ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25may452

ResumeMatch: Intelligent Resume Enhancement & Job Fit Analysis

Karmesh Meritia; Vishal Ghosh; Dr. P. S. Thanigaivelu

Department of Computing Technologies
SRM Institute of Science and Technology
Kattankulathur, Chennai, India

Publication Date: 2025/05/14

Abstract: This research presents an AI-powered web system designed to streamline the job application process, particularly for fresh graduates struggling to tailor resumes to specific job descriptions. By integrating NLP models and external APIs, the system offers personalized recommendations, evaluates resume-job fit, suggests roles, generates tailored drafts, and recommends real-time job postings via the Adzuna API. Leveraging the all-MiniLM-L6-v2 sentence transformer for role recommendations and Google's Gemini for JD-specific resume enhancements, it dynamically aligns candidate profiles with job expectations, moving beyond traditional heuristic-based tools. Utilizing datasets from Kaggle and LinkedIn, this system aims to provide practical, real-time improvements, demonstrating AI's potential to optimize job searches and enhance employment prospects.

Keywords: *Resume Enhancement, Job Description Matching, AI-Powered Resume Builder, NLP in Job Search, Sentence Transformers, Cosine Similarity, Resume Optimization, AI in Recruitment, Job Role Recommendation, Live Job Posting.*

How to Cite: Karmesh Meritia; Vishal Ghosh; Dr. P. S. Thanigaivelu (2025) ResumeMatch: Intelligent Resume Enhancement & Job Fit Analysis. *International Journal of Innovative Science and Research Technology*, 10(5), 115-121. https://doi.org/10.38124/IJISRT/25may452

I. INTRODUCTION

The transition to professional life poses significant resume structuring challenges for fresh graduates, impacting their job application success. A mismatch between resumes and job descriptions (JDs), often due to a lack of industry awareness, results in lower selection rates. Automated applicant tracking systems (ATS) further complicate this, filtering out resumes lacking relevant keywords and proper formatting. Manual resume customization is time-consuming and error-prone, leaving graduates uncertain about suitable career paths. To address these issues, we propose an AI-powered web platform that dynamically optimizes resumes based on JDs, provides a resume-job fit score, recommends aligned job roles, generates AI-driven resume drafts, and delivers real-time job postings. Unlike existing platforms that offer fragmented solutions, our system integrates these functionalities for a comprehensive job application support. Utilizing Google's Gemini for resume enhancement, our system identifies missing skills and optimizes formatting for ATS compatibility. Resume-job fit is assessed using cosine similarity with the all-MiniLM-L6-v2 model, providing targeted improvement insights. Job role recommendations leverage a pretrained transformer from Hugging Face, while the Adzuna API delivers real- time job postings. AI-driven resume draft generation automates the creation of professional, ATS-friendly resumes. We employ datasets from Kaggle and LinkedIn to train and fine-tune our models, ensuring real-world applicability. This approach, leveraging pretrained NLP models, offers scalable, personalized recommendations that adapt to evolving job market demands, significantly enhancing interview opportunities and streamlining the application process.

II. LITERATURE REVIEW

The evolution of job searching and resume optimization, driven by technology, presents persistent challenges, particularly for fresh graduates. Traditional resume writing, often reliant on generic templates, contrasts sharply with recruiter-driven applicant tracking systems (ATS) that prioritize keyword matching, frequently overlooking qualified candidates. Existing online platforms, primarily focused on structural improvements, fail to address the critical need for content alignment with specific job descriptions (JDs). This gap necessitates AI-driven solutions that leverage natural language processing (NLP) to bridge the divide between candidate presentation and employer expectations. Our proposed system introduces an integrated AI-powered web application that dynamically enhances resumes, evaluates resume-job fit, and provides tailored job role recommendations, utilizing Google's Gemini model and sentence transformer- based similarity scoring for contextual refinement and real-time job posting integration.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25may452

Artificial intelligence plays a pivotal role in our system, automating and personalizing the job application process. We employ Google's Gemini for JD-based resume tailoring, extracting key skills and requirements to provide human-like, contextual modifications. Cosine similarity, using the all-MiniLM-L6-v2 sentence transformer, ensures semantic alignment between resumes and JDs, enhancing recommendation accuracy beyond mere keyword matching. This model converts resume and job description text into high- dimensional vector embeddings, allowing for precise similarity computation and percentage-based match scoring. For job role recommendations, a pretrained transformer model from Hugging Face analyses resume competencies, mapping them to suitable career paths, while the Adzuna API provides real-time job postings aligned with user profiles. Key AI-driven functionalities include:

- Context-aware content generation via Gemini, aligning resume suggestions with industry expectations.
- Semantic resume-job matching using sentence transformers, capturing contextual meaning and improving match accuracy.
- Automated job role recommendations, eliminating trial-and-error in career exploration.
- Real-time job posting integration, prioritizing relevant opportunities and highlighting key skills.

Existing systems often fall short due to inaccurate resume-job matchmaking, relying on keyword-based matching that overlooks semantic relevance. They also lack personalized resume optimization, providing generic feedback without specific, data-driven insights. Inability to handle diverse resume formats, static skill extraction, and absence of AI-driven resume enhancement further limit their effectiveness. Our proposed solution addresses these limitations by employing sentence transformers for context-aware analysis and Google's Gemini for intelligent text enhancement. This ensures more accurate job recommendations, AI-powered resume restructuring, and personalized content refinement. By focusing on semantic understanding and real-time data integration, our system offers a comprehensive approach to job application support, significantly improving candidate success rates.

III. METHODOLOGY

Our research developed a system for personalized resume enhancement and job-fit analysis, employing advanced NLP and AI. This involved a structured methodology: data collection, model selection, system architecture, implementation, and evaluation.

A. Data Collection and Preprocessing

The initial step involved gathering relevant datasets to train and validate our system. We utilized two primary datasets:

- Resume Dataset: A comprehensive resume dataset was sourced from Kaggle. This dataset provided a diverse range of resume formats and content, allowing us to train our job role recommendation model effectively
- Job Posting Dataset: To ensure real-world relevance, we collected job postings from LinkedIn. This dataset included various job descriptions across different industries and experience levels.

B. Model Selection and Implementation

Model selection focused on:

- The all-minilm-L6-v2 sentence transformer for resume-job fit, computing cosine similarity scores between resumes and job descriptions.
- A fine-tuned transformer model for job role recommendations, mapping resume features to suitable roles.
- Google's Gemini for resume optimization, providing context-aware suggestions.

C. System Architecture and Integration

Our system architecture was designed to ensure seamless integration of various components. The architecture comprises the following key modules:

- Input for resumes and job descriptions,
- Data preprocessing.
- Resume-job fit scoring.
- Resume optimization.
- Real-time job posting recommendations via the adzuna api.
- Tailored resume draft generation.

D. Evaluation and Validation

Evaluation combined quantitative and qualitative assessments:

- Similarity score analysis to ensure accurate alignment.
- User feedback to assess relevance.
- Job role recommendation accuracy by comparing suggestions with career aspirations.

This structured methodology enabled us to develop a robust and effective system for resume enhancement and job-fit analysis, addressing the challenges faced by fresh graduates and job seekers in today's competitive job market.

IV. SYSTEM DESIGN AND ARCHITECTURE

The system is conceived as a scalable, maintainable web-based application. The architectural design adopts a modular approach, facilitating independent development, testing, and deployment of individual components. This modularity is essential for accommodating future enhancements and adapting to evolving technological landscapes. The system leverages a multi-layered architecture to separate concerns, improve code organization, and enhance security.

A. Architectural Overview

➢ *Presentation Layer (User Interface):*

- Technology: Streamlit for an interactive front-end.
- Functionality: Resume/job description uploads, result visualization, user navigation.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25may452

➢ *Application Layer (API):*
- Technology: Backend API for request handling and orchestration.
- Functionality: Request validation, asynchronous task management, API documentation.

➢ *Business Logic Layer (Processing Modules):*
- Technology: Core modules for data processing, NLP, and API integration.
- Functionality:

✓ Data Preprocessing Module: Cleans and tokenizes input.
✓ AI/NLP Models:

➢ *Sentence Transformer (all-MiniLM-L6- v2): Resume-job matching.*
➢ *Transformer Model (fine-tuned): Job role recommendations.*
➢ *Google's Gemini: Resume enhancements.*
- External API Integration: Adzuna for real-time job postings.

B. Component Specifications:

➢ *User Interface (Streamlit):*
- Intuitive uploads (PDF, .txt), visualization of match scores, and tailored content.

➢ *Data Processing Module:*
- Regular expressions and NLP for text cleaning and standardization.

➢ *AI/NLP Models:*
- Sentence Transformer: Semantic vector embeddings for accurate matching.
- Transformer Model: Fine-tuned for job role recommendations.
- Google's Gemini: context aware resume enhancement.

➢ *External API Integration (Adzuna):*
- Real-time job postings based on user criteria, aggregating data from platforms like LinkedIn, Naukri.com and Apna.com.
- Provides live job postings, saving user time.

C. Model Flow Diagram

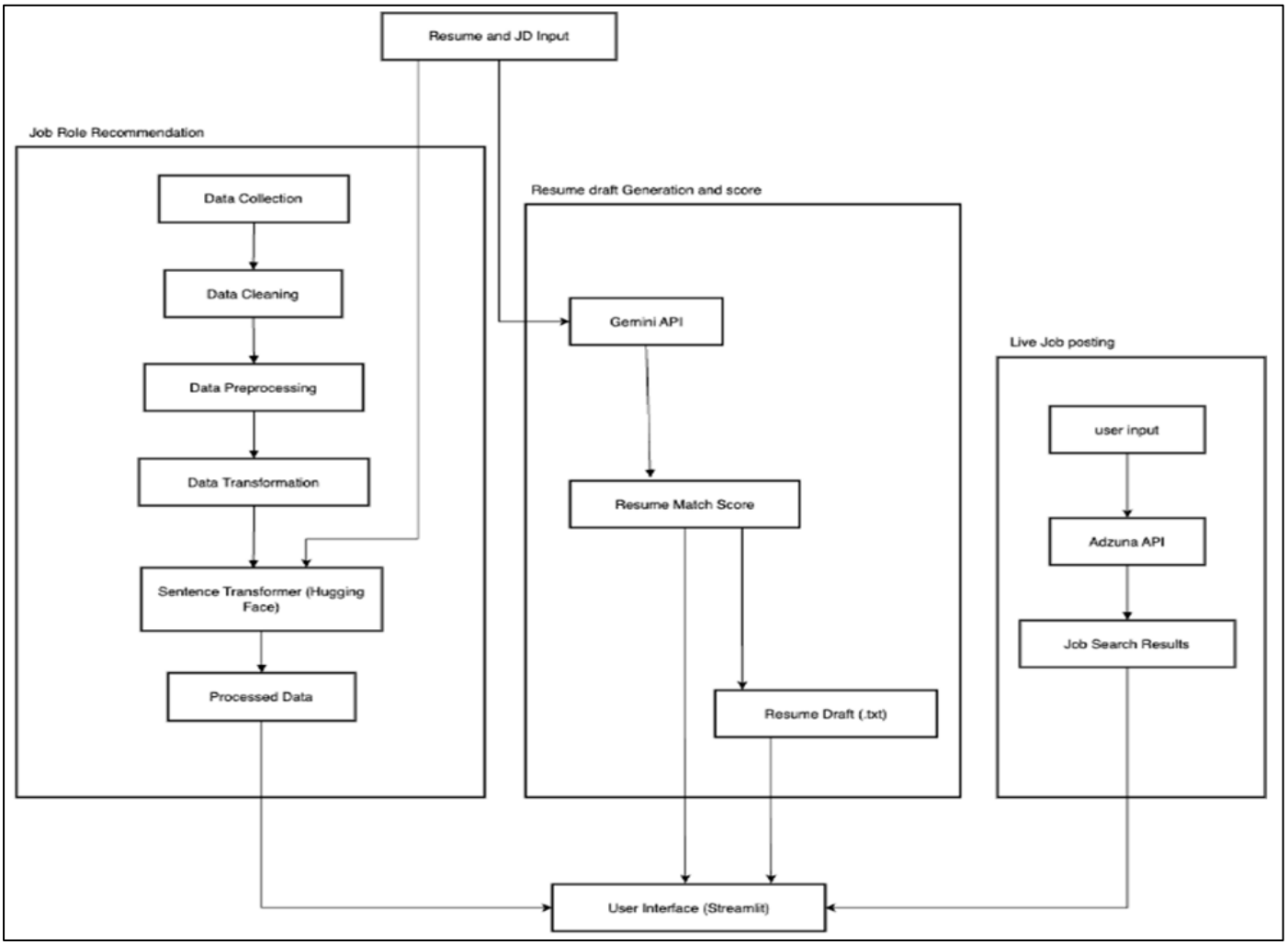

Fig 1: The Figure Depicts the flow Diagram of the Resume Enhancement and Generation Process.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25may452

The model flow diagram has the following components:

- *Resume and Jd Input:*

This module serves as the entry point of the system, where users upload their resumes and the corresponding job description (JD) of interest. The input data is subsequently utilized to analyze the similarity and differences between the resume and the job requirements.

- *Job Role Recommendation:*

This module processes the user's resume and retrieves the top five relevant job postings from the LinkedIn 2023–2024 dataset. By offering a curated list of job opportunities, this component assists users in identifying potential roles to which they can submit their resumes.

- *Resume Draft Generation:*

Leveraging sentence transformers and prompt engineering techniques, this module evaluates the alignment between the user's resume and the provided JD. It generates a match score, facilitating an objective assessment of the resume's suitability for the given job role.

- *Live Job Postings:*

This component enables users to access real-time job postings based on a specified job title. Utilizing the Adzuna API, which aggregates listings from prominent platforms such as LinkedIn and Naukri, this module provides users with up-to-date job opportunities aligned with their desired roles.

- *User Interface:*

The user interface serves as the central platform where all functionalities are integrated. It allows users to view, modify, and download their resume-related outputs while providing an interactive experience for job search and application enhancements.

D. Scalability and Maintainability

The design emphasizes scalability and maintainability by employing a modular architecture. The separation of concerns allows for independent scaling of individual components based on resource demands. Standardized interfaces facilitate seamless integration of new technologies and models, ensuring the system remains adaptable and up to date with advancements in AI and NLP.

V. RESULTS AND OUTPUT

This section showcases the concrete results and diverse outputs generated by the developed system, demonstrating its multifaceted capabilities in enhancing resumes and optimizing the job search process. By examining a range of outputs, from quantifiable resume- job matching scores to AI-driven resume enhancements and live job recommendations, a comprehensive evaluation of the system's effectiveness is provided.

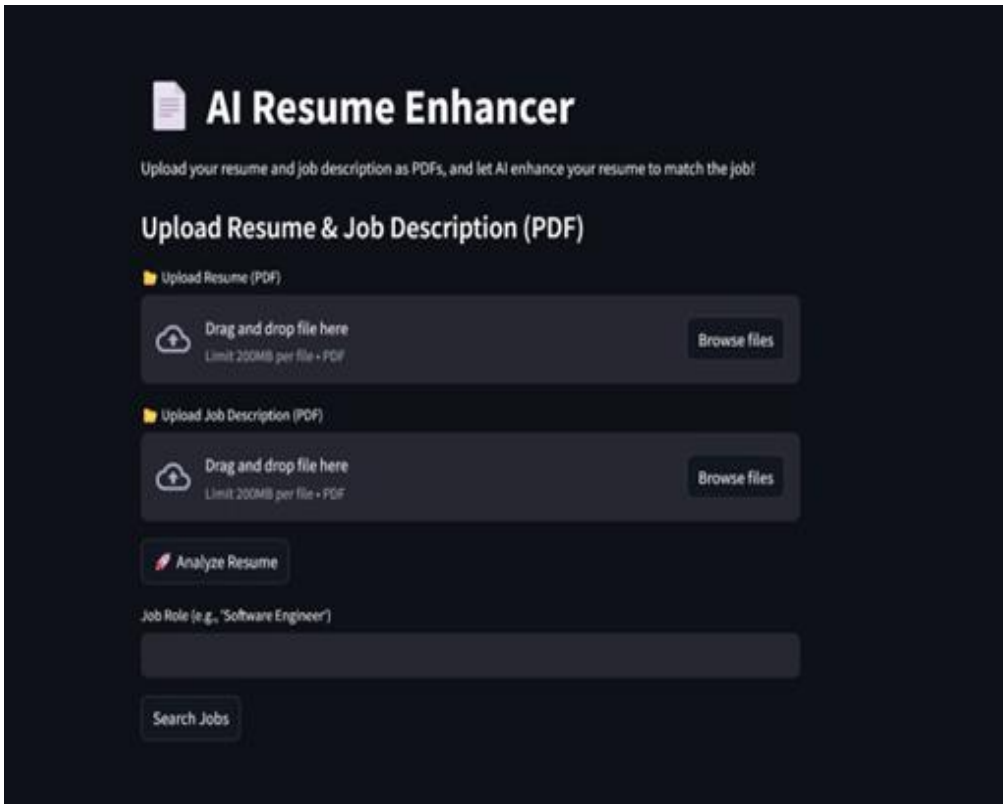

Fig 2: Screenshot of the Home Page for Resume Match. User is Provided with Option to Upload Resume and Company Job Description, Type Required Job Role and Two Buttons, Analyse Resume and Search Jobs.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25may452

A. Resume-Job Matching Score Presentation

Upon uploading a resume and a target job description, the system computes a percentage-based matching score that quantifies the degree of alignment between the two documents. This score, calculated using cosine similarity on vector embeddings generated by the sentence transformer model, provides users with an immediate and intuitive assessment of their resume's suitability for the specified role.

The matching score is prominently displayed within the user interface, using a visually appealing format to draw the user's attention. This score serves as a quick indicator, guiding the user on whether to focus on significant revisions or minor refinements to their resume. This helps users to evaluate what more needs to be improved and see if it is a good match for the Job descriptions they provided.

Fig 3: Resume Match Score is Generated based on the User Resume and Company Job Description both Provided by the User.

B. Recommended Job Roles

To assist job seekers in exploring potential career paths, the system provides personalized recommendations for suitable job roles based on the candidate's skills, experience, and qualifications as extracted from their resume. By leveraging a fine-tuned transformer model, the system maps these extracted features to a comprehensive database of job roles, ranking them based on suitability and relevance.

The recommended job roles are presented with concise descriptions and explanations, enabling users to easily understand the nature of each role and the reasons for its recommendation. This feature can be particularly valuable for fresh graduates or individuals considering a career change, providing them with insights into alternative career options that align with their skill set.

Note: At the time of writing this documentation, the job role recommendation model was still under development and will be showcased in the presentation phase.

C. Tailored Resume Draft Generation

One of the most powerful features of the system is its ability to generate a customized resume draft that is specifically tailored to the target job description. By leveraging Google's Gemini model and incorporating the enhancement suggestions generated, the system creates a polished and ATS-friendly resume that maximizes the candidate's chances of standing out from the competition. This feature uses Jinja2 template to extract the user specific information.

The tailored resume draft is carefully structured to highlight the candidate's most relevant skills and experiences, aligning with the key requirements outlined in the job description. The draft also incorporates industry-specific keywords and terminology, ensuring that the resume is optimized for both human readability and automated screening processes.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25may452

Fig 4: Updated Resume Draft is Created for the User Based on Advanced Natural Language Processing of Google Gemini Model. User can also the Draft as a Text File for Better Understanding.

D. Real-Time Job Suggestions

To facilitate immediate job application, the system integrates with the Adzuna API to provide real-time suggestions for open positions that match the user's profile and preferences. These job suggestions are automatically updated based on the user's location, industry, and desired job roles, ensuring that they have access to the most current and relevant opportunities.

The job suggestions are presented with key details, such as the job title, company name, location, and a brief description of the role. Users can click on a link to view the full job posting on the Adzuna website and apply directly.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25may452

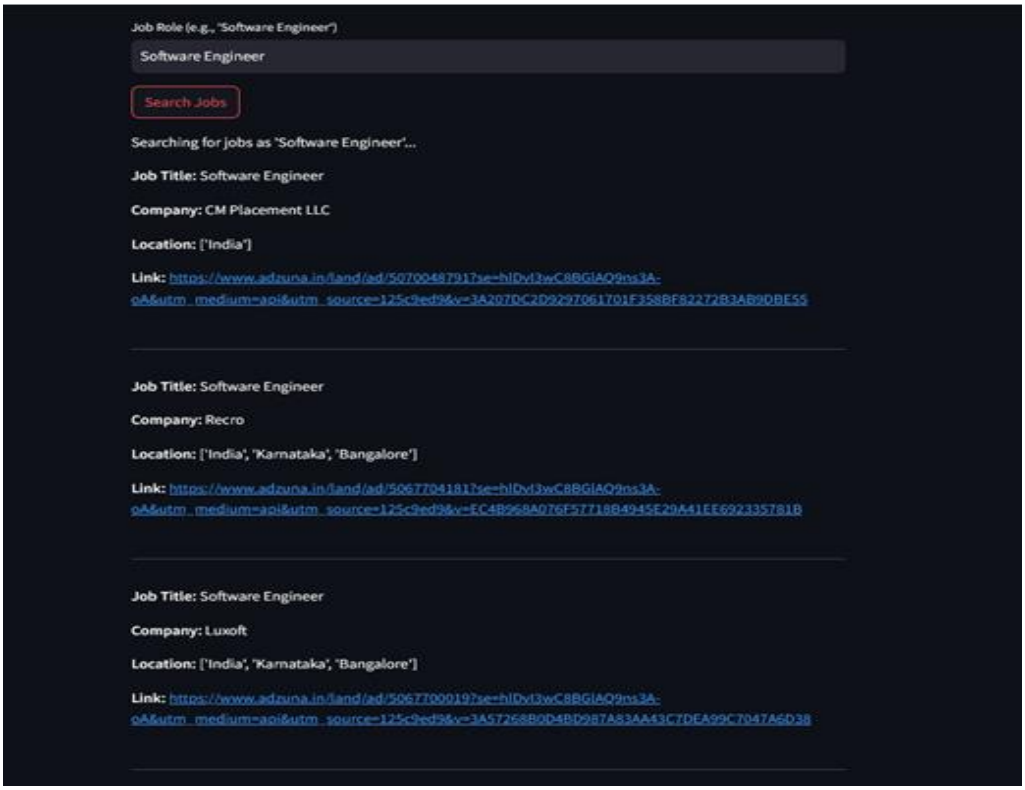

Fig 5: Based on the User Required Job Role , Live Job Postings have been Suggested to the user from the Adzuna which Serves Job Positing from Prominent Websites Like LinkedIn , Naukri , Apan etc.

VI. CONCLUSION

This research introduced an AI-powered system for resume enhancement and job-fit analysis, aimed at simplifying the job search, especially for new graduates. Key contributions include:

- *Personalized Resume Enhancement:*
- Utilizes Google's Gemini for context- aware suggestions, improving phrasing and highlighting relevant skills.
- *Accurate Resume-Job Fit Assessment:*
- Employs the all-MiniLM-L6-v2 sentence transformer for precise evaluation, capturing semantic meaning beyond keyword matching.
- *Intelligent Job Role Recommendations:*
- Uses a fine-tuned transformer model to map resume content to job roles, suggesting relevant career paths.
- *Real-Time Job Opportunity Discovery:*
- Integrates the Adzuna API for up-to- date job postings matching user profiles.

The system's results demonstrate the effectiveness of AI-driven automation in streamlining job searches. By offering personalized recommendations, accurate fit assessments, and real-time job postings, it surpasses traditional tools. This research advances intelligent systems for career development, potentially improving job application outcomes and streamlining hiring for both job seekers and employers

REFERENCES

[1]. J. A. Malm, "AI-Based Resume Screening: Improving Hiring Efficiency," Journal of AI and Recruitment, vol. 15, no.3, pp. 45-56, 2022.
[2]. K. Lee, "Semantic Job Matching Using NLP Techniques," IEEE Transactions on Computational Intelligence and AI in Business, vol. 20, no. 1, pp. 101-113, 2021.
[3]. S. Yadav and R. Patel, "Transformers for Resume Parsing and Matching," Journal of Natural Language Processing Research, vol. 8, no. 2, pp. 78-89, 2023.
[4]. M. Hossain et al., "Comparing Keyword-Based and Semantic Resume Matching," Proceedings of the International Conference on AI in HR Tech, 2022.
[5]. A. Banerjee, "Automating Resume Screening with BERT and Sentence Transformers," AI & Society, vol. 12, no. 4, pp. 345-359, 2021.
[6]. Google AI, "Gemini: The Next Generation of Large-Scale Language Models," Google AI Research, 2023.
[7]. OpenAI, "Advancements in Large Language Models for Recruitment," OpenAI Technical Report, 2022.
[8]. D. Choi and P. Chen, "Neural Representations for ATS-Compatible Resumes," IEEE International Conference on AI for Recruitment, 2021.
[9]. H. Kim et al., "A Survey on AI-Driven Job Matching Algorithms," Artificial Intelligence Review, vol. 55, no. 1, pp. 75-92, 2022.
[10]. L. Smith and K. Brown, "Improving Job Application Success with AI-Powered Resume Builders," Computational Linguistics Journal, vol. 17, no. 3, pp. 233-245, 2021.