience, test results and quality of resume. These results show that tools such as the Automatic Resume/ATS Analyzer, Smart Mock Interview Feature and AI created resume and cover letters will all assist users in receiving more job offers. Career Classifier shows Logistic Regression identifies paths across 15 different industries and 200 different specializations.

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