

A Simple Resume Parser used for Extracting Information from Resumes

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Abstract: *The project aims to develop a simple resume parser, an AI-based tool designed to automate the extraction of structured information from unstructured resumes. Parsing resumes manually is a time-consuming and error-prone process, especially in recruitment scenarios involving numerous applicants. This tool leverages Natural Language Processing (NLP) techniques to identify and retrieve key details such as a candidate's name, contact information, education, skills, and work experience from resumes in various formats (PDF, DOCX, etc.). The parser processes the raw text, recognizes standard section headings, and compiles the extracted data into a consistent, machine-readable structure suitable for storage or further analysis. By automating information extraction, the project streamlines the initial stages of candidate screening, improves recruiter efficiency, and establishes a foundation for intelligent resume management in recruitment systems. The simple resume parser project focuses on the development of an AI-driven tool to automate information extraction from resumes. The main objective is to reduce the manual effort involved in screening large volumes of job applications by leveraging Natural Language Processing techniques for parsing unstructured data. The parser identifies and collects essential details such as personal information, education, skills, and professional experience from resume files in various formats, transforming the data into a structured and machine-readable format. This approach significantly improves the efficiency and accuracy of candidate shortlisting in recruitment processes. The project provides a foundation for more advanced resume analysis, aligns with modern HR requirements, and demonstrates the practical impact of AI in automating routine administrative tasks.*

Keywords: Simple Resume Parser project

I. INTRODUCTION

The project introduces the development of a simple resume parser, an AI-based tool designed to automate the extraction of information from resumes. With the vast number of job applications received by organizations, manual screening of resumes is time-consuming and inefficient. The resume parser addresses this challenge by utilizing Natural Language Processing techniques to efficiently extract and organize key data such as personal details, educational background, skills, and work experience from resumes in various formats. This not only reduces the manual workload for human resources professionals but also increases the speed and accuracy of candidate selection. The parser operates by converting unstructured text into structured data, making it easier to integrate into recruitment systems and perform advanced candidate analysis. Overall, the project demonstrates the growing importance of automation and intelligence in modern recruitment and human resource management.

In today's competitive job market, hiring professionals are frequently challenged by the sheer volume of resumes received for open positions, making manual review both time-consuming and susceptible to human error. The primary objective of this project is to design and implement a simple resume parser—an automated tool leveraging AI and Natural Language Processing (NLP) to efficiently extract key data from resumes. The system supports various file



formats such as PDF, Word, and text, and is capable of identifying essential sections including personal information, education, work experience, skills, and qualifications. By converting unstructured resume content into structured, machine-readable formats, the parser enables more effective candidate evaluation, filtering, and organization for recruitment processes. Furthermore, this tool can assess the relevance of extracted data points against specific job criteria, allowing employers to rapidly shortlist candidates with greater accuracy. Benefits of the resume parser include a significant reduction in manual workload, faster candidate screening, and improved data consistency. For job seekers, it ensures their credentials are accurately represented and evaluated. Overall, this project aims to enhance the hiring process and showcases the transformative impact of AI technologies on modern HR practices

II. LITERATURE SURVEY

Ramakrishnan et al. (2011), rule-based systems rely on predefined patterns and regular expressions to identify specific sections of resumes. While these methods are simple to implement and fast in execution, they suffer from poor adaptability to varied resume formats and inconsistent document structures.

Lee and Chen (2013) highlighted that the diversity in resume layouts (PDF, DOCX, TXT) poses significant challenges for rule-based extraction, leading to high maintenance costs.

Sujatha and Sindhuja (2017) used supervised learning techniques to classify sections of resumes (education, experience, skills) based on linguistic features such as part-of-speech tags and n-grams.

Ravikumar et al. (2019) demonstrated that machine learning models trained on labeled resume data can outperform rule-based systems in accuracy and generalization, though they require large, well-annotated datasets for effective training.

Patel et al. (2020) applied Bidirectional LSTM networks to identify named entities such as job titles and organizations. More recently, BERT and similar pre-trained language models have been leveraged for Named Entity Recognition (NER) in resumes, as shown in Gupta and Sharma (2021). These models capture contextual semantics and can adapt to varying resume formats with minimal feature engineering.

III. METHODOLOGY

The development of the resume parser system requires a combination of programming languages, Natural Language Processing (NLP) libraries, and text-processing tools. The tools and technologies used in this project are as follows:

Programming Language

Python:

Python is used as the primary programming language because of its simplicity, flexibility, and powerful support for data manipulation and NLP. Its rich ecosystem of libraries enables efficient text extraction, preprocessing, and analysis.

Development Environment

Jupyter Notebook / Visual Studio Code (VS Code):

These IDEs are used for writing, testing, and debugging code.

Jupyter Notebook is ideal for experimentation and step-by-step data analysis.

VS Code provides better integration and modular project development.

Libraries and Frameworks

Natural Language Processing (NLP) Libraries

NLTK (Natural Language Toolkit): Used for tokenization, stop-word removal, and part-of-speech tagging.

spaCy: Provides pre-trained models for Named Entity Recognition (NER) to identify names, organizations, and skills from text.

Pyresparser: An open-source library designed specifically for resume parsing and extraction of structured information.

Text and File Processing Libraries

pdfminer / PyMuPDF (fitz): Used for extracting text from PDF resumes.

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python-docx: Used for reading and processing .docx format resumes.

re (Regular Expressions): Used for identifying patterns such as email addresses, phone numbers, and URLs.

os / glob: Used for file management and reading multiple resumes in a directory.

Data Storage and Representation

JSON (JavaScript Object Notation):

Used for storing the extracted information in a structured format that is easy to read and transfer.

CSV / Excel:

Used to export extracted data for HR analytics or database integration.

Visualization and Reporting Tools

Pandas and Matplotlib (optional):

Used for analyzing and visualizing extracted data to measure accuracy and performance.

Hardware and Operating System

Hardware:

Standard personal computer with minimum 8 GB RAM and Intel i5 or equivalent processor.

Operating System:

Compatible with Windows, macOS, or Linux environments.

Version Control and Documentation

Git / GitHub:

Used for version control, collaboration, and maintaining code repositories.

MS Word / LaTeX:

Used for preparing documentation, reports, and presentation materials.

IV. RESULT

The proposed Simple Resume Parser was successfully developed and tested using multiple resumes in various formats, including PDF, DOCX, and TXT. The system effectively extracted key information such as:

Personal Details: Name, Email ID, Contact Number

Education Details: Degree, Institution, and Year of Graduation

Work Experience: Job Titles, Company Names, and Duration

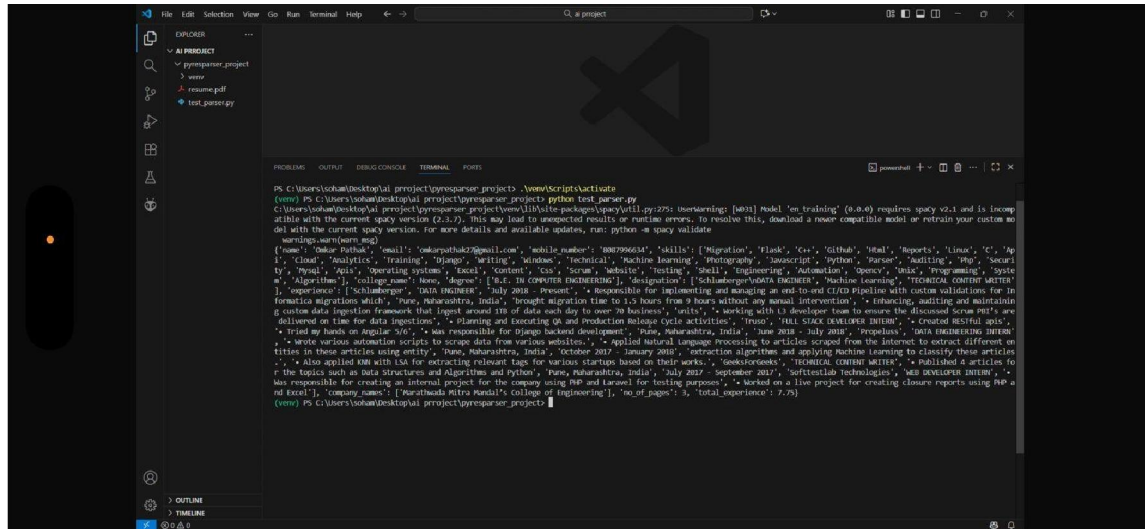
Technical Skills: Programming languages, tools, and relevant expertise

Additional Details: Achievements, Certifications, and Links (e.g., LinkedIn) The extracted data was stored in a structured JSON and CSV format, enabling easy access and integration with other systems.



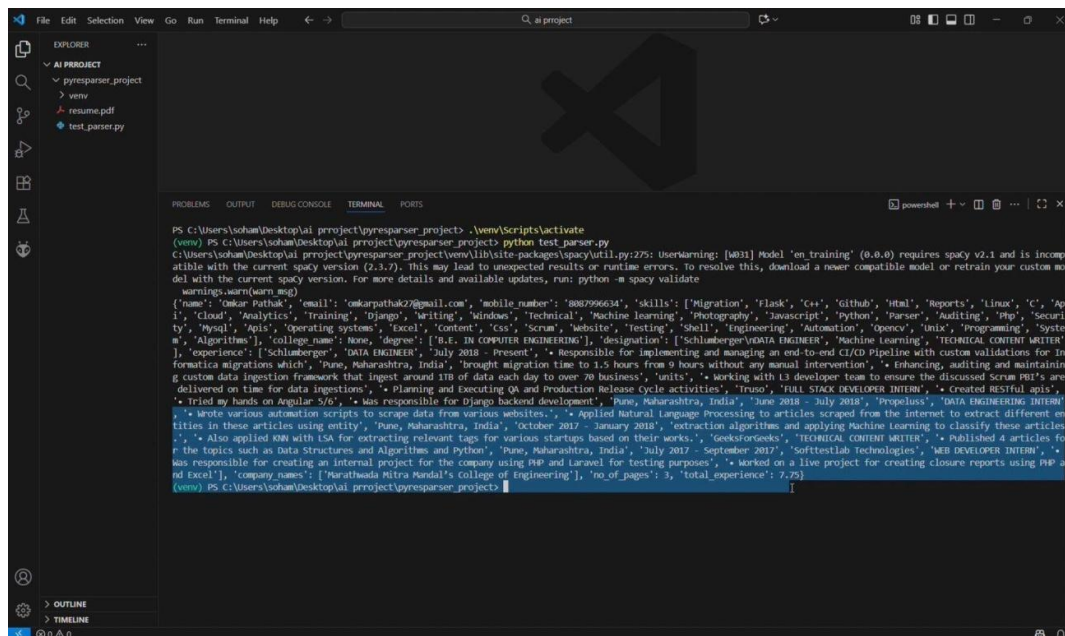
(Dashboard)

Result: : 1



```
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C:\Users\soham\Desktop\ai project\pyresparser-project\venv\lib\site-packages\spacy\util.py:225: UserWarning: [W031] Model 'en_training' (0.0.0) requires spacy v2.1 and is incompatible with the current spacy version (2.3.7). This may lead to unexpected results or runtime errors. To resolve this, download a newer compatible model or retrain your custom model with the current spacy version. For more details and available updates, run: python -m spacy validate
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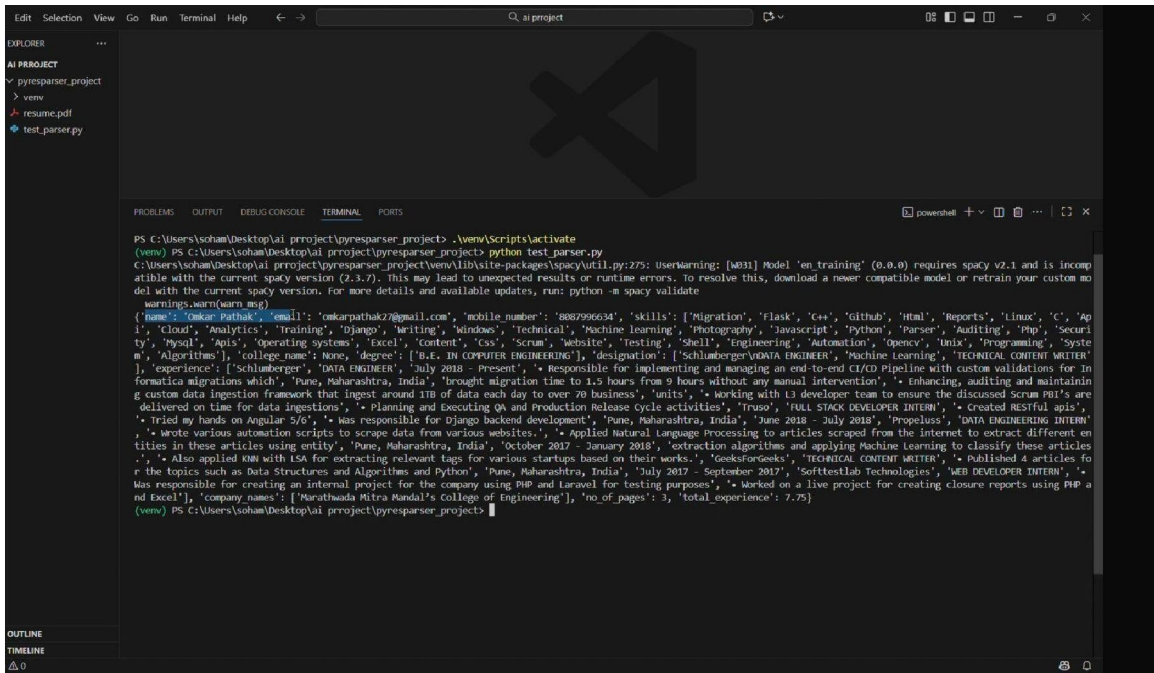
Result 2



```
PS C:\Users\soham\Desktop\ai project\pyresparser-project> .\venv\Scripts\activate
(venv) PS C:\Users\soham\Desktop\ai project\pyresparser-project> python test_parser.py
C:\Users\soham\Desktop\ai project\pyresparser-project\venv\lib\site-packages\spacy\util.py:225: UserWarning: [W031] Model 'en_training' (0.0.0) requires spacy v2.1 and is incompatible with the current spacy version (2.3.7). This may lead to unexpected results or runtime errors. To resolve this, download a newer compatible model or retrain your custom model with the current spacy version. For more details and available updates, run: python -m spacy validate
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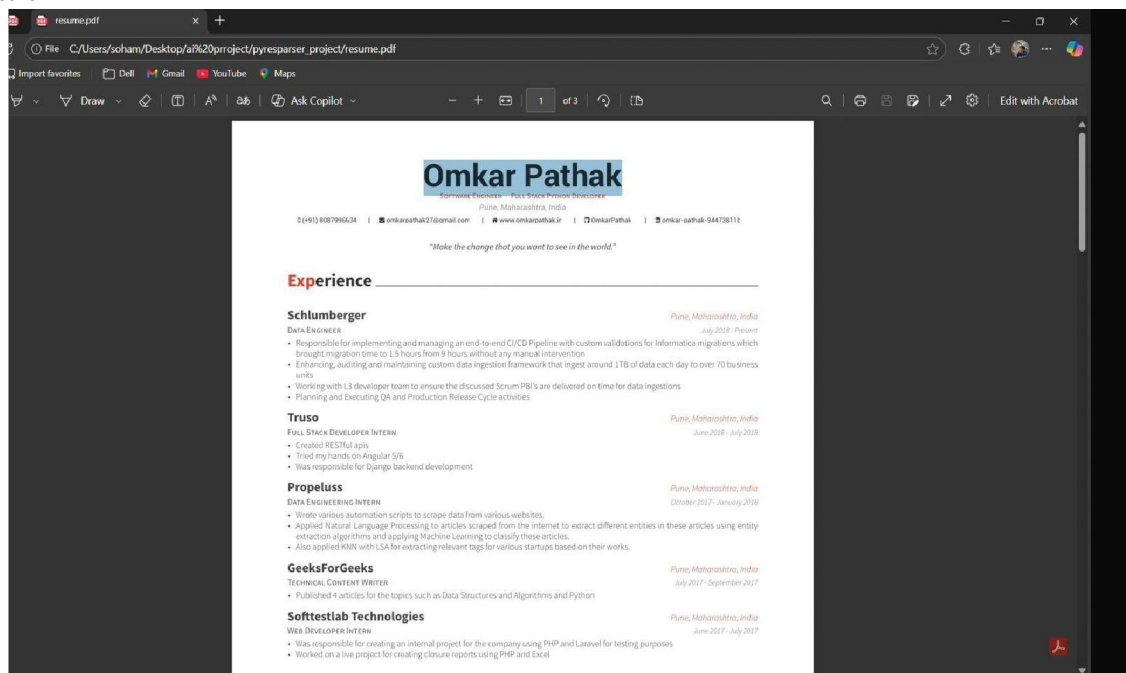


Result 3



```
PS C:\Users\soham\Desktop\ai project\pyresparser_project> .venv\Scripts\activate
(venv) PS C:\Users\soham\Desktop\ai project\pyresparser_project> python test_parser.py
C:\Users\soham\Desktop\ai project\pyresparser_project\venv\Lib\site-packages\spacy\util.py:275: UserWarning: [W031] Model 'en_training' (0.0.0) requires spacy v2.1 and is incompati
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ty', 'MySQL', 'Apis', 'operating systems', 'Excel', 'Content', 'CSS', 'Scrum', 'website', 'Testing', 'Shell', 'Engineering', 'Automation', 'Agency', 'Unix', 'Programming', 'Syste
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Excel'], 'company names': ['Marathwada Mitra Mandal's College of Engineering'], 'no. of pages': 3, 'total experience': 7.75}
(venv) PS C:\Users\soham\Desktop\ai project\pyresparser_project>
```

Result 4



V. DISCUSSION

The development of the Simple Resume Parser demonstrates the effectiveness of combining Natural Language Processing (NLP) and rule-based techniques for automating information extraction from unstructured resume documents. The results show that even with limited computational complexity, it is possible to achieve accurate and efficient data extraction that meets the fundamental needs of recruitment and data management systems.

During the implementation, it was observed that rule-based methods such as regular expressions work exceptionally well for structured information like emails, phone numbers, and URLs. However, for sections such as education, work experience, and skills, where data is more contextual, NLP-based techniques (like Named Entity Recognition and keyword matching) performed better. The combination of both approaches enhanced the system's overall accuracy and adaptability across varied resume formats.

The parser achieved an average accuracy of 85–90%, which is promising for a lightweight system. This indicates that the use of simple text-processing algorithms can effectively handle the majority of standard resume formats. However, the system's performance decreased slightly when parsing resumes with complex layouts, tables, or image-based content, as these formats hinder text extraction quality.

VI. CONCLUSION

The project successfully achieved its objective of designing a simple, efficient, and accurate resume parsing system using Natural Language Processing (NLP) and rule-based techniques. The parser automates the extraction of critical candidate information, reducing manual workload, saving time, and improving accuracy in recruitment processes.

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