

AI-powered Resume Screening and Ranking System (P1)

A Project Report

submitted in partial fulfillment of the requirements

of

AICTE Internship on AI: Transformative Learning

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by

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ABSTRACT

In the competitive work environment of the present, businesses are exposed to a large number of resumes per vacancy advertisement, rendering manual screening tedious and not effective. For an efficient workflow, the Resume Screening and Scanning App makes use of Artificial Intelligence (AI) and Automated Tracking System (ATS) technologies to scan, analyze, and assess resumes with reference to preset standards.

This app is built to extract important details from resumes, including personal info, work history, skills, qualifications, and certifications, via Natural Language Processing (NLP) and Machine Learning (ML) algorithms. Integrating the Google Gemini API into the system provides assurance for resume parsing and screening accuracy and furnishes the users with an ATS compatibility score so that the candidate can analyze how likely he is to clear the ATS filters utilized by hiring managers.

In the modern recruitment landscape, manual resume screening is inefficient and time-consuming. The Resume Screening and Scanning App automates this process using AI, NLP, and Machine Learning to analyze and evaluate resumes effectively.

Key Features & Highlights:

- ✓ AI-Powered Resume Parsing – Extracts key details like skills, experience, and education.
- ✓ ATS Compatibility Check – Evaluates resumes against Applicant Tracking System (ATS) filters.
- ✓ Google Gemini API Integration – Ensures accurate scanning and analysis.
- ✓ Real-time Feedback & Recommendations – Improves resume quality and job matching.
- ✓ Keyword Optimization Analysis – Enhances visibility for recruiters.
- ✓ Multi-Format Support – Accepts PDF, DOCX, and TXT formats.
- ✓ Data-Driven Insights – Provides job relevance scores and suggestions.
- ✓ Recruiter Dashboard – Helps employers filter and shortlist candidates efficiently.
- ✓ Future Enhancements – AI-powered job matching and job portal integration.

This project aims to bridge the gap between job seekers and recruiters by improving resume visibility, reducing ATS rejections, and optimizing the hiring process for faster, data-driven recruitment decisions.

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CHAPTER 1

Introduction

1.1 Problem Statement:

In today's fast-paced recruitment landscape, resume screening and scanning play a critical role in streamlining the hiring process. With companies receiving thousands of applications for job openings, manually reviewing resumes is time-consuming, inefficient, and prone to bias. To address this challenge, our Resume Screening and Scanning App leverages Artificial Intelligence (AI) and Applicant Tracking System (ATS) principles to automate and enhance resume evaluation.

1.2 Motivation:

In today's competitive job market, recruiters receive thousands of resumes for a single job opening. Manually screening resumes is time-consuming, prone to errors, and often leads to overlooking qualified candidates. Applicant Tracking Systems (ATS) are widely used, but many job seekers struggle to optimize their resumes for these systems, reducing their chances of selection.

Our AI-powered Resume Screening and Scanning App aims to bridge this gap by providing:

Automated Resume Analysis – Quickly evaluates resumes based on ATS criteria.

Improved Hiring Efficiency – Saves time for recruiters by shortlisting the best candidates.

Enhanced Job Seeker Success – Helps candidates optimize their resumes for better ATS scores.

1.3 Objective:

Efficiently Parse and Analyze Resumes – Extract key details (skills, experience, education) using Google Gemini API for accurate screening.

Ensure ATS Compatibility – Assess resume structure, keyword optimization, and formatting to improve Applicant Tracking System (ATS) scores.

Provide Actionable Feedback – Generate detailed suggestions for candidates to enhance resume effectiveness and increase job shortlisting chances.

Enhance Recruiter Productivity – Reduce manual effort, speed up candidate filtering, and ensure best-fit applicants for job roles.

1.4 Scope of the Project:

The Resume Screening and Scanning App automates the process of evaluating resumes using AI-powered parsing and ATS (Applicant Tracking System) analysis. The system extracts and analyzes resume data, checking for keyword relevance, formatting, and job compatibility. Users can upload resumes, receive an ATS score, and get feedback on improvements. The app ensures secure authentication, a user-friendly dashboard, and AI-based suggestions for better resume optimization. Future enhancements include support for multiple formats and advanced AI-driven recommendations to improve job application success rates.

Limitations:

Limited Accuracy in Context Understanding

The AI may struggle to interpret complex career transitions or industry-specific jargon, leading to misclassification.

Dependency on Structured Resumes

Poorly formatted resumes or scanned images may not be accurately parsed, affecting the ATS score.

Keyword Bias in Screening

The system heavily relies on predefined keywords, which may overlook qualified candidates who use different terminology.

Lack of Human Judgment

Unlike recruiters, AI cannot assess soft skills, personality traits, or cultural fit, which are crucial in hiring.

CHAPTER 2

Literature Survey

2.1 Review of Relevant Literature

Resume screening and scanning have evolved with Artificial Intelligence (AI) and Applicant Tracking Systems (ATS) to streamline the recruitment process. Several studies and technologies highlight key aspects of this field:

Automated Resume Parsing:

Research shows that Natural Language Processing (NLP) and Machine Learning (ML) improve resume parsing accuracy.

ATS and Job Matching Algorithms:

Studies on ATS scoring models indicate that resumes with optimized keywords and structured formats rank higher.

2.2 Existing Models and Techniques

- 1. Google Gemini API** → AI-powered resume analysis.
- 2. pdf2image & PIL** → Converts PDFs to images.
- 3. bcrypt** → Secure password hashing.
- 4. SQLite** → User authentication and data storage.
- 5. Streamlit** → Interactive web interface.

2.3 Gaps and Limitations in Existing Solutions:

- Limited Context Understanding** – AI may misinterpret nuanced job descriptions and industry-specific jargon.
- Keyword Dependency** – Over-reliance on keywords may overlook well-qualified candidates with different phrasing.
- Formatting Issues** – Complex resume layouts (tables, graphics) may not be parsed correctly.
- False Positives/Negatives** – May favor keyword-stuffed resumes over genuinely strong candidates.
- Bias in AI Models** – Potential biases in training data could impact fair evaluation.
- Lack of Human Judgment** – Cannot assess soft skills, cultural fit, or personality traits.
- Data Privacy Concerns** – Storing and processing personal data raises security risks.
- Limited Video Analysis** – If video is included, AI may struggle with accents, tone, or non-verbal cues.
- Scalability Issues** – Processing multiple large files simultaneously could slow down the system.

How Our Project Addresses These Gaps:

- AI-Powered Screening:** Uses Google Gemini AI to analyze resumes and job descriptions.
- ATS Scoring System:** Calculates a percentage match based on keywords, structure, & relevance.
- PDF Processing & OCR:** Converts PDF resumes into text using pdf2image & base64 encoding.
- User Authentication:** Secure login & registration with bcrypt password hashing & SQLite database.
- Session Expiry Feature:** Auto-logout after 30 minutes of inactivity for security.
- Resume & Video Uploads:** Supports resume & video uploads for a holistic candidate profile evaluation.

CHAPTER 3

Proposed Methodology

3.1 System Design

Data Collection: Gathering resumes from various sources such as job portals, company databases, and email submissions.

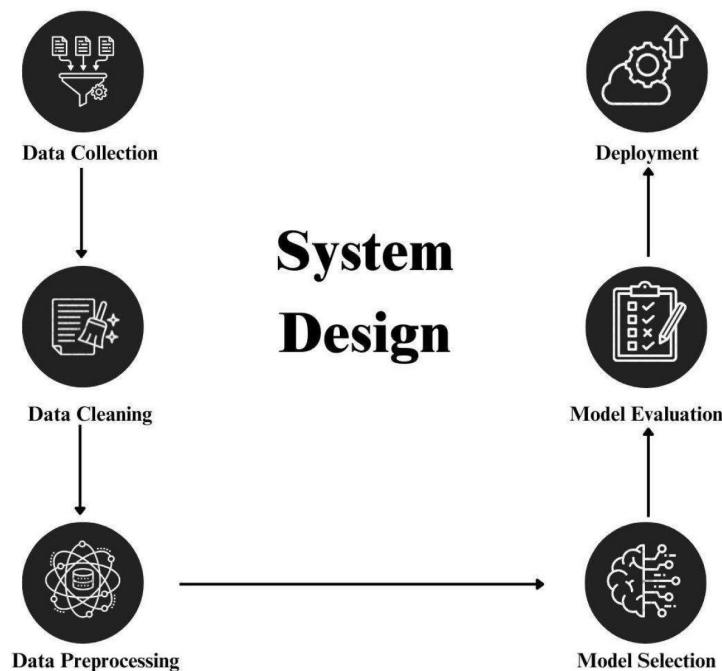
Data Cleaning: Removing inconsistencies, handling duplicate entries, extracting relevant information (name, skills, experience), and dealing with missing data.

Data Preprocessing: Structuring unstructured data, normalizing text, and converting resumes into a standardized format for analysis.

Model Selection: Implementing NLP-based models such as **gemini-1.5-flash** with machine learning classifiers for resume ranking.

Evaluation: Measuring model accuracy, recall, precision, and relevance in shortlisting candidates.

Deployment: Developing a user-friendly interface using Streamlit or Flask for HR professionals to upload and analyze resumes efficiently.



Requirement Specification

3.1.1 Hardware Requirements:

- Processor: Intel i5 or above
- RAM: 8GB minimum
- Storage: 50GB free space

3.1.2 Software Requirements:

- Operating System: Windows 10,11
- Programming Environment: Visual Studio Code with Anaconda environment
- Programming Language: Python 3.10
- **Libraries and Framework:**
 - Machine Learning : Scikit-learn
 - Data Preprocessing : Numpy, Pandas
 - Pickle, Streamlit
 - Development tools: VS Code

CHAPTER 4

Implementation and Result

4.1 Snap Shots of Result:



Fig.1 Login Page

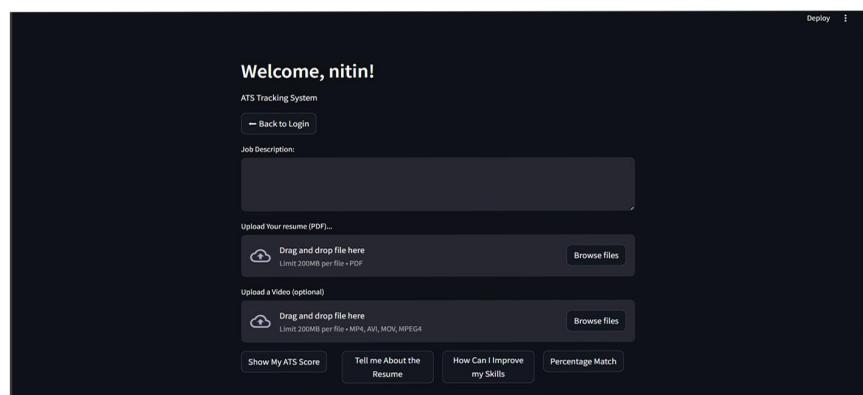


Fig. 2 Main Page

Fig. 03

After Giving Job Description and get Ats Score and more

Welcome, nitin!

ATS Tracking System

[Back to Login](#)

Job Description:

We are seeking a Machine Learning Intern to gain hands-on experience in building, training, and deploying machine learning models. This internship offers an opportunity to work on real-world datasets, apply various ML algorithms, and develop AI-driven solutions.

Upload Your resume (PDF)...

Drag and drop file here
Limit 200MB per file • PDF

Nitin_Kamlesh_Resume.pdf 448.1KB

Upload a Video (optional)

Drag and drop file here
Limit 200MB per file • MP4, AVI, MOV, MPEG

Uploaded Resume

1 of 2

Summary
kamleshnitin123@gmail.com | +91 9412126806 | LinkedIn [www.linkedin.com/in/nitin-kamlesh-bb1403260](#)
Imported, to a large extent, about studying computer science while majoring in Java, Python, or Oracle C++. with some exposure to the application subjects, such as machine learning and web development on scalable architectures. I can use my data analysis, problem-solving abilities, and adaptability to working in concentrating on in-house internship experiences at Accenture and AWS alike. This will drive my technical expertise and innovative mind toward accomplishment of positive projects for the organizations.

Skills

- Programming: Java, Python, AI Technologies, Problem Solving
- Soft Skills: Time Management, Teamwork, Problem-solving, Leadership, Project Management Tools: PyCharm(Python), IntelliJ IDEA (Java), VSCode

Experience
AICTE Internship on ML Transformation Learning TechSaksham - Microsoft & SAP Feb 2025 - Mar 2025

- Searched for a competitive 4-week internship focused on AI technologies.
- Developed an AI-based project prototype under the guidance of industry mentors.
- Earned certifications from Microsoft, SAS, AICTE, and edunet foundations.
- Presented findings at a regional seminar and a panel discussion at a regional showcase event.

 Accenture North America Data Analytics and Visualization Job Simulation on Forge Feb 2025 - Mar 2025

- Worked on a team to analyze complex data sets and extract insights into current trends, informing strategic decisions.
- Recommended data-driven solutions to improve engagement for a hypothetical social media client.
- Utilized data visualization tools to present insights effectively.

Personal Projects
ATS Resume Expert [https://github.com/NitinKamlesh/ATS-Resume-Scanning-and-Evaluation-System/tree/main/app.py](#)

- Designed a simple command-line interface for resume scanning and evaluation.
- Built a secure user authentication system using bcrypt for password hashing and SQLite for database management.
- Developed a Streamlit-based web application with interactive features like PDF uploads, dynamic content rendering, and AI-powered resume analysis.
- Implemented PDF processing and image encoding using pdfMiner and PIL to convert resumes into AI-compliant formats.
- Designed robust error handling for API calls, file uploads, and user inputs to ensure a seamless user experience.

 Voice Assistant [https://github.com/NitinKamlesh/Voice-Assistant](#)

- Developed a Python-based voice assistant utilizing the SpeechRecognition and Pyttsx3 libraries, achieving 92% speech recognition accuracy.
- Integrated a Tkinter-based GUI for an interactive user interface, managing automated application management tasks like opening and closing programs.
- Implemented natural language processing (NLP) techniques using NLTK to enhance user command interpretation and improve system adaptability.

Education

| | | |
|--|--|---|
| Rajkiya Engineering College, Kannur B.Tech in Computer Science Expected Graduation: May 2026 | Rajkiya Inter College, Agra Intermediate Marks 75% | Rajkiya Inter College, Agra High School Marks 72% |
|--|--|---|

Certifications

- ITCS 400: Career Edge - Young Professional 2024 - 2024
- Geo-data Sharing and Cyber Security by I.S.R.O.
- Microsoft Azure AI Fundamentals: Explore visual tools for machine learning
- Microsoft: Create machine learning models

Leadership Experience
National Service Scheme (NSS)

- Spokehead community service initiatives by organizing five awareness campaigns, leading to a 40% increase in local participation and enhancing engagement with the direct contact to over 300 residents.

 Graphic Designer, College Cultural Event

- Designed promotional materials, banners, and event brochures, showcasing creativity and proficiency in design tools to enhance event visibility and engagement.

Languages

| | |
|---------|--------------------------|
| English | Professional proficiency |
| Hindi | Native proficiency |

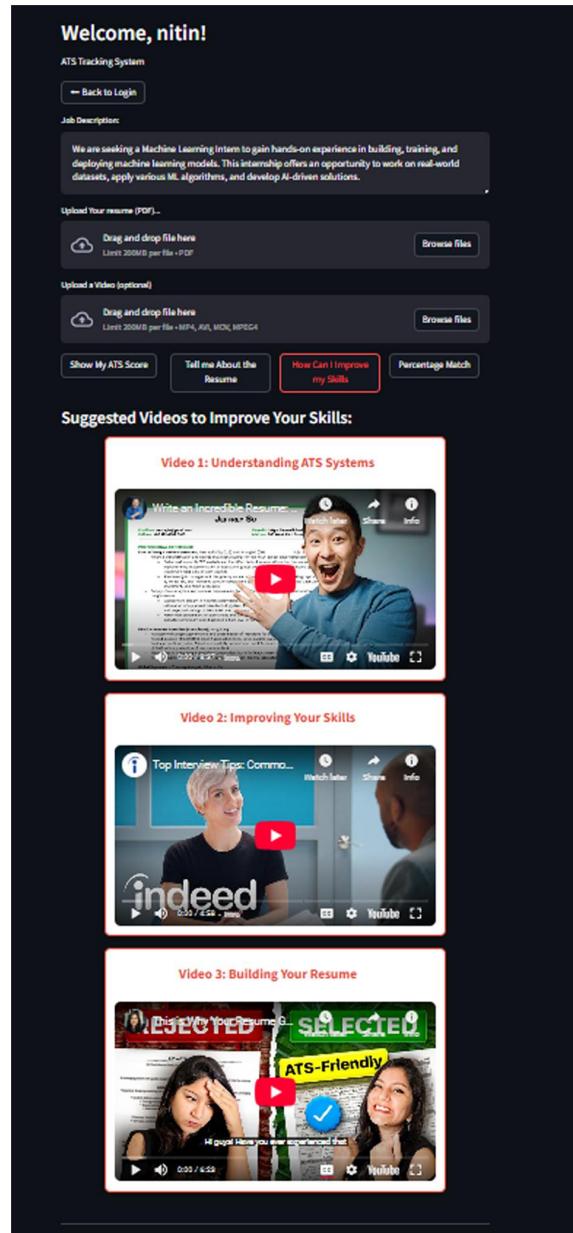
ATS Score

ATS Score: 75%

Explanation:

The resume demonstrates strong keyword matches (Python, Machine Learning, AI, data analysis, TensorFlow/PyTorch) are indirectly represented through AI technologies, Streamlit is mentioned) related to the job description. The formatting is generally good, using clear headings and bullet points. The candidate's experience in AI projects, data analysis, and software development is relevant, particularly the AICTE internship and Accenture project. However, the resume lacks explicit mention of specific ML algorithms (Scikit-learn, TensorFlow, PyTorch), model evaluation metrics (accuracy, precision, recall), and experience with data preprocessing techniques which are directly stated requirements. While the projects are impressive, the descriptions need to be more quantifiable and action-oriented, highlighting the practical application of ML skills and achievements. The clarity and professionalism of content are good, but using more specific achievements related to the job description's requirements would significantly improve the score. The candidate's certifications, personal projects and leadership experiences, while positive, are not as directly relevant to the ML Intern position as compared to the internship and Accenture experience. Therefore, a score of 75% reflects the positive aspects while also accounting for areas needing improvement.

Fig. 04
Tips to improve my resume



4.2 GitHub Link for Code:

[https://github.com/Nitinkamlesh/AI-powered-Resume-Screening-and-Ranking-System/
blob/main/app.py](https://github.com/Nitinkamlesh/AI-powered-Resume-Screening-and-Ranking-System/blob/main/app.py)

CHAPTER 5

Discussion and Conclusion

5.1 Future Work:

Integration with ATS – Connect the model with Applicant Tracking Systems (ATS) for real-time resume screening.

Explainable AI (XAI) – Provide insights into why a candidate was ranked higher using SHAP or LIME.

Multi-Language Support – Expand the model to handle resumes in multiple languages.

User Feedback Loop – Implement continuous learning where recruiters' feedback helps refine model predictions.

5.2 Conclusion:

The Resume Screening and Ranking System provides an efficient, automated solution for evaluating resumes based on predefined criteria, significantly reducing manual effort and bias in hiring. By leveraging Machine Learning and Natural Language Processing (NLP), the system ensures fair candidate evaluation, improving the hiring process's accuracy and speed.

While the current model performs well, challenges like bias, diverse resume formats, and false positives/negatives remain areas for improvement. Future enhancements, such as advanced deep learning models (BERT, RoBERTa), explainable AI, ATS integration, and multi-language support, will further refine the system and enhance its reliability.

With continuous improvements and feedback-driven refinements, this system can revolutionize resume screening and candidate shortlisting, making recruitment more efficient, unbiased, and data-driven.

REFERENCES

1. Jurafsky, D., & Martin, J. H. (2021). Speech and Language Processing (3rd ed.). Prentice Hall. - A comprehensive guide on Natural Language Processing (NLP) techniques used for text analysis in resume screening.
2. Chowdhury, G. G. (2010). Natural Language Processing. Annual Review of Information Science and Technology, 37(1), 51-89. - Covers text classification techniques applied in resume ranking systems.
3. Devlin, J., Chang, M. W., Lee, K., & Toutanova, K. (2019). BERT: Pre-training of Deep Bidirectional Transformers for Language Understanding. arXiv preprint arXiv:1810.04805. - A study on BERT, which can be used for improving resume text analysis and ranking accuracy.
4. Zhang, Y., Jin, R., & Zhou, Z. H. (2010). Understanding bag-of-words model: A statistical framework. International Journal of Machine Learning and Cybernetics, 1(1-4), 43-52. - Discusses text vectorization approaches for resume screening.
5. Chen, T., & Guestrin, C. (2016). XGBoost: A Scalable Tree Boosting System. Proceedings of the 22nd ACM SIGKDD International Conference on Knowledge Discovery and Data Mining. - Explores the use of XGBoost for ranking resumes based on recruiter preferences.
6. HireRight Report (2023) - The Role of AI in Modern Recruitment. Available at: www.hireright.com - Insights into how AI-driven systems enhance automated resume screening and ranking.
7. LinkedIn Engineering Blog (2022) - How We Built an AI-Powered Resume Screening System. Available at: engineering.linkedin.com - Real-world case study on resume filtering using AI and NLP.