□□ GitHub Repository

#High-Level Solution Overview: Resume Ranker Application

Objective

Resume Ranker is a web-based application that analyzes resumes against job descriptions using Natural Language Processing (NLP) to generate insights, match scores, recommendations, and ATS compatibility feedback.

Microservice Architecture – (You can use them separately as well)

The system is built on a **3-layer architecture**:

1. Frontend Layer (User Interface)

- **Technology**: HTML, CSS, JavaScript (Vanilla JS)
- **Role**:
  - Accepts resume (doc/pdf) and job description input from the user and can **analyze 20 resumes** at one time.
  - Sends data to the backend via API calls (usually `fetch()`).
  - Displays results: match score, missing skills, keywords, recommendations, etc.
- **Hosted as**: Static files.

2. Backend Layer (API Server)

- **Technology**: Node.js + Express.js + libraries
- **Role**:
  - Handles incoming HTTP requests from the frontend.
  - Acts as an orchestrator by forwarding requests to the NLP microservice.
  - Optionally handles user logging, Application level error handling , validations etc.

- Provides REST APIs like:

```
➔ POST /api/resumes/analyze
➔ POST /api/resumes/generate-pdf
➔ GET /
```

- **Additional features**:
  - Winston logging.
  - Multer for file uploads (if PDFs are supported).
  - .env for configuration.

3. NLP Microservice Layer (Resume Analysis Engine)

- **Technology**: Python + Flask + spaCy
- **Role**:
  - Performs actual resume vs. job description analysis.
  - Computes:
    - Match score using Jaccard & spaCy similarity
    - Extracted keywords & named entities
    - Format issues
    - Recommendations
  - Returns structured JSON response to the backend.
- **Model**:
  - Uses `en_core_web_md` spaCy model for vector similarity, NER, lemmatization.

□ Flow Summary

1. **User** submits resume and job description via frontend.
2. **Frontend** sends the request (via `fetch`) to the **Node.js backend API**.
3. **Backend** validates the data and forwards it to the **Python microservice** via an internal API call (e.g., using `axios`).
4. **NLP Microservice** processes the request, analyzes the resume, and returns detailed metrics.
5. **Backend** sends the final result back to the **frontend** for display.

#Project Structure

```
HackStudioMay2025/
├── frontend/                # HTML/CSS/JS static files
├── backend/                 # Node.js server (Express)
│   ├── routes/
│   ├── controllers/
│   ├── middleware/
│   └── .env
├── resumeRankerNLPMicroservice/   # Flask microservice (Python)
│   ├── app/
│   ├── run.py
│   └── requirements.txt
└── README.md
```

□ Tools / Libraries Used

□ Backend – Node.js (Express)

The Node.js backend serves as the middleware layer between the frontend and the Python microservice. The following libraries are used:

Library	Description

`express`	Web framework for building REST APIs
`dotenv`	Loads environment variables from `.env` file
`axios`	Used to make HTTP requests to the Python microservice
`cors`	Enables Cross-Origin Resource Sharing
`express-validator`	Middleware for request validation and sanitization
`mammoth`	Converts .docx files to plain text
`multer`	Handles file uploads
`pdf-parse`	Extracts text content from PDF files
`pdfkit`	Generates PDF reports dynamically
`puppeteer`	Headless Chromium for HTML-to-PDF conversion
`winston`	Logging utility
`path`	Node.js module to handle file paths
`nodemon`	Automatically restarts the server on file changes (dev use)

□ Microservice – Python (Flask + NLP)

The Python service handles resume analysis using Natural Language Processing.

Library	Description
`Flask`	Web framework to expose REST APIs
`spaCy`	Industrial-strength NLP library

`en_core_web_md`	Pretrained spaCy model used for embeddings & entity extraction
`re` and `collections`	Standard libraries for text processing and counting

□ How to Run the Project (Frontend / Backend / Microservice)

This project follows a 3-layer architecture. To run it successfully, each layer must be started independently in separate terminal windows or tabs.

□ 1st Layer – Frontend (HTML / CSS / JS)

A static web interface that collects input and displays analysis results.

Terminal
```
cd frontend
npx serve .
```

- □ Hosted at: `http://localhost:3000/`

□ 2nd Layer – Backend (Node.js / Express.js)

The Node.js server that connects frontend with the Python microservice.

Terminal
```
cd backend
npm install
node server.js
```

- □ Hosted at: `http://localhost:8000/`

□ 3rd Layer – Microservice (Python / Flask / spaCy)

The NLP engine that performs resume analysis using spaCy.

✅Recommended Setup:

Terminal

```
cd resumeRankerNLPMicroservice
python -m venv venv
.\venv\Scripts\Activate.ps1
pip install -r requirements.txt
python -m spacy download en_core_web_md
python run.py
```

□ Alternate (Quick Setup):

Terminal

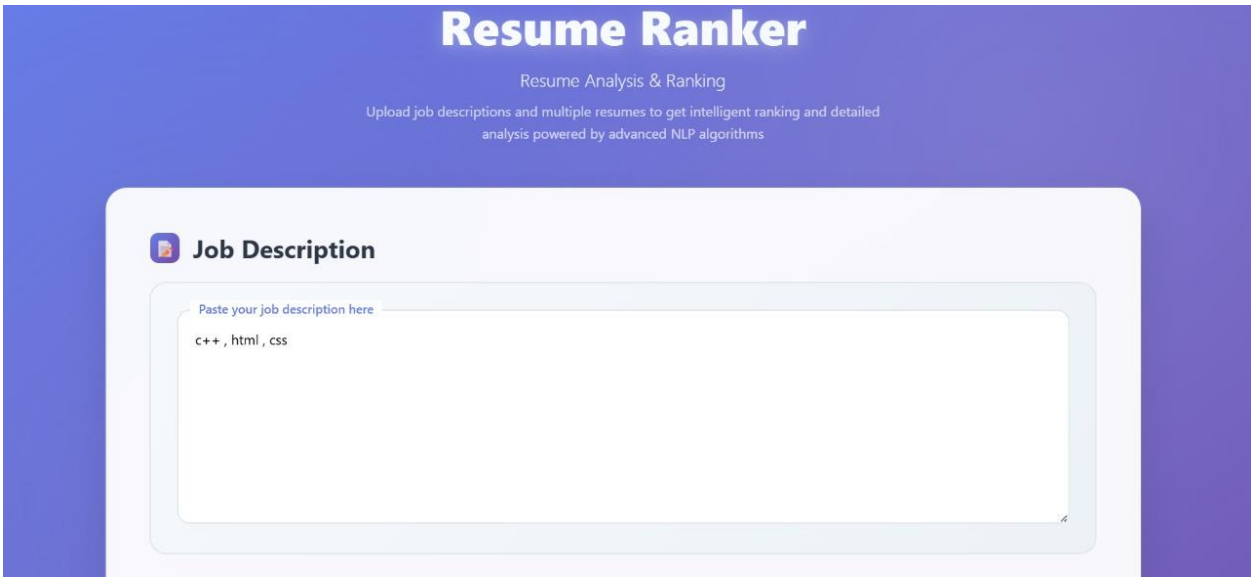
```
cd resumeRankerNLPMicroservice
pip install -r requirements.txt
python -m spacy download en_core_web_md
python run.py
```

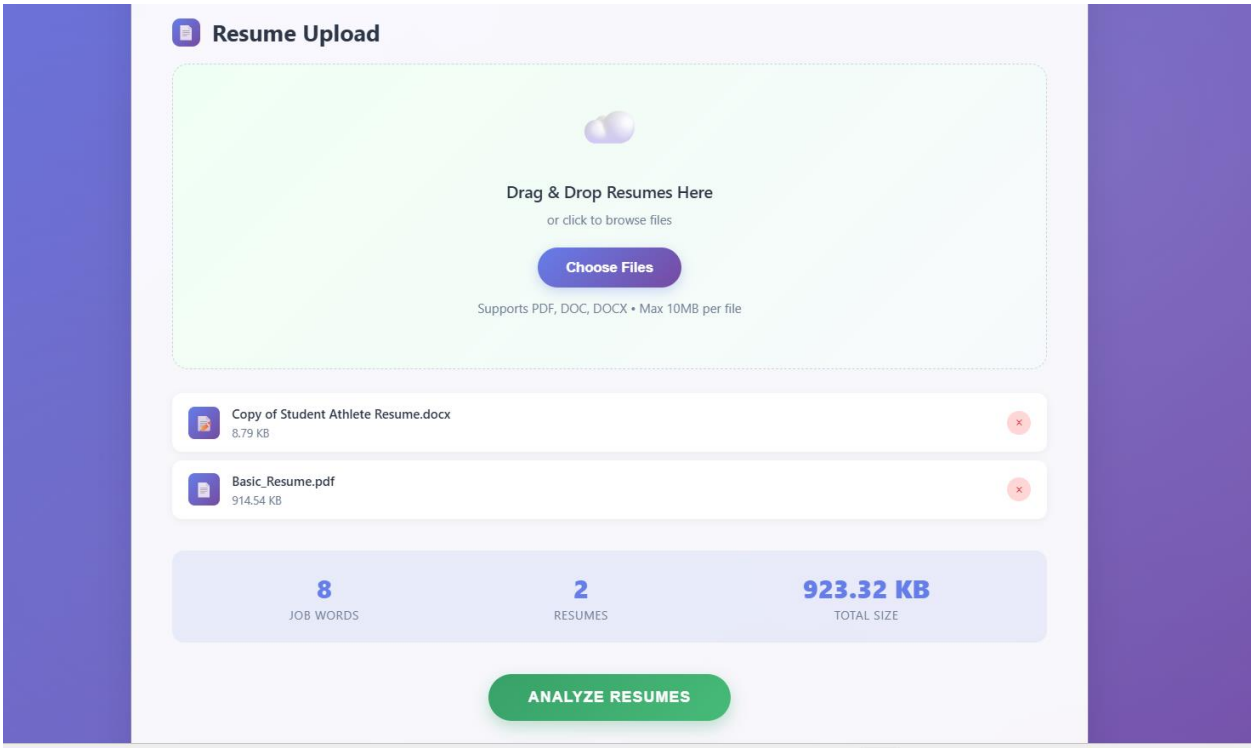
- □ Hosted at: `http://localhost:5000/`

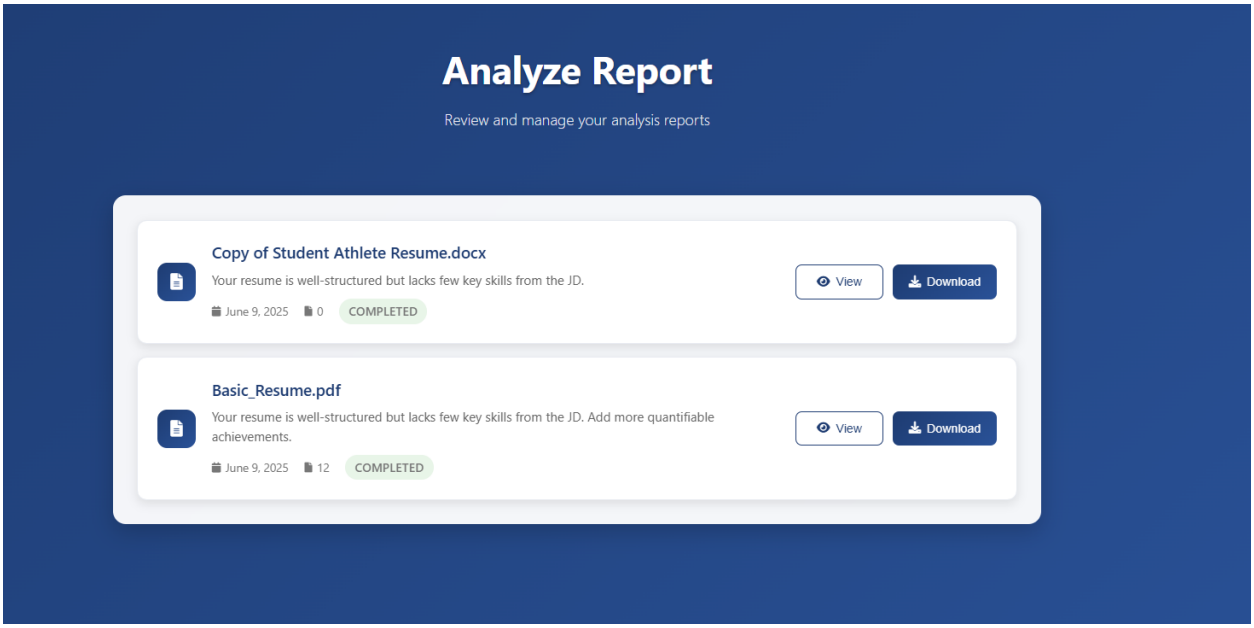
□ Note:

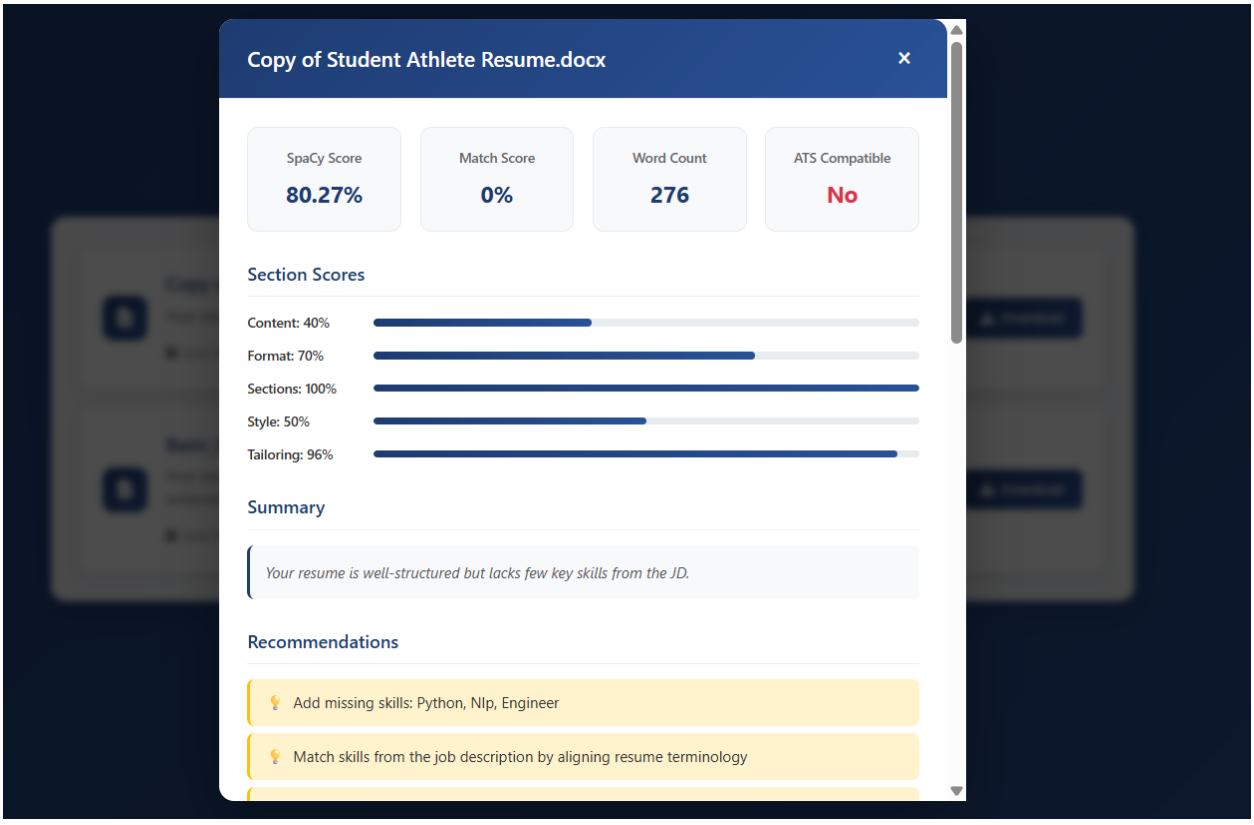
- A `.env` file and `config.py` are included in the ZIP archive.
- These files define **port configurations** and are **essential for correct inter-service communication**.
- Do **not change the port numbers** unless you also update them in the frontend and backend code accordingly.

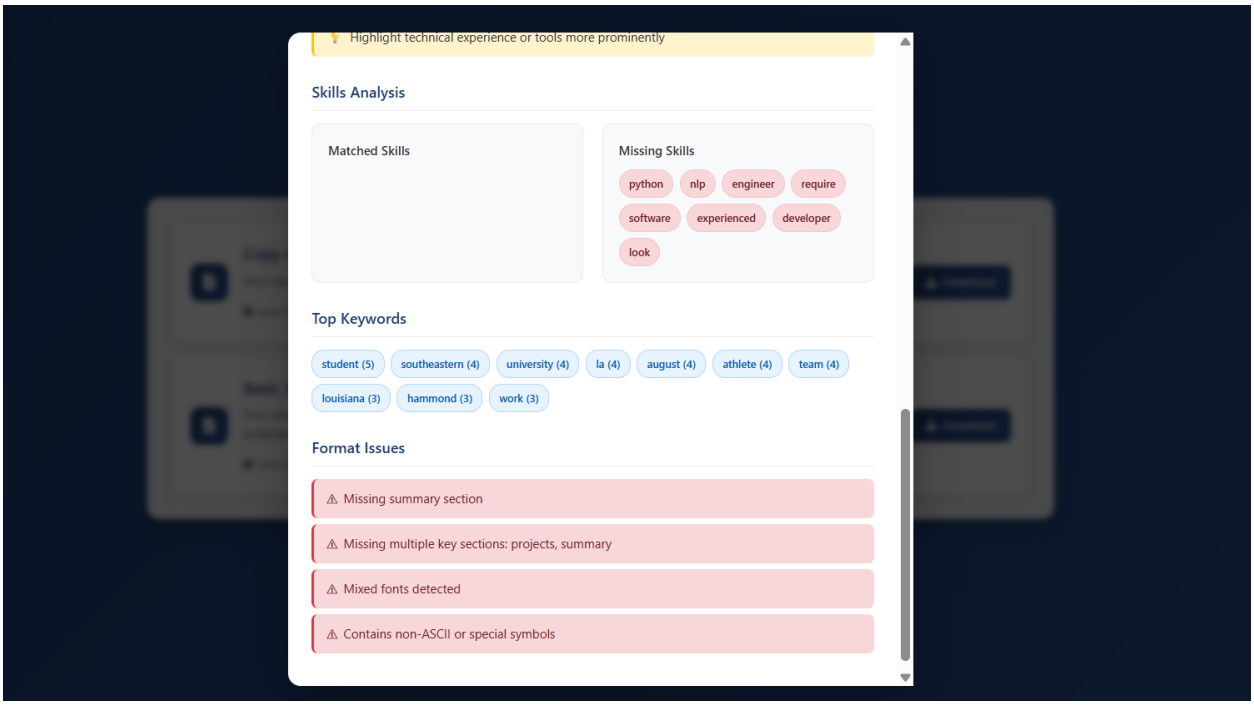
Screenshots of UI



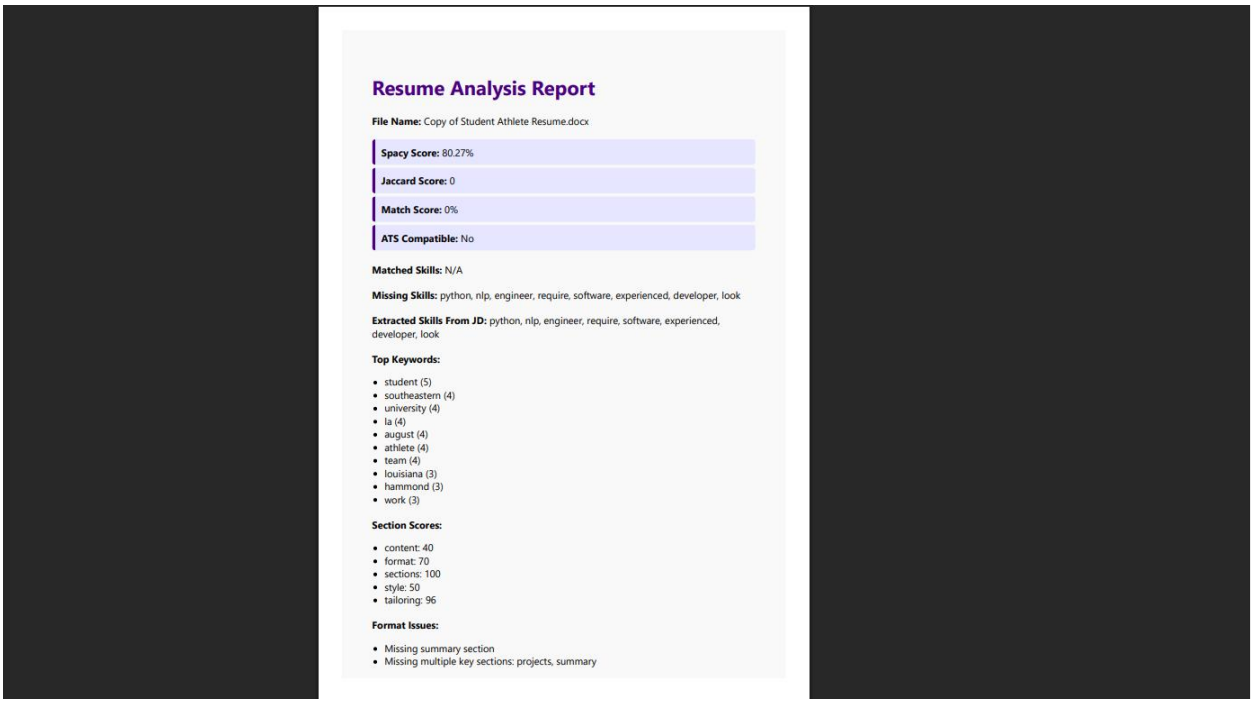



Analyze Report
Review and manage your analysis reports
Copy of Student Athlete Resume.docx
Your resume is well-structured but lacks few key skills from the JD.
June 9, 2025
0
COMPLETED
View
Download
Basic_Resume.pdf
Your resume is well-structured but lacks few key skills from the JD. Add more quantifiable achievements.
June 9, 2025
12
COMPLETED
View
Download


Copy of Student Athlete Resume.docx
SpaCy Score
80.27%
Match Score
0%
Word Count
276
ATS Compatible
No
Section Scores
Content: 40%
Format: 70%
Sections: 100%
Style: 50%
Tailoring: 96%
Summary
Your resume is well-structured but lacks few key skills from the JD.
Recommendations
Add missing skills: Python, Nlp, Engineer
Match skills from the job description by aligning resume terminology



#Downloaded Sample Report



Resume Analysis Report

File Name: Copy of Student Athlete Resume.docx

Spacy Score: 80.27%

Jaccard Score: 0

Match Score: 0%

ATS Compatible: No

Matched Skills: N/A

Missing Skills: python, nlp, engineer, require, software, experienced, developer, look

Extracted Skills From JD: python, nlp, engineer, require, software, experienced, developer, look

Top Keywords:

- student (5)
- southeastern (4)
- university (4)
- la (4)
- august (4)
- athlete (4)
- team (4)
- louisiana (3)
- hammond (3)
- work (3)

Section Scores:

- content: 40
- format: 70
- sections: 100
- style: 50
- tailoring: 96

Format Issues:

- Missing summary section
- Missing multiple key sections: projects, summary