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AI-Based Career Guidance Mentor

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Abstract: *The rapid evolution of artificial intelligence has significantly transformed the landscape of career guidance and employability enhancement. Traditional career counseling methods often suffer from limited accessibility, lack of personalization, and dependency on human experts. This research paper presents an AI-based career guidance system that integrates three core modules: an intelligent chatbot, an AI-driven mock interview platform, and an automated resume analysis engine. The proposed system aims to provide personalized, scalable, and cost-effective career support to students and job seekers. The chatbot module leverages Natural Language Processing (NLP) to deliver real-time career guidance and query resolution. The mock interview module simulates real interview environments, evaluates candidate responses, and provides structured feedback. The resume analysis module uses machine learning and NLP techniques to assess resume quality, skill relevance, and job-role alignment. This paper details the methodology, discusses challenges and limitations, and highlights the system's future scope. The proposed solution demonstrates how AI can bridge the gap between academic learning and industry expectations by enhancing career readiness and decision-making.*

Keywords: *Artificial Intelligence, Career Guidance, Chatbot, Mock Interview, Resume Analysis, Natural Language Processing, Machine Learning.*

1. Introduction

Career planning is a critical aspect of an individual's professional development. With rapidly changing job markets and emerging technologies, students and professionals often struggle to identify suitable career paths, prepare for interviews, and present themselves effectively through resumes. Conventional career guidance systems rely heavily on human counselors, workshops, and static online resources, which are often inaccessible, time-consuming, and expensive.

Artificial Intelligence (AI) offers a promising alternative by enabling intelligent, data-driven, and personalized career guidance solutions. AI-powered systems can analyze user profiles, simulate interview scenarios, and provide real-time feedback, thereby improving employability outcomes. The integration of chatbots, automated interview evaluation, and resume analysis creates a comprehensive ecosystem for career development.

This research paper proposes an AI-based career guidance system consisting of three interconnected modules:

(1) An intelligent chatbot for career mentoring,
(2) A mock interview system for interview preparation, and
(3) A resume analysis engine for resume optimization. The system is designed to be scalable, user-friendly, and adaptable to various career domains.

2. Methodology

2.1 Chatbot Module

User Interaction

1.The chatbot acts as a virtual mentor that interacts with users through:

- Text-based chat interface

Users ask questions related to careers, skills, interviews, and education.

2. Input Processing

- User input is captured in real time
- Text is cleaned by removing unnecessary symbols and stop words
- Language detection and normalization are applied

3. Natural Language Understanding (NLU)

AI techniques such as NLP are used to:

- Identify user intent (career advice, interview help, resume query)
- Extract key entities (skills, job role, experience level)

4. Knowledge Base & AI Model

The chatbot uses:

- Predefined career knowledge base
- Machine learning models
- Rule-based responses for common queries

It matches user intent with the most relevant response.

5. Response Generation

- Generates accurate and contextual responses
- Uses templates or generative AI for dynamic replies
- Provides guidance, suggestions, and learning resources

6. Continuous Learning

User feedback and chat history are used to:

- Improve chatbot responses
- Update FAQs and knowledge base

2.2 Mock Interview Module Methodology

1. Interview Setup

- User selects job role (e.g., Software Engineer, Data Analyst)
- Interview level is chosen (Beginner, Intermediate, Advanced)
- Interview type: Technical, HR, Behavioral

2. Question Generation

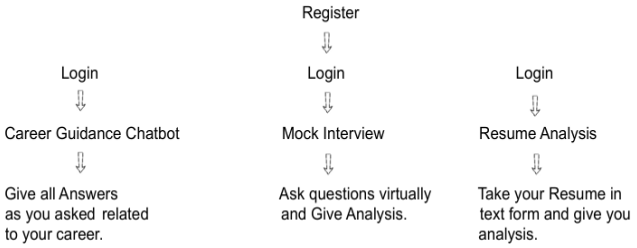
AI generates interview questions using:

- Job role-specific datasets
- Difficulty-based question banks
- NLP-based dynamic question generation

3. User Response Collection

User answers are captured through:

- Text input
- Voice input (converted to text using speech-to-text)



4. Answer Analysis

AI evaluates responses based on:

- Relevance to the question
- Keyword matching
- Grammar and clarity
- Confidence level (for voice input)

5. Scoring and Feedback

- Each answer is scored
- Strengths and weaknesses are identified
- Suggestions for improvement are provided

6. Performance Report

After the interview:

- Overall score is generated
- Skill-wise analysis is shown
- Personalized interview preparation tips are given

2.3 Resume Analysis Module Methodology

1. Resume Upload

- User uploads resume in PDF/DOC format
- File is validated and securely stored

2. Resume Parsing

AI extracts key information using NLP:

- Personal details
- Education
- Skills
- Work experience
- Projects and certifications

3. Skill Matching

- Extracted skills are compared with job role requirements
- Skill gaps are identified
- Industry-relevant skills are highlighted

4. Resume Quality Analysis

The system evaluates:

- Resume structure and formatting
- Grammar and spelling

- Keyword optimization (ATS compatibility)
- Content relevance

5. Scoring and Suggestions

- Resume score is generated
- Section-wise improvement suggestions are provided
- Missing sections and weak areas are identified

6. Job Role Recommendation

Based on resume analysis:

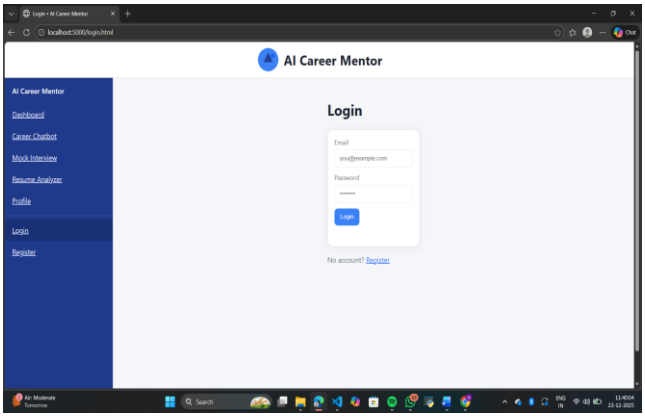
- Suitable job roles are suggested
- Resume customization tips for specific roles are provided

3. Limitations

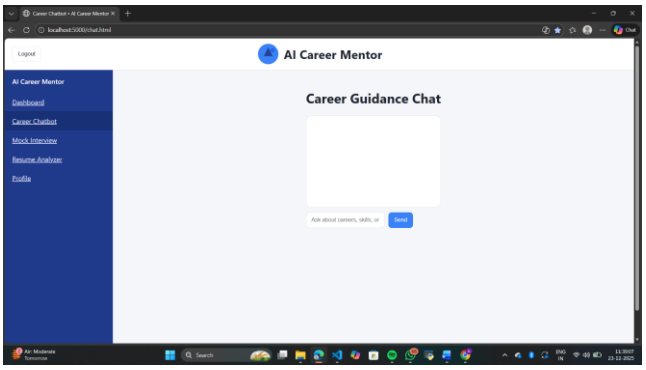
Despite its effectiveness, the proposed system has certain limitations. The accuracy of recommendations depends heavily on the quality and diversity of training data. NLP models may struggle with ambiguous or poorly structured user inputs. The mock interview evaluation cannot fully capture non-verbal cues such as body language. Resume analysis may face challenges with highly creative or non-standard resume formats. Additionally, AI-generated guidance should complement, not replace, professional human counselling.

4. System Overview

Login:

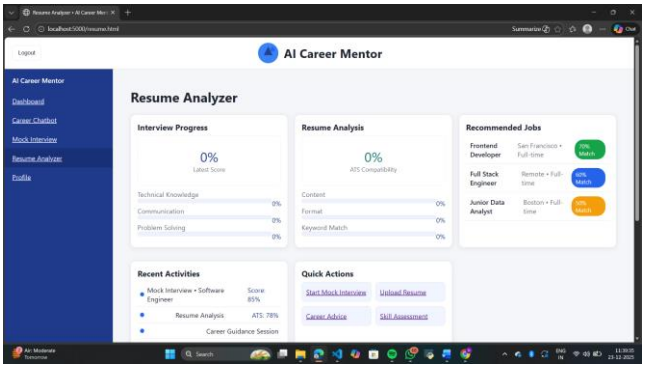


The architecture consists of three modules:
Career Guidance Chatbot:



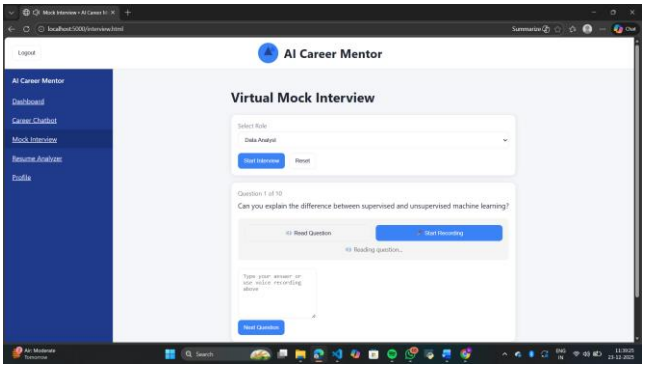
— built using Python, prompt based LLM pipelines, and custom skill gap analysis prompts.

Resume Analysis & Integrated Platform



— a web interface enabling resume upload, analysis, and system integration with the other modules.

Virtual Interview Bot:



— a structured question generator and behavioral assessment engine allowing mock interview sessions.

5. Challenges

The development of the system involves several challenges, including ensuring data privacy and ethical AI usage, minimizing bias in recommendations, handling multilingual inputs, and maintaining up-to-date career information. Computational complexity and real-time response generation also pose technical challenges. Building user trust in AI-driven career guidance remains a critical concern.

The development and deployment of an AI-based career guidance system involve several technical and ethical challenges:

1. **Data Privacy and Security**
   Protecting user data such as resumes, interview responses, and personal information is critical. Ensuring secure data storage and compliance with privacy standards is a major challenge.
2. **Ethical AI and Bias Reduction**
   AI models may introduce bias due to imbalanced or incomplete training data. Designing fair and unbiased recommendation mechanisms is essential to ensure equal career guidance for all users.
3. **Multilingual Input Handling**
   Supporting users from diverse linguistic backgrounds requires accurate language processing. Misinterpretation of queries due to language variation can affect system performance.
4. **Real-Time Response Generation**
   Delivering fast and accurate responses while processing complex AI models demands efficient computation and system optimization.
5. **Model Accuracy and Reliability**
   Ensuring consistent and reliable recommendations across different career domains remains a challenge, especially for emerging job roles.
6. **User Trust and Acceptance**
   Gaining user confidence in AI-driven guidance requires transparent decision-making and explainable recommendations.
7. **System Scalability and Maintenance**
   Regular updates are required to keep career data, job roles, and skill requirements relevant in a rapidly changing job market.

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6. Conclusion and Future Scope

This research paper presented an AI-based career guidance system integrating chatbot interaction, mock interview simulation, and resume analysis. The system demonstrates how AI can enhance career preparedness through personalized, scalable, and data-driven guidance. By addressing key aspects of career development, the proposed solution bridges the gap between academic learning and industry requirements.
Future enhancements may include emotion-aware interview analysis, multilingual support, integration with real-time job portals, advanced analytics for career prediction, and adaptive learning pathways. Incorporating explainable AI techniques and continuous user feedback will further improve transparency, accuracy, and user trust.

References

[1] Russell, S., & Norvig, P., *Artificial Intelligence: A Modern Approach*, Pearson, 2021.
[2] Jurafsky, D., & Martin, J. H., *Speech and Language Processing*, Pearson, 2022.
[3] IEEE Standards Association, *Ethical Considerations in Artificial Intelligence Systems*, 2020.
[4] Brown, T. et al., "Language Models are Few-Shot Learners," *NeurIPS*, 2020.
[5] Jain, P., & Gupta, R., "AI-Based Career Recommendation Systems," *International Journal of Computer Applications*, 2022.
[6] Joshua, K. P., Rao, D. S., Patil, G., Kadwal, M., & Choudhary, J. (2023). Cascaded ANN Based Clustering and Optimized Routing Path Selection in Mobile Adhoc Networks. *SSRG International Journal of Electrical and Electronics Engineering*, *10*(6), 81-93.
[7] Sheetlani, J., Kadwal, M., Sharma, S., Jain, S., & Telang, S. (2023). Comparative Overview of FER Methods for Human-Robot Interaction Using Review Analysis. *Robotic Process Automation*, 189-196.
[8] Kadwal, M., Patil, G., & Dubey, S. (2025). Application of machine learning techniques in modern hybrid. *Power System Management: Advances and Applications*, 50.
[9] Rawat, R., Chakrawarti, R. K., Sarangi, S. K., Choudhary, R., Gadwal, A. S., & Bhardwaj, V. (Eds.). (2023). *Robotic Process Automation*. John Wiley & Sons.

[10] L. S. Songare, H. P. Singh, S. Bhayal, P. Baniya, A. S. Rajput and P. Lakkadwala, "Laptop Price Estimation Using Data-Driven Predictive Analytics," *2025 IEEE International Conference on Advances in Computing Research On Science Engineering and Technology (ACROSET)*, INDORE, India, 2025, pp. 1-6, doi: 10.1109/ACROSET66531.2025.11281104.

[11] A. Mewada, A. S. Yadav, H. P. Singh, P. Nigam, M. A. Ansari and S. Ahmad, "Smart Censorship: Real-Time Obscene Content Detection Using Skin Pixel Aggregation and Humanoid Shape Recognition," *2025 IEEE Madhya Pradesh Section Conference (MPCON)*, Jabalpur, India, 2025, pp. 743-747, doi: 10.1109/MPCON66082.2025.11256623.

[12] Avani Trivedi et al., "Development of Mental Health Prediction App for the Depression Assistance Based on AI Chatbot," 2025 International Conference on Engineering Innovations and Technologies (ICoEIT), Bhopal, India, 2025, pp. 1369-1374, doi: 10.1109/ICoEIT63558.2025.11211786.

[13] K. N. Singh, H. P. Singh, S. Mohod, S. Adekar, A. Budholiya and R. Kushwah, "Technological Approach for Safe Transportation Through Elderly and Impaired Drivers," 2025 International Conference on Engineering Innovations and Technologies (ICoEIT), Bhopal, India, 2025, pp. 120-125, doi: 10.1109/ICoEIT63558.2025.11211795.

[14] H. P. Singh, A. Sharma, S. Chouhan, P. Rane, A. H. Pilay and N. Singh, "Hand Interaction in VR: A Comparative Evaluation of Techniques and Performance," *2025 International Conference on Engineering Innovations and Technologies (ICoEIT)*, Bhopal, India, 2025, pp. 1435-1440, doi: 10.1109/ICoEIT63558.2025.11211762

[15] Singh, Harsh Pratap, et al. "AVATRY: Virtual Fitting Room Solution." 2024 2nd International Conference on Computer, Communication and Control (IC4). IEEE, 2024.

[16] Singh, Nagendra, et al. "Blockchain Cloud Computing: Comparative study on DDoS, MITM and SQL Injection Attack." 2024 IEEE International Conference on Big Data & Machine Learning (ICBDML). IEEE, 2024.

[17] Singh, Harsh Pratap, et al. "Logistic Regression based Sentiment Analysis System: Rectify." 2024 IEEE International Conference on Big Data & Machine Learning (ICBDML). IEEE, 2024.

[18] Naiyer, Vaseem, Jitendra Sheetlani, and Harsh Pratap Singh. "Software Quality Prediction Using Machine Learning Application." Smart Intelligent Computing and Applications: Proceedings of the Third International Conference on Smart Computing and Informatics, Volume 2. Springer Singapore, 2020.

[19] Joshi, M., Birla, S., Pal, H., Khatri, K., Kadwal, M., & Salitra, D. (2024). AI-Driven Intrusion Detection Systems: Leveraging deep learning for network security. *Nanotechnology Perceptions*, *20*(S10).

[20] Shrivastava, A., Gautam, V., Patel, N., Sharma, S., & Kadwal, M. (2024). PixelSake Deep Convolution Generative Adversarial Network.

[21] Shrivastava, A., Gautam, V., Patel, N., Sharma, S., & Kadwal, M. PetoPia Paradise For Pets