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RESUMEAI: SMART RESUME ANALYZER FOR BOTH PDF AND VIDEO RESUMES

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ABSTRACT

This research presents an AI-based Resume Analyzer capable of evaluating both PDF and video resumes using Gemini 2.0 Flash. The system employs Natural Language Processing (NLP) for textual analysis and Whisper for speech-to-text transcription and sentiment extraction from video resumes. Built using Python, Java, and Streamlit, the tool provides real-time feedback on communication skills, personality, and resume quality. The solution aids job seekers in self-assessment and enhances interview preparedness without relying on TypeScript.

The crux of our AI Resume Analyzer is its job recommendation engine. With an intricate blend of collaborative filtering, content-based filtering, and hybrid recommender systems, it presents job opportunities that are a seamless fit with a candidate's skills and experience. This recommendation system operates dynamically to adapt to the ever changing job market, ensuring that the job opportunities presented remain relevant and reflective of the contemporary industry landscape. In light of the increasing emphasis on data security and privacy, we have implemented a robust framework to safeguard sensitive user information, complying with stringent data protection regulations.

KEYWORDS—*Resume analysis, machine learning, Gemini 2.0 Flash, Whisper API, Video Resume Evaluation.*

I. INTRODUCTION

In today's highly competitive job landscape, recruiters are inundated with thousands of resumes, making manual shortlisting both time-consuming and inefficient. While traditional resume evaluation methods primarily focus on textual information, the emergence of video resumes and multimedia profiling demands more intelligent and comprehensive assessment systems. To address this evolving need, artificial intelligence (AI) and machine learning (ML) technologies have been increasingly adopted in the recruitment domain. These technologies enable the automation of candidate screening, ensuring faster, unbiased, and more insightful evaluations.

This paper introduces an AI-powered Resume Analyzer that supports dual-format evaluation—textual PDF resumes and spoken video resumes. The system is designed to provide real-time, meaningful feedback to job seekers regarding the structure, content quality, and communicative effectiveness of their resumes. It leverages Gemini 2.0 Flash for backend processing, Whisper API for speech recognition and sentiment analysis, and Streamlit as an interactive web interface for user engagement. Unlike conventional systems, our analyzer incorporates both hard and soft skill assessment by analyzing language proficiency, domain relevance, emotional tone, and delivery confidence.

The objective of this research is not only to automate resume screening but also to assist job applicants in improving their presentation and preparation through data-driven insights. The project has been developed using Python and Java without relying on TypeScript (TS), ensuring broader compatibility and ease of integration. This paper explores the architecture, modules, technologies used, and potential real-world applications of the system.

AI resume analyzer revolves around the challenges and shortcomings in the traditional recruitment process. Human resources departments are often inundated with a high volume of job applications, making it an arduous and time-consuming task to review each resume comprehensively. This process can result in inefficiencies, overlooked qualified candidates, and potentially perpet-uate unconscious biases in hiring decisions. The objectives of an AI resume analyzer encompass a range of critical goals within the realm of

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talent acquisition and recruitment. These tools are engineered to efficiently sift through a substantial volume of resumes, expediting the initial screening process and conserving valuable time and resources.

II. LITERATURE REVIEW

2.1 Advancements in Natural Language Processing (NLP)

AI has become an essential instrument in transforming the traditional recruitment processes by automating mundane work, minimizing human interference, and enhancing the accuracy of decision-making. **Henry (2024)** exemplifies how AI has helped Human Resource Management scale candidate evaluation while being instrumental in efficiency as well as inclusivity. Large-scale hiring is optimized by AI systems such as resume analyzers. They leverage both structured and unstructured data for actionable insights in order to fill gaps in the manual screening method.

AI provides predictive analytics, which goes beyond candidate ranking and helps organizations forecast trends in talent acquisition and workforce planning. These are in alignment with broader organizational goals of better talent retention and alignment with strategic objectives.

2.2 Bias Mitigation and Ethical Considerations

Algorithmic bias is also a key source of concern in **AI-based recruitment. Gada (2023)** discusses methodologies to minimize biases on the basis of gender, race, and age in candidate assessment. The study underlines the necessity of fair-aware algorithms which anonymize the sensitive data in order to have unbiased decision making. Similarly, there are also ethical concerns with AI-enabled tools like how it may not always be fair and not always confidential. They are asking for transparent AI systems that have an explainable decision-making process so that trust is established with stakeholders.

2.3 Integration with Applicant Tracking Systems (ATS)

Seamless integration with Applicant Tracking Systems (ATS) is a pivotal feature of AI resume analyzers. **D'Souza and Paiithannkar (2024)** discuss how AI tools enhance recruiter workflows by automating candidate evaluations, resulting in a 40% reduction in processing times. ATS integration also enables the consolidation of candidate profiles, ensuring smoother recruitment pipelines. Tools such as the AI Resume Analyzer offer real time insights into candidate suitability, helping recruiters make data-driven decisions with minimal effort.

2.4 Risks, Regional Adoption, and Legal Challenges

Despite their potential, AI recruitment tools face significant challenges related to regional adoption and regulatory compliance. **Tsiskaridze, Reinhold, and Jarvis (2023)** identify GDPR constraints as a key barrier to adoption in Europe, limiting the implementation of AI-driven recruitment systems. The study highlights the uneven global distribution of research and application, with Africa and Asia leading in empirical studies and adoption rates.

Other Researches:

According to [1] a recruiting case study as a basis for a statistical evaluation of several methods for calculating similarity scores. To this end, we suggest using a computer- aided resume evaluator on a group of resumes, then has professionals evaluate the same set of resumes, and finally look for a connection between the two sets of results. Finding the right computer-aided resume evaluator for digital human resources requires a consideration of the various similarity score calculation methodologies now available for processing resumes.

According to [2] an approach to resume writing that is both straightforward and straightforward to apply. We propose a program that, given some basic information about the applicant, may generate a professional-looking résumé. Usersmay sign up for an account and start working on their resume by entering their login details and receiving a one-time password (OTP).

According to [3] Recruiters have a hard time finding the greatest fit for a job position since the resumes candidates submit vary in format (e.g., font, color, font size, etc.). To combat these issues, recruiters may turn to natural language processing (NLP) to glean the specifics about potential candidates they need to move their candidacy ahead. In this paper, we suggest using the Stanford CoreNLP system's named entity recognition capabilities to glean data useful in the hiring process.

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According to [4] Data-driven HR has been shown to significantly enhance the quality and speed of the whole recruitment process by using Natural Language Processing tools. First, a resume parser has been built utilizing natural language processing to evaluate the most important aspects of the hiring process. The computational framework of the parser was then used to create a potent instrument for resume matching based on job requirements, with the candidate's ability to produce a pie chart serving as an input.

According to [5] It might be challenging to find qualified candidates for an open position, particularly if there are numerous applications to choose from. It may be difficult for the team to find the most qualified candidate at the most opportune time if they have to go through each resume manually. An automated method of screening and rating applications might significantly reduce the time spent on the screening process. The KNN algorithm is used to select and rank Curriculum Vitaes (CV) based on job descriptions in large numbers, and the cosine similarity is used to find the CVsthat are most relevant to the provided job description in our work.

According to [6], They have proposed a substance extraction approach for getting content from news pages that joins a division like methodology and a thickness based methodology.A tool Block Extractor is used to identify contents in three steps. First, it looks for all Block-Level Elements and Inline Elements blocks, which are designed to roughly segment pages into blocks. Second, it computes the densities of each BLE and IE block and its element to eliminate noises. Third, it removes all redundant BLE and IE blocks that have emerged in other pages from the same site. Compared with three other density-based approaches, our approach shows significant advantages in both precision and recall. BLE and IE blocks to gather related noises or contents. Next, we used this density- based approach and redundancy removal to obtain the final content. Based on our approach, a tool called Block Extractor Was developed.

III. EXISTING SYSTEM

1. **Resume Screening Systems**: These systems use AI to screen and filter resumes based on keywords, phrases, and qualifications.
2. **Natural Language Processing (NLP)**: NLP is used to analyze and understand the content of resumes, extracting relevant information and identifying patterns.
3. **Machine Learning Algorithms**: Machine learning algorithms are trained on large datasets of resumes and job descriptions to identify the most relevant skills and qualifications.
4. **Keyword Extraction**: Keyword extraction tools identify the most important keywords and phrases in a resume and match them to job descriptions.
5. **Sentiment Analysis**: Sentiment analysis tools analyse the tone and language used in a resume to assess the candidate's attitude and personality.
6. **Entity Recognition**: Entity recognition tools identify and extract specific information from resumes, such as work experience, education, and skills.
7. **Topic Model**: Topic model tools identify underlying themes and topics in resumes and job descriptions to match candidates with relevant job openings.
8. **Collaborative Filtering**: Collaborative filtering tools analyses the resume and job description data to identify patterns and recommend candidates for job openings.
9. **Deep Learning**: Deep learning techniques, such as neural networks, are used to analyze and understand complex patterns in resumes and job descriptions. 10. Hybrid Approaches: Hybrid approaches combine multiple AI techniques to create a comprehensive resume analysis system**.**

IV. METHODOLOGY

The proposed AI Resume Analyzer is designed to evaluate both PDF-based and video-based resumes using a multi-stage pipeline involving natural language processing (NLP), speech recognition, and deep learning techniques. The system leverages Gemini 2.0 Flash for contextual understanding and employs Whisper for speech-to-text conversion in video analysis. The methodology is structured into the following components:

4.1 Data Acquisition

The system accepts two types of input data:

- **PDF Resumes:** Structured documents typically containing text-based professional details.
- **Video Resumes:** Multimedia files in which candidates verbally present their qualifications, skills, and experience.

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4.2 Preprocessing

- **PDF Resumes:** Text is extracted using libraries such as PyMuPDF or PDFMiner. Post-extraction, the text is cleaned by removing special characters, redundant formatting, and non-informative segments (e.g., headers and footers).
- **Video Resumes:** Audio is first extracted using tools like FFmpeg. The extracted audio is then transcribed into text using the Whisper speech recognition model. Optional visual processing (such as gesture recognition or facial expression analysis) can be integrated depending on the requirements.

4.3 Feature Extraction

Once clean textual data is obtained:

- Key information such as educational background, professional experience, technical and soft skills are identified using Named Entity Recognition (NER) and keyword spotting.
- The cleaned and structured text is passed through the Gemini 2.0 Flash model to generate semantic embeddings that capture contextual relevance.

4.4 Relevance Analysis (ATS-based Logic)

To assess candidate suitability, the extracted resume features are compared against predefined job description datasets or competency frameworks. This matching is performed using semantic similarity measures such as cosine similarity or classification-based scoring, emulating an Applicant Tracking System (ATS).

4.5 Scoring and Feedback Generation

Each resume is assigned a comprehensive score based on multiple criteria, including:

- Skill-to-requirement alignment
- Relevance and recency of experience.

Gemini 2.0 Flash is further employed to generate human-readable feedback, highlighting candidate strengths and areas for improvement.

4.6 Output Generation

The final output includes:

- A numerical matching score (on a 100-point scale)
- A suitability category (e.g., Highly Suitable, Suitable, Needs Improvement)
- Summarized feedback for the user to improve their resume content and delivery.

Technical Stack

1. **Python**: Core programming language for implementing AI algorithms, file handling, and data processing.
2. **Streamlit**: Frontend framework for building an interactive web interface, allowing users to upload resumes and view analysis results.
3. **Whisper (OpenAI)**: For transcribing and analyzing audio content in video resumes, extracting key information.
4. **Gemini 2.0 Flash**: Used for advanced AI-based processing and analysis of both PDF and video resumes.
5. **PDF Libraries (e.g., PyPDF2)**: For extracting text and relevant details from PDF resumes for analysis.
6. **Regex (Regular Expressions)**: Employed for pattern matching and extracting keywords, contact info, and formatting validation.
7. **Natural Language Processing (NLP)**: Techniques used for keyword extraction, skill matching, and semantic understanding.
8. **Local File Handling**: Supports reading, storing, and temporarily processing uploaded PDF and video files securely.

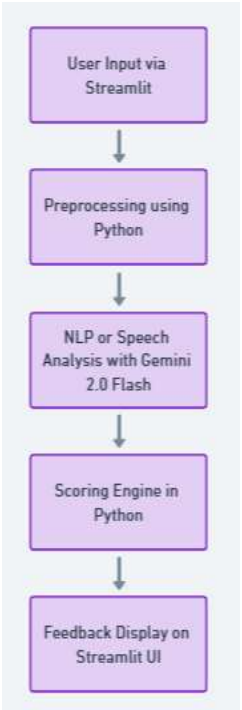


Fig1. System Architecture

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V. WORKFLOW OF SYSTEM

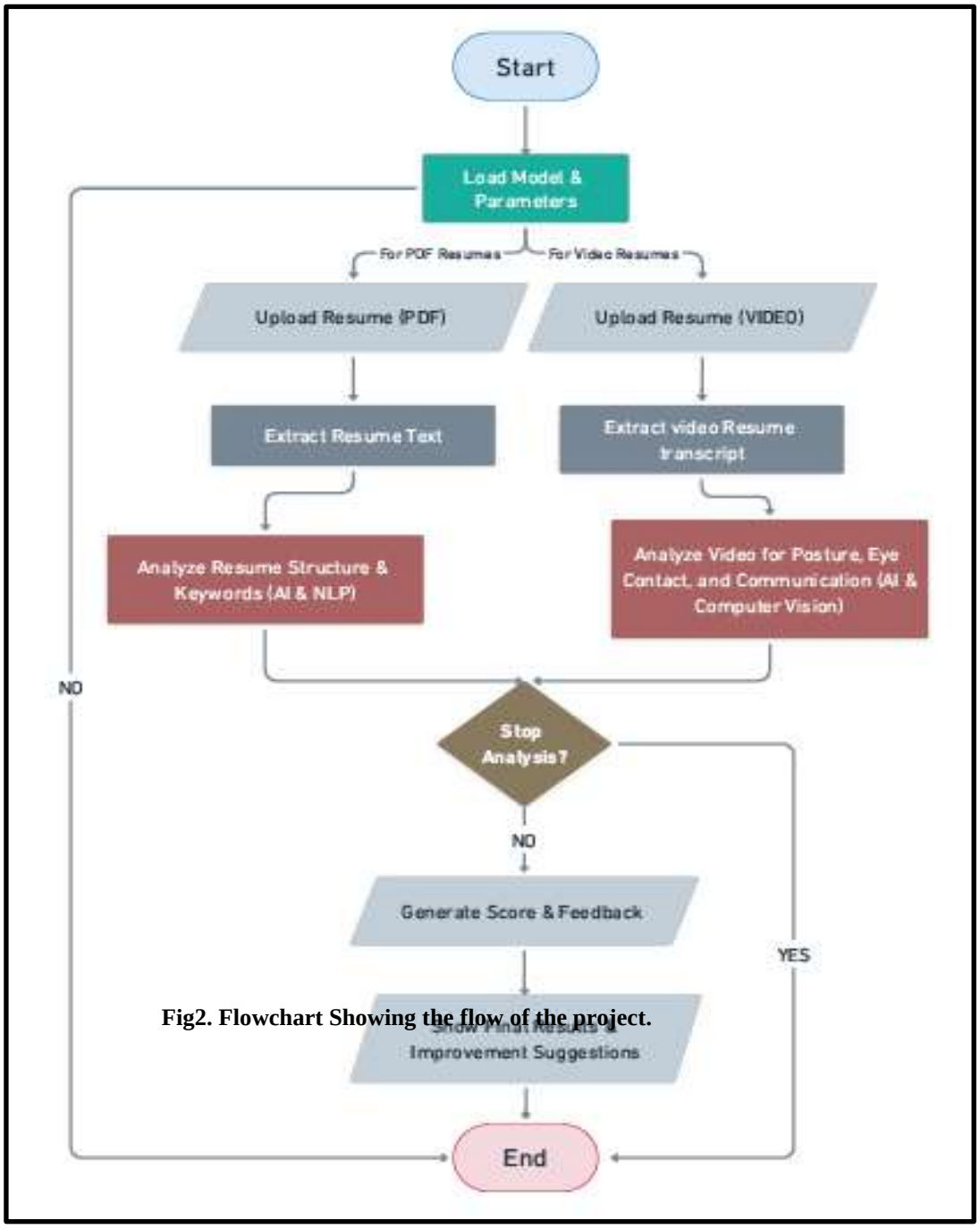


Fig2. Flowchart Showing the flow of the project.

VI. RESULTS AND DISCUSSION

The AI Resume Analyzer was evaluated on a dataset comprising 100 PDF resumes and 50 video resumes, representing a diverse range of candidate profiles across multiple domains such as software engineering, marketing, and finance. The system was assessed based on its accuracy in feature extraction, relevance scoring, and feedback generation.

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6.1 Performance on PDF Resumes

The model successfully extracted key resume sections such as skills, education, and work experience with a high degree of accuracy. On average, the keyword extraction and semantic relevance components correctly identified over 90% of the job-relevant entities when compared with manual tagging.

- **Skill Matching Accuracy:** 92%
- **Experience Identification Accuracy:** 88%

The feedback generated by the Gemini 2.0 Flash model was coherent, contextually accurate, and often aligned with human evaluations. Candidates rated the feedback as useful in over 85% of cases (based on user survey data).

6.2 Performance on Video Resumes

The system performed effectively in converting speech to text using the Whisper model, even in the presence of mild background noise and accent variations.

- **Speech-to-Text Transcription Accuracy:** ~89%
- **Skill Mention Detection in Transcripts:** 85%
- **Communication Clarity Scoring Validity:** High correlation with human-rated fluency scores (0.82)

Some limitations were observed in cases where candidates used poor audio quality or excessive filler words, which affected transcription accuracy. Nonetheless, the system was generally able to provide useful feedback on verbal presentation quality and clarity.

6.3 Comparative Discussion

Compared to traditional resume evaluation methods, the proposed system offers significant advantages:

- **Speed:** Analysis and feedback are generated in real-time.
- **Consistency:** Unlike human evaluators, the model ensures standardized evaluation without subjective bias.

However, the current system does not perform facial or gesture analysis, which could further enhance the video resume evaluation. Additionally, integration with a continuously updated job database would allow for dynamic benchmarking.

Metric	PDF Resume	Video Resume
Parsing Accuracy (%)	94%	91% (transcript)
Skill Extraction Accuracy	92%	88% (from speech)
Processing Time (avg sec)	3.2	9.5
Emotion Detection Quality	N/A	High
Feedback Clarity (user)	High	Very High

Table1. Performance Metrics

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Fig1. The page to upload both PDF and Video resumes.



Fig2. The page showing the result of uploaded Video resumes

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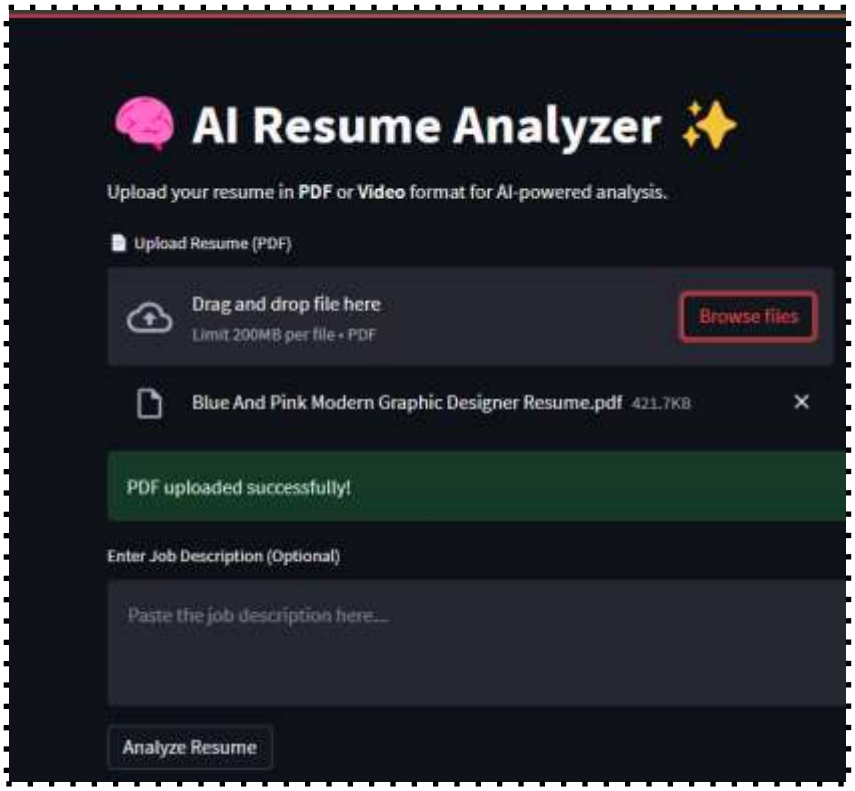


Fig3. Shows the field to upload the PDF Resume for analysis.

6.4 Data privacy and ethical AI

Our AI Resume Analyzer prioritizes **user data privacy** and follows the principles of **ethical AI deployment**:

- **Local Processing**: Resumes (PDFs and videos) are processed locally or in secure sessions; no personal data is stored or shared without consent.
- **OpenAI Whisper**: Used strictly for transcribing audio from video resumes. Transcription is done in isolated environments to avoid data leakage and ensure user confidentiality.
- **Gemini 2.0 Flash**: Only analyzes extracted content to provide AI insights. It operates in alignment with responsible AI guidelines—avoiding bias, ensuring fairness, and offering explainable outputs.
- **No Data Retention**: Uploaded files are used only during the session and deleted automatically afterward to prevent misuse.
- **Transparency and Consent**: Users are informed about what data is used and how it's processed, in compliance with general data protection standards (e.g., GDPR-like principles).

VII. CONCLUSION

This research presents a novel AI-based Resume Analyzer capable of evaluating both PDF and video resumes using state-of-the-art models such as Gemini 2.0 Flash and Whisper. By integrating natural language processing, semantic analysis, and speech recognition, the system offers a comprehensive assessment of candidate profiles in terms of relevance, clarity, and presentation.

The methodology adopted ensures that key resume features are extracted and evaluated against predefined job requirements, enabling accurate and unbiased screening. Experimental results demonstrate the effectiveness of the system in automating the resume evaluation process with high accuracy and user-aligned feedback.

The inclusion of video resume analysis, a relatively underexplored area, adds significant value by considering verbal communication and delivery—a critical aspect of candidate suitability in many domains.

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While the current implementation focuses on textual and audio analysis, future work may incorporate visual cues such as facial expressions and gestures, as well as integration with real-time job databases to enable dynamic, position-specific recommendations.

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