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AI-BASED SMART RECRUITMENT AND CANDIDATE RANKING SYSTEM

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Abstract

Recruitment is an important process for organizations because selecting suitable candidates directly affects productivity, performance, and business growth. Traditional recruitment processes often require recruiters to manually review large numbers of resumes, compare candidate qualifications, conduct initial screening, and shortlist applicants. When the number of applications is high, this process becomes time-consuming and can result in delays or inconsistent evaluations. The AI-Based Smart Recruitment and Candidate Ranking System is proposed as an intelligent solution for automating candidate screening and ranking.

The proposed system uses Artificial Intelligence, Natural Language Processing, and Machine Learning to analyze resumes and job descriptions. The system extracts important information such as educational qualifications, technical skills, work experience, certifications, projects, and other job-related attributes from candidate resumes. It also analyzes the requirements specified in a job description and identifies the skills and qualifications required for the position.

After extracting relevant information, the system compares candidate profiles with job requirements and calculates a matching score. Candidates can then be ranked according to factors such as skill relevance, educational qualifications, experience, certifications, and other predefined criteria. The system can identify candidates who closely match the requirements and generate a shortlist for further evaluation by recruiters.

A centralized recruitment dashboard can display candidate profiles, matching scores, rankings, extracted skills, experience, and screening results. Recruiters can search, filter, compare, and review candidates more efficiently. The system can also provide explanations for ranking factors so that recruiters can understand why a candidate received a particular score rather than relying only on an unexplained automated decision.

Overall, the proposed system aims to reduce repetitive recruitment work, improve screening efficiency, and support recruiters in handling large application volumes. The system should be used as a decision-support tool rather than an automatic hiring decision-maker, with human recruiters reviewing shortlisted candidates and ensuring that recruitment decisions comply with applicable employment, privacy, and fairness requirements. Future enhancements can include multilingual resume processing, interview scheduling, skill-gap analysis, candidate recommendations, and integration with Applicant Tracking Systems.

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I. Introduction

Recruitment is a fundamental activity for organizations looking to attract and select qualified employees. A typical recruitment process includes job posting, application collection, resume screening, candidate shortlisting, interviews, evaluation, and final selection. Among these stages, resume screening can require significant effort because recruiters may need to review hundreds or thousands of applications for a single position. Efficient screening is therefore important for reducing recruitment time and identifying potentially suitable candidates.

Traditional recruitment processes generally depend on recruiters manually reading resumes and comparing candidate qualifications with job requirements. Recruiters examine educational backgrounds, technical skills, work experience, certifications, projects, and other relevant information. Manual screening can become difficult when resumes use different formats, terminology, and writing styles. Human evaluation may also vary between recruiters, making consistent candidate comparison challenging.

Artificial Intelligence provides opportunities to automate repetitive parts of recruitment. Natural Language Processing can extract meaningful information from unstructured resume documents, while Machine Learning can identify relationships between candidate attributes and job requirements. Semantic matching techniques can compare the meaning of skills and experience rather than depending only on exact keyword matches.

The proposed **AI-Based Smart Recruitment and Candidate Ranking System** uses these technologies to analyze candidate resumes and compare them with job descriptions. The system extracts relevant candidate information, identifies job requirements, calculates a matching score, and ranks candidates based on predefined criteria. Recruiters can then use the generated ranking as an additional source of information during the shortlisting process.

The objective of the proposed system is to reduce the time spent on repetitive resume screening while improving the organization and consistency of candidate evaluation. The system can help recruiters focus more attention on interviews, candidate engagement, and final evaluation. At the same time, automated rankings should remain reviewable and configurable so that qualified candidates are not unfairly excluded because of limitations in the data or model.

II. Literature Survey

Traditional recruitment systems have primarily relied on manual resume screening and spreadsheet-based candidate tracking. Recruiters read resumes individually, identify relevant qualifications, and create shortlists based on job requirements. Although human evaluation can consider contextual factors, manual screening becomes increasingly difficult as application volumes grow. The process can also require considerable time and administrative effort.

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Applicant Tracking Systems were developed to organize recruitment activities electronically. These systems can collect applications, store candidate information, track recruitment stages, and support communication with applicants. Many traditional Applicant Tracking Systems also provide keyword-based resume filtering. However, exact keyword matching may overlook candidates who possess relevant skills but describe them using different terminology.

Natural Language Processing has been applied to resume parsing and information extraction. NLP techniques can identify entities such as names, educational qualifications, organizations, job titles, skills, certifications, and experience. Resume-parsing systems can convert unstructured documents into structured candidate profiles, making them easier to compare and search.

Machine-learning approaches have been explored for candidate classification and job-candidate matching. Classification models can categorize candidates according to predefined recruitment criteria, while similarity models can compare candidate profiles with job descriptions. These approaches can improve automation, but their performance depends heavily on training data quality, feature selection, and the relevance of the evaluation criteria.

Recent developments in semantic search and Generative AI have improved the ability of recruitment systems to understand contextual relationships between skills and job requirements. Embedding-based approaches can identify semantic similarities between different terms, while language models can summarize resumes and job descriptions. These technologies can provide richer candidate matching than simple keyword-based filtering.

Research and practical deployment of AI in recruitment also highlight important concerns involving fairness, explainability, privacy, and bias. Historical recruitment data may contain biases that can be unintentionally reproduced by automated systems. Therefore, modern AI recruitment platforms should include human review, transparent scoring criteria, appropriate data protection, monitoring, and regular evaluation. The proposed system incorporates these principles while providing automated resume analysis, candidate matching, ranking, and recruiter-focused analytics.

III. System Analysis

The proposed system provides an intelligent platform for analyzing job descriptions and candidate resumes. The recruitment process begins when a recruiter creates a job position and enters the required qualifications, skills, experience, and other selection criteria. Candidate resumes are uploaded to the system in supported formats such as PDF or DOCX. A document-processing module extracts text and removes irrelevant formatting or duplicated information. The NLP module identifies important candidate attributes including education, skills, experience, certifications, projects, and job roles. A job-requirement extraction module identifies the important requirements from the corresponding job description. The matching engine compares candidate attributes with job requirements using keyword and semantic similarity techniques. A scoring

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engine calculates a candidate-job matching score based on configurable recruitment criteria. Candidates are ranked according to their calculated scores and relevant qualification factors. The recruiter dashboard displays ranked candidates, matching percentages, extracted skills, experience, and other evaluation information. Recruiters can filter candidates based on specific skills, qualifications, experience levels, or ranking ranges. The system can provide explanations showing the factors contributing to a candidate's ranking. Candidates who require additional review can be flagged for human evaluation rather than being automatically rejected. The system stores recruitment records securely and generates analytics that help recruiters understand the overall candidate pool.

Existing System

Existing recruitment processes commonly rely on manual resume screening, spreadsheets, email communication, and basic Applicant Tracking Systems. Recruiters receive resumes from job portals, company websites, referrals, and email applications. Each resume must be reviewed to determine whether the candidate satisfies the requirements of the available position. Keyword-based filtering is sometimes used to reduce the number of resumes that require manual review. However, keyword filtering can miss candidates who use alternative terms to describe equivalent skills. Traditional systems may also treat all skills equally without considering their relevance to the specific position. Candidate ranking is often performed manually using recruiter judgment and spreadsheets. Large application volumes can significantly increase screening time and administrative workload. Different recruiters may apply different evaluation criteria, resulting in inconsistent candidate rankings. Existing systems may provide limited explanations for why a candidate is shortlisted or filtered out. Manual comparison of multiple candidates can also be difficult when candidate information is stored in different formats. Historical recruitment analytics may require additional manual processing. These limitations create a need for an intelligent system that can extract candidate information, understand job requirements, calculate matching scores, and provide an organized ranking for recruiter review.

Disadvantages of Existing System

- Resume screening is time-consuming.
- Heavy dependence on manual recruiter effort.
- Difficult to process large numbers of applications quickly.
- Keyword matching may miss relevant candidates.
- Different resume formats complicate manual comparison.
- Manual candidate ranking can be inconsistent.
- Recruiters may apply different evaluation criteria.
- Limited semantic understanding of skills and experience.
- Manual extraction of resume information is repetitive.
- Candidate comparison can require significant administrative work.
- Limited explanation of automated filtering in basic systems.
- Recruitment analytics may require manual preparation.
- Difficult to identify skill relationships automatically.

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- Limited intelligent candidate recommendations.

Proposed System

The proposed system provides an AI-based platform for intelligent resume screening and candidate ranking. Recruiters first create a job profile containing required skills, qualifications, experience, certifications, and other relevant criteria. Candidates submit resumes through the recruitment portal, and the system extracts text from supported document formats. NLP techniques identify structured information such as education, technical skills, work experience, projects, certifications, and job roles. The system separately analyzes the job description to identify essential and preferred requirements. A matching engine compares candidate information with job requirements using both keyword and semantic similarity. A scoring module calculates a configurable candidate-job matching score based on the organization's approved evaluation criteria. Candidates are ranked according to their matching scores and relevant qualifications. Recruiters can view the ranking together with the candidate's extracted skills, experience, education, and matched requirements. The system can highlight strong matches and identify missing or less-relevant requirements without making an automatic hiring decision. Recruiters can filter, compare, and shortlist candidates through the dashboard. The system can also provide an explanation of the factors that contributed to a candidate's ranking. All candidate information is stored with appropriate access controls and privacy safeguards. Human recruiters remain responsible for final selection decisions, interviews, and verification of candidate information.

Advantages of Proposed System

- Automates resume information extraction.
- Reduces repetitive manual screening work.
- Processes large numbers of resumes efficiently.
- Matches candidates with specific job requirements.
- Supports semantic skill matching.
- Provides candidate-job matching scores.
- Automatically ranks candidates for recruiter review.
- Displays extracted skills and qualifications.
- Supports customizable evaluation criteria.
- Provides transparent ranking factors.
- Enables candidate filtering and comparison.
- Improves recruitment workflow organization.
- Provides recruitment analytics and reports.
- Reduces administrative workload.
- Supports human-in-the-loop recruitment decisions.
- Can be integrated with Applicant Tracking Systems.

IV. Methodology

The methodology of the proposed system consists of several stages beginning with job creation and ending with recruiter-assisted candidate shortlisting. The first stage is

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job requirement collection, where recruiters enter the job title, required skills, educational qualifications, experience, certifications, and other approved criteria. Candidate resumes are then uploaded through the recruitment portal in supported document formats. A document-processing module extracts text from each resume and performs preprocessing such as formatting cleanup, text normalization, and duplicate-content removal. The NLP module identifies candidate information including technical skills, education, experience, certifications, projects, and job positions. A separate NLP process analyzes the job description and extracts required and preferred qualifications. The matching engine compares candidate attributes with job requirements using semantic similarity and other appropriate matching techniques. A scoring engine assigns weights to approved criteria and calculates an overall candidate-job matching score. Candidates are then ranked according to their scores and relevant qualification information. The recruiter dashboard displays candidate rankings, matched skills, missing requirements, experience, and other extracted information. Recruiters can filter and compare candidates and select individuals for further human evaluation. The system can record recruitment outcomes and feedback for monitoring, while avoiding uncontrolled use of historical hiring decisions as automatic ground truth. Finally, performance is evaluated using measures such as resume-parsing accuracy, matching precision, ranking quality, processing time, and fairness-related evaluation metrics.

System Architecture

The system architecture consists of several interconnected components including the Candidate/Recruiter Interface, Resume Upload Module, Document Processing Layer, NLP and Resume Parsing Engine, Job Requirement Extraction Module, Candidate Matching Engine, Ranking and Scoring Module, Secure Candidate Database, Recruitment Dashboard, Analytics Module, and Human Review Layer. The process begins when recruiters create a job profile and candidates upload their resumes through the recruitment interface. The document-processing module extracts and preprocesses resume content from supported formats. The NLP engine identifies structured candidate information such as skills, education, work experience, certifications, projects, and job roles. In parallel, the job-requirement module analyzes the job description and extracts required and preferred qualifications. The candidate-matching engine compares the extracted candidate profile with the job requirements using keyword and semantic similarity techniques.

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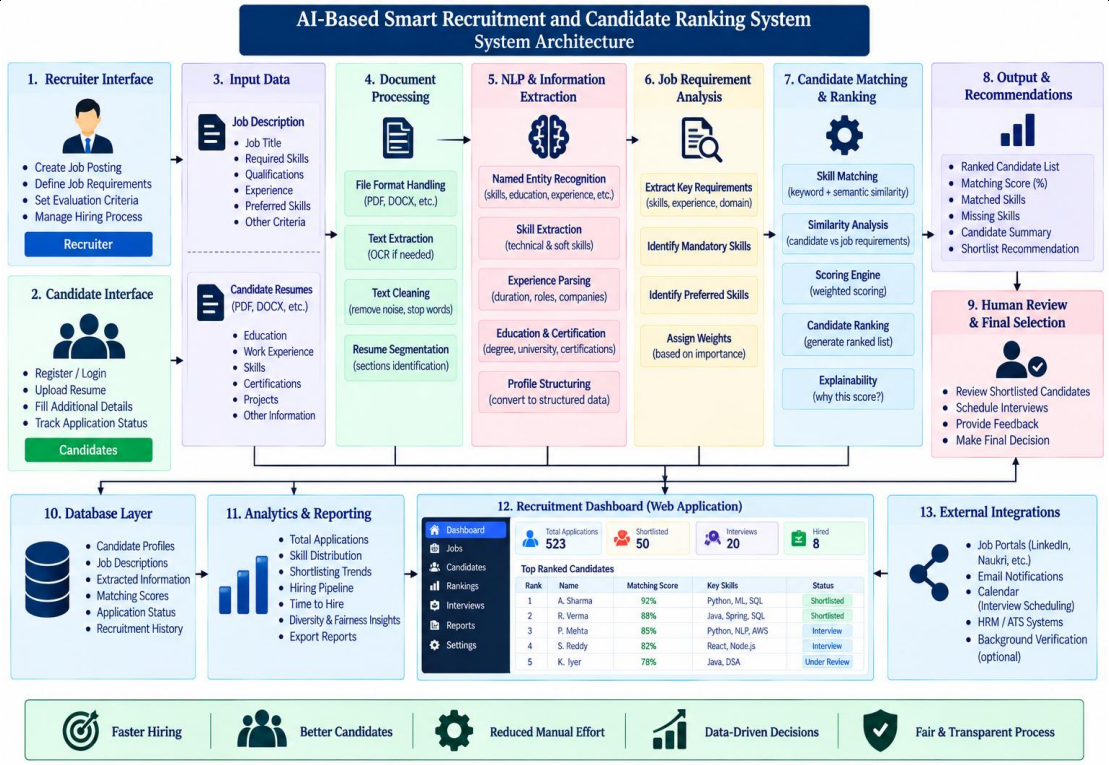

The scoring engine applies configurable and approved evaluation criteria to calculate the candidate-job matching score. Candidates are then ranked according to the resulting scores and relevant matching factors. The secure database stores candidate profiles, job descriptions, matching results, ranking information, and recruitment records with appropriate access controls. The recruiter dashboard presents ranked candidates, matched skills, missing requirements, scores, and comparison information. An analytics module provides recruitment statistics such as application volume, skill distribution, processing time, and shortlist trends. The human review layer allows recruiters to verify candidate information and make final decisions rather than relying solely on automated rankings. The complete architecture follows the flow **Job Description → Requirement Extraction → Resume Upload → Document Processing → NLP Resume Parsing → Candidate Profile → Skill & Requirement Matching → Scoring & Ranking → Secure Database → Recruiter Dashboard → Human Review & Final Selection**.

V. Result and Output

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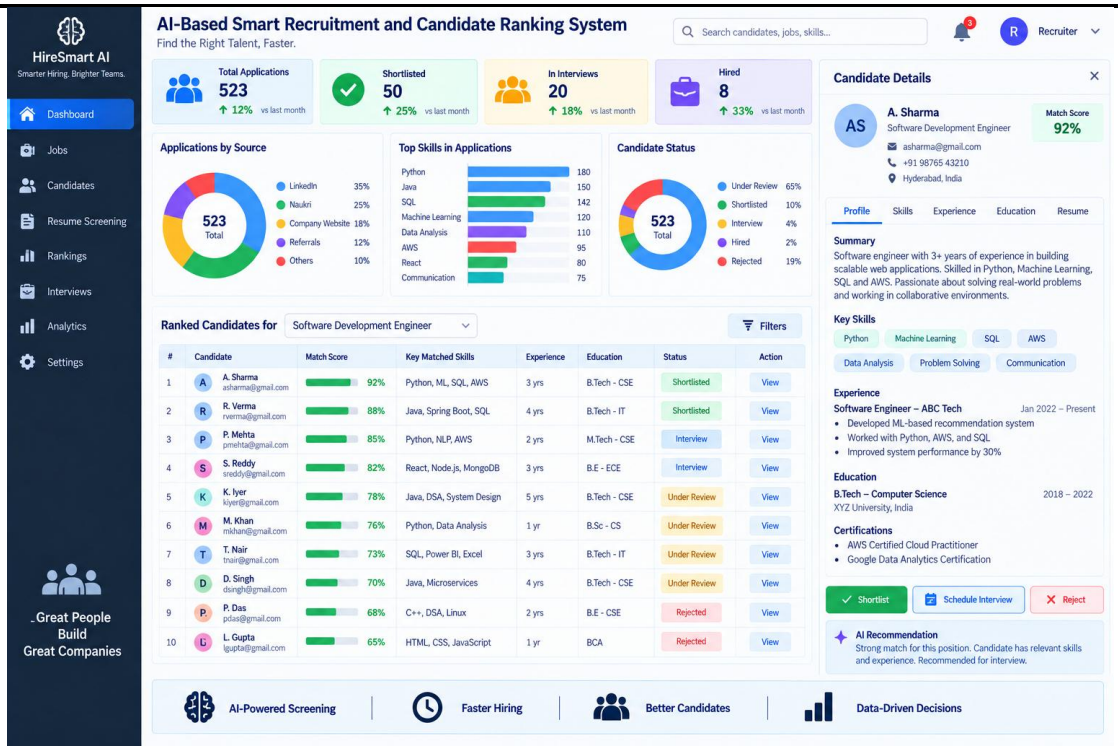

VI. Conclusion

The AI-Based Smart Recruitment and Candidate Ranking System provides an intelligent and efficient solution for automating the initial stages of the recruitment process. By using Artificial Intelligence, Natural Language Processing, Machine Learning, and semantic matching, the system can analyze resumes, extract candidate information, and compare qualifications with specific job requirements.

The proposed system reduces the time and effort required for manual resume screening. It can automatically identify relevant skills, educational qualifications, work experience, certifications, and projects, then calculate a candidate-job matching score and generate a ranked list for recruiter review.

The system also provides a centralized recruitment dashboard where recruiters can view candidate profiles, matching scores, matched and missing skills, application status, and recruitment analytics. This helps recruiters compare candidates more efficiently and make better-informed decisions.

Overall, the project demonstrates how AI can make recruitment faster, more organized, and data-driven while keeping human recruiters involved in the final decision-making process. Future enhancements can include multilingual resume processing, AI-based interview assistance, skill-gap analysis, interview scheduling, candidate recommendations, fairness monitoring, and integration with Applicant Tracking Systems (ATS).

References

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[1] Kumar, R. D., Prudhviraj, G., Vijay, K., Kumar, P. S., & Plugmann, P. (2024). Exploring COVID-19 through intensive investigation with supervised machine learning algorithm. In Handbook of Artificial Intelligence and Wearables (pp. 145-158). CRC Press.

[2] Swathi, B., Vijay, K., Sushanth Babu, M., & Dinesh Kumar, R. (2024, November). Machine Learning Techniques in Cloud Based Intrusion Detection. In The International Conference on Artificial Intelligence and Smart Environment (pp. 557-564). Cham: Springer Nature Switzerland.

[3] Sv satyakrishna, shirisha rangu ,bhargavi nalacheruve.(2024) Prospective investigation on colorectal cancer with SMOTE on machine learning Algorithm

[4] Dr.G.Vishnu Murthy, BhargaviNalacheruve 1Professor, Department of computer Science & engineering, Anurag University, TS, India. 2Student, Department of computer Science & engineering, Anurag University, TS, India.

[5] V. N. S. Manaswini, K. K, C. Nigam, S. S. Ali, R. Niranjana, and Suman, "Real-Time Object Detection in Drone Surveillance Using YOLOv5," in Proc. 2025 3rd Int. Conf. IoT, Communication and Automation Technology (ICICAT), Gorakhpur, India, 2025, pp. 1–6, doi: 10.1109/ICICAT68430.2025.11414670.

[6] B. Soundarya, V. N. S. Manaswini, M. Ayyakrishnan, R. D. Kumar, "Contextual Analysis of Big Data Analytics in Intelligent Transportation Frameworks," in Intersection of Artificial Intelligence, Data Science, and Cutting-Edge Technologies: From Concepts to Applications in Smart Environment, Lecture Notes in Networks and Systems, vol. 1353, Cham: Springer, 2025, doi: 10.1007/978-3-031-88304-0_79.

[7] R. D. Kumar, V. N. S.Manaswini, "Applications of blockchain in smart cities: detecting fake documents from land records using blockchain technology," in Blockchain for Smart Cities, Elsevier, 2021, pp. 105–117, doi: 10.1016/B978-0-12-824446-3.00017-X.

[8] Tejavath Veeramma, Badarla Anil, Guguloth Ravinder, "An advanced movie recommender using collaborative filtering and sentiment analysis," International Research Journal of Modernization in Engineering Technology and Science, vol. 7, no. 7, July 2025, doi: 10.56726/IRJMETS81618.

[9] Ravi Kumar Banoth, Ramana Murthy B V, "Automatic crop recommendation system using LightGBM and decision tree machine learning models," Journal of Machine and Computing, vol. 5, no. 1, pp. 343, Jan. 2025, doi: 10.53759/7669/jmc202505026.

[10] Ravi Kumar Banoth, Dr. B.V. Ramana Murthy, "Smart agriculture through IoT and machine learning for analyzing carbon footprints," in Proc. Int. Conf. Computer Science and Communication Engineering (ICCSCE), Apr. 2025.

[11] Ravi Kumar Banoth, B. V. Ramana Murthy, "Soil image classification using transfer learning approach: MobileNetV2 with CNN," SN Computer Science, vol. 5, art. no. 199, 2024, doi: 10.1007/s42979-023-02500-x.