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RESUME GENIE: AN AI POWERED RESUME ASSISTANT FOR CAREER ADVANCEMENT

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Abstract—**This project is an AI-powered career growth assistant that goes beyond traditional resume builders. It transforms user resumes into professional, ATS-friendly, and role-specific documents using Python and OpenAI API. Users can upload job descriptions and also the old resumes, and the system parses and extracts the required information. It also performs skill gap analysis to identify missing skills. AI provides actionable suggestions to improve content, add relevant skills, and reorder sections effectively. It provides the keyword suggestions in order to improve the ATS score of the resume. From a single resume, multiple role-specific variants can be generated instantly. The system ensures resumes are aligned with job requirements for higher selection chances. it offers an interactive and user-friendly interface for seamless resume creation. Unlike existing tools, it combines resume optimization, skill enhancement, and career guidance in one platform. This solution empowers users to not only create resumes today but also grow their career for tomorrow.**

Keywords— **Artificial Intelligence, Resume Optimization, Applicant Tracking System (ATS), Natural Language Processing, Machine Learning, Job Description Analysis, Skill Gap Analysis, Keyword Extraction, Web-Based Application.**

I. INTRODUCTION

The rise of digital recruitment platforms and Applicant Tracking Systems (ATS) has made resume optimization essential for job seekers. Traditional resume preparation methods are manual and static, making them inadequate for modern, data-driven hiring processes. Advances in AI, NLP, and machine learning have enabled intelligent resume builders that can analyze resumes and job descriptions, extract key information, and optimize content for better ATS compatibility and recruiter visibility.

The proposed system is an AI-powered resume builder that offers end-to-end enhancement by parsing resumes and job descriptions to understand both candidate profiles and job requirements. It provides features such as keyword suggestions, resume scoring, real-time feedback, and skill gap analysis, along with personalized recommendations for improvement and upskilling. Additionally, it includes industry-specific templates, multilingual support, and job board integration for seamless applications.

Unlike existing tools with limited or premium-restricted features, this system delivers a comprehensive, scalable, and user-friendly platform. It improves resume quality, enhances ATS performance, and streamlines the job application process by aligning candidate profiles with evolving job market demands through AI-driven techniques.

II. RELATED WORK

The use of Artificial Intelligence (AI) and Natural Language Processing (NLP) in recruitment has grown significantly, especially for automating resume screening and candidate selection. Traditional systems relied on rule-based and keyword-matching techniques, which often failed to identify strong candidates accurately. Recent advancements in machine learning and deep learning have enabled smarter resume analysis tools that offer features like resume scoring, keyword suggestions, and role-specific content generation. However, many existing tools still focus mainly on formatting and basic keyword optimization, with limited support for in-depth analysis, personalization, and resume development. Additionally, advanced features are often restricted behind paid subscriptions.

A. Existing System

Existing systems include traditional resume builders and basic AI-powered platforms. While traditional tools focus on templates and formatting, AI-based systems provide limited analysis using simple techniques, lacking deeper semantic understanding. They often fail to deliver detailed feedback, skill gap analysis, and personalized recommendations, making it difficult for users to create ATS-optimized, role specific resumes.

B. Proposed System

To address these limitations, the proposed system is an AI based web application for resume optimization. It will

allow users to upload resumes and job descriptions, analyze them using AI, NLP, and machine learning, and provide intelligent suggestions for content, keywords, and formatting. Key features include ATS-based analysis, skill gap detection, personalized recommendations, real-time feedback, and resume templates. The system aims to offer a comprehensive, user-friendly solution that improves resume quality, enhances ATS performance, and simplifies the job application process.

III. METHODOLOGY

The proposed AI-Based Smart Resume Builder follows a modular and intelligent pipeline that utilizes Natural Language Processing (NLP) and Machine Learning (ML) algorithms to automatically generate, optimize, and evaluate resumes. The overall framework is designed to ensure scalability, accuracy, and real-time performance.

A. Data Collection and Input Processing

The system accepts user inputs such as personal information, education details, skills, and work experience through structured forms. Users may also upload existing resumes in PDF or DOC formats along with target job descriptions. These inputs are converted into machine-readable text using document parsers. Multilingual inputs are supported through language detection and translation mechanisms.

B. Resume Parsing Module

Resume parsing is performed using NLP-based information extraction techniques. Named Entity Recognition (NER) and rule-based parsers are used to identify and extract essential components such as skills, experience, education, certifications, and achievements. The extracted information is structured according to predefined data models for further processing.

C. Job Description Analysis

Job descriptions are analysed using transformer-based language models such as BERT. The system extracts required technical skills, soft skills, role-specific keywords, and experience requirements. Semantic similarity techniques are applied to measure the relevance between the resume content and the job description.

D. Keyword Extraction and Optimization

Keywords are extracted using techniques such as TF-IDF, word embeddings, and domain-specific skill taxonomies. The system identifies missing or weak keywords and provides recommendations to improve ATS compatibility while maintaining natural language quality in the resume.

E. Resume Optimization and Skill Gap Analysis

The skill gap analysis module compares the skills extracted from the resume with those required in the job description. Missing or insufficient skills are highlighted, and personalized recommendations are provided to guide users toward relevant learning and professional development opportunities.

F. Resume Scoring Engine

The resume scoring engine evaluates resumes based on multiple parameters, including formatting quality, keyword relevance, content completeness, and job description alignment. A weighted score is generated to help users assess their resume's effectiveness.

G. Personalized Recommendation System

Based on user data, resume analysis results, and historical trends, the recommendation system provides suggestions for improving resume structure, language usage, template selection, and skill enhancement. Recommendations are tailored to the user's preferred job role and industry.

H. Real-Time Feedback Module

As users modify their resumes, the system delivers real-time feedback on grammar, formatting, keyword usage, and ATS compatibility. This continuous feedback loop helps users incrementally improve resume quality.

I. Output Generation

The final resume is available for download in multiple formats such as PDF and DOCX. The system generates ATS-friendly resumes and provides watermark-free downloads based on user access levels.

IV. WORKFLOW OF THE SYSTEM

Step 1: User Accesses the System

The process begins when the user opens the Resume Genie application through the web interface. The system loads the required modules and prepares the environment for resume creation or analysis.

Step 2: Resume Data Input

The user enters resume details such as personal information, education, skills, work experience, and projects. Alternatively, the user can upload an existing resume for analysis. This serves as the primary input to the system.

Step 3: Resume Parsing (if uploaded)

If a resume is uploaded, the system converts it into text format and extracts relevant information such as skills, education, and experience. The Resume Parser module transforms unstructured data into structured format.

Step 4: Data Processing and Structuring

The system organizes and validates the input data, ensuring all necessary fields are properly structured and ready for further processing.

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Step 5: Career Objective Generation
Based on the user's skills and target role, the system generates a professional career objective using Natural Language Generation techniques.

Step 6: ATS Score Calculation
The ATS Analyzer evaluates the resume by analyzing keyword relevance, content completeness, and formatting. It calculates an ATS score using techniques like TF-IDF and cosine similarity.

Step 7: Resume Generation and Formatting
The system compiles all processed data into a professional resume format and applies the selected template to enhance presentation.

Step 8: Resume Preview
The generated resume is displayed to the user for review. The user can make necessary edits and improvements.

Step 9: Resume Download
After finalizing, the user can download the resume in the desired format for use in job applications.

Step 10: Feedback and Improvement
The system provides feedback based on ATS score and analysis, helping the user improve resume quality and effectiveness.

V. EXPERIMENTAL SETUP AND EVALUATION

Experimental Environment:

- Operating System: Windows/Linux
- Technologies Used: React.js, Node.js, Express.js
- NLP Techniques: TF-IDF, Cosine Similarity
- Storage: Local Storage / Database

To evaluate the performance of the Resume Genie system, a controlled experimental setup was used. Sample resumes from different domains along with job descriptions were processed through the system. The resumes were analyzed, generated, and evaluated under different conditions to measure system effectiveness and accuracy.

Performance Metrics:
Resume Parsing Accuracy, ATS Score Accuracy, Keyword Matching Score, Semantic Similarity Score, Response Time, Resume Quality Improvement.

a) Resume Parsing Accuracy
The system successfully extracted key information such as skills, education, and experience from uploaded resumes with high accuracy. Structured output was generated effectively from unstructured data.

b) ATS Score and Keyword Matching
The ATS Analyzer correctly evaluated resumes based on keyword relevance and content completeness. Resumes with better keyword alignment showed higher ATS scores.

c) Resume Quality Improvement
The system provided suggestions and generated content such as career objectives, which improved overall resume quality and alignment with job descriptions.

d) System Response Time
The system demonstrated fast response time during resume analysis and generation, providing near real-time feedback to users.

e) Performance under Multiple Requests
The system maintained stable performance when handling multiple resume analyses simultaneously, ensuring consistent output without degradation.

f) Overall Analysis
The system showed reliable performance in resume generation, parsing, and ATS evaluation. It effectively improved resume quality and demonstrated scalability and efficiency under different conditions.

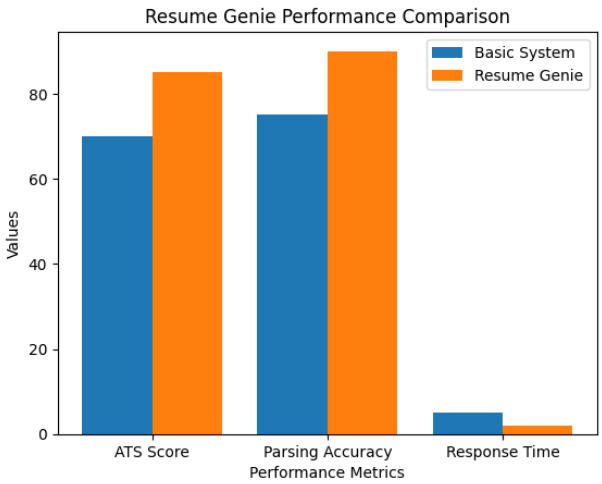

Fig.1: performance of Resume genie

VI. RESULTS AND DISCUSSIONS

The experimental results show that the Resume Genie system provides significant improvements in resume creation, analysis, and optimization compared to traditional resume-building methods. The system generates resumes instantly and provides real-time feedback, unlike manual methods that require more time and effort. The ATS scoring mechanism helps users understand how well their resume matches job requirements, improving their chances of selection. The use of NLP techniques ensures accurate keyword extraction and better alignment with job

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descriptions. Additionally, the system enhances resume quality by suggesting improvements and generating professional content such as career objectives.

a. Web-Based Deployment
The system is designed as a web-based application, allowing users to access it from anywhere using a browser. This ensures ease of use, flexibility, and accessibility without the need for installation.

b. Use in Educational and Career Development The system can be effectively used by students and job seekers to create professional resumes and improve their profiles. It assists users in preparing job-ready resumes aligned with industry standards.

c. Use in Recruitment and Hiring
Recruiters can benefit from the system by analyzing resumes quickly using ATS scores and keyword matching. This reduces manual effort and speeds up the short listing process.

d. Support for Large-Scale Usage
The system can handle multiple users simultaneously and process large volumes of resumes efficiently. Its architecture supports scalability, making it suitable for widespread use.

e. Improvement in Resume Quality
The system helps users improve resume quality by providing feedback, keyword suggestions, and structured formatting. This results in better ATS compatibility and increased chances of selection.

f. Reduction in Time and Effort
By automating resume generation, parsing, and analysis, the system significantly reduces manual effort and time required to create and optimize resumes.

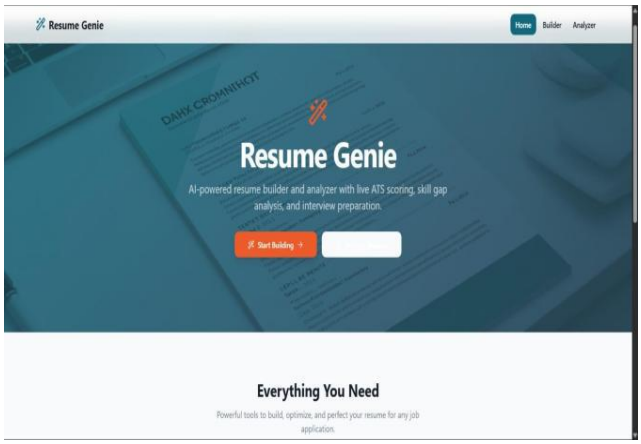

Fig. 2: Home page of Resume Genie

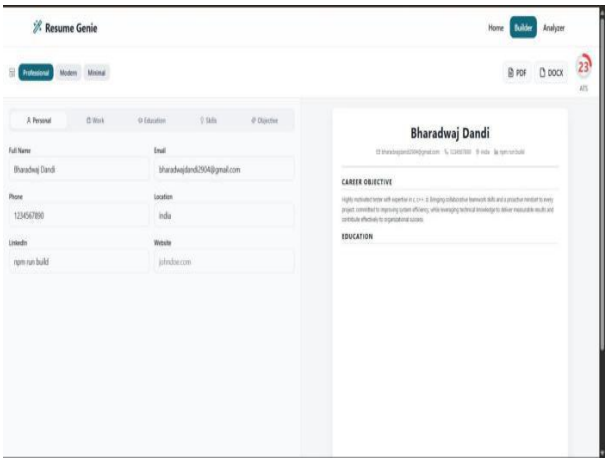

Fig. 3: Resume builder- personal information module

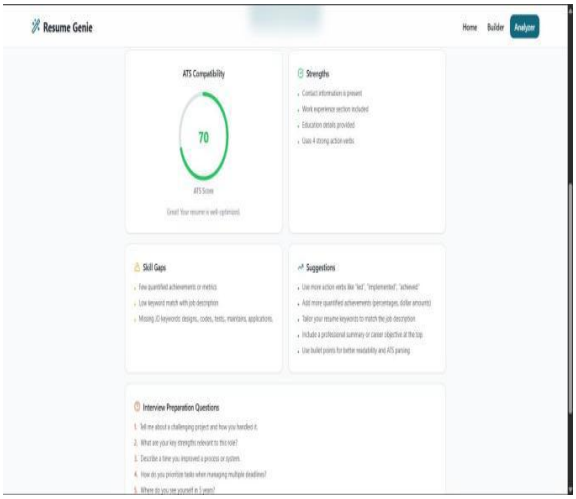

Fig. 4: ATS score check

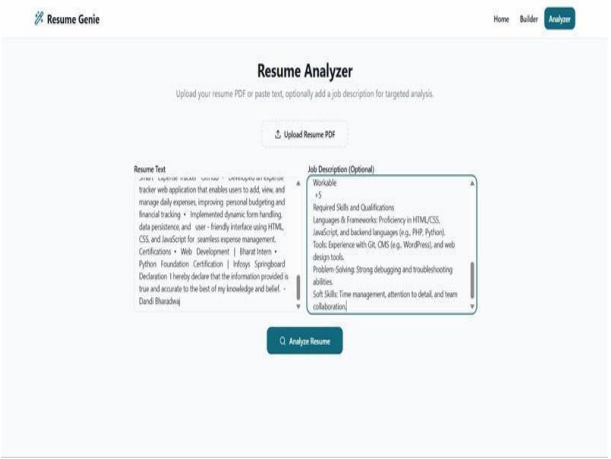

Fig. 5: Resume analyzer input module

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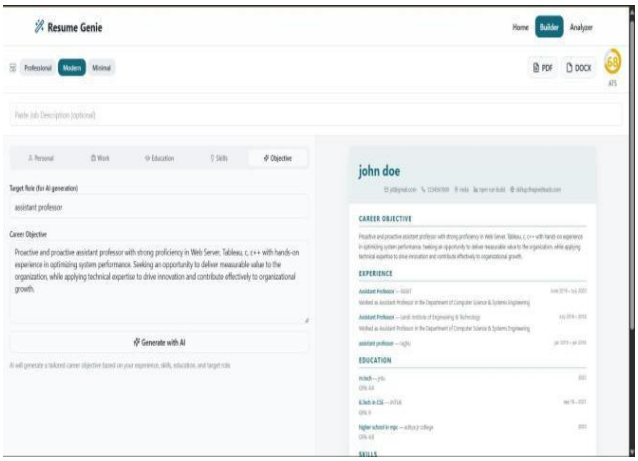

Fig. 6: Creer objective generation

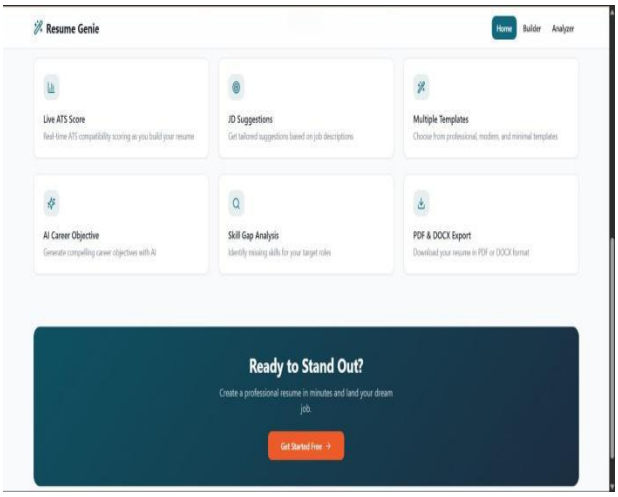

Fig. 7: Features of Resume Genie

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