JobLens – AI-Powered Job Application Coach

Introduction & Context:

The hiring landscape is becoming increasingly competitive. For every job opening, recruiters often receive hundreds (sometimes thousands) of resumes. Most applicants submit generic resumes, not tailored to specific job descriptions (JDs). This reduces their chances of being shortlisted even if they possess relevant skills.

Recruiters, on the other hand, face the challenge of sifting through large volumes of resumes, identifying the right candidates, and ensuring fair evaluation. Current solutions either don't provide feedback or are locked behind expensive subscriptions.

Target Users:

- Job Seekers – Students, freshers, and professionals who want personalized AI-driven resume feedback to improve their chances of getting shortlisted.
- Recruiters / HR Teams – Hiring managers who want faster pre-screening tools that highlight how closely a resume aligns with a job description.

Problem Statement:

Pain Points for Job Seekers

❌ Struggle to customize resumes for each job application.

❌ Lack of awareness about missing keywords and required skills.

❌ Manual tailoring is tedious, inconsistent, and time-consuming.

❌ Reduced shortlisting chances despite being qualified.

Gaps in Current Platforms

- Job portals (e.g., LinkedIn, Naukri) allow uploading resumes but do not provide **smart alignment feedback**.
- Tools like **JobLens** provide keyword matching but are **paywalled** or too generic.
- There's **no free, lightweight, and user-friendly tool** that offers **real-time, AI-powered resume optimization**.

Solution Overview:

JobLens is an **AI-powered Job Application Coach** designed to bridge this gap.

Key Features

- Upload resume (PDF/DOCX) and a target job description.
- Extract keywords, entities, and technical skills.

- Compute **relevance/match score** between resume and JD.
- Highlight missing or weakly represented skills.
- Provide **improvement suggestions** (add skills, adjust phrasing, structure improvements).

Benefits

- ⏳ **Saves Time** – Quick feedback instead of manual edits.
- 🎯 **Increases Shortlisting Probability** – Optimized resumes match recruiter expectations.
- 📊 **Recruiter Utility** – Use it as a pre-screening filter to rank candidates.
- 🌐 **Accessible** – No subscription barrier, user-friendly interface.

Features:

MVP Features:

- Resume upload (PDF/DOCX).
- JD upload (paste text or upload).
- Keyword extraction (skills, verbs, domain terms).
- Similarity scoring (TF-IDF + cosine similarity).
- Missing keyword highlighting.
- Improvement suggestions.

Future Enhancements:

- Integration with **LinkedIn job postings**.
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- **Recruiter dashboards** with candidate ranking.
- ATS optimization feedback.

Product Thinking & Strategic Vision:

JobLens is designed with both job seekers and recruiters in mind, aiming to:

- **Democratize Access:** Make advanced resume optimization tools freely available to all job seekers.
- **Enhance Fairness:** Reduce bias and subjectivity in resume screening through objective, data-driven analysis.
- **Accelerate Hiring:** Enable recruiters to efficiently identify top candidates, reducing time-to-hire.
- **Continuous Improvement:** Incorporate user feedback and analytics to refine AI models and user experience over time.

Technical Implementation:

Tech Stack

Frontend:

- React + Tailwind CSS → Modern, responsive, minimal UI.
- Recharts → Visual display of scores and keyword coverage.

Backend:

- FastAPI (Python) → Async, lightweight, well-suited for ML integration.
- CORS enabled for smooth frontend-backend communication.

AI/NLP:

- spaCy → Named Entity Recognition (skills, roles, education).
- KeyBERT → Keyword extraction from text.
- TF-IDF (scikit-learn) → Similarity scoring.

Data & File Handling:

- pdfplumber → PDF text extraction.
- python-docx → DOCX parsing.

Optional DB:

- SQLite/PostgreSQL → Store user histories & analytics (future)..

Installation:

Prerequisites

- Python 3.10 or higher
- Node.js 18 or higher
- npm or yarn

Backend Setup

```
cd backend
python -m venv venv
source venv/bin/activate    # Linux/Mac
venv\Scripts\activate       # Windows
pip install -r requirements.txt

flask run
```

Frontend Setup

```
cd frontend
npm install
npm run dev
```

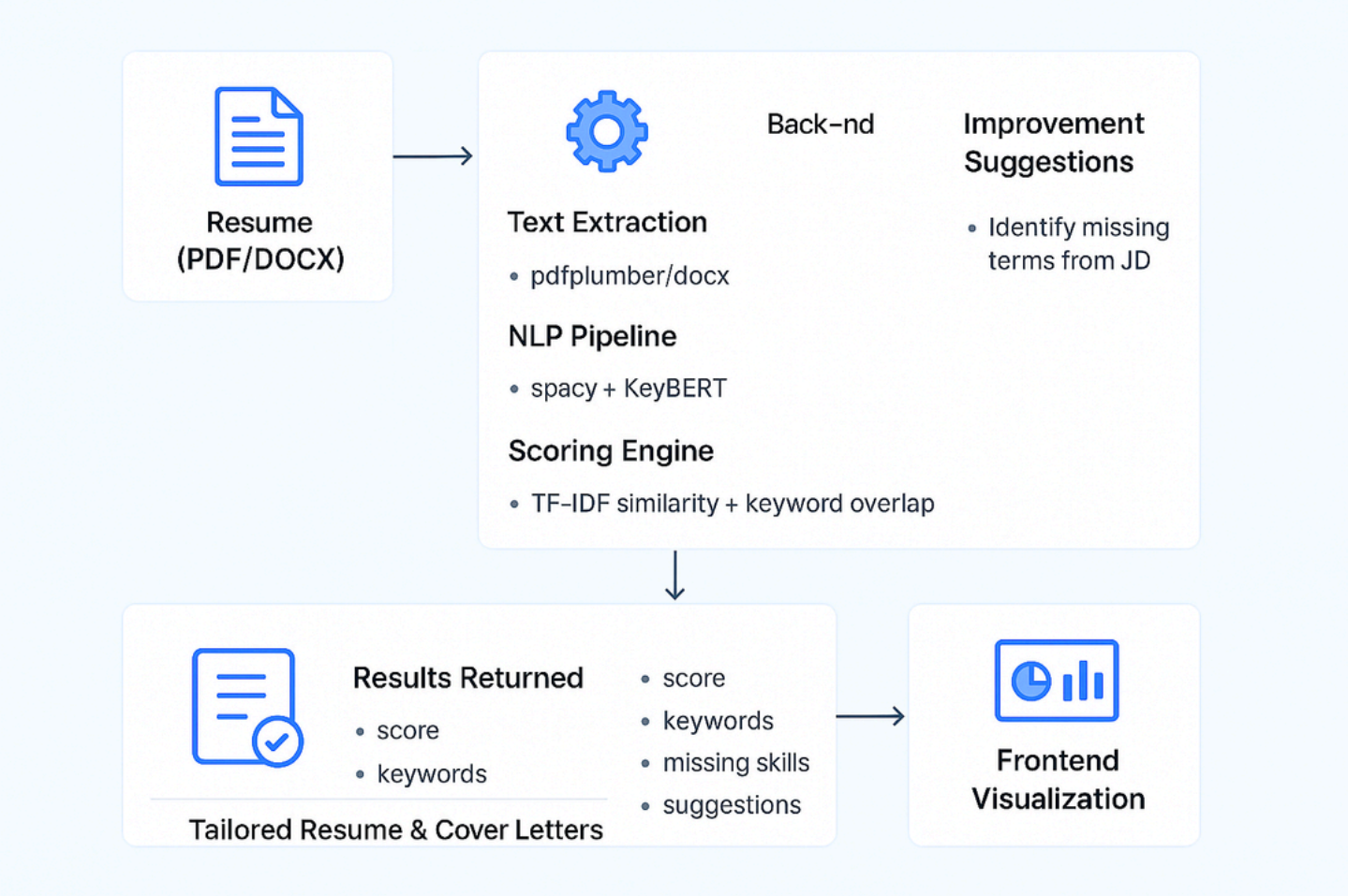
Data Collection & Model Selection:

- **Dataset Used:** Pre-collected merged_skills.csv with 1000+ skills across IT, management, and domain-specific categories.
- **Model Selection:**
  - **TF-IDF + Cosine Similarity:** Measures overlap between JD and resume.
  - **Keyword Matching (KeyBERT + spaCy):** Extracts critical terms.
  - **Hybrid Approach:** Combines statistical and semantic analysis for robust scoring.

Architecture & System Design:

📌 Flow:

1. **User uploads Resume (PDF/DOCX) + JD**.
2. **Backend extracts text** using pdfplumber/docx.
3. **NLP Pipeline:** spacy + KeyBERT for skills & keywords.
4. **Scoring Engine:** TF-IDF similarity + keyword overlap.
5. **Improvement Suggestions:** Identify missing terms from JD.
6. **Results Returned:** JSON with score, keywords, missing skills, and suggestions.
7. **Frontend Visualization:** Charts, progress bars, and highlights.



Implementation Steps:

- **Frontend:** File upload UI, results dashboard, Tailwind components.
- **Backend:** FastAPI endpoints (/upload_resume, /analyze_jd).
- **AI Integration:** Keyword extraction + scoring pipeline.
- **Testing:** Validated across multiple resumes (IT, Marketing, Data Science).

User Testing & Feedback:

- Early testers: Peers and job seekers.
- Improvements made:
  - Added **keyword highlighting** in results.
  - Reduced backend processing time by caching embeddings.
  - Improved mobile UI compatibility.

Challenges & Solutions:

- **PDF Parsing Errors:** Some resumes had non-standard formatting. → Used hybrid parsing (pdfplumber + regex cleanup).
- **Unstructured JDs:** Some were poorly formatted. → Preprocessing pipeline (stopword removal, tokenization).
- **Performance Bottlenecks:** Large resumes slowed TF-IDF. → Optimized with text preprocessing & caching.

Product Management Thinking:

Why These Features?

- **Resume tailoring** is the #1 need for job seekers.
- Focusing on MVP ensures **simplicity** and **real usability**.
- Avoided feature bloat to maximize **speed + clarity**.

Improving Stickiness & Candidate Success

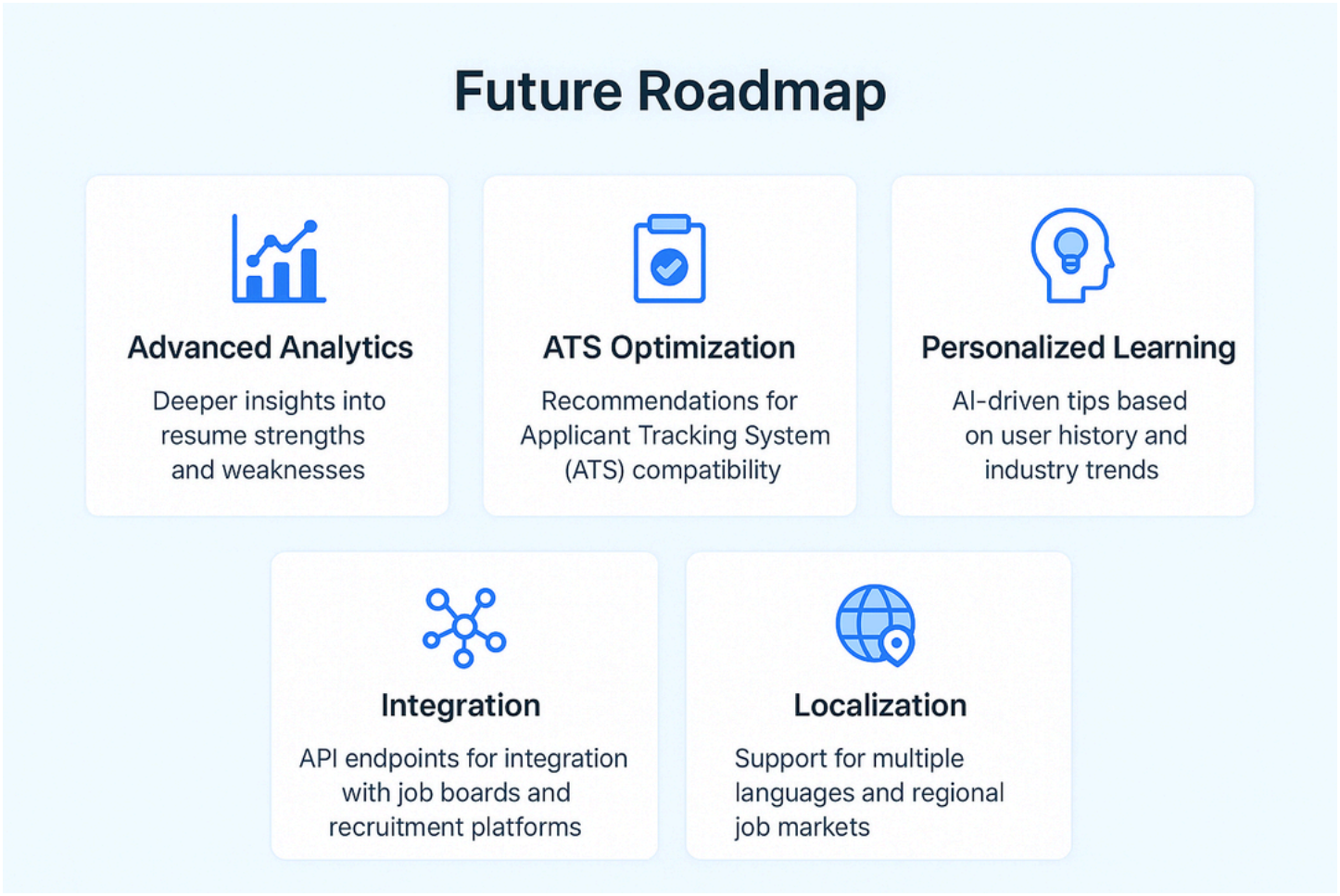
- Users re-upload multiple resumes for different jobs.
- Feedback loop (score improvement → confidence boost).
- Recruiters gain quick filtering tools.

Metrics for Success

- Average match score improvement across multiple resume attempts.
- Number of resumes analyzed per user session.
- Returning users (retention rate).
- Long-term: Resume-to-interview conversion rate.

Future Roadmap:

- **Advanced Analytics:** Deeper insights into resume strengths and weaknesses.
- **ATS Optimization:** Recommendations for Applicant Tracking System (ATS) compatibility.
- **Personalized Learning:** AI-driven tips based on user history and industry trends.
- **Integration:** API endpoints for integration with job boards and recruitment platforms.
- **Localization:** Support for multiple languages and regional job markets.



Conclusion:

JobLens delivers a robust, AI-powered solution for resume optimization and candidate screening. By combining advanced NLP, intuitive design, and actionable insights, JobLens empowers job seekers to present their best selves and enables recruiters to make faster, smarter hiring decisions.