

AI POWERED RECRUITMENT AND CANDIDATE SCREENING SYSTEM

#1 Ms. R. Jenifer, @2Rohith U, @3Sadhana G, @4 Yashvanth Kumar E

#1 Assistant Professor, Sri Shakthi Institute of Engineering and Technology, Coimbatore,

rjenifercse@siet.ac.in,

@2, @3, @4 UG Student, Sri Shakthi Institute of Engineering and Technology, Coimbatore,

rohithu22cse@srishakthi.ac.in

sadhanag22cse@srishakthi.ac.in

yashvanthkumare22cse@srishakthi.ac.in

Abstract - The AI POWERED RECRUITMENT AND CANDIDATE SCREENING SYSTEM is an advanced, AI-powered platform developed to streamline and optimize the hiring process. This system utilizes cutting-edge artificial intelligence techniques to automate resume screening, skill extraction, and job matching, ensuring that candidates are accurately aligned with suitable job opportunities based on predefined requirements and current industry demands. By incorporating Natural Language Processing (NLP) and machine learning algorithms, the platform efficiently analyses candidate profiles and compares them with job descriptions, significantly reducing the need for manual shortlisting. One of the core features of the system is the Real-Time AI Interview Module, which conducts automated interviews through voice or text-based interactions. This module intelligently assesses candidates' communication abilities, confidence levels, and technical expertise, and generates instant performance reports for recruiters. The integration of resume analysis, intelligent job matching, and automated interviewing creates a fair, efficient, and data-driven recruitment process. Additionally, the system enhances the candidate experience by providing personalized job recommendations and immediate feedback. It also features a scalable and cloud-based architecture, ensuring seamless handling of large volumes of applications while maintaining system performance and reliability. Overall, this solution transforms traditional recruitment methods into a smart, automated, and real-time talent acquisition system, saving time and improving decision-making for organizations

Keyword- Artificial Intelligence; Recruitment Automation; Resume Parsing; Natural Language Processing; Machine Learning; Job Recommendation System; Semantic Matching; Interview Scheduling; AI Mock Interview; Real-Time Calendar Integration; Candidate-Job Matching; Named Entity Recognition; Deep Learning; Reinforcement Learning; Explainable AI; Skill Gap Analysis; Career Recommendation; Behavioral Analysis; Cloud-Based System; Intelligent Hiring Platform

I. INTRODUCTION

The AI-Driven Job Matching and Interview Automation System is designed to modernize and optimize the entire recruitment process by leveraging the power of artificial intelligence and automation. In the current job market, organizations often struggle with handling a high number of applications, filtering suitable candidates, and conducting timely interviews. Traditional hiring methods are not only time-consuming but also prone to human bias and inefficiencies. To address these challenges, this project introduces an intelligent system that simplifies and accelerates the process of candidate selection, ensuring a fair, data-driven, and efficient hiring experience for both employers and job seekers. The system utilizes machine learning algorithms and natural language processing (NLP) to analyse resumes and extract important details such as skills, experience, education, and achievements.

In addition to resume screening and job matching, the platform integrates an AI-powered interview automation module that conducts real-time virtual interviews. The AI interviewer asks predefined or dynamically generated questions, evaluates candidate responses using NLP and sentiment analysis, and measures communication skills, confidence, and subject knowledge. The system then generates a comprehensive performance report to assist recruiters in decision-making. This feature ensures that the interview process remains unbiased, consistent, and efficient while offering candidates an interactive experience. Overall, the AI-Driven Job Matching and Interview Automation System aims to create a smarter, faster, and fairer recruitment ecosystem. It bridges the gap between job seekers and employers through intelligent automation, reduces hiring time, minimizes operational costs, and enhances the quality of talent acquisition. By combining data-driven insights with automated interview analysis, the system represents a significant step forward in the evolution of digital recruitment technology.

II. LITERATURE REVIEW

Sinha and Akhtar et al. developed an automated system that reads resumes and predicts job domains

using machine learning algorithms like Random Forest and SVM. Their model extracts key details from resumes and matches candidates to suitable job categories. They highlight that traditional Applicant Tracking Systems (ATS) struggle with diverse resume formats, often missing important information. By engineering features from resume text, their approach improves accuracy in reading and interpreting resumes. This system helps recruiters save time and efficiently identify the right candidates while emphasizing the keyword-based analysis for effective recruitment automation.[1]

Gan and Mori. et al. came up with a new way to pull important information from resumes using very little labelled data. Instead of needing lots of examples to train their system, they used smart prompts with powerful language models like GPT and BERT. This means their approach can figure out things like job titles, education, and skills—even from resumes it hasn't seen before. Their method is flexible enough to work with different formats and even different languages, without a lot of extra work. Because it uses fewer examples and smart prompts, it saves time and effort when setting up the system. Plus, it can grow to handle resumes from around the world and work in specific industries. This makes it a practical solution for companies that need to process lots of job applications efficiently.[2]

Mandalapu. et al. proposed a Deep Reinforcement Learning (DRL) framework for a job recommendation system that improves over time based on user engagement and feedback. Their model conceptualizes job recommendation as a sequential decision-making process, where the system learns an optimal policy to maximize user satisfaction. Using Q-learning and policy gradient methods, the algorithm dynamically adjusts its recommendation strategies according to candidate responses, such as clicks, applications, or rejections. The study highlights the scalability of DRL-based systems and their ability to handle complex, evolving datasets common in recruitment. Moreover, the system introduces an adaptive reward function that accounts for user preferences, resulting in improved accuracy and engagement rates. The authors suggest that reinforcement learning provides a path forward for next-generation recruitment engines capable of real time optimization and autonomous learning without constant manual tuning.[7]

Jagtap et al. developed an AI-driven real-time interview simulation application integrating voice recognition and facial expression analysis to assess communication and emotional responses during interviews. Their research demonstrates how multimodal AI systems can evaluate both verbal and non-verbal cues to provide comprehensive feedback to candidates. Using speech-to-text models and facial feature detection, the system measures confidence levels, tone modulation, and emotional state to simulate realistic interview scenarios. The results

showed significant improvements in user preparedness and reduced interview anxiety after repeated sessions. Additionally, the system maintains an analytics dashboard that tracks user progress across sessions, highlighting key metrics such as response quality and improvement rate. This research supports the integration of an AI mock interviewer into recruitment ecosystems, enabling users to engage in pre-interview simulations and receive actionable feedback before actual job interviews.[8]

Guthrie et al. conducted a systematic review on the role of artificial intelligence in employee recruitment, focusing on ethical, technical, and operational implications. Their study highlights how AI enhances recruitment efficiency through automation while cautioning against risks such as bias, opacity, and over reliance on algorithms. The authors emphasize the importance of explainable AI (XAI) to ensure that hiring decisions are transparent and accountable. They also discuss the integration of AI-driven analytics for workforce planning and performance forecasting, showcasing AI's long-term value beyond initial recruitment stages. Importantly, the research stresses the need for compliance with global data protection laws and ethical guidelines to safeguard candidate information. Guthrie et al. conclude that future recruitment systems must balance technological innovation with ethical governance to achieve fairness, inclusivity, and sustainability in hiring practices.[10]

III. EXISTING SYSTEM

Existing online recruitment and job application systems rely on manual operations and keyword-based search algorithms to identify a candidate's match for a particular job. Candidates typically send their resumes to websites like LinkedIn, indeed, or Naukri, and filtering mechanisms scan for certain keywords to suggest jobs. This approach misses out on capturing the contextual meaning of a candidate's skills and experiences, thus making job recommendations completely irrelevant or mismatched. Also, in current systems, interview scheduling remains manual and time-consuming, with several email exchanges or calls between the recruiter and a candidate.

There is no real-time calendar integration; hence, there are scheduling conflicts and/or delays in communication. Another major limitation is the lack of AI-driven interview preparation features: candidates receive job matches, but they are not provided with any adaptive learning support or mock interview assistance to improve their readiness. The challenges to these systems are data privacy and scalability. Most of the platforms use centralized data storage with little encryption, thus demonstrating some security issues. Besides, the lack of adaptive intelligence means that user feedback, job preferences, and performance metrics are not leveraged to refine future recommendations.

IV. SYSTEM ARCHITECTURE

The Smart Recruitment and Interview Automation System is designed using a modular, scalable, and layered architecture that integrates multiple technologies to automate the complete recruitment lifecycle. This architecture ensures smooth interaction between different components, efficient data processing, and flexibility for future enhancements. At the top level, the system includes a **User Interface Layer**, which acts as the primary interaction point for both candidates and recruiters. Through a web-based platform, candidates can upload their resumes, explore personalized job recommendations, and schedule interviews, while recruiters can post job openings, review candidate profiles, and manage the hiring process. The interface is designed to be responsive and user-friendly, allowing seamless access across various devices. Below this, the **Application Layer** handles all core system functionalities and acts as a bridge between the user interface and backend services. This layer is responsible for user authentication and authorization (such as secure login using JWT), resume submission, job posting management, and real-time communication. It also integrates third-party services such as Google Calendar APIs to enable automated interview scheduling, reminders, and notifications, reducing manual coordination efforts.

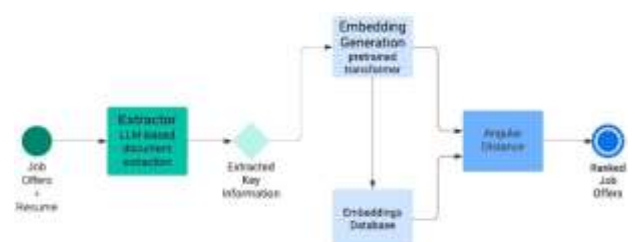
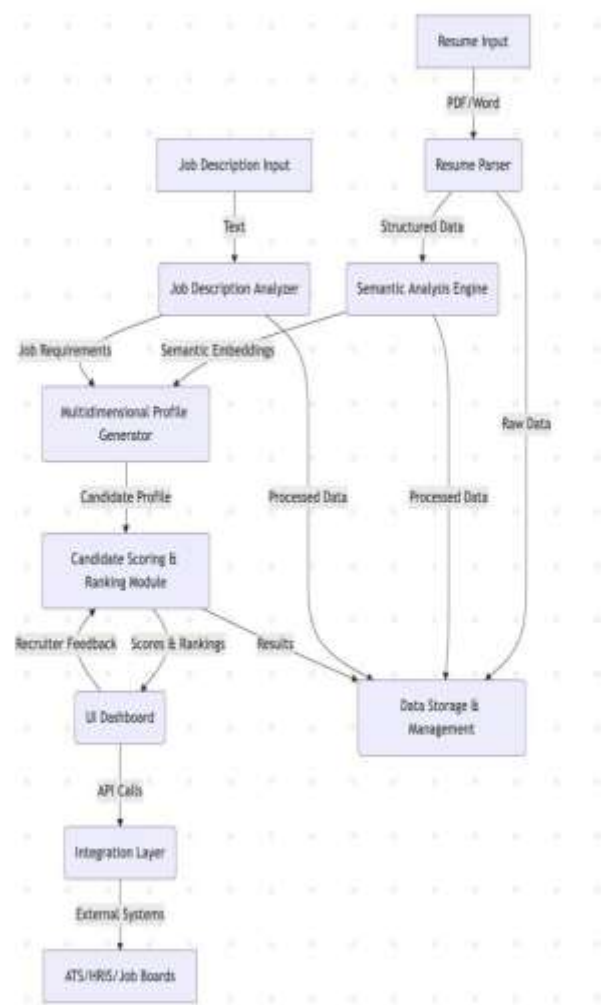
The **AI Processing Layer** forms the core intelligence of the system. This layer performs advanced operations such as resume parsing using Natural Language Processing (NLP) to extract structured information like skills, education, and experience from unstructured data. It also includes a job matching engine that uses Machine Learning algorithms to perform semantic matching between candidate profiles and job descriptions, ensuring more accurate and meaningful recommendations. Additionally, this layer provides personalized job suggestions and course recommendations based on skill gaps. Another key component is the AI-powered mock interview module, which simulates real interview scenarios through voice or text interaction and provides real-time feedback on performance, helping candidates improve their readiness.

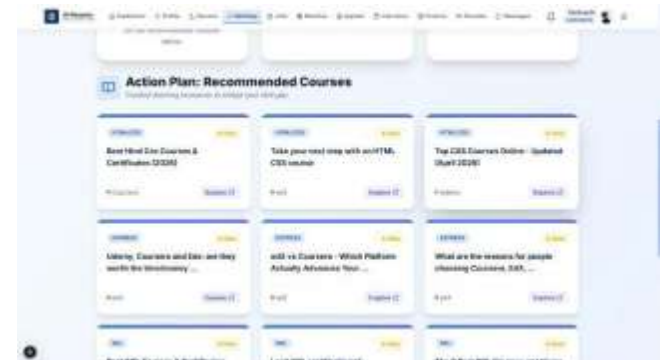
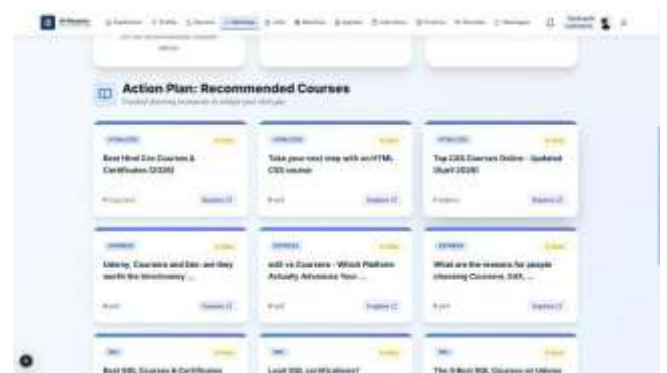
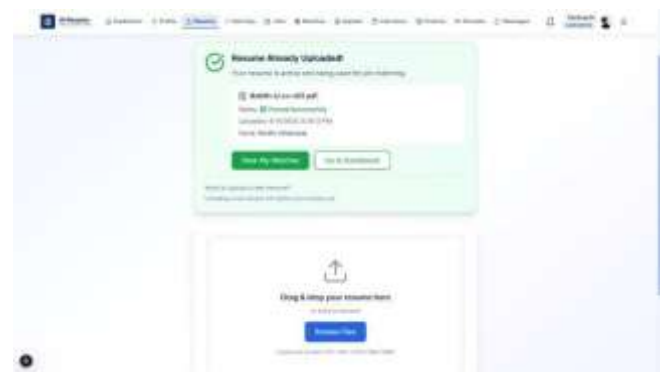
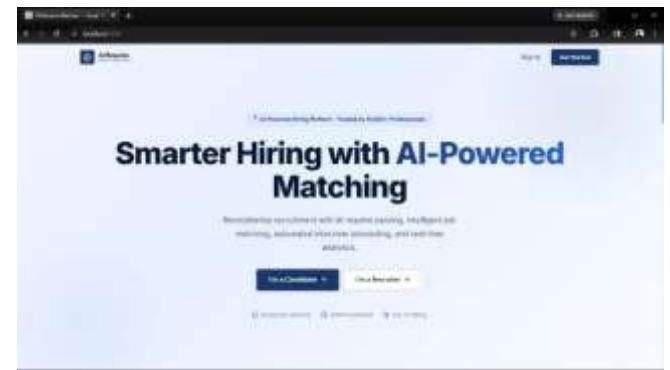
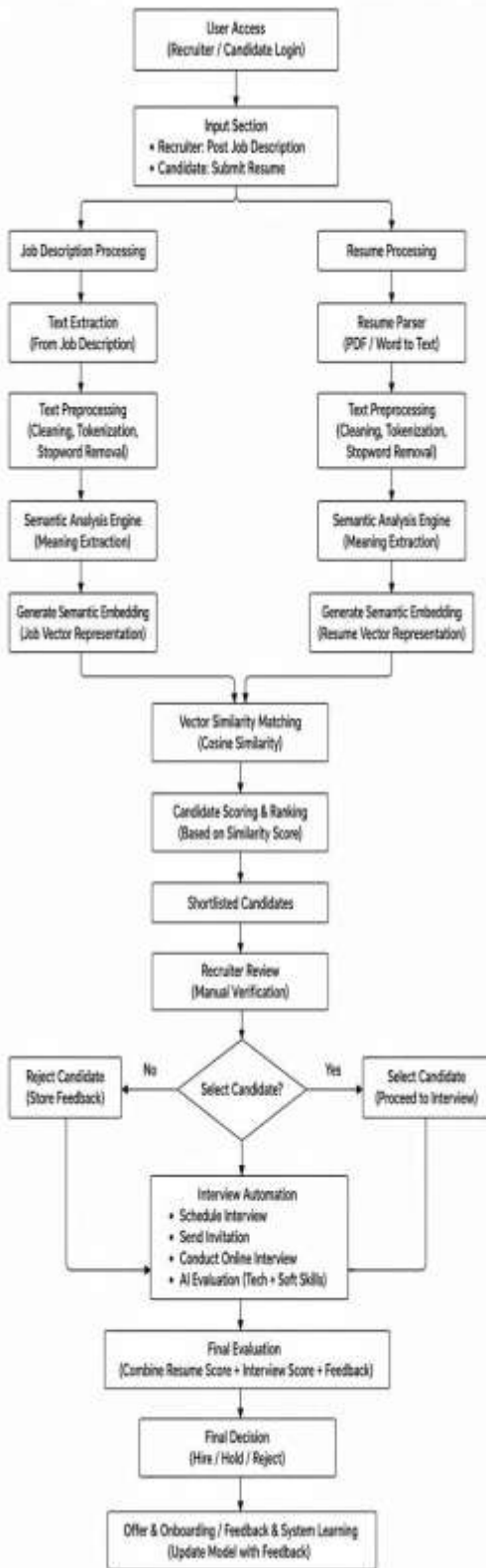
Furthermore, the architecture supports **scalability and integration**, allowing the system to handle a large number of users simultaneously and adapt to different industries and job roles. Additional components such as analytics dashboards and reporting tools can be integrated to provide insights for recruiters, including candidate performance metrics and hiring trends. Overall, the proposed system architecture ensures efficient data flow, reduced manual effort, enhanced accuracy, and an improved user experience, making the recruitment process faster, smarter, and more reliable for both candidates and recruiters.

V. METHODOLOGY

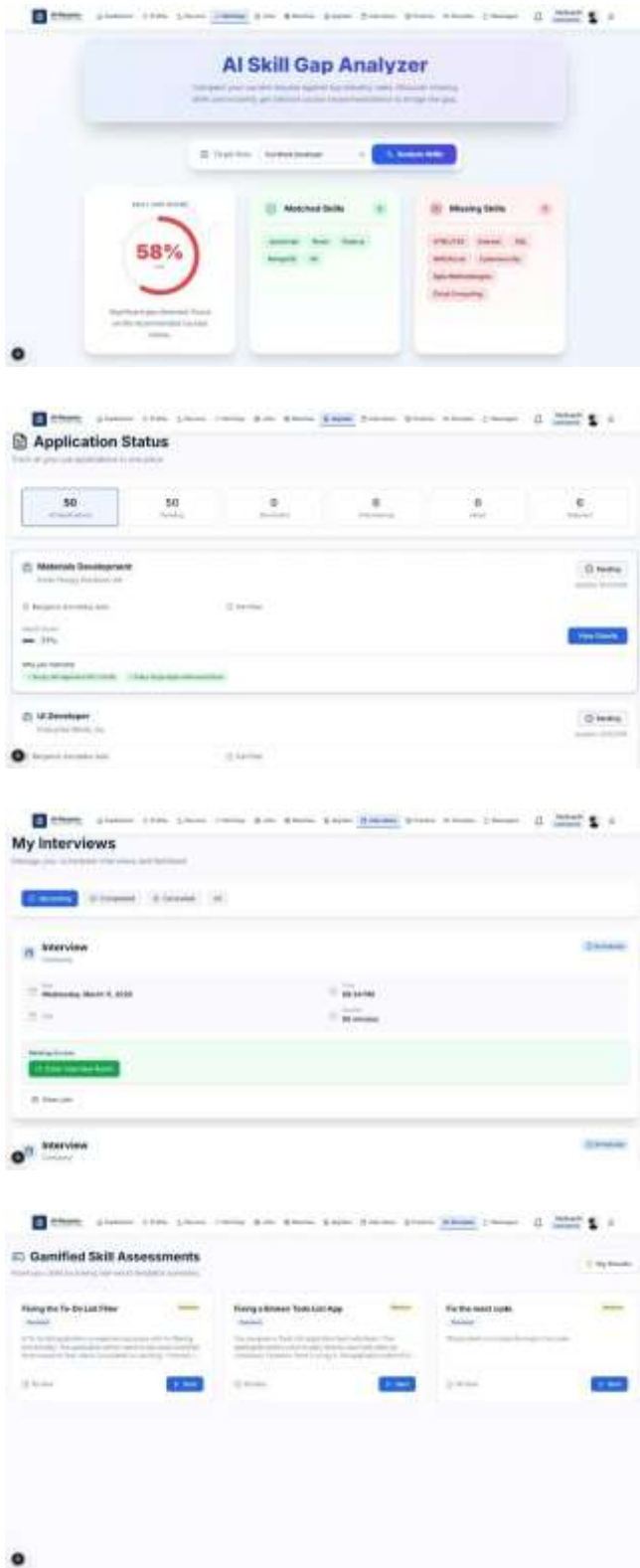
WORKING:

- User registers/logs in and provides profile details (skills, education, goals)
- System conducts skill assessment to evaluate user knowledge
- Profile data is processed to identify strengths and skill gaps
- AI matching engine analyzes profile and compares with course database
- Personalized course recommendations are generated and ranked
- User can preview courses through simulation (sample content & activities)
- User enrolls and begins structured learning with progress tracking
- System collects feedback and updates recommendations for continuous learning





VI. EXPERIMENTAL RESULTS



VII. CONCLUSION AND FUTURE WORK

The Smart Recruitment and Interview Automation System successfully demonstrate how Artificial Intelligence can be utilized to enhance and streamline the hiring process. By integrating technologies such as Natural Language Processing (NLP), Machine Learning (ML), and real-time scheduling, the system automates key recruitment tasks including resume parsing, job matching, interview scheduling, and candidate preparation. This reduces manual effort,

improves accuracy, and ensures a more efficient and fair selection process.

The inclusion of features like AI-based mock interviews and personalized course recommendations further strengthens candidate readiness and skill development. Additionally, the system provides a user-friendly and scalable solution that benefits both recruiters and job seekers by improving communication, reducing delays, and enabling data-driven decision-making. Overall, the proposed system contributes to building a smarter, faster, and more reliable recruitment ecosystem.

- Integration of advanced Large Language Models (LLMs) for more accurate resume understanding and conversational interview simulations
- Implementation of multilingual support to make the system accessible to users from different regions
- Enhancement of AI models using real-time user feedback and reinforcement learning for improved recommendations
- Integration with additional platforms such as LinkedIn, Zoom, and Microsoft Teams for broader connectivity
- Addition of video-based interview analysis using facial expression and emotion recognition
- Development of a mobile application for improved accessibility and user experience
- Incorporation of blockchain technology for secure and verifiable candidate data management
- Advanced analytics dashboard for recruiters with predictive hiring insights and workforce planning

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