

Smart HR Management System: Job Posting, Screening & Decision Support

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Abstract - Traditional recruitment involves several manual steps that often slow down the hiring process and lead to inconsistencies, especially when organisations deal with a large number of applicants. Tasks such as creating job descriptions, advertising vacancies on different platforms, and manually reviewing resumes can become overwhelming, resulting in delays and varying quality in decision-making. To address these issues, this study introduces an AI-driven Smart HR Management System designed to streamline the recruitment workflow. The system integrates Natural Language Processing (NLP) and Machine Learning (ML) techniques to convert unstructured job and resume information into structured, meaningful data. GPT-based language models assist in generating clear and standardised job descriptions, while TF-IDF and Cosine Similarity methods help measure the alignment between job requirements and candidate profiles. The proposed solution aims to reduce the time required to fill positions, maintain uniformity across job postings, minimise reliance on subjective judgement, and assist HR teams with transparent and evidence-based insights through visually rich dashboards.

I. INTRODUCTION

The recruitment function plays a crucial role in shaping an organisation's workforce. Despite significant technological advancements, many organisations continue to follow traditional approaches that rely heavily on manual involvement. HR professionals often spend a considerable amount of time drafting job descriptions, posting them on multiple platforms, collecting resumes from different sources, and evaluating applicants through manual screening. These steps require substantial effort and can vary in quality depending on the individual performing the task.

As the number of applications grows, these manual methods become increasingly inefficient and may lead to inconsistent hiring decisions. Large applicant volumes heighten the risk of errors, delayed processing, and uneven candidate evaluations. Furthermore, without structured analytical support, recruiters may unintentionally overlook qualified candidates due to fatigue or subjective interpretations.

Advancements in Artificial Intelligence (AI), Natural Language Processing (NLP), and Machine Learning (ML) provide new avenues to improve the recruitment process. AI enables systems to analyse large datasets swiftly, while NLP makes it possible to interpret the language used in

resumes and job descriptions. ML supports the identification of patterns and similarities that help determine how well a candidate matches a job requirement.

The Smart HR Management System proposed in this study brings these technologies together to create a more structured and efficient recruitment pipeline. The system aims to automate key steps such as job description creation, resume evaluation, and candidate ranking. Additionally, the analytical dashboard ensures that HR teams can make informed decisions based on clear, data-driven insights rather than relying solely on personal judgement.

II. LITERATURE REVIEW

Growing interest in the digital transformation of HRM has encouraged several researchers to explore how AI can improve recruitment and other HR activities. Many studies highlight that AI-based tools reduce repetitive tasks, allowing HR teams to focus more on strategic responsibilities. For example, NLP techniques have gained prominence because they can extract information from resumes with greater consistency than manual methods.

Research also indicates that AI supports fairness and transparency in the hiring process by minimising the influence of personal biases. Machine Learning models, particularly those used for ranking and classification, help ensure that candidate evaluations remain consistent and objective. Chatbots have emerged as another area of interest for their ability to respond to candidate queries, schedule interviews, and maintain continuous communication throughout the recruitment cycle.

Bibliometric studies show a significant rise in publications focusing on AI in HRM, demonstrating the growing academic and industry relevance of automated HR solutions. These studies collectively reinforce the need for integrated systems that handle job description creation, resume processing, candidate matching, and decision support—areas central to the system developed in this research.

III. EXISTING METHODOLOGY

MANUAL JOB DESCRIPTION CREATION

In many organisations, HR teams prepare job

descriptions based on their personal experiences or by reusing old templates. While this approach may work for simple roles, it often leads to differences in tone, clarity, and completeness. Important information such as expectations, qualifications, or responsibilities may be unintentionally omitted. Additionally, preparing detailed descriptions for multiple roles can consume a significant amount of time, especially in organisations with frequent hiring needs.

JOB POSTING AND ADVERTISEMENT

Posting job descriptions manually across several platforms—such as company websites, job portals, and professional networks—requires repeated effort. Because there is no unified system for publishing or tracking job posts, HR teams may experience delays and inconsistencies in the content shared. This lack of coordination can reduce the visibility of job openings and slow down the overall recruitment process.

RESUME COLLECTION

HR professionals receive resumes from diverse sources including email, referrals, campus drives, and online job portals. These resumes often come in different formats like PDF, Word documents, and scanned images. Managing and organising such varied data manually can be challenging and may lead to loss of documents or duplicated entries. Sorting resumes based on role requirements adds another layer of complexity.

RESUME SCREENING

Manual resume screening is one of the most time-consuming tasks in recruitment. Recruiters must review each resume individually to determine whether a candidate meets the required qualifications. When the applicant pool is large, this becomes extremely strenuous. Human fatigue can lead to oversight, and subjective judgement may influence decisions, reducing consistency and fairness.

CANDIDATE SHORTLISTING

Shortlisting typically depends on the recruiter's interpretation of the resumes and job criteria. Without standardised evaluation methods, two recruiters may arrive at different conclusions for the same set of applicants. This variation affects transparency and creates challenges in maintaining consistent hiring standards across the organisation.

IV. PROPOSED SYSTEM

AI- BASED JOB DESCRIPTION GENERATOR

The job description generator uses GPT-based language models to convert basic job-related inputs into complete and professional descriptions. Instead of spending time manually drafting long paragraphs, HR staff can simply

provide required inputs, such as responsibilities, qualifications, and experience levels. The model organises this information into a clear and consistent format. This reduces the dependency on individual writing styles and ensures that job descriptions maintain a uniform standard across the organisation.

AUTOMATED JOB DISSEMINATION

After the job description is finalised, the system distributes it automatically across multiple recruitment platforms. Integrated APIs allow the system to publish postings instantly on job portals, company websites, and social media channels. This automation reduces repetitive work, ensures timely announcements, and increases the chances of reaching a wider audience.

RESUME PARSING AND PROCESSING MODULE

When resumes are uploaded, the system converts various file types into readable text. NLP techniques are applied to filter out unnecessary details and extract essential information such as skills, work experience, educational background, and certifications. This structured representation of resume data makes further ML-based analysis more reliable. It also reduces errors that commonly occur during manual data entry or interpretation.

MACHINE LEARNING-BASED MATCHING ENGINE

The matching engine evaluates the alignment between a candidate's resume and the job description using TF-IDF vectorisation and Cosine Similarity. TF-IDF identifies key terms that matter most for the job, while Cosine Similarity computes how closely the resume matches the job requirements. This process ensures an unbiased assessment of candidates based solely on factual content rather than subjective impressions.

HR DASHBOARD AND ANALYTICS

The dashboard provides HR teams with a visual summary of candidate rankings, similarity scores, and match percentages. This enables recruiters to easily compare multiple applicants and identify the strongest candidates. Filters and sorting options provide deeper insights, helping HR professionals make decisions more quickly and with greater confidence. The dashboard design also improves transparency, as every ranking decision is supported by measurable evidence.

V. IMPLEMENTATION USER

INTERFACE DEVELOPMENT

The user interface acts as the central platform where HR professionals interact with the system. It is designed to be intuitive and accessible, allowing users to navigate through various features with ease. The interface supports job creation, resume uploads, data visualisation, and candidate

comparisons. By ensuring a smooth connection with backend services, the interface maintains quick response times and enhances overall user experience.

NLP-BASED JOB DESCRIPTION GENERATION

Once job-related details are submitted, the backend processes the information and sends it to the GPT-based model. The output is then displayed to the user for review. The descriptions generated are stored for future reference and shared during the matching process to ensure consistency across the system.

RESUME INGESTION AND PREPROCESSING

During ingestion, resumes are converted from their original formats into plain text. The system then applies NLP preprocessing - such as converting text to lowercase, removing repeated or irrelevant words, and standardising variations of the same word. This preparation step is essential for achieving accurate similarity calculations, as the quality of preprocessing directly influences the performance of the ML models.

TF-IDF VECTORIZATION

Using TF-IDF, the system identifies keywords that are unique or important within each resume and job description. This helps highlight relevant skills and experiences, improving the matching accuracy. Terms that appear too frequently across many documents are assigned lower weight, reducing noise in the analysis.

COSINE SIMILARITY COMPUTATION

Cosine Similarity compares the vector representations of resumes and job descriptions. The score generated reflects how well a candidate fits the job criteria. Candidates with higher similarity scores are placed at the top of the ranking list, ensuring a fair and consistent evaluation process.

DASHBOARD VISUALIZATION

The dashboard showcases results in an organised manner using charts, tables, and progress indicators. Recruiters can quickly interpret match results and explore detailed comparisons between candidates. This visual format helps HR teams make informed decisions without having to manually analyse each resume.

VI. CONCLUSION

The Smart HR Management System provides a structured and efficient approach to modern recruitment challenges. By employing AI-based job description generation, automated posting, and ML-driven resume evaluation, the system reduces the workload on HR teams and improves the accuracy of candidate assessments. The objective nature of TF-IDF and Cosine Similarity helps remove personal biases from hiring decisions, while the analytical dashboard gives

HR professionals clear and reliable insights. Overall, this system demonstrates the value of integrating AI into HRM and highlights how technology can improve speed, fairness, and consistency in recruitment practices.

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