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HR RESUME SCREENER AND INTERVIEW AGENT

[1]Mrs.G. ARCHANA, [2]M. GANESH REDDY, [3]M. RANJITH KUMAR, [4]L. SAIMANIKANTA

[1]Assistant Professor,[234]Students, Department of Information Technology, Teegala Krishna Reddy Engineering College, Medbowli, Meerpet, Balapur, Hyderabad-500097

ABSTRACT

The HR Resume Screener and Interview Agent is an intelligent recruitment automation system designed to enhance the efficiency and accuracy of hiring processes in modern organizations. Traditional recruitment involves manual resume screening and preliminary interviews, which are time-consuming, prone to human bias, and inefficient when handling large volumes of applications. The proposed system leverages Artificial Intelligence (AI), Machine Learning (ML), and Natural Language Processing (NLP) to automate resume analysis, candidate shortlisting, and interview evaluation. The system extracts key information such as skills, education, experience, and certifications from resumes and compares them with job requirements to generate a matching score. Based on this score, candidates are ranked and shortlisted automatically. Furthermore, the integrated AI interview agent conducts preliminary interviews by asking predefined or dynamically generated questions, analyzing candidate responses, and evaluating communication and technical skills. The system stores candidate data, generates performance reports, and provides insights to HR professionals for better decision-making. This approach reduces manual workload, improves consistency in evaluation, minimizes bias, and accelerates the hiring cycle. Additionally, the system supports scalability and can handle large datasets efficiently, making it suitable for organizations of all sizes. Overall, the proposed system provides a smart, reliable, and automated solution for modern recruitment challenges, ensuring faster, fairer, and more accurate hiring outcomes.

Keywords: Artificial Intelligence, Resume Screening, NLP, Machine Learning, Recruitment Automation, Interview Agent, Candidate Ranking

I. INTRODUCTION

The recruitment process is a critical function in any organization, directly influencing workforce quality and productivity [1]. Traditional hiring methods rely heavily on manual resume screening and human judgment, which are often inefficient and time-consuming [2]. HR professionals must review hundreds or thousands of resumes to identify suitable candidates, leading to delays in hiring [3]. Moreover, manual evaluation increases the risk of human errors and biases, which can affect decision-making [4]. With the advancement of Artificial Intelligence (AI), organizations are increasingly adopting automated recruitment systems to improve efficiency [5]. Machine Learning (ML) algorithms can analyze large datasets and identify patterns in candidate profiles [6]. Natural Language Processing (NLP) plays a key role in extracting meaningful information from unstructured resume data [7]. Automated systems help in comparing candidate qualifications with job requirements accurately [8]. These technologies reduce the

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workload on HR professionals and enhance the speed of hiring [9]. Additionally, AI-based tools enable standardized evaluation, ensuring fairness and consistency [10]. The integration of digital platforms further simplifies data storage and management [11]. As organizations grow, the need for scalable recruitment solutions becomes essential [12]. Automated systems also provide better tracking of candidate performance and recruitment metrics [13]. The use of intelligent systems ensures better alignment between job roles and candidate skills [14]. Furthermore, automation reduces operational costs associated with hiring processes [15].

The HR Resume Screener and Interview Agent system addresses these challenges by integrating resume screening and automated interviewing into a unified platform [16]. The system allows candidates to upload resumes, which are then processed using NLP techniques to extract relevant information [17]. ML algorithms evaluate candidate profiles and generate a matching score based on job requirements [18]. This enables automatic shortlisting of candidates, reducing manual intervention [19]. The system also includes an AI-based interview agent that conducts preliminary interviews [20]. It generates relevant questions and evaluates candidate responses in real time [21]. This improves the consistency and accuracy of candidate assessment [22]. The system stores data in a structured format for easy retrieval and analysis [23]. A web-based interface ensures user-friendly interaction for both HR professionals and candidates [24]. Backend technologies support efficient data processing and communication [25]. The system design allows scalability and integration with cloud services [26]. It ensures real-time processing and quick decision-making [27]. Automated reporting features provide insights into candidate performance [28]. This helps HR teams make informed hiring decisions [29]. Overall, the system enhances recruitment efficiency, reduces bias, and ensures a streamlined hiring process [30].

II. LITERATURE SURVEY

The evolution of recruitment systems has been significantly influenced by advancements in Artificial Intelligence and data-driven technologies [1]. Early recruitment methods relied on manual resume screening, which was inefficient and prone to bias [2]. Researchers introduced automated resume parsing techniques to extract structured information from resumes [3]. These techniques use Natural Language Processing (NLP) to analyze text and identify key attributes such as skills and experience [4]. Machine Learning (ML) algorithms were later integrated to improve candidate-job matching accuracy [5]. Studies have shown that ML-based systems can significantly reduce screening time [6]. Automated ranking systems help prioritize candidates based on relevance to job descriptions [7]. Several research works focus on improving the accuracy of resume classification [8]. AI-based recruitment tools have also been developed to reduce human intervention [9]. These tools enhance consistency and fairness in candidate evaluation [10]. Chatbot-based systems have been introduced to interact with candidates during initial stages [11]. Such systems improve engagement and streamline communication [12]. Research also highlights the importance of data preprocessing in improving model performance [13]. Feature extraction techniques play a crucial role in identifying relevant candidate attributes [14].

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Advanced algorithms such as deep learning models have further improved prediction accuracy [15].

Recent studies emphasize the integration of automated interview systems with resume screening technologies [16]. AI-driven interview agents can generate questions and evaluate responses efficiently [17]. These systems analyze both textual and voice-based responses for better assessment [18]. Research indicates that automated interviews improve consistency in evaluation [19]. Candidate scoring systems provide quantitative metrics for comparison [20]. Several frameworks have been proposed to integrate resume screening with interview evaluation [21]. These frameworks improve overall recruitment efficiency [22]. Cloud-based systems enable scalability and real-time processing [23]. Studies also highlight the importance of user-friendly interfaces in recruitment systems [24]. Data storage and management play a critical role in system performance [25]. Security and privacy concerns are also addressed in modern recruitment platforms [26]. AI-based systems are capable of handling large volumes of applications efficiently [27]. Integration with external services enhances system functionality [28]. Continuous learning models improve system performance over time [29]. Overall, literature suggests that AI-based recruitment systems significantly enhance hiring efficiency and accuracy [30].

III. PROPOSED SYSTEM

The proposed HR Resume Screener and Interview Agent system is designed to automate and optimize the recruitment process using Artificial Intelligence and Machine Learning techniques. Candidates can upload their resumes through a web-based interface, where the system securely stores and processes the data. The resume parsing module extracts essential information such as skills, education, experience, and certifications using Natural Language Processing. This extracted data is then structured and analyzed by the AI-based matching engine, which compares candidate profiles with job descriptions provided by HR administrators. Based on predefined criteria and similarity scores, the system ranks candidates and automatically shortlists the most suitable applicants. This eliminates the need for manual resume screening and significantly reduces the time required for candidate selection.

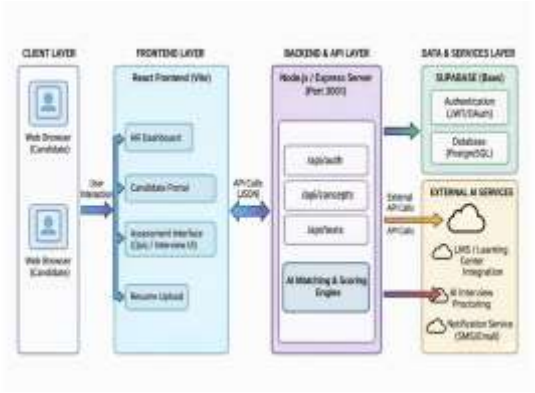

Fig.1 Architecture

In addition to resume screening, the system incorporates an automated interview agent that conducts preliminary interviews. The AI agent generates job-specific questions and evaluates candidate responses in real time. It assesses both technical knowledge and communication skills, providing a comprehensive evaluation of each candidate. The system generates detailed reports, including scores and performance analysis, which are accessible to HR professionals عبر the dashboard. This ensures data-driven decision-making and improves hiring accuracy. The system also supports scalability, enabling it to handle large numbers of applications efficiently. By integrating resume screening and automated interviewing, the

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proposed system enhances recruitment efficiency, reduces human bias, and ensures a faster and more reliable hiring process.

IV. SYSTEM DESIGN

The system design of the HR Resume Screener and Interview Agent is based on a modular and scalable architecture consisting of multiple interconnected components, the system begins with a client layer where candidates and HR users interact through a web interface. The frontend, developed using HTML, CSS, and JavaScript, provides features such as resume upload, job application, and interview participation. The backend layer, implemented using frameworks like Flask or Node.js, handles API requests, processes data, and communicates with the database. The data layer stores candidate information, job descriptions, and interview results using structured databases. The system also integrates external AI services for resume analysis and interview evaluation.

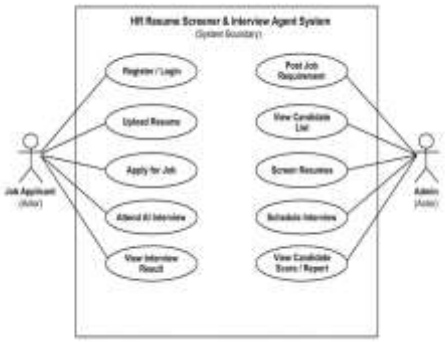

Fig.2 Use case diagram

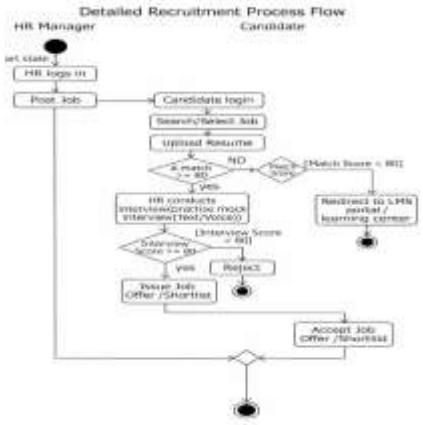

Fig.3 Sequence diagram

The core functionality of the system is managed by modules such as resume parsing, job matching, candidate selection, and interview evaluation. The resume parsing module extracts relevant data from resumes and converts it into a structured format. The AI matching module compares candidate profiles with job requirements and generates matching scores. The interview module conducts automated interviews and evaluates responses using AI techniques. The system uses JSON-based communication for efficient data exchange between frontend and backend. UML diagrams such as use case, sequence, and activity diagrams (pages 18–20) illustrate the workflow and interactions within the system. This modular design ensures scalability, maintainability, and efficient performance, making the system suitable for real-world recruitment applications.

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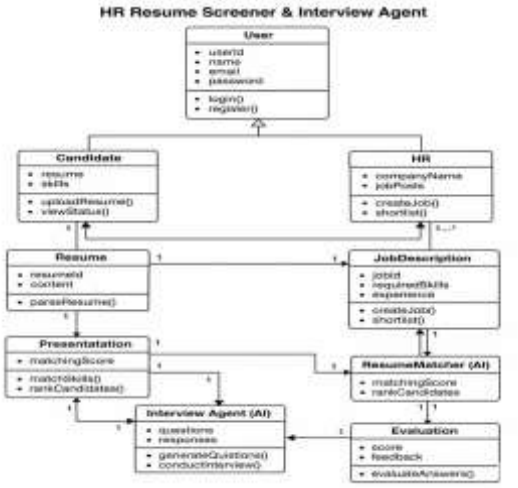
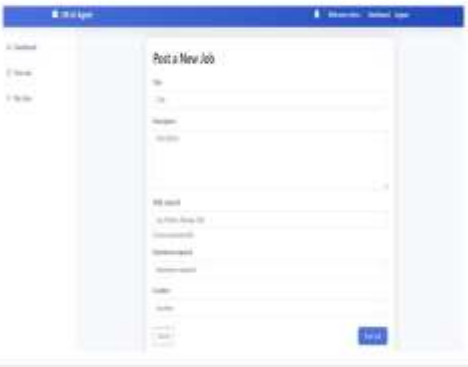


Fig.4 Activity diagram

Machine Learning Model	Input Data	Predicted Output	Expected Output
Resume upload & parsing	Valid pdfresume filesand valid DOCX resume file	96%	98%



V. RESULTS & ANALYSIS

Test analysis for the HR Resume Screener & Interview Agent system involves examining requirements and identifying critical areas to be tested, such as resume parsing accuracy, AI- based matching logic, interview question generation, and response evaluation. It focuses on validating data inputs, expected outputs, and system behavior under different conditions, including edge cases like incomplete resumes or invalid responses. The analysis helps in designing effective test cases, selecting appropriate test data, and ensuring that the system meets functional, performance, and security requirements while delivering accurate and reliable hiring outcomes.

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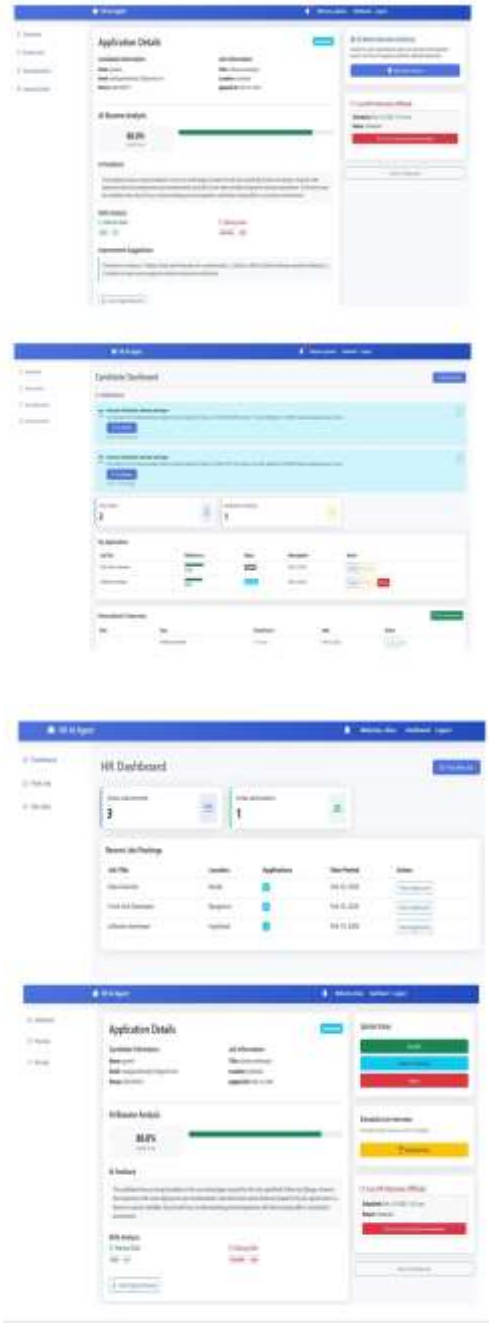

VI. CONCLUSION

The HR Resume Screener and Interview Agent system presents an effective solution to modern recruitment challenges by leveraging Artificial Intelligence, Machine Learning, and Natural Language Processing technologies. It automates key stages of the hiring process, including resume screening, candidate shortlisting, and preliminary interviews, thereby significantly reducing manual effort and time consumption. The system ensures accurate matching of candidate skills with job requirements and provides consistent evaluation through automated scoring mechanisms. By minimizing human bias and errors, it enhances fairness and transparency in recruitment. The integration of an AI-based interview agent further improves candidate assessment by analyzing responses and communication skills in real time. The system's ability to handle large volumes of applications makes it highly scalable and suitable for organizations of all sizes. Additionally, the generation of detailed reports and performance insights supports data-driven decision-making for HR professionals. The modular system design allows easy integration with advanced technologies and future enhancements such as predictive analytics and voice-based interviews. Overall, the proposed system improves recruitment efficiency, reduces operational costs, and ensures faster and more reliable hiring outcomes. It represents a significant advancement in intelligent recruitment systems and provides a strong foundation for future developments in automated hiring technologies.

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