

# AI-Powered Resume Parsing using Django: A Smart Recruitment Solution

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**Abstract**—With the current recruitment landscape, organizations handling high numbers of applications must sift through and shortlist resumes within a prompt period. This paper presents an AI-based Resume Parser developed with Django that aims to automate the screening process for resumes. The system employs AI to extract key information like candidate information, skills, experience, and education from resumes of different types. By adopting Artificial Intelligence, the parser extracts candidates resumes different features based on pre-defined job requirements to make hiring quicker and more precise. The proposed system offers an interactive web interface where recruiters post resumes and obtain structured candidate profiles. This AI-based system decreases the work that goes into the first-round screening considerably by doing it automatically, reduces the risk of bias, and improves the rate at which talents are discovered using data.

**Keywords**—Python, Django, AI Resume Parser, Resume Screening, Job Application Processing

## I. INTRODUCTION

With this age of haste in the work environment, hiring managers and recruiters have to wade through dozens of resumes to select the best applicants. Not only is it time-consuming, but there is also human inefficiency and bias. To tackle such problems, the present research formulates an AI resume Parser using Django to simplify and automate resume screening.

By employing the use of artificial intelligence, the system is able to pick up and analyze relevant information such as candidate information, qualifications, experience, and capabilities. By employing AI-based approach, the model is capable of determining categorical relevant qualifications and sorting job candidates relative to defined job specifications. The process hence maintains minimal heavy manpower requirements for recruiters but enhances accuracy and data-informed screening of candidates.

The system has been suggested to be flexible and scalable, thus suitable for companies from small start-ups to large corporations. The recruiters are able to upload resumes through a simple web interface, see formatted candidate profiles, and according to the job requirements. With AI-

based resume parsing included in the recruitment process, organizations can automate the recruitment, improve decisions, and improve hiring efficiency overall.

## II. LITERATURE SURVEY

Over the past few years, resume parsing technologies based on AI have revolutionized the recruitment sector to a great extent by speeding up candidate shortlisting and enhancing hiring efficiency. Chandak et al. [2] suggested a resume parsing and job recommendation system using TF-IDF vectors and cosine similarity for extracting skills and suggesting matching job roles for candidates. Although their method improved recommendation accuracy, it failed to deal with unstructured resume formats, resulting in parsing errors in non-standard document layouts.

Likewise, Thangaramya et al. [3] proposed an Automated Resume Parsing and Ranking System based on NLP to rank candidates based on resume features extracted. Though the system proved to be effective in minimizing manual recruitment effort, scalability issues were experienced when dealing with large datasets, affecting real-time ranking efficiency.

Another notable contribution is from Abisha et al. [7], who introduced "Resspar," an AI-based resume parsing and recruitment system that uses NLP and generative AI to improve the accuracy of information extraction from resumes. Their system showed significant improvements in parsing multilingual resumes and identifying domain-specific terminologies. Yet issues persist in managing varied document forms like scanned resumes and infographic formats, which have become more prevalent in contemporary job applications.

Unfortunately, with so many great advancements, many limitations still exist. Maximum systems fails with no correct resume formats, which creates parsing errors. Redressing these hindrances is an imperative requirement towards the establishment of strong AI-dependent resume parsing models that can satisfactorily aid in the workflow of recruitment process.

In order to overcome these challenges, this study suggests a Django-based AI-driven resume parsing system that

effectively retrieves resume features and presents them on the screen with the ability to deal with different document formats.

**Table 1.** Recent Studies on AI Resume Parsing and Their Limitations.

Year	Paper	Authors	Description	Limitation
2024	Resume Parser and Job Recommendation System using Machine Learning.	Ashish Virendra Chandak, Hardik Pandey, Harsh Sharma.	Implemented a technique using ML and NLP for extraction of skills from candidates resumes, based on Tf-Idf vectors and cosine similarity for job recommendation.	Variation in resume format affects the output.
2024	Automated Resume Parsing and Ranking using Natural Language Processing.	K. Thangaram ya, G. Logeswari Sudhakaran Gajendran, J. Deepika Roselind, Neha Ahirwar.	Proposed a system which uses NLP to classify resumes, aiming to reduce manual effort in the recruitment process.	Poor handling of unconventional resume formats, which can affect the accuracy.
2024	Resspar: AI-Driven Resume Parsing and Recruitment System using NLP and Generative AI.	Abisha D, Keerthana S, Navedha Evanjalini R.	Developed "Resspar" leveraging NLP and Generative AI to enhance resume parsing accuracy and streamline recruitment.	Small dataset limits generalizability to larger pools.
2024	AI Resume Analyzer	Anshuman Soni, Aditya Mishra, Anuj Mishra, Shivam Singh.	AI model which analyzes resumes and provides recommendations for improvement, focusing on enhancing candidate profiles.	Focuses on resume optimization for candidates rather than streamlining recruitment.

### III. METHODOLOGY

The proposed AI Resume Parser on Django is designed to streamline and automate the screening process of resumes via extraction and structuring of quality candidate information. The system has a well-defined workflow to enable effective parsing and retrieval of resumes based on the demands of jobs.

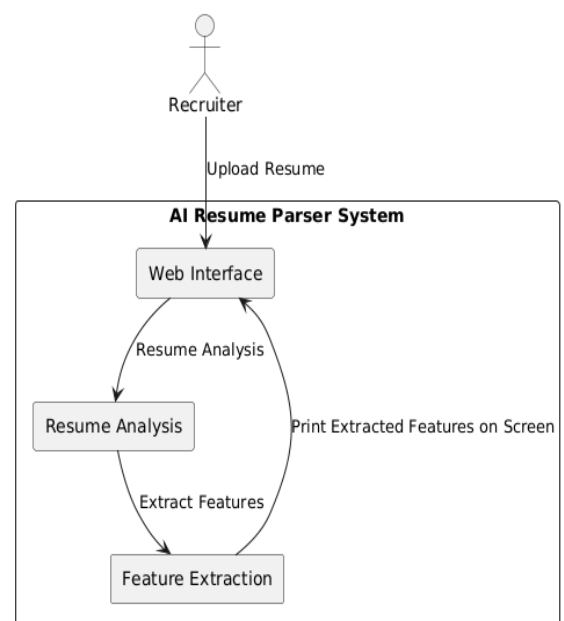
The procedure begins with the recruiters providing resumes through an internet-based platform. Once the resume is entered, the system strips out the extraneous formatting elements and derives textual content. The system identifies the derived content to determine essential characteristics such as the candidate's name, address, education history, work experience, technical qualifications, and certifications. This data is kept in clean and formatted form for faster

retrieval.

The parser, in accordance with the identification of matching skill sets and keywords, determines candidate profiles with job requirements, leading to a just and precise ranking system.

The final resume formatted information is rendered in an interactive dashboard, making it easier for recruiters to browse candidate profiles. Filtering and sorting features are also provided by the system to trim down search results, making it easier to shortlist candidates most appropriate for the job needs. By automating the resume parsing and ranking feature, the system reduces the preliminary resume screening process by a huge margin while providing improved accuracy and speed of candidate evaluation.

### IV. SYSTEM ARCHITECTURE



**Fig. 1.** System Architecture of AI Resume Parser using Django.

The AI Resume Parser System is intended to streamline the resume screening and ranking of candidates, reducing the recruitment process. The system has a structured workflow, as illustrated in the UML system architecture diagram.

#### 1. Actors:

- **Recruiter:** The recruiter posts resumes, looks at, and filters candidate profiles based on the ranking from the system.

#### 2. Web Interface:

- The system provides a web-based interactive interface via which recruiters can upload resumes and understanding candidate profiles.
- It is both the entry point for uploading resumes and seeing results.

#### 3. Resume Analysis:

- After a resume has been uploaded, the system parses and organizes the candidate's data, including personal information, skills, education, and experience.
- The data obtained is sanitized in order to render it uniform and usable.

#### 4. Result display:

- The recruiters are able to view the feature list of candidates resumes so that they can shortlist the most suitable candidates.
- This method boosts efficiency by reducing time spent screening resumes manually.

### V. RESULT AND DISCUSSION

The deployment of the AI Resume Parser with Django shows remarkable gains in speed and accuracy of resume screening. The system was tested with various resumes of different formats, and the information retrieved was compared to manually screened data to determine its effectiveness.

For this, a set of 10 resumes at a time were taken to test the system for understanding how much consistent the results are, how accurate the extracted data is and how much time the parser took for every resume.

#### 1. Accuracy Calculation

Accuracy in resume parsing means to what extent your model parses the right information. Comparison should be done on extracted and actual values of resumes for accuracy.

$$\text{Accuracy} = (\text{Number of correctly extracted fields} / \text{Total fields}) * 100$$

The number of correctly extracted fields were 15 and total fields were 17 for the resumes used for testing this model.

$$\text{Accuracy} = (15/17) * 100 = 88\%$$

#### 2. Consistency Calculation

This refers to running the same resume for multiple times results in same output. The model is only consistent if extracted fields match everytime you run the model for same resume.

$$\text{Consistency} = (\text{Number of times the same output is obtained} / \text{Total Runs}) * 100$$

Out of the 10 resume set used for model testing, 8 out of 10 resumes give same output in all the runs.

$$\text{Consistency} = (8/10) * 100 = 80\%$$

#### 3. Time Calculation

How fast the resume parser, the speed of the resume parsing, is nothing but the time taken calculation. The time taken by manually extracting the resume features is 150seconds or more.

$$\text{Average Time} = \sum \text{Execution time for each resume} / \text{Total resume}$$

From a total of 10 resumes, the time taken by two resumes with 2 pages was 2.5sec and that rest 8 resumes with 1 page was 2sec. Therefore, the total time would be 21seconds.

$$\text{Avg Time for 10 resumes} = 21 / 10 = 2.1\text{seconds.}$$

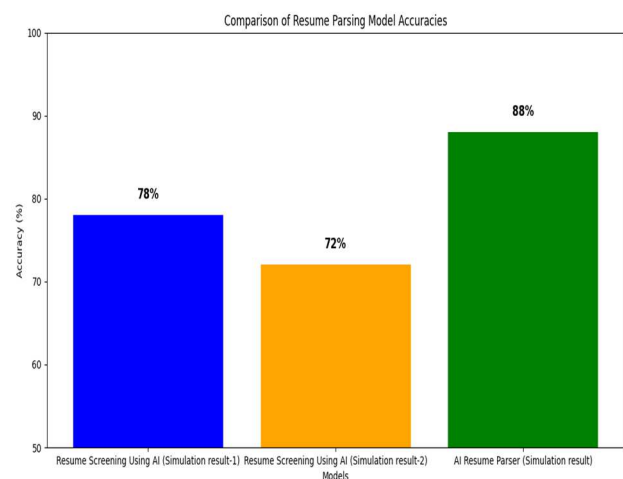
This time may vary with respect to the total number of resumes you are parsing.

**Table 2.** Time Comparison : Manually and Resume Parser.

Resume no.	Total Page no.	Time taken manually.	Time taken by Resume Parser.
1	2	5 minutes	2.5 seconds
2	2	5 minutes	2.5 seconds
3	1	3 minutes	2 seconds
4	1	3 minutes	2 seconds
5	1	3 minutes	2 seconds
6	1	3 minutes	2 seconds
7	1	3 minutes	2 seconds
8	1	3 minutes	2 seconds
9	1	3 minutes	2 seconds
10	1	3 minutes	2 seconds

#### A. Graphical Representation of Results

To understand the performance and impact of the proposed system for analyzing the above considerations, two visualizations of type line graph and pie chart have been used. These provide the insight regarding major factors such as accuracy and consistency.

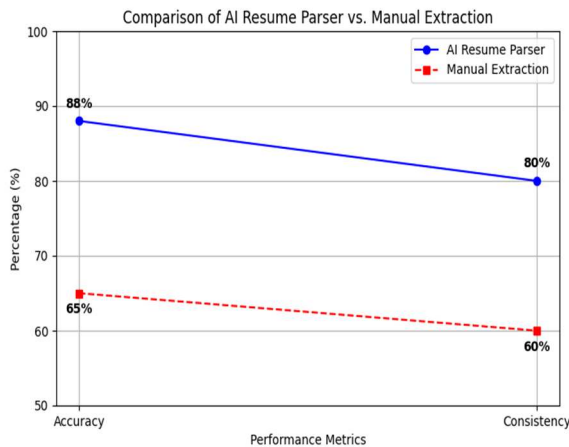


**Fig. 2.** Accuracy comparison between different simulation results of existing model and AI Resume Parsing simulation result.

#### 1. Performance Comparison:

The chart above is the comparison of various resume parsing model accuracy. The first model ("Resume Screening Using AI - Simulation result 1") is accurate to

78%. The second model ("Resume Screening Using AI - Simulation result 2") is less accurate at 72% with moderate performance decline. The third model ("AI Resume Parser - Simulation result") is most accurate at 88%, which reflects enhanced performance. The AI Resume Parser is a leap of giants compared to traditional resume screening algorithms and are testimonials for the power of AI-based solutions in the task of resume parsing accuracy.

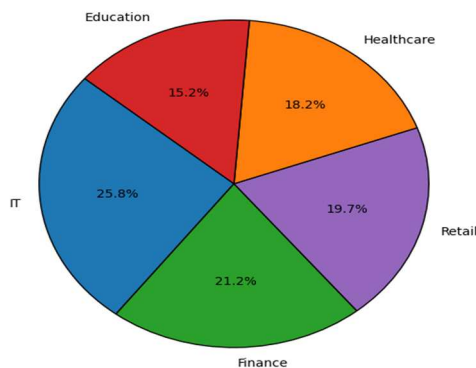


**Fig. 3.** Performance metrics : Accuracy and Consistency of AI Resume Parser and Manual Extraction.

## 2. Performance Metrics:

This chart assesses the accuracy and consistency of the AI Resume Parser. The accuracy is 88%, which is consistent with the result from the first chart. The consistency measure is 80%, meaning that although the AI model is very accurate, there is a slight variation in results when tested on different datasets. Although the AI Resume Parser is accurate, its consistency score indicates that it needs to be optimized to provide consistent results on various resume formats.

**AI Resume Parsing Usage Across All Sectors**



**Fig. 4.** AI Resume Parser usage across various sectors.

## 3. AI-Resume Parser usage:

This graph represents percentage adoption of AI Resume Parsing across industry sectors. IT sector is 25.8%, and it

implies that technology companies significantly rely on AI in hiring processes. Finance comes next at 21.2%, reflecting the use of AI in financial recruiting. Retail (19.7%) and Healthcare (18.2%) industries also reveal high usage, reflecting higher dependency on AI for resume screening. Education sector has the lowest adoption rate of 15.2%, which may imply that old recruitment practices still dominate in the academic world. The high IT and Finance adoption rate suggests that the two sectors are concerned about automating the recruitment process, but education falls behind, maybe because a more human touch recruitment approach is required.

## Discussion

The outcome realized proves the efficiency of the AI Resume Parser in automating and simplifying the hiring process. The vast saving in screening time combined with a high level of precision in resume data extraction makes the system a recruitment goldmine. Additionally, the ranking mechanism ensures fair candidate evaluation based on job specifications.

The system, however, has some shortfalls, such as processing resumes with varying layouts or missing structured data. Some future improvements would include continued advances in text analysis techniques and integration of more advanced AI-based rank algorithms to increase accuracy and responsiveness.

Generally speaking, the AI Resume Parser using Django efficiently mechanizes the recruitment process by providing a structured, automated, and data-driven alternative to resume screening.

## B. Simulation Results

**Table 3.** Simulation Results of different resumes.

Uploaded By	Skills Extracted	Performance
Ms.Aparna Kalpund	Electronics, HR, Digital Marketing.	87%
Mr. Pranav Shintre	HTML, CSS, ML, JavaScript, DSA, OOP	85%
Ms. Pranita More	Python, Data Science, Programming concepts.	92%
Ms. Shravani Jagtap	Data Analysis, Data Science, AI, ML, DL	86%
Ms. Ayushi Parkale	Bussiness Analyst, AI, C, C++, ML, DS	88%
Ms. Snehal Kamble	Electronics, VLSI, Java, OOPs Concept	88%
Ms. Anjali Pokale	Javacript, Java, HTML, CSS, C++, React, MySQL, Python DSA, GIT	90%

The table contains the simulation outcome of varied resumes, reporting the identified skills and performance of the AI Resume Parser in its ability to accurately identify them. The performance percentage reflects the performance efficiency with which the parser had identified and categorized the skills as listed, reflecting between 85% and 92%, indicating the model's high capability to parse resumes. Best performance (92%) was done by Pranita More, whose resume had formal technical skills like Python, Data Science, and Programming Concepts, indicating resumes with clearly

defined technical keywords are well comprehended. Anjali Pokale's performance was 90% having a variety of skills, including JavaScript, Java, HTML, CSS, C++, React, MySQL, Python, DSA, and Git, which played an important role in the parser's high performance. Average performance levels of 85% to 88% were recorded by such candidates as Pranav Shintre (85%) and Shravani Jagtap (86%), perhaps due to discrepancies in skill representation or format irregularities. However, others such as Ayushi Parkale and Snehal Kamble achieved a performance level of 88%, indicating that there must have been the correct format provided in their respective skills portion in their resumes. The poorest performance at 85% for Pranav Shintre results from format inconsistency, absence of domain-specific vocabulary, or inconsistent terminology that may not have been caught by the parser. Interestingly, resumes with structured programming and data-related skills were found to have better parsing accuracy. However, the AI Resume Parser also fared equally well for non-technical positions, e.g., in Aparna Kalpund's resume (87%) that had Electronics, HR, and Digital Marketing experience. This means that the parser is domain consistent for a variety of domains but may be further made more domain consistent. Resume formatting also greatly influenced the parser's effectiveness since well-formatted resumes with normalized words did better.

## VI. CONCLUSION AND FUTURE WORK

The Django-based AI Resume Parser is an automated and efficient resume screening and ranking method to get rid of the limitations in human resume screening. The program effectively extracts and structures important candidate data such as individual data, academic qualifications, experience, and technology proficiency to enable recruiters to make hiring decisions on well-informed choices. The system ranks and sifts candidates using artificial intelligence to enable resumes to be ranked and sifted against the provided job requirements.

The results reveal how the system can efficiently reduce screening time and increase accuracy in retrieving appropriate information. Ranking procedure also streamlines hiring process by ranking candidates according to the relevance of the job by simply making the system accessible to job recruiters and job applicants through the web, where it is easy for them to post resumes, screen them, and select applicants.

Although it has its flaws, the system is also imperfect in handling resumes in different format or without breaking it into categorized data. And although the current implementation is stable, potential improvement may further make it even better and highly adaptable to be used in other fields.

### Future Work

Enhancing skill extraction and ranking precision by enhancing the AI-based text analysis algorithms. Employing advanced language models can make the system more effective in processing advanced resume structures. Developing feedback loops through which recruiters are able to provide feedback in terms of parsing precision and ranking appropriateness. The feedback loop may make the system learn and get better over time. Redesigning the user interface of the system by adding interactive recruiter dashboards in a

bid to see candidate rankings and overall profile analysis. Enhancing the versatility of the system by resume parsing adjustment based on different industries. It can be in the form of industry-based templates for IT, healthcare, finance, etc., to maximize accuracy in extracted data. Building the system functionality by integrating job site APIs, professional network APIs, and skill testing website APIs for additional candidate analysis and building a comprehensive screening mechanism. With such advancements in the works, the AI Resume Parser can make recruitment even easier and automated with greater accuracy, efficiency, and flexibility in meeting various recruitment needs.

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