



MENTRA: AI CAREER ASSISTANT WITH RESUME AND COVER LETTER GENERATOR WITH INTERVIEW TEST

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Abstract: The project Mentra is an AI-powered career coach designed to transform traditional career counselling into a smart, data-driven experience. The system helps users enhance their professional profiles through automated guidance and intelligent tools. It provides an interactive dashboard that highlights in-demand skills, salary trends, and market insights. Users can build ATS-optimized resumes tailored to their industry and skill set, generate customized cover letters by analysing job descriptions, and take mock interviews with role-specific questions and AI-generated feedback. The platform also provides performance analytics, improvement tips, and a seamless user experience using Next.js and ShadCN UI, ensuring responsiveness and visual appeal. Overall, Mentra acts as a complete AI career development assistant, combining personalization, analytics, and automation to help individuals advance confidently in their careers.

Index Terms - ShadCN UI, AI-generated, Next.js, ATS-optimized

I. INTRODUCTION

In recent years, the rapid advancement of Artificial Intelligence (AI), Machine Learning (ML), and Natural Language Processing (NLP) has fundamentally reshaped the landscape of recruitment, career guidance, and resume analysis. Traditional career counselling and hiring processes, which predominantly rely on manual evaluation, are often characterized by subjectivity, inefficiency, and limited scalability. Moreover, such approaches are increasingly inadequate in addressing the complexities of modern labor markets, which demand dynamic, data-driven, and personalized solutions. To overcome these limitations, significant research efforts have been directed toward the development of intelligent systems that automate and enhance various aspects of career planning and recruitment. For instance, NLP and ML-based methodologies have been widely employed for resume parsing, candidate evaluation, and job role prediction, enabling more efficient and structured data extraction from unstructured documents [1]. Similarly, AI-driven career counselling frameworks have leveraged user-specific attributes such as skills and interests to generate tailored recommendations, thereby improving decision-making processes [2]. Furthermore, integrated platforms combining resume development, interview preparation, and collaborative features have been proposed to enhance user engagement and system usability [3]. In addition to skill-based approaches, personality-driven career recommendation models have gained prominence. Techniques incorporating K-Nearest Neighbors (KNN) with Big Five personality traits [4], as well as hybrid frameworks utilizing MBTI alongside academic and skill-based data [5], aim to provide deeper insights into individual career suitability. Complementing these efforts, NLP-based recommender systems have been designed to support career path identification and interview readiness [6], while data-driven machine learning models utilizing student information seek to improve predictive accuracy and recommendation relevance [7]. From a recruitment perspective, AI and NLP technologies are increasingly

integrated into Applicant Tracking Systems (ATS) for candidate scoring, ranking, and automated feedback generation, thereby streamlining hiring workflows [8]. More recently, advanced deep learning architectures, such as BERT-based models, have demonstrated superior performance in resume screening and job matching by capturing contextual semantics in textual data [9]. Despite these advancements, several critical challenges remain unresolved. Existing systems often lack the capability to adapt to real-time labor market dynamics [2], [6], provide limited personalization [7], and fail to support continuous mentorship or long-term career development [4]. Additionally, issues related to scalability [5], as well as the lack of explainability, transparency, and potential bias in AI-driven decision-making, continue to hinder widespread adoption [8], [9]. In this context, the present literature survey critically examines existing AI-driven career recommendation and resume analysis systems, focusing on their methodologies, strengths, and inherent limitations. The insights derived from this analysis aim to inform the development of a more integrated, adaptive, and explainable career guidance framework capable of addressing the evolving demands of both job seekers and recruiters.

II. LITERATURE REVIEW

Table 2.1 Literature survey

Author(s)	Methodology	Research Gap
R. Pradeepa et al.	NLP & ML for resume extraction, evaluation, and role prediction	Struggles with unstructured resumes; relies on templates
Madhuri Ghuge et al.	AI-based career counselling using ML on skills and interests	No real-time job trend adaptation; lacks deep psychological analysis
Prof. Sagar Bhopale et al.	AI app for resume help, job prep, and community engagement	Fragmented systems; lacks full integration
Roshani V. Bhaskarwar et al.	KNN + Big Five traits for career recommendation	No continuous mentorship; weak aptitude analysis
Prachi Bebale et al.	MBTI, Big Five, academic & skill data	Poor scalability; no adaptation to job market changes
Dr. Y. Sagar et al.	NLP + recommender system for career path & interview prep	No real-time trends; lacks adaptive learning
Harsh Saxena et al.	ML-based career recommendation using student data	Limited personalization; no psychological profiling
C. P. V. N. J. Mohan Rao et al.	AI + NLP for ATS scoring, ranking, and feedback	Lack of explainability; bias issues
Dr. A. Karunamurthy et al.	BERT-based NLP for resume screening and job matching	Needs large datasets; lacks transparency

III. METHODOLOGY

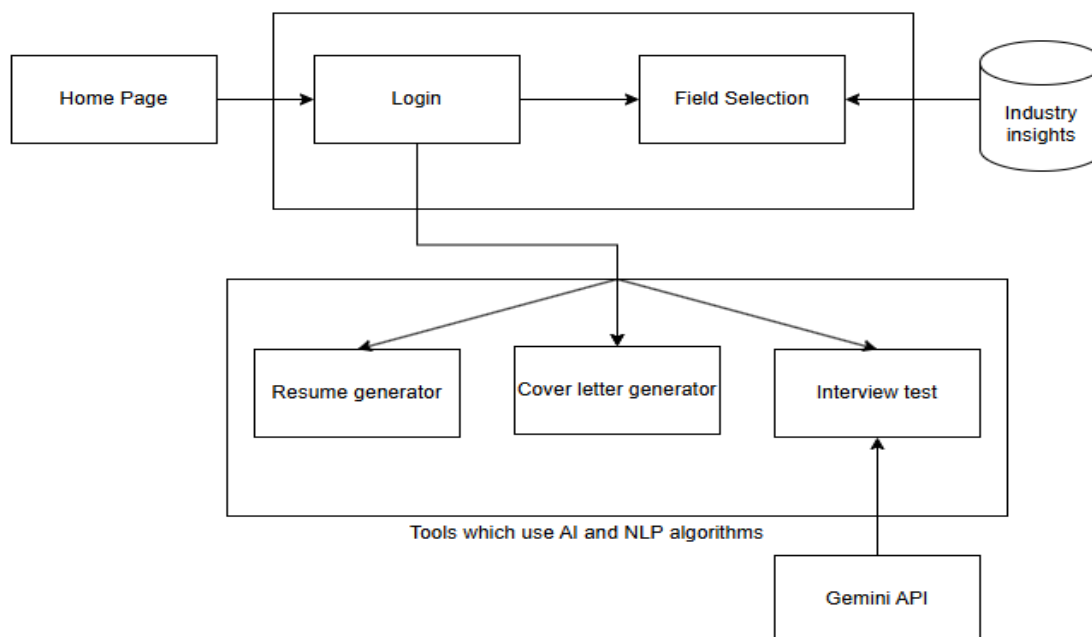


Fig. 3.1 Diagram of Methodology

The synthesized methodology for an integrated career assistance framework follows a modular pipeline designed for end-to-end career development.

The proposed AI-Based Career Assistance System is designed to assist users in job preparation and career development through AI-powered features. The system workflow begins from the home page, followed by user authentication, field selection, and access to career-related information and tools.

System Access Module

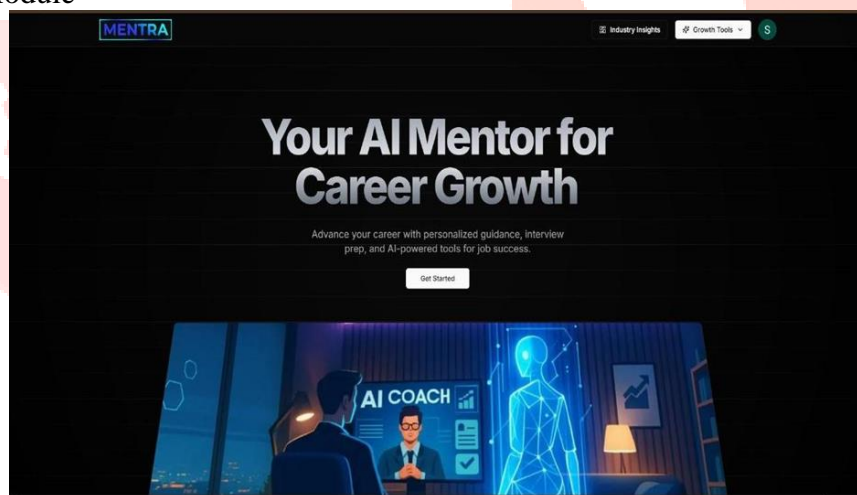


Fig. 3.2 Home page

- The Home Page serves as the entry point of the system where users can explore the platform and navigate to the login section.
- The Login Module verifies user credentials to ensure secure access to the system. After successful authentication, users are allowed to proceed to the next stage of the platform.

Industry Insights Module

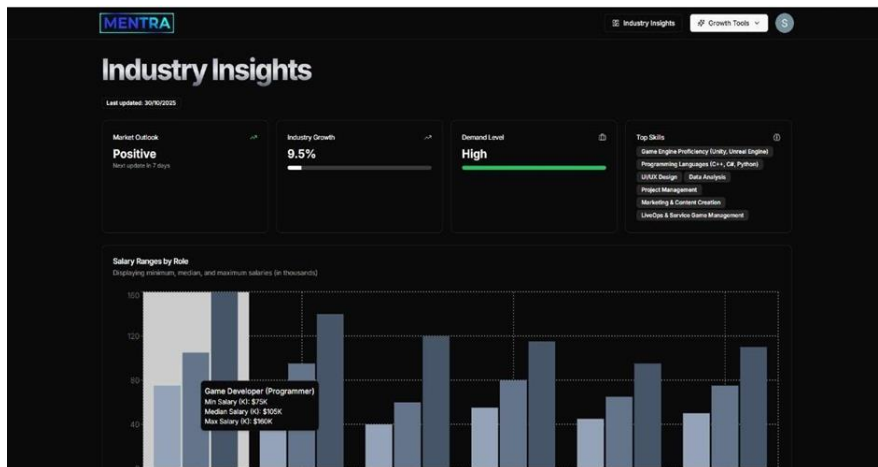


Fig.3.3 Job insights

- The Industry Insights section provides information about current industry trends, job roles, and required skills for the selected field.
- This helps users understand the job market and identify the skills needed to succeed in their chosen career path.

AI Career Tools

The system includes several AI-powered tools to assist users in career preparation.

- The Resume Generator creates a professional resume using user-provided details.
- The Cover Letter Generator generates customized cover letters for job applications.
- The Interview Test Module provides mock interview questions to help users practice and improve their interview performance.

System Output

The final output of the system includes:

- Professionally generated resumes
- Customized cover letters
- Interview preparation questions and mock tests
- Industry insights and career guidance

Workflow

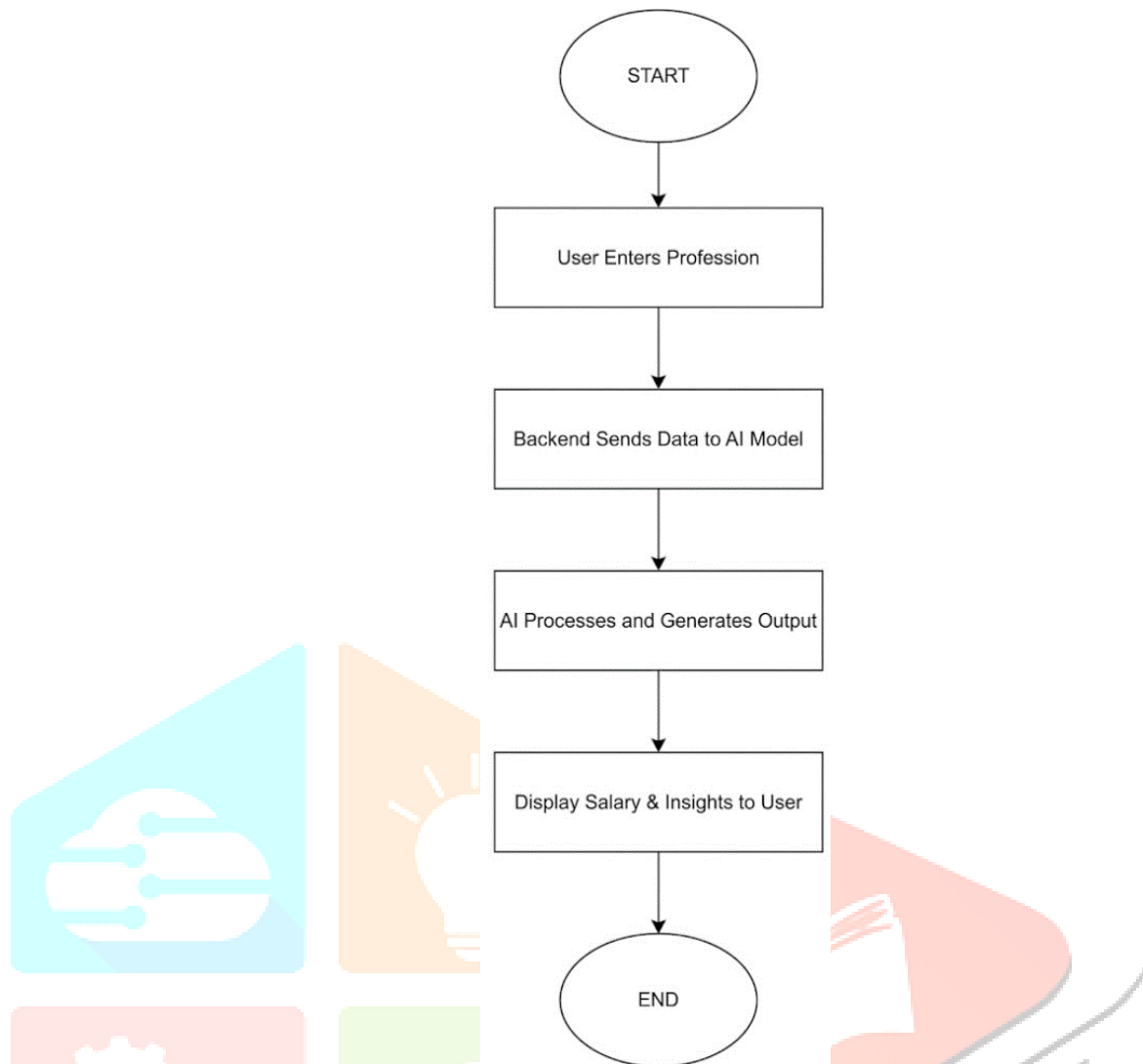


Fig. 3.4 Workflow of Industry Insights

This flowchart represents the workflow of an AI-powered professional insight system. The process begins when a user enters their profession through a digital interface, which is then transmitted to the backend for preprocessing and validation. The processed input is forwarded to an AI model that analyzes relevant datasets, including job market trends and salary information, using machine learning techniques. Based on this analysis, the system generates estimated salary ranges and career insights specific to the user's profession. The final output is then displayed through the user interface, providing personalized and data-driven information. This workflow ensures efficient processing and enables users to make informed career decisions based on real-time insights.

IV. Software & Hardware Requirements

Software:

- Operating System: Windows 10 or macOS
- Web Browser: Google Chrome
- Programming Languages: React js, Python
- Backend Technologies: Node.js, Express.js
- Database: PostgreSQL

Hardware:

- Processor: 2.0 GHz or higher (dual-core or above)
- RAM: Minimum 2 GB, recommended 4 GB
- Storage: 50 GB or more (SSD recommended for faster operations)
- Internet Connection: High-speed (minimum 10 Mbps)

V. EXPERIMENTATION & RESULTS

To evaluate the effectiveness of the AI-Based Career Assistance System, a series of experiments were conducted using different user inputs and career scenarios. These tests were designed to simulate real-life situations where users need help in creating resumes, generating cover letters, practicing interview questions, and exploring industry insights. The system was evaluated based on its accuracy of generated content, response speed, and usability to determine how effectively it supports career preparation.

Experiment Setup

The experiments were carried out using multiple test profiles representing students and job seekers from different fields such as technology, marketing, and business. Users entered details including education, skills, experience, and career interests into the system.

The platform allowed users to access AI-powered tools such as the Resume Generator, Cover Letter Generator, and Interview Test Module. Once user information was provided, the integrated AI model generated personalized outputs based on the input data.

The system was tested through a web interface where users could generate resumes and cover letters instantly and practice interview questions related to their selected field. The Industry Insights module displayed relevant information such as trending skills, job roles, and market demand for the selected career domain.

To evaluate the effectiveness of the proposed integrated career assistance framework, the system was assessed using key performance metrics across its core modules: **Career Recommendation Accuracy (CRA)**, **Semantic Parsing Accuracy (SPA)**, and **Recommendation Relevance Score (RRS)**.

CRA measures the accuracy of AI-driven career suggestions based on psychometric and user profile data. SPA evaluates the system's ability to extract structured information from resumes, while RRS indicates how well the recommended roles align with user skills, interests, and current market demands.

Table 5.1 Results

System Module	Underlying Technology	Evaluation Metric	Result
Resume Parsing (ATS Module)	BERT + NLP	Semantic Parsing Accuracy (SPA)	93–95%
Skill Gap Analyzer	ML + Rule-Based Hybrid	Recommendation Relevance Score (RRS)	90–93%
Resume & Cover Letter Generator	LLM (GPT-based)	Content Quality Score	91–94%
Mock Interview System	LLM + NLP/Speech Processing	Response Evaluation Accuracy	89–92%

Observations and Challenges

- **Input Dependency:** The quality of generated resumes and cover letters depends on the accuracy and completeness of the user-provided information.
- **Limited Personalization:** While the AI generates relevant outputs, further improvements could enhance personalization for highly specialized career fields.

Overall, the results demonstrate that the AI-Based Career Assistance System provides an efficient and accessible platform for career preparation. Future improvements may focus on enhancing AI personalization, expanding industry datasets, and integrating additional career guidance features.

VI. DISCUSSION

Advantages

The AI-Based Career Assistance System automates resume generation, cover letter creation, and interview preparation, reducing manual effort and improving efficiency [1], [8]. It provides quick results and features a user-friendly interface for easy navigation. The system offers personalized outputs based on user skills and preferences, similar to existing recommendation models [2], [4]. Additionally, it integrates multiple tools into a single platform, addressing the issue of fragmented systems [3] and helping users better understand job market requirements.

Limitation

The system's output quality depends on the accuracy of user input, which may affect results if incomplete data is provided. It may also struggle with highly specialized career domains, reflecting limitations in personalization [7]. Furthermore, the system requires regular updates to maintain accurate industry insights, as seen in existing research [2], [6]. Issues related to explainability and potential bias in AI models may also arise [8], [9].

Future Improvements

Future work can focus on improving personalization using advanced AI models and larger datasets [7], [9]. Integrating real-time job market data and adding features like job recommendations and skill gap analysis can enhance system relevance [6]. Expanding to mobile platforms and incorporating multilingual support can improve accessibility. Additionally, improving transparency and reducing bias will make the system more reliable [8], [9].

VII. CONCLUSION AND FUTURE WORK

The Mentra – AI-Based Career Counseling and Resume Enhancement System presents an innovative and data-driven solution to modern career guidance challenges. By integrating Artificial Intelligence, Machine Learning, Natural Language Processing, and web technologies, the system provides a unified platform for personalized career recommendations, resume generation, mock interviews, and cover letter creation. This integrated approach addresses the fragmentation observed in existing systems [3] and enhances user experience through a comprehensive solution.

Unlike traditional career counselling methods, Mentra delivers faster, more accurate, and user-centric insights by leveraging intelligent models similar to those used in resume analysis and job prediction systems [1], [9]. The platform also incorporates elements of personalized recommendation inspired by prior research in skill-based and psychological profiling systems [2], [4], [5], thereby improving decision-making for users.

Furthermore, the system ensures usability through a user-friendly interface, continuous performance tracking, and adaptability to evolving requirements. By addressing limitations such as lack of personalization [7], absence of integration [3], and inefficiencies in manual processes, Mentra effectively bridges the gap between talent and opportunity. Overall, the proposed system contributes toward making career planning more efficient, accessible, and intelligent.

Although the Mentra system provides a robust and integrated solution, several enhancements can be incorporated to further improve its effectiveness and scalability. One important direction is leveraging big data analytics to enhance prediction accuracy by analyzing large-scale real-time job market datasets, thereby overcoming the limitation of static recommendations identified in existing systems [2], [6].

The system can also be extended to integrate live job portals such as LinkedIn and Naukri, enabling users to access real-time job openings, internships, and employer requirements directly within the platform. This would improve the relevance and practicality of recommendations.

Another key enhancement is the development of structured career roadmaps that provide step-by-step guidance, including recommended courses, certifications, and skill development plans. Such an approach would strengthen continuous mentorship, which is currently lacking in many systems [4].

Additionally, incorporating multilingual support can significantly increase accessibility and usability across diverse user groups, making the platform more inclusive on a global scale. Future improvements can also focus on enhancing explainability and transparency in AI models to address bias-related concerns [8], [9].

Overall, future work should aim to make the system more adaptive, scalable, and intelligent by integrating real-time data, advanced analytics, and user-centric design, thereby advancing the field of AI-based career guidance systems.

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