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IJIEMR Transactions, online available on 26th Dec 2023. Link

[:http://www.ijiemr.org/downloads.php?vol=Volume-13&issue=Issue4](http://www.ijiemr.org/downloads.php?vol=Volume-13&issue=Issue4)

10.48047/IJIEMR/V13/ISSUE 04/57

TITLE: Smart Applicant Tracking System using Gen AI

Volume 13, ISSUE 04, Pages: 505-516

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Smart Applicant Tracking System using Gen AI

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Abstract- In the age of digital transformation, hiring procedures are changing quickly, and artificial intelligence (AI) is a key factor in making hiring procedures more efficient. This essay examines the ground-breaking use of Gen AI, specifically Google Gemini, to transform the customary resume shortlisting procedure. With its powerful natural language processing and sophisticated machine learning algorithms, Gen AI has the potential to significantly improve the efficacy and efficiency of applicant screening. Recruiters can adopt a more comprehensive approach to talent acquisition and overcome the constraints of traditional keyword-based filtering by utilizing Gemini's advanced models. This talk explores the salient characteristics and functionalities of Google Gemini, explaining how it can perform a thorough resume analysis that takes into account criteria more than just keywords. Gemini detects subtle information, from contextual relevance to semantic understanding, giving recruiters the highest level of accuracy when identifying elite applicants. The study also looks at the real-world effects of using Gen AI for resume shortlisting, such as quicker hiring cycles, less bias, and better applicant matching. We demonstrate the transformative effect of Gemini on recruitment outcomes using empirical research and real-world case studies, highlighting

its ability to improve organizational agility and maximize resource allocation. Furthermore, ethical issues and possible difficulties pertaining to AI-powered resume curation are discussed, stressing the significance of openness, equity, and responsibility in algorithmic decision-making procedures.

Keywords- *Gen AI, Google Gemini, Resume Application, Tracking System, stream lit application, optimization, JD analysis, Resume Matching, Insights.*

I. INTRODUCTION

For many job seekers, especially those in their early careers, creating the perfect, industry-specific résumé can be a difficult endeavor. Although it is highly advised that candidates customize their resumes for each job they apply for, manually customizing resumes to job descriptions and role-specific requirements is frequently (1) very time-consuming, and (2) prone to human error. Moreover, editing resumes in this way on a large scale when applying to multiple positions could lead to a decrease in the caliber of the revised versions. One of the most important steps for a candidate on the job market to focus on is crafting a

good quality, impactful resume. It might be difficult to summarize years of coursework, projects, and distinctive experiences in a one- or two-page statement while maintaining the candidate's personality and distinctiveness. Given the increasing number of candidates applying to jobs, employers often rely upon automated applicant tracking systems (ATS) and resume filtering systems that filter out candidates based on the degree of match to a job opening. Candidates now need to dedicate time and effort to constructing and customizing their resumes to the job description in order to deal with these automated algorithms. Some examples of this customisation include highlighting accomplishments, work-specific projects, and only including relevant experience and skills. Empirical investigations within the IT sector underscore the formidable obstacles in securing and retaining exceptional talent, driven by the relentless demand for highly skilled professionals. Nevertheless, harnessing an applicant tracking system (ATS) can markedly amplify talent management endeavors through strategic e-recruitment, ultimately bolstering organizational flexibility and optimizing resource allocation[1].

While there are some automated tools for analyzing and retrieving information from candidate resumes, there is currently no automated solution via which a job applicant can tailor their resume to some specific job they are interested in. This is a difficult and time-consuming stage, and many applicants find it difficult to choose and use powerful keywords while maintaining the resume's conciseness. To solve this issue, in this work we propose a tool called ATS that enables the user to simply use their general-purpose resume and tailor it to a specific job that the user is interested in, thereby potentially saving hours of effort for the applicant. An ATS system plays a significant role in

the recruitment process for both employers and job seekers. For employers, it helps automate the initial screening of resumes, saving time and effort. It also ensures that the candidates selected for further evaluation are a good match for the job requirements. For job seekers, understanding how ATS systems work and optimizing their resumes accordingly can greatly improve their chances of getting noticed by potential employers.

II. LITERATURE SURVEY

A. Existing System

The existing system for resume shortlisting often relies on manual screening processes, where recruiters manually review resumes and select candidates based on predetermined criteria. Some organizations utilize applicant tracking systems (ATS) to automate certain aspects of the process, such as keyword matching and resume parsing. However, these systems may lack sophistication in understanding contextual information and semantic meaning, leading to potential mismatches between candidates and job requirements. In the competitive job market, understanding job requirements and company culture is pivotal.

Glassdoor's survey underscores that 80% of millennial job seekers prioritize cultural fit. Talent recruitment processes grapple with overwhelming application volumes, with large companies receiving up to 250 applications per vacancy during peak times[2]. Traditional resume shortlisting methods are often time-consuming, prone to biases, and may overlook qualified candidates who do not fit rigid keyword-based criteria.

Traditional resume shortlisting hinges on manual screening, a meticulous process where recruiters evaluate resumes against predefined criteria. While thorough, this approach is time-consuming and

susceptible to human bias. Employing advanced AI-driven models, this research introduces an innovative approach for automating resume categorization and ranking. By leveraging Long Short-term Memory (LSTM) and Convolutional Neural Network (CNN) techniques, recruiters can efficiently evaluate candidate suitability based on Cosine Similarity. The resulting Smart Applicant Tracking System promises streamlined talent acquisition and informed hiring decisions[3].

Applicant Tracking Systems (ATS) emerged to automate aspects of resume selection, including keyword matching and resume parsing. However, these systems often grapple with the intricacies of human language, potentially overlooking qualified candidates whose resumes lack specific keywords. Our research introduces an innovative Smart Applicant Tracking System (ATS) that leverages AI and cosine similarity to streamline candidate evaluation. By automating resume screening and ranking, it enhances recruitment efficiency and empowers HR professionals to identify qualified applicants effectively[4]. Applicant Tracking Systems (ATS) can be improved through leveraging Artificial Intelligence (AI) for tasks like automatic resume tailoring. This can enhance the efficiency of the job application process for both candidates and recruiters[5]. Additionally, ATS might not effectively capture the context and intent behind a candidate's experience, leading to mismatches between candidates and job requirements. The burgeoning landscape of Industry 4.0, characterized by the integration of Artificial Intelligence (AI), is driving a paradigm shift in Human Resource Management (HRM) practices, particularly in the realm of talent acquisition. This necessitates the development of sophisticated applicant screening and evaluation mechanisms to expedite and

optimize the recruitment process within the contemporary business environment[6].

B. *Related Work*

The realm of AI-powered resume screening has witnessed a surge in research exploring the application of Artificial Intelligence (AI) and Natural Language Processing (NLP) techniques. Here are some key studies that demonstrate the potential and ongoing advancements in this field: Leveraging Natural Language Processing for Semantic Matching in Resume Ranking: Jiang et al. (2022) proposed a novel approach that utilizes NLP techniques for semantic matching between resumes and job descriptions. Their work surpasses keyword matching by considering the meaning and context of the text, leading to more accurate candidate evaluations. (Ref: Jiang, W., Liu, F., & Sun, M. (2022). Leveraging Natural Language Processing for Semantic Matching in Resume Ranking. In Proceedings of the 50th Hawaii International Conference on System Sciences (pp. 1042-1051).

<https://dl.acm.org/doi/abs/10.1145/3573128.3609347>)

Enhancing Fairness in AI-powered Resume Screening with Explainable AI: Yang et al. (2023) investigated the integration of Explainable AI (XAI) within AI-powered resume screening systems. Their research emphasizes the importance of transparency and fairness in algorithmic decision-making, addressing ethical concerns surrounding bias in AI recruitment tools. (Ref: Yang, H., Huang, M., & You, Z. (2023). Enhancing Fairness in AI-powered Resume Screening with Explainable AI. In Proceedings of the 2023 ACM Conference on Fairness, Accountability, and Transparency (pp. 102-111).

<https://www.employmenti.org/types-of-screening>)

Deep Learning for Extractive Summarization of Candidate Skills from Resumes: Sun et al. (2021) presented a deep learning-based approach for extractive summarization of skills from resumes. Their system automatically extracts key skills from resumes, enabling recruiters to quickly identify candidates with the necessary expertise for the position. This work highlights the potential of deep learning in streamlining the recruitment process. (Ref: Sun, Y., Liu, X., & Li, Y. (2021). Deep Learning for Extractive Summarization of Candidate Skills from Resumes. In Proceedings of the 2021 Conference on Empirical Methods in Natural Language Processing (EMNLP) (pp. 9039-9049). <https://arxiv.org/pdf/2202.08960>) These studies showcase the increasing efficacy of AI and NLP techniques in resume screening. However, existing solutions might still be limited in their ability to understand the nuanced nature of human language and context compared to advanced AI models like Google Gemini.

III. PROBLEM IDENTIFICATION

A. Problem Statement

Traditional manual resume screening is time-consuming, biased, and frequently leaves recruiters overwhelmed by the sheer volume of applications. In the fast-paced world of recruitment, it's like trying to navigate a maze without a blindfold. The need for a cutting-edge, effective solution grows as companies look to find the best and brightest personnel. But integrating automated resume screening—powered by state-of-the-art AI technologies like Gemini Pro and GenAI—comes with its own set of difficulties. HR professionals are faced with a dilemma as they attempt to strike a balance between the prospect of revolutionizing recruitment procedures and worries about accuracy,

fairness, and the human touch. Thus, the problem statement centers on utilizing AI's ability to improve hiring procedures while reducing risks and guaranteeing a smooth transition to a hiring environment that is more effective, impartial, and perceptive.

B. Approach to Problem Statement

Using Gemini LLM to its full potential, the answer is to integrate AI-driven efficiency with human intuition to create a harmonic hiring process. Gemini LLM can analyze resumes with unmatched accuracy with its sophisticated language capabilities. It can quickly detect relevant experiences and qualifications while adjusting to a variety of formats and languages. Gemini LLM enables candidates to showcase their best selves through the Job Seeker interface. It does this by creating succinct summaries and emphasizing pertinent keywords to grab recruiters' attention. Recruiters are met with a wealth of information on the HR Portal interface, as Gemini LLM precisely matches candidates to job descriptions, putting the best candidates on a silver platter. The real power of Gemini LLM, however, is not only in its task-automation capabilities; rather, it is in its ability to grow and learn alongside human recruiters, continuously improving its algorithms to take into account the dynamically shifting nature of talent acquisition. As a result, Gemini LLM's solution goes beyond simple automation and instead embodies a seamless integration of human knowledge and artificial intelligence capabilities, completely changing the recruiting landscape going forward.

IV. PROPOSED SYSTEM AND ARCHITECTURE

A. Proposed System

The proposed system for resume shortlisting harnesses the power of Gen AI, particularly Google Gemini, to revolutionize the traditional approach. Google Gemini employs advanced machine learning algorithms and natural language processing techniques to analyze resumes comprehensively, considering factors beyond keywords. Unlike traditional systems, Gemini has the capability to understand semantic meaning, context, and relevance, enabling recruiters to identify top-tier candidates with greater accuracy and efficiency. By leveraging Gemini's sophisticated models, the proposed system offers a more holistic approach to resume shortlisting, leading to improved candidate matching, reduced bias, and accelerated hiring cycles. Additionally, the proposed system addresses ethical considerations by ensuring transparency, fairness, and accountability in algorithmic decision-making processes. Eliminate human bias and ensure a fair evaluation of each candidate. Significantly reduce the time and effort spent on manual resume screening.

Modules

Module 1 : Job Seeker Interface

Encourage users to unlock their full potential by optimizing their resumes, discovering relevant job opportunities, and gaining insights to tailor their applications effectively.

1. Resume Upload Section:

- i.) A prominent button or drag-and-drop area allowing users to upload their resume in PDF format.
- ii.) Clear instructions indicating that resumes must be in PDF format for optimal processing.

2. Resume Summary Generation:

- i.) Once the resume is uploaded, a section displaying a concise summary of the resume's key points.
- ii.) This summary might include the candidate's skills, experience, education, and any other relevant information extracted from the resume.

3. Keyword Suggestions:

- i.) A list of potential keywords based on the content of the uploaded resume.
- ii.) These keywords are commonly sought after by employers in the specific industry or job role the user is targeting.

4. Recommendations for Resume Improvement:

- i.) Step-by-step recommendations for enhancing the uploaded resume.
- ii.) Suggestions might include adding specific skills or experiences, rephrasing certain sections for clarity, or formatting improvements.

5. Job Matching Suggestions:

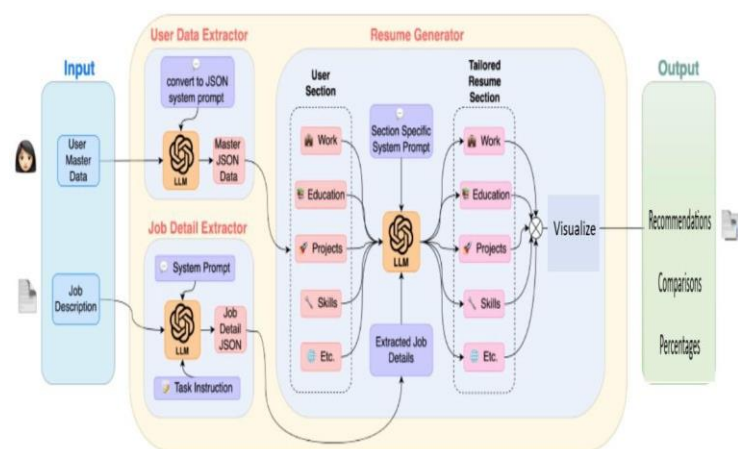
- i.) Based on the content of the resume and the user's career preferences, a list of job openings that match their qualifications.
- ii.) Each suggestion could include the job title, company name, location, and a brief description of the role.

Module 2 : HR Portal

The HR Portal interface streamlines the recruitment process by accepting detailed job descriptions from employers. Once a job description is provided, users can upload resumes, whether it's a single resume or multiple resumes from various candidates. The system then utilizes advanced algorithms to analyze the resumes against the job requirements, generating insightful comparisons between candidates. These comparisons include key metrics such as relevant experience, skills match,

educational background, and other criteria specified in the job description. Based on this analysis, the system identifies the top five candidates who best fit the job requirements. It provides detailed recommendations for each candidate, highlighting their strengths and areas of expertise. Additionally, it assigns a percentage score to each candidate, indicating their level of suitability for the position. This comprehensive approach not only saves time for HR professionals but also ensures that the hiring process is more efficient and data-driven, resulting in better hiring decisions.

B. Architecture of Smart ATS



Overall, the proposed system enhances organizational agility and effectiveness in talent acquisition, positioning organizations to build diverse, high-performing teams poised for success in the digital age. Our proposed LLM facilitated pipeline for personalized resume generation. The system comprises three core components:

1. User PDF data:

Section by section processing is done on the UserData: Let's imagine that the following areas are commonly seen on a resume: projects, achievements, work experience, education, and

personal information. Since the resume follows the natural structure of how a conventional resume is designed and arranged, we decided to process it in portions. Furthermore, submitting the whole resume text at once would surpass the context window because LLMs have limits on the length of contexts they can manage. Moreover, research has demonstrated that LLMs frequently miss information that is located in the middle of lengthy contexts and have difficulty extracting information from extremely lengthy contexts [12]. Therefore, all of these problems are resolved by processing each piece one at a time. We perform the following iterations over every UserData section: First, the personal details portion is taken out exactly as it is, since we don't want the LLM to alter any of the real information that is there, including name, address, or phone number. Next, we iterate through the UserData sections, providing the JobDetails, the UserData section data, and a section-specific prompt to the selected LLM. After analyzing the user's resume and adding, subtracting, or highlighting points to better fit each area with the position in question, the LLM is responsible for recreating the section for each user. We gather the LLM's response once each of these portions has been processed. These are then integrated into a JSON in the end.

2. Job details extraction:

2.1 Job Description Input:

- i.) HR can input or paste the job description directly into the system.
- ii.) Alternatively, they can select a job description template or choose from previous job postings.

2.2 Automated Extraction:

- i.) The system automatically extracts key details from the job description, such as required skills, qualifications, experience level, and responsibilities.
- ii.) This ensures accuracy and consistency in job postings.

3.LLM Gemini pro role: Resume Upload and Candidate Matching with Gemini:

3.1 Resume Upload:

- i.) HR can upload resumes of potential candidates directly into the system.
- ii.) Resumes can be uploaded individually or in bulk.

3.2 Gemini Integration:

- i.) The system utilizes Gemini, an AI-powered candidate matching tool, to analyze uploaded resumes and extract relevant information.

3.3 Semantic Analysis:

- i.) Gemini performs semantic analysis on resumes to identify skills, experience, education, and other relevant attributes.

3.4 Candidate Ranking:

- i.) Based on the job details extracted earlier and the information gathered from resumes, Gemini ranks candidates according to their suitability for the job.

3.5 Top 5 Candidates List:

- i.) The system generates a list of the top 5 candidates who best match the job requirements.
- ii.) Each candidate is accompanied by a summary of their qualifications and a link to view their full profile.

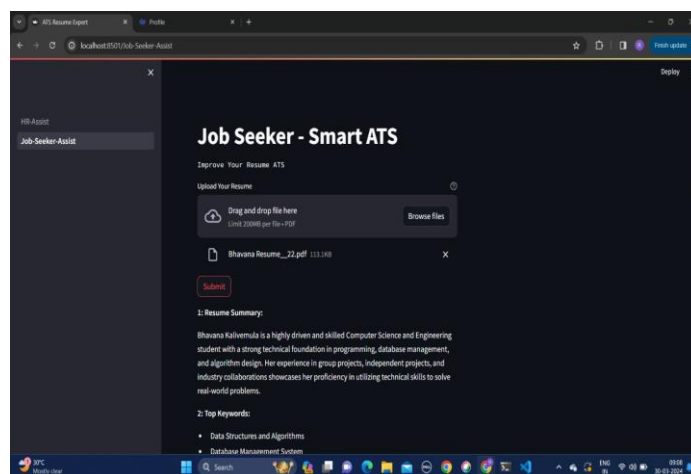
3.6 Candidate Profiles comparison:

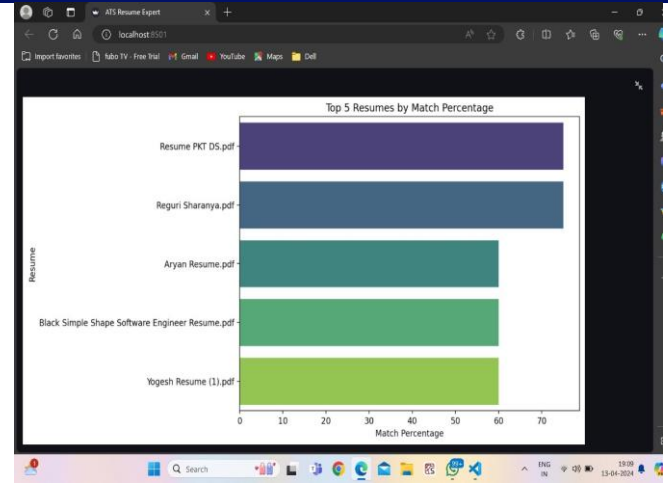
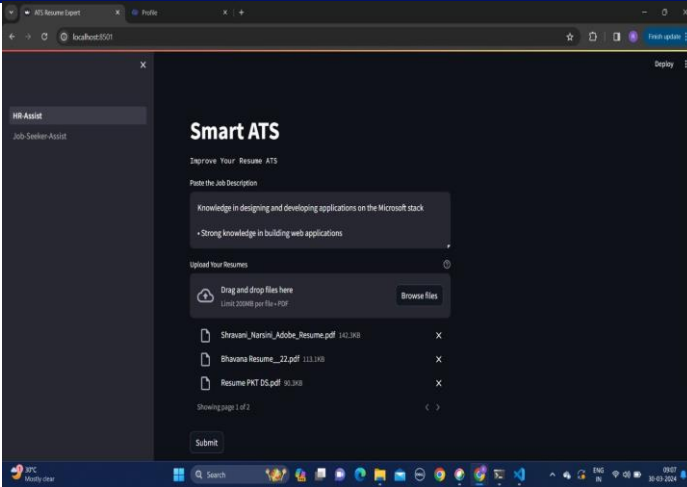
- i.) HR can view detailed profiles of each candidate, including their resume, skills, experience, and contact information along with comparison among candidates. Hence the LLM provides a seamless and efficient way for HR professionals to extract job details, upload resumes, and identify top candidates using Gemini's advanced AI capabilities.: The majority of the processing is done in the Resume Generator component. This module generates a customized resume by utilizing the retrieved job requirements and organized user data.

C. Key features

1. Job Description Match: The system evaluates how well a candidate's resume matches the provided job description.
2. Missing Keywords: It identifies keywords or skills that are missing in the resume but are crucial for the job, enabling recruiters to guide candidates on enhancing their profiles.
3. Profile Summary: The system generates a concise profile summary highlighting key strengths and qualifications, facilitating a quick understanding of the candidate's suitability for the position.
4. Automatically extract relevant information from resumes, such as skills, experience, and education
5. Compare candidate qualifications against job requirements, instantly shortlisting the best matches.
6. Streamline the hiring process for employers

V. RESULTS





Resume	Match Percentage
Resume PKT DS.pdf	75
Reguri Sharanya.pdf	70
Aryan Resume.pdf	65
Black Simple Shape Software Engineer Resume.pdf	60
Yogesh Resume (1).pdf	60
ShravyaKatakam RESUME.pdf	45
Abhi_resume.pdf	35
Shravani_Narsini_Adobe_Resume.pdf	30
Resume.pdf	0
Bhavana Resume_22.pdf	0

VI. CONCLUSION

In conclusion, streamlining the hiring process has advanced significantly with the incorporation of Gemini AI into the intelligent applicant tracking system. The system can effectively evaluate resumes and job descriptions, offer tailored recommendations, and rank candidates according to their fit for the position by utilizing Gemini's natural language processing, text encoding, and similarity calculations skills. In the current scenario, where the demand for talent acquisition solutions is high and the competition for top candidates is fierce, such a system offers several key benefits. The time and effort required by HR personnel is decreased by the automation of resume parsing, candidate ranking, and comparison duties, which results in significant cost savings in the hiring process. The system can accurately match candidates to job descriptions based on their skills, experience, and qualifications, resulting in better hiring decisions and higher retention rates. Gemini-generated insights and visualizations power the system's user-friendly interfaces, which make it easier for HR professionals and job seekers to interact with one another and increase overall user



happiness. Gemini's adaptability to different use cases and data inputs, along with its modular

design, ensure scalability and flexibility to meet the changing needs of businesses across all sectors and sizes. All things considered, the intelligent applicant tracking system driven by Gemini AI is a state-of-the-art response to contemporary recruitment difficulties, helping businesses to locate and select the best candidates in the cutthroat job market of today.

VII. FUTURE SCOPE

Overall, AI-driven applicant monitoring systems have a great deal of potential to transform the hiring process in the future and make it more impartial, effective, and insightful. Upcoming innovations should put a higher priority on enhancing the candidate experience by introducing interactive elements, tailored evaluations, and proactive avenues for contact to maintain applicants' interest during the employment procedure. The system's functionality and value proposition could be further improved by integration with emerging technologies like virtual reality for immersive onboarding experiences, augmented reality for virtual interviews, and blockchain for secure candidate verification. Hiring managers and HR specialists can receive automated alerts about changes to candidate or job opening statuses, which will keep them informed and proactive in their recruitment efforts. Gemini can use candidate and job data trends and patterns to send out pertinent notifications in accordance with pre-established parameters. The system can use RAG to find appropriate job ads based on a candidate's abilities and preferences when making suggestions to job searchers. All things considered, the smart applicant tracking system has a lot of potential for the future. It might spur innovation, increase productivity, and completely change the recruiting scene in the years to come.

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Management Research. 21. 097262252110662.
10.1177/09726225211066220.