SBGI – AI Resume Analyzer and Automated Job Applier

¹Mr.S.S.HARLE, ²ANIS.S.MULANI, ³SNEHA.A.SHINDE, ⁴AYESHA.Y.JAMADAR,

⁵PRACHI.V.MULIK

[1,]Professor, [2,3, 4, 5,] Students

Department of Artifical Intelligence and Machine Learning Engineering, Shri Ambabai Talim Sanstha
SanjayBhokare Group of Institue, Miraj 416410, India

Abstract— The "AI Resume Analyzer and Automated Job Applier" is a comprehensive web application designed to streamline the job search process by leveraging artificial intelligence and modern web technologies. Built with React, TypeScript, and Puter.js, the platform enables users to upload their resumes, which are then analyzed using Claude AI to extract key skills and experiences. Integrated with the Adzuna Job Search API, it performs intelligent job matching, calculating compatibility scores from 0-100 and providing recommendations to apply, review, or skip opportunities. Additional features include AI-generated personalized cover letters, job bookmarking for later review, and a detailed application tracking dashboard with status updates. The system emphasizes user privacy and control, storing all data securely in the user's Puter.js cloud, while offering a responsive, user-friendly interface with features like skills gap analysis and automated resume tailoring to enhance career prospects.

I. INTRODUCTION

The AI Resume Analyzer and Automated Job Applier is an innovative web application built with React, TypeScript, and integrated AI technologies like Claude 3.7 Sonnet via Puter.js, designed to revolutionize the job search process by combining intelligent resume analysis with automated job matching and application assistance. Leveraging the Adzuna Job Search API for real-time job listings, the platform analyzes user-uploaded resumes against job descriptions to calculate match scores from 0-100, providing actionable recommendations such as "Apply" for strong matches (≥60%), "Review" for moderate ones (40-59%), and "Skip" for poor fits (<40%), while highlighting matched and missing skills to guide career development. Key features include a beautiful dashboard with summary statistics, job cards displaying match details, skills gap analysis, AI-generated personalized cover letters, job bookmarking, application tracking with status management (Applied, Interview, Offer, Rejected, Withdrawn), and secure data storage in the user's Puter.js cloud, ensuring privacy and user control without auto-submission of applications. The system emphasizes ethical practices, offering tools for job seekers to prioritize high-match opportunities, optimize resumes, and track progress, making it a comprehensive solution for efficient, AI-enhanced job hunting..

II. LITERATURE REVIEW

1. **Amit Sharma and Neha Verma** studied the increasing use of artificial intelligence in recruitment systems, particularly focusing on automated resume screening and candidate shortlisting. Their research highlights how manual resume evaluation is inefficient and prone to human bias, whereas AI-based resume analyzers can process large volumes of resumes quickly using skill extraction, keyword matching, and experience analysis. The study concludes that AI-driven recruitment tools significantly improve hiring accuracy and reduce recruitment time.

2. **Rahul Mehta and Priya Kulkarni** explored the role of natural language processing (NLP) in analyzing unstructured resume data. Their work explains how NLP techniques help extract critical information such as technical skills, educational background, certifications, and work experience from resumes of varying formats. The authors emphasize that NLP-based resume parsing improves compatibility with Applicant Tracking Systems (ATS) and

enhances job–candidate matching accuracy.

3. **Sandeep Iyer and Ananya Rao** focused on intelligent job recommendation systems that compare candidate resumes with job descriptions. Their study demonstrates how machine learning models can identify suitable job opportunities based on skill similarity, experience level, and role requirements. The authors found that personalized job recommendations reduce the job search burden for candidates and increase application success rates.

4. **Kunal Deshpande and Ritu Malhotra** examined the automation of online job application processes using AI-assisted systems. Their research highlights the effectiveness of assisted auto-apply mechanisms that help users fill application forms, generate customized resumes, and draft cover letters while keeping the user in control. The study suggests that such systems improve efficiency without violating job portal policies or ethical guidelines.

5. **Vikram Singh and Pooja Nair** ,analyzed data privacy and security challenges in AI-powered recruitment platforms. Their paper discusses risks related to storing resumes, personal details, and job application history in cloud environments. The authors recommend secure authentication, encrypted storage, and controlled data access to ensure user trust and regulatory compliance.

In summary, the reviewed studies indicate that AI-powered resume analysis, intelligent job matching, and assisted job application systems offer a transformative approach to modern recruitment. These findings strongly support the development of an AI Resume Analyzer and Auto Job Applier that is efficient, secure, and scalable.

Research Objectives

a. Develop a User-Friendly Platform: To design an intuitive web-based system that allows users to analyze resumes, identify relevant job opportunities, and apply efficiently.

b. Optimize Performance and Security: To ensure fast processing, secure authentication, and safe handling of user data.

c. Understand User Needs in Job Search Automation: To analyze challenges faced by job seekers in resume preparation, job discovery, and repetitive application tasks.

d. Enable Integration and Scalability: To support seamless integration with job APIs, AI models, and cloud services while allowing future expansion.

III. METHODOLOGY

The The methodology of the proposed system, titled **"AI Resume Analyzer and Automated Job Applier"**, defines a structured and systematic approach for designing, developing, and implementing an
intelligent career assistance platform. The primary objective of the system is to assist job seekers in resume evaluation, job discovery, skill gap identification, and application management through the responsible use of Artificial Intelligence (AI).

The system is implemented as a modular, web-based application, utilizing **React.js** for frontend development and **Puter.js** for authentication, cloud storage, and key–value data persistence. AI-driven techniques are employed for resume parsing, semantic job matching, skill analysis, and automated content generation. Emphasis is placed on usability, scalability, data security, and ethical AI practices, ensuring that users maintain full control over the job application process.

The methodology follows a modular design approach, where each functional component is independently developed and later integrated to form a cohesive system. This design enhances maintainability, extensibility, and

system reliability.

3.1 System Overview

The AI Resume Analyzer and Automated Job Applier provides an end-to-end solution for modern job seekers. The platform allows users to upload resumes, analyze professional profiles using AI models, retrieve real-time job listings from external APIs, and manage applications through an assisted workflow. Unlike fully automated job application tools, the system adopts an **assisted apply mechanism**, ensuring ethical compliance by requiring user confirmation before submission.

The system architecture is divided into multiple logical modules, each responsible for a distinct function such as user interaction, AI processing, job matching, data storage, and system administration.

3.2 Module-Wise Methodology

3.2.1 User Panel (Job Seeker Interface)

The User Panel acts as the primary interaction layer between job seekers and the system. It is designed to provide a centralized, intuitive, and accessible interface that enables users to manage all job-related activities efficiently.

Users can securely upload resumes in PDF format, which are stored in encrypted cloud storage. The uploaded resumes are analyzed using AI-based text extraction techniques to identify professional attributes such as skills, work experience, education, certifications, and relevant keywords. The panel presents summarized insights including job match scores, saved job listings, and application status, allowing users to assess their job search progress at a glance.

The job search functionality integrates with external job listing APIs such as **Adzuna**, enabling users to retrieve real-time job opportunities based on customized parameters including job role, location, and preferences. Each job listing is accompanied by an AI-generated compatibility score, providing immediate feedback on relevance.

The panel also includes skill gap analysis, which compares resume content with job requirements to highlight missing or underrepresented skills. This feature assists users in identifying areas for improvement and supports informed upskilling decisions. AI-generated resume tailoring suggestions enhance resume compatibility with Applicant Tracking Systems (ATS).

Additional functionalities include job bookmarking, application tracking with customizable status labels, AI-powered cover letter generation, search history logging, notification alerts, profile management, and secure session termination. Together, these features promote transparency, user engagement, and efficient career planning.

3.2.2 AI Matching Engine

The AI Matching Engine forms the intellectual core of the system and is responsible for analyzing resumes and job descriptions to generate meaningful insights. This module processes both structured and unstructured data using AI-driven natural language processing techniques.

Resume parsing algorithms extract relevant information such as skills, experience duration, education levels, and domain-specific keywords. Job descriptions retrieved from external APIs undergo similar processing to identify required competencies and qualifications. The extracted data is compared using similarity analysis techniques to compute a match score on a scale of 0 to 100.

The engine performs skill extraction and comparison to identify overlaps and deficiencies, enabling precise skill gap identification. Match scores are visualized using progress indicators and badges to improve interpretability. Based on aggregated user data and market trends, the recommendation system suggests suitable job roles and in-demand skills to enhance employability.

To ensure reliability, the module incorporates error-handling mechanisms for API failures, incomplete AI responses, and parsing inconsistencies. Performance optimization strategies such as caching and prompt optimization are applied to handle multiple job listings efficiently. Strict privacy controls ensure that all user data remains isolated within individual cloud environments.

Ethical AI principles are enforced by ensuring that the system does not fabricate skills or experiences and operates solely on user-provided information.

3.2.3 Job Application Assistance Panel

The Job Application Assistance Panel facilitates ethical and efficient job application management. Each job opportunity is displayed through a detailed job card interface containing job descriptions, match scores, and AI-generated application materials.

Instead of auto-submitting applications, the system redirects users to official job portals with pre-prepared resumes and cover letters. This assisted approach ensures transparency and user consent while reducing repetitive manual effort.

Users can update application status, maintain notes, and store timestamps for tracking progress across various stages such as applied, interview, offer, rejection, or withdrawal. All application-related data is persistently stored in cloud-based key–value storage, allowing seamless access across sessions.

The panel supports data export and deletion options to give users full control over personal information. Mobile responsiveness and accessibility features such as keyboard navigation and screen reader compatibility enhance usability across devices and user groups.

3.2.4 Admin and System Management Panel

The Admin Panel supports system maintenance, monitoring, and optimization. It provides administrators with tools to track system performance metrics such as API usage, AI response time, and error frequency.

Secure access control mechanisms ensure role-based authorization, preventing unauthorized access to sensitive configurations. The panel supports API credential management, feature updates, system configuration, and error logging. An analytics dashboard presents anonymized usage insights to support data-driven improvements.

Regular security audits, backup mechanisms, and compliance checks ensure adherence to ethical AI standards and data protection regulations.

3.2.5 Database and Cloud Storage Design

The database architecture is designed to manage user profiles, resumes, job listings, match scores, applications, cover letters, and search history efficiently. Data storage is implemented using Puter.js cloud storage and key–value persistence, ensuring high availability and data isolation.

Logical relationships among entities such as Users, Resumes, Jobs, Applications, and Search History maintain consistency and integrity while enabling efficient data retrieval.

3.3 Design Considerations

The system design prioritizes usability through intuitive navigation and minimal user effort. Scalability is achieved through modular architecture and cloud-based services. Security and privacy are ensured using encrypted storage, secure authentication, and user-controlled data management. Ethical AI usage is enforced by avoiding automated submissions and fabricated content.

3.4 Testing and Validation

Testing and validation were systematically carried out to verify the accuracy, stability, efficiency, and ethical behavior of the proposed AI Resume Analyzer and Automated Job Applier. A layered testing approach was employed to assess both functional and non-functional characteristics of the system under practical operating conditions. Additional validation was performed to ensure reliable data persistence, confirming that user profiles, application records, and AI-generated content were consistently stored and retrieved across sessions without inconsistency or data loss.

Individual system components, including resume upload, automated resume analysis, job matching logic, and cover letter generation, were evaluated through unit testing to confirm correct execution and robust handling of boundary conditions. Integration testing ensured smooth interaction among the frontend interface, AI processing services, external job listing APIs, and cloud-based authentication and storage mechanisms. Reliability testing further assessed system behavior during network disruptions and external API unavailability to confirm graceful recovery.
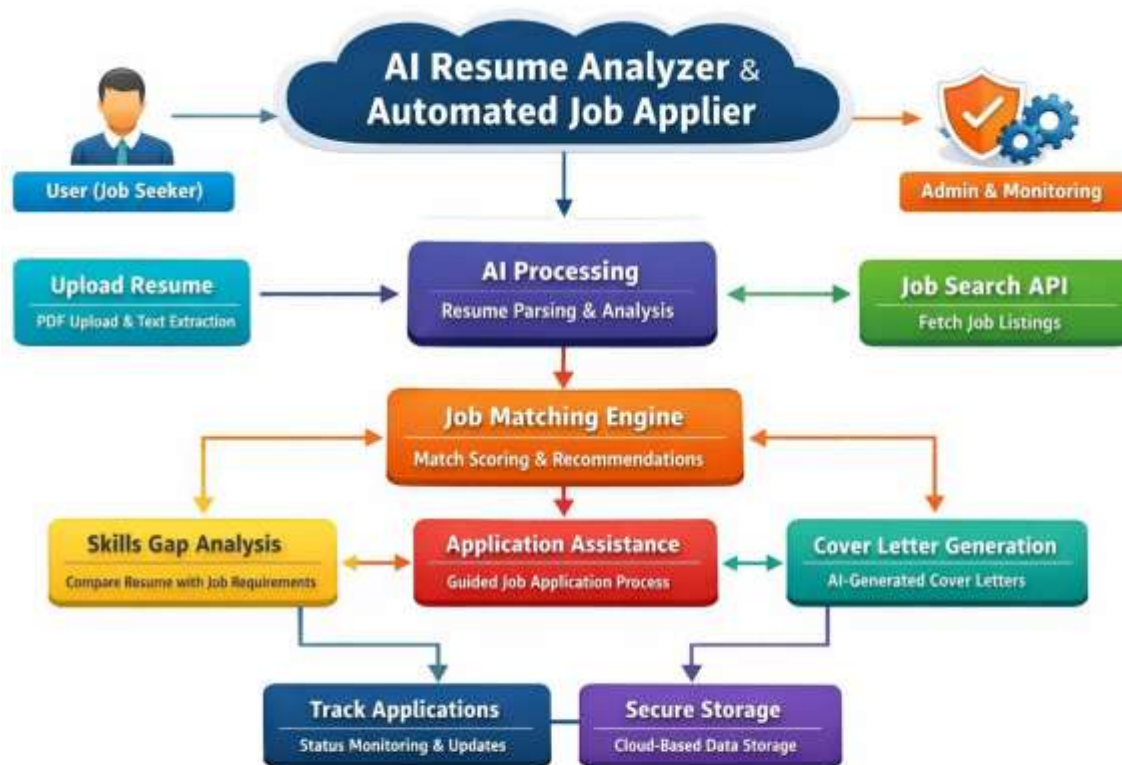
Functional testing verified that all user-facing operations—such as job discovery, match score computation, skill gap identification, and assisted application workflows—performed according to defined requirements. Performance evaluation examined system responsiveness and scalability by simulating concurrent job searches and resume analyses, ensuring acceptable response times under increased workload.

Security and privacy assessments validated secure session handling, access control, and isolation of user data within cloud storage. Usability and accessibility testing ensured intuitive navigation and compatibility with assistive technologies. Finally, user acceptance testing confirmed system effectiveness in real-world usage, while AI output validation ensured that all generated results remained factually accurate, transparent, and ethically compliant.

In addition to functional and performance validation, the system underwent consistency and regression testing to ensure that newly integrated features did not adversely affect existing functionality. Each system update was evaluated against previously validated workflows such as resume analysis, job matching, and application tracking. This approach ensured long-term system stability and reduced the risk of functional degradation during iterative development.

Furthermore, qualitative evaluation was conducted to assess the interpretability and usefulness of AI- generated outputs. Resume insights, skill gap suggestions, and cover letter content were reviewed for relevance, clarity, and alignment with job descriptions. Feedback obtained during this evaluation phase was incorporated to refine AI prompts and improve output quality. This iterative validation process enhanced user trust, transparency, and overall system effectiveness.

3.5 Flowchart of System Working

IV. CONCLUSIONS

The "AI Resume Analyzer and Automated Job Applier" project marks a transformative approach to revolutionizing the job application process for modern job seekers. By leveraging advanced AI technologies, web frameworks, and cloud-based solutions, the system streamlines tasks such as resume analysis, job matching, skills gap identification, and automated application recommendations. The AI Resume Analyzer not only addresses the inefficiencies of manual job searching and resume tailoring but also fosters a more organized, transparent, and accessible environment for users navigating competitive job markets.

The centralized digital platform promises enhanced matching accuracy, improved decision-making capabilities through real- time AI insights, and a more engaging user experience with intuitive dashboards and self-service functionalities. Furthermore, by integrating strong privacy protocols and ethical AI practices, it ensures the safe handling of sensitive user data without compromising control. This approach empowers users to prioritize high-match opportunities, optimize their resumes, and gain valuable career development insights.

Overall, the AI Resume Analyzer project presents a scalable, user-friendly, and cost-effective solution, contributing significantly to operational efficiency, user satisfaction, and adaptability in a dynamic employment landscape. The successful implementation of this system positions users to meet future career demands and challenges with agility and confidence, ultimately bridging the gap between talent and opportunity in the evolving job market.

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