



# Project Documentation Report

## CredX AI Challenge

### Task 3

#### AI Powered Resume Analyzer

An AI engine that parses, evaluates, scores, and explains resume quality — with ATS checks, section-wise grading, and actionable AI suggestions, and dashboard.



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**Date:** 16 AUG 2025

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## The Problem

### Why an AI Resume Analyzer is Needed

Resumes remain the first and most critical step in the hiring process, but most candidates fail to present themselves effectively:

- ATS Filters: Over 70% of resumes are rejected by Applicant Tracking Systems before reaching recruiters.
- Time Constraint: Recruiters spend only 6–8 seconds scanning each resume.
- No Feedback Loop: Candidates rarely know why they are rejected.

This results in talented individuals missing opportunities not because of skill gaps, but due to poor resume design, weak keywords, or formatting errors.

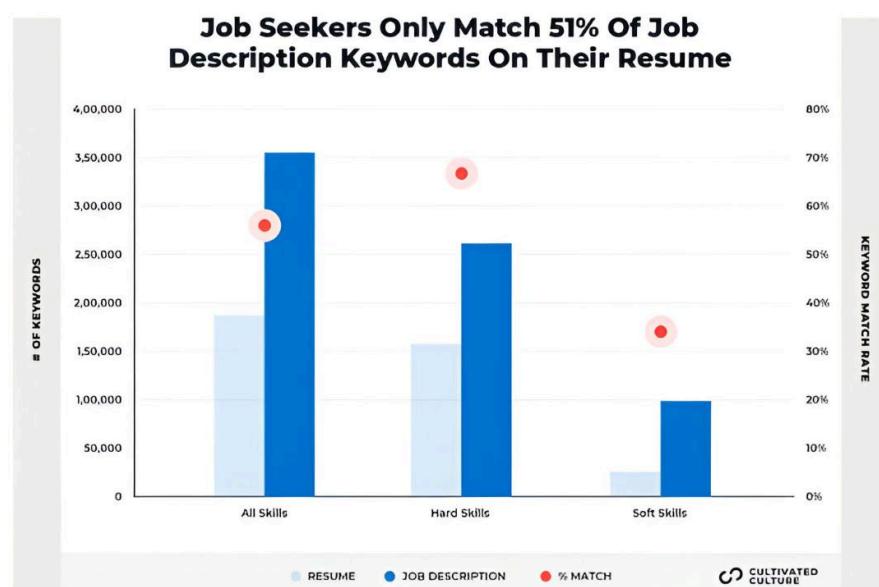
### The Scale of the Problem

- According to JobScan, 75% of resumes are never seen by human recruiters.
- Over 50% of students from Tier-2/3 colleges apply with resumes that don't meet basic ATS standards.
- Placement cells struggle to evaluate hundreds of resumes at once, wasting time on manual reviews.

### The Resume Paradox

Job seekers invest time in writing resumes, but

- They don't know what recruiters are looking for.
- They overuse generic buzzwords.
- They don't align resumes with job roles.
- Universities and NGOs lack tools to provide scalable, structured feedback.



## **Overview of the Resume Analyzer**

The AI Resume Analyzer is an intelligent, AI-driven system designed to help job seekers, students, and universities improve resumes with data-backed evaluation and personalized feedback.

Unlike traditional checklists or grammar tools, this analyzer uses a blend of Natural Language Processing (NLP), AI recommendations, and ATS compliance checks to look at resumes the way recruiters and hiring systems do. It doesn't just flag errors — it explains *why* they matter and provides actionable suggestions to make resumes stronger, role-specific, and recruiter-friendly.

## **Key Features**

### **1. Single page Resume / Bulk Resumes Upload & Parsing**

- Supports PDF and DOCX formats, the most widely used in recruitment.
- Allows uploading and processing of multiple resumes at once.
- Automatically extracts structured sections like Profile Summary, Work Experience, Education, and Skills.
- Cleans formatting issues (bullets, tables, fonts) and ensures the content is readable and optimized for both ATS and AI.
- Saves HR teams time and effort by enabling large-scale resume analysis quickly and efficiently.

### **2. AIML Powered Evaluation**

- Uses NLP models (spaCy, NLTK) and Generative AI (Gemini/GPT) to assess clarity, relevance, and alignment with job roles.
- Evaluates resumes across five weighted categories:
  1. Profile Summary (15%)
  2. Work Experience (35%)
  3. Skills (20%)
  4. Education (15%)
  5. ATS Compliance (15%)
- Detects missing keywords, weak phrasing, and unquantifiable achievements.

### **3. Section-Wise Feedback**

The analyzer doesn't just give a flat score — it explains what's working and what's missing in each section.

- Profile Summary:
  - Check if the summary is concise (2–3 sentences).
  - Detects overuse of generic buzzwords (“hardworking,” “motivated”).
  - Recommends strong action verbs and career highlights.
- Work Experience:
  - Identifies whether descriptions are achievement-driven vs. task-based.
  - Highlights missing quantifiable metrics (“Increased sales by 20%”).
  - Ensures chronological clarity and career progression.
- Skills Section:
  - Compares listed skills with industry/job-role expectations.
  - Flags irrelevant or outdated skills (e.g., MS Paint, Typing Speed).
  - Suggests grouping skills into technical, soft, and tools/frameworks.
- Education:
  - Ensures mandatory fields (degree, institution, year) are included.
  - Highlights gaps or formatting issues.
  - Suggests adding academic achievements (projects, honors) where missing.

## 4. ATS Compliance Check

Simulates how an Applicant Tracking System reads a resume:

- Verifies headers like Experience and Education.
- Flags images, tables, or fonts that can break ATS parsing.
- Identifies keyword gaps relevant to job descriptions.

## 5. Scoring & Recommendation Engine

- Resume Score (0–100): A numeric benchmark.
- Grade (A–F): A simple, recruiter-style assessment.
- Recommendations: Grouped as  Urgent,  Critical,  Optional for clarity.
- Suggestions are AI-generated so feedback feels personalized, not generic.

## 6. Visual Dashboard

- Score Gauge: Overall performance at a glance.
- Bar Chart: Section-wise strengths and weaknesses.
- Issue List: Clear fixes grouped by priority.
- Progress Tracking: Optional re-upload tracking to show improvements.

## 7. Downloadable Reports

- PDF Reports: User-friendly, shareable, and recruiter-ready.
- JSON Reports: Developer-friendly for system integrations.

## How the Resume Analyzer Works

The Resume Analyzer follows a 7-step custom AI/ML pipeline, designed to evaluate resumes with accuracy and provide structured, role-relevant feedback.

### Step 1: Resume Upload (PDF/DOCX)

- Users upload resumes in PDF/DOCX.
- Extracts raw text using `pdfplumber / docx2txt`.
- Ensures flexibility: no strict templates needed.

### Step 2: Resume Parsing (Custom ML Classifier)

- Uses Regex + Supervised ML classification to separate sections like:
  - Profile Summary
  - Education
  - Skills
  - Work Experience
- Cleans noise (bullets, fonts, spacing issues).
- Output → structured JSON with labeled sections.

### Step 3: Text Preprocessing & Feature Engineering

- Custom NLP + ML preprocessing pipeline:
  - Tokenization, lemmatization, stopword removal.
  - TF-IDF + Bag-of-Words for keyword weighting.
  - Named Entity Recognition (NER) with spaCy for extracting organizations, degrees, skills.
  - Domain-specific embeddings (trained from job postings + resume corpora) to capture skill/role alignment.

### Step 4: ATS Compliance Check (Rule + ML Hybrid)

- Mimics how Applicant Tracking Systems filter resumes.
- Rule-based checks:
  - Verifies standard headers (Education, Experience, Skills).

- Detects use of tables, graphics, or unusual fonts.
- ML models:
  - Classify ATS readability (high / medium / low).
  - Predict keyword alignment score for given roles.
- Output → ATS compatibility score.

## Step 5: AI/ML Recommendations Engine

- A custom ML model trained on recruiter-reviewed resumes provides actionable feedback.
- Types of feedback:
  - Section-specific improvements: “Your summary is too generic — add career focus.”
  - Achievements detection: flags vague phrases and suggests quantifiable metrics.
  - Keyword augmentation: matches resume skills vs required role keywords (e.g., missing SQL, Flask for backend).
  - Format & readability fixes: ensures clear, ATS-friendly structure.

## Step 6: Scoring Engine (Weighted ML Model)

- Assigns resume scores using weighted scoring logic + ML predictions:
  - Work Experience (35%)
  - Skills (20%)
  - Profile Summary (15%)
  - Education (15%)
  - ATS Compliance (15%)
- **Outputs:**
  - Numeric Score (0–100) → precise evaluation.
  - Letter Grade (A–F) → quick benchmarking.
- ML algorithms like Random Forest / SVM are used for predicting score ranges based on training data.

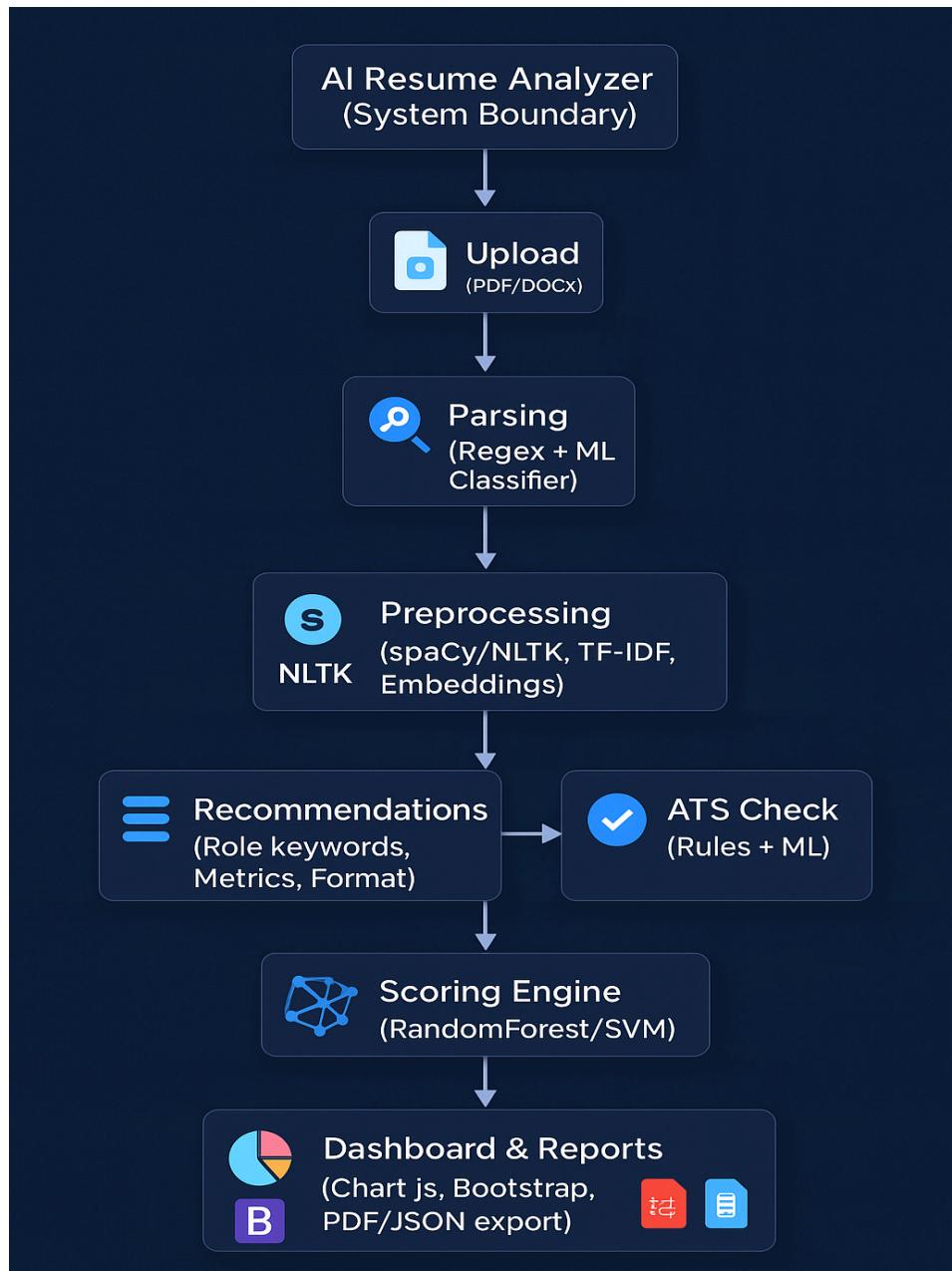
## Step 7: Dashboard & Report Generation

- A modern dashboard (Chart.js + Bootstrap) displays results:
  - Gauge chart → overall resume score.
  - Bar chart → section-wise strengths/weaknesses.
  - Table → issues grouped into ● Urgent, ● Critical, ● Optional fixes.
- Exports:
  - PDF Report → shareable, user-friendly.
  - JSON → for developer/university portal integrations

## SYSTEM DESIGN / WORKFLOW

Our system is designed as a **modular pipeline**, where each block works independently yet connects seamlessly to deliver actionable insights:

1. **Upload Module** → Accepts resumes in PDF/DOCX, ensuring accessibility without rigid templates.
2. **Parsing Engine** → Extracts structured sections (Summary, Skills, Education, Experience) using regex + ML.
3. **Preprocessing** → Cleans and transforms text with NLP (spaCy/NLTK, TF-IDF, embeddings) to prepare features for ML models.
4. **ATS Compliance Check** → Mimics real applicant tracking systems by flagging formatting issues, missing headers, or weak keyword alignment.
5. **Recommendation Engine** → Generates targeted, role-specific improvements (keywords, measurable results, formatting).
6. **Scoring Engine** → Uses ML models (Random Forest / SVM) with weighted logic to assign scores and grades.
7. **Dashboard & Reports** → Visualizes performance via charts, gauges, and recommendation lists, with options to export PDF/JSON.

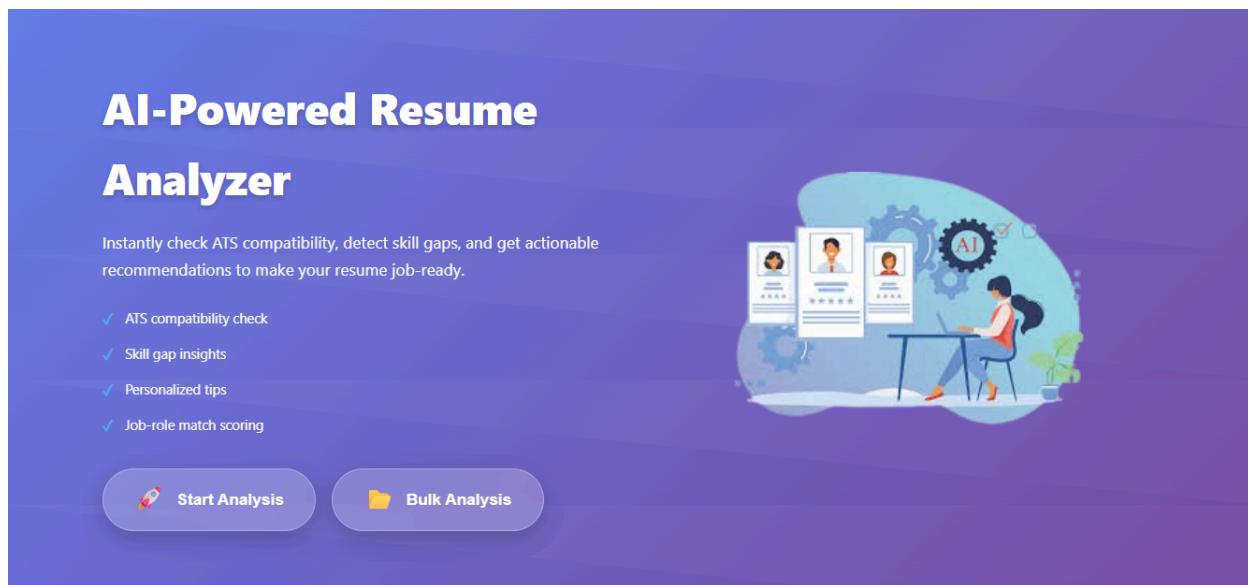


This design ensures the system is scalable, modular, and transparent, making it practical for students, universities, and placement cells to adopt.

## Detailed Features of AI Resume Analyzer

### 1. Resume Parsing

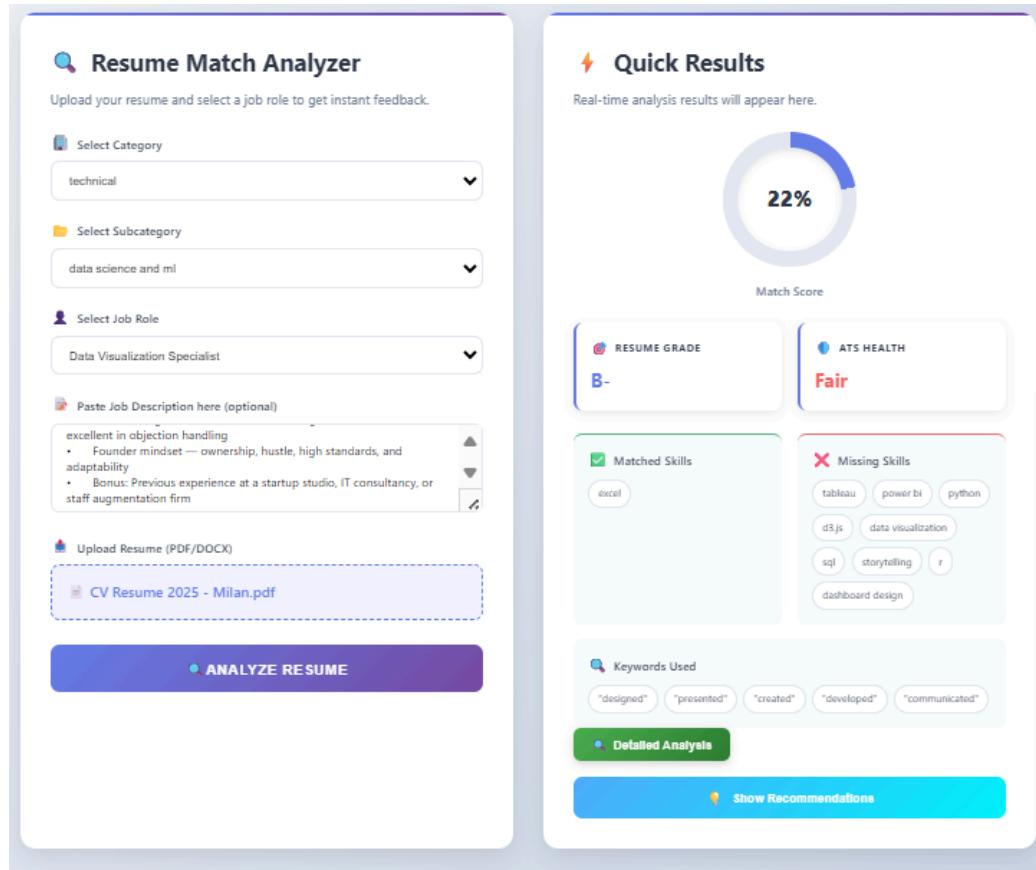
- **NLP-driven Extraction** → Uses spaCy and regex-based rules combined with a custom ML classifier to automatically detect and extract sections like Profile Summary, Education, Work Experience, and Skills.
- **Noise Cleaning** → Removes unnecessary formatting issues such as special characters, inconsistent bullet points, and irregular spacing to ensure clean, structured input.
- **Structured Output** → Produces a JSON-like labeled structure, where each section is tagged and ready for downstream analysis.



### 2. Scoring & Section-Wise Analysis

- **Weighted Scoring System** → The resume is evaluated across five key areas:
  - Work Experience (35%)
  - Skills (20%)
  - Profile Summary (15%)
  - Education (15%)
  - ATS Compliance (15%)

- **Feature Evaluation** → Each section is checked for:
  - **Work Experience** → Measures achievements, quantifiable impact, and career progression.
  - **Skills** → Matches relevancy with industry/job-role requirements.
  - **Summary** → Ensures clarity, focus, and use of strong keywords.
  - **Education** → Verifies correctness, degrees, and institution details.
- **Outcome** → Generates both a numerical score (0–100) and a grade (A–F) for benchmarking.



### 3. ATS Compliance Checker

- **Header Validation** → Ensures presence of essential headers like Education, Experience, Skills, Summary.
- **Formatting Check** → Flags tables, graphics, logos, and unusual fonts that reduce ATS readability.
- **Keyword Alignment** → Predicts ATS pass probability by analyzing presence/absence of role-specific keywords.

- **Compliance Score** → Classifies resumes as High, Medium, or Low ATS-friendly.

**Detailed Analysis**

**Professional Summary**

Your resume shows strong design skills but could benefit from more quantifiable achievements and better ATS optimization.

**Issues Breakdown**

Category	Issues
Work Experience	Irrelevant Titles: 1 issue Career Gaps Or Inconsistencies: 3 issues Missing Metrics: 4 issues
Education	Missing Details: 2 issues Irrelevant Courses: 1 issue
Profile Summary	Buzzwords: 2 issues Too Generic: 1 issue
Skills Section	Missing Hard Skills: 3 issues Unbalanced Ratio: 1 issue

**Priority Fixes**

1. Add metrics to 3-5 work experience bullet points
2. Include 2-3 more technical skills from job description
3. Rewrite profile summary to be more specific

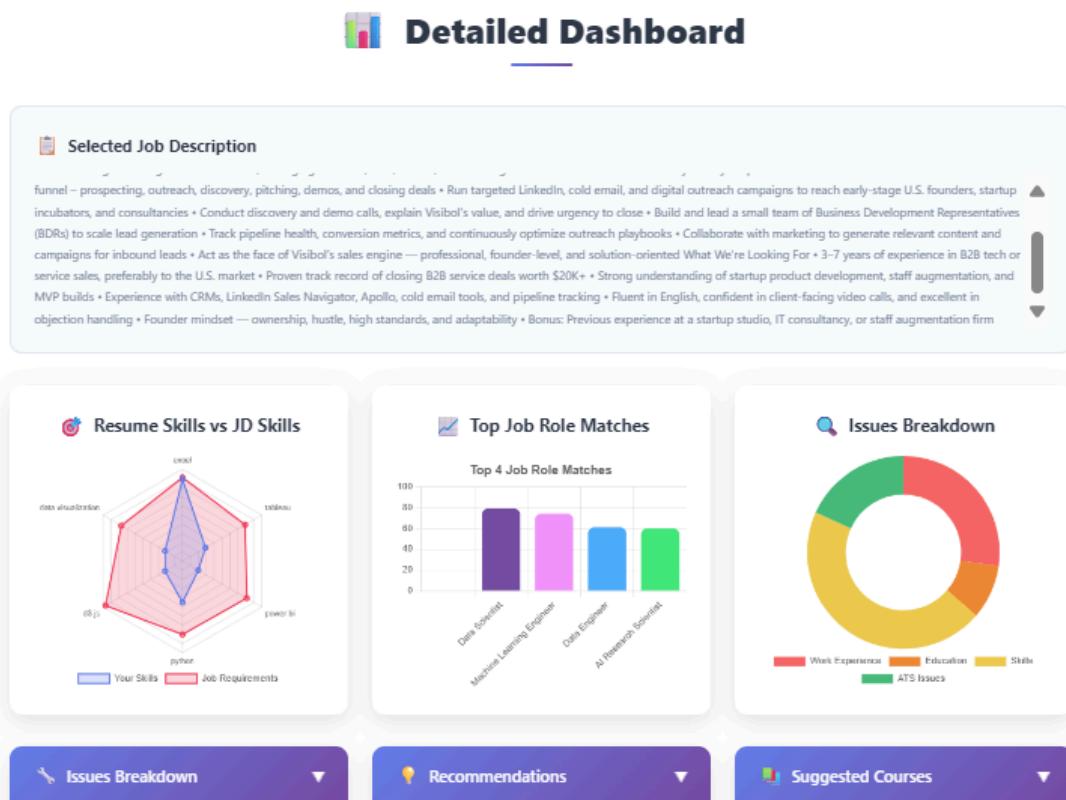
## 4. ML Recommendations Engine

- **Personalized Feedback** → Generates actionable insights for each section, e.g.:
  - “Your summary is too generic — highlight your career focus in one line.”
  - “Convert this statement into a measurable result: Managed a team → Led 5-member team, improving delivery speed by 20%.”
- **Role-Based Suggestions** → ML Models match, compare and extract resume skills against job-role keyword libraries (e.g., Backend Developer, Data Scientist) and suggest missing critical skills.

- **Format & Readability Fixes** → Ensures alignment with best practices — short bullet points, strong verbs, and ATS-friendly structure.

## 5. Visual Dashboard & Reports

- **Dashboard Highlights:**
  - **Gauge Chart** → Shows the overall resume score at a glance.
  - **Section-Wise Bars** → Highlights strong and weak areas (Experience, Skills, Education, etc.).
  - **Recommendations Table** → Groups feedback by severity → ● Urgent, ● Critical, ● Optional fixes.
- **Reports:**
  - **PDF Download** → Clean, shareable report for candidates.
  - **JSON Export** → Developer-friendly format for integration with university/placement portals.
- **Design** → Built with Chart.js + Bootstrap for a clean, modern UI that is easy to interpret for both students and recruiters.





## Webpages / Functionalities

### Page 1 – Upload Page

- Upload button (PDF/DOCX).
- Instructions on supported formats and best practices.

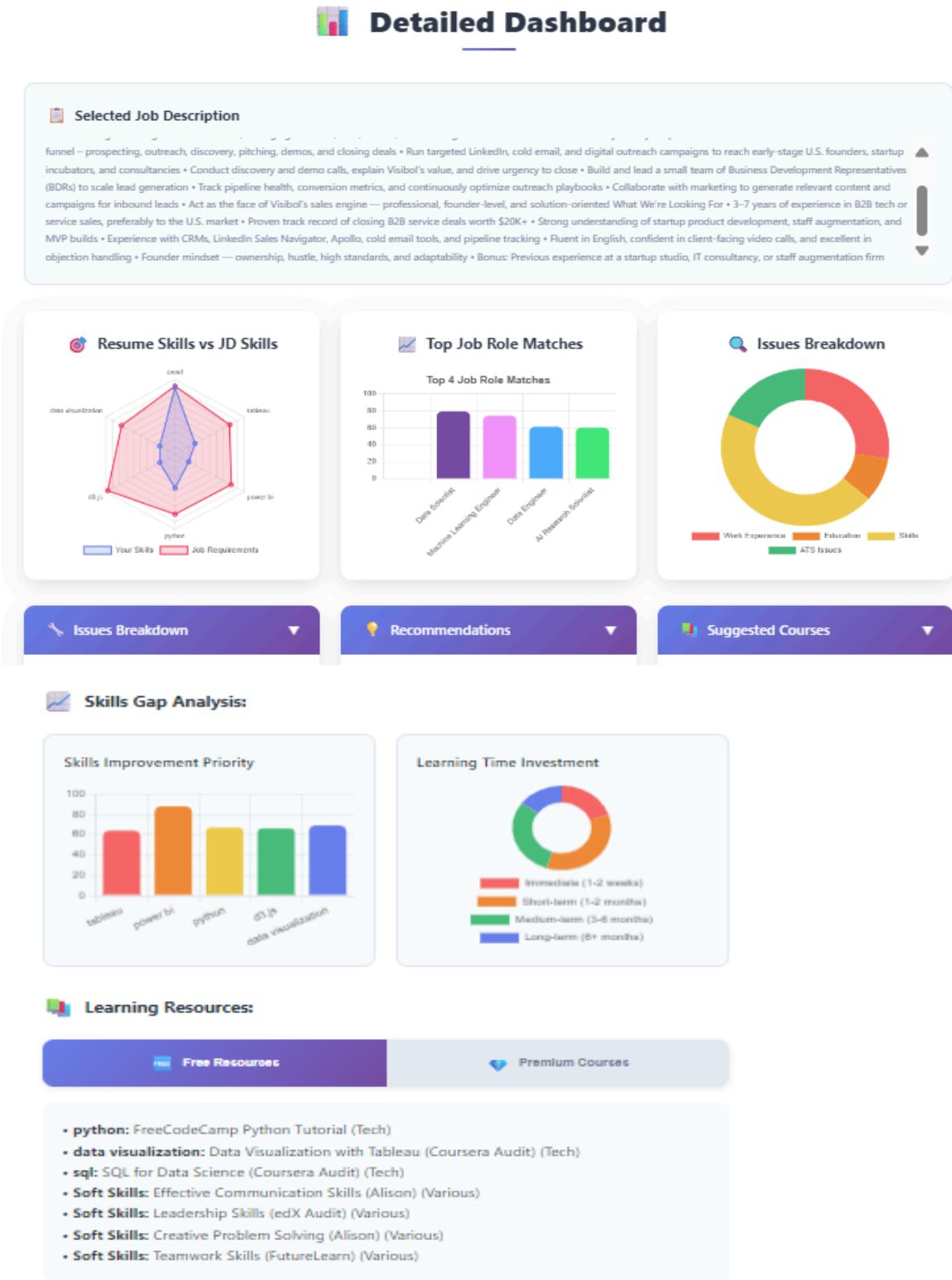
The screenshot shows the homepage of the AI-Powered Resume Analyzer. The title 'AI-Powered Resume Analyzer' is prominently displayed. Below it, a sub-headline reads: 'Instantly check ATS compatibility, detect skill gaps, and get actionable recommendations to make your resume job-ready.' A list of features includes: ✓ ATS compatibility check, ✓ Skill gap insights, ✓ Personalized tips, and ✓ Job-role match scoring. At the bottom are two buttons: 'Start Analysis' with a rocket icon and 'Bulk Analysis' with a folder icon.

The screenshot shows a modal dialog box titled 'Bulk Resume Analysis'. It contains instructions: 'Upload a folder containing multiple resumes (PDF/DOCX) to analyze against your selected software engineer job role.' Below this is a 'Select Folder' button with a folder icon.

The screenshot shows the results of a bulk resume analysis. The title is 'Bulk Resume Analysis'. The instructions say: 'Upload a folder containing multiple resumes (PDF/DOCX) to analyze against your selected software engineer job role.' A 'Select Folder' button is present. The 'Analysis Results' section displays a bar chart titled 'Bulk Analysis Results (Average Score: 99%)'. The chart compares 'Good Matches' (1 resume) and 'Needs Improvement' (3 resumes). Below the chart, summary statistics are shown: 'Total Resumes' (4), 'Good Matches' (1), and 'Average Score' (99%).

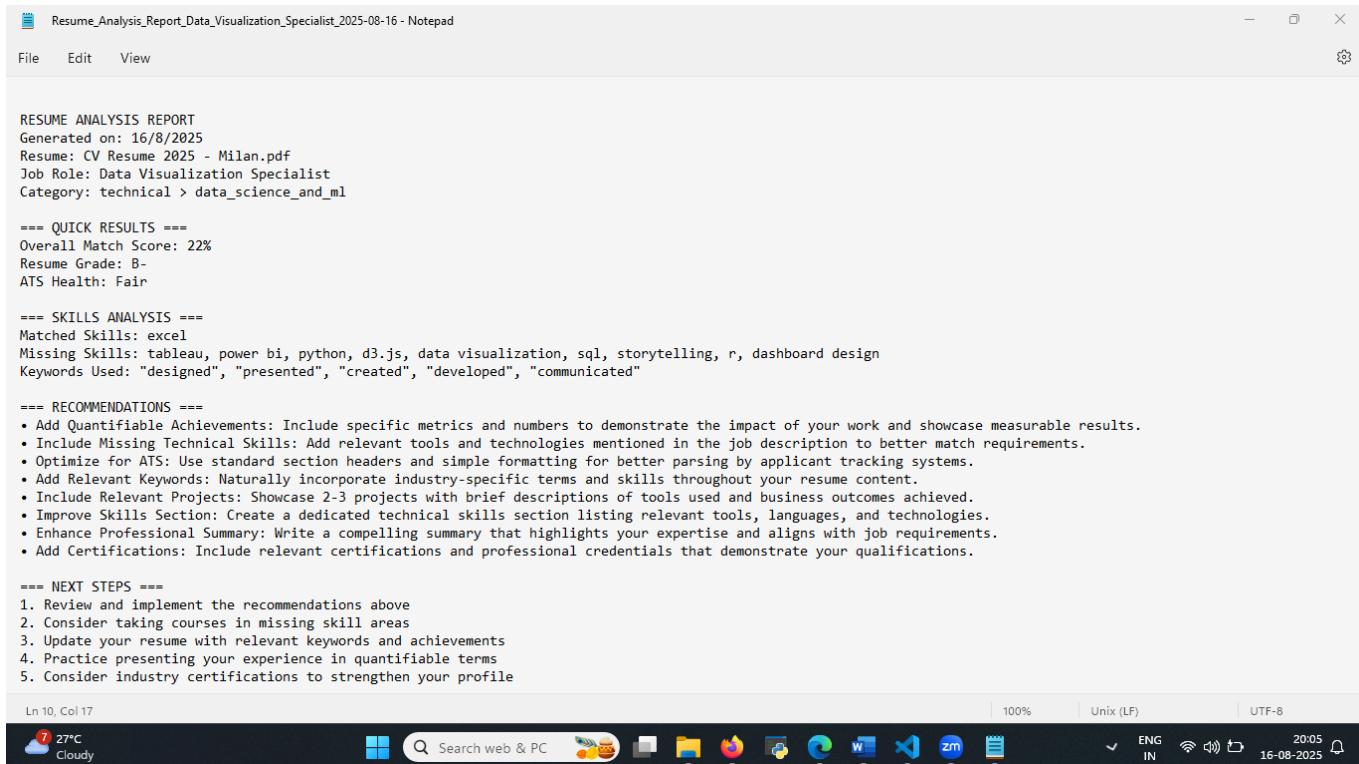
## Page 2 – Dashboard

- Resume Score gauge.
- Section-wise bar chart.
- List of issues + recommended fixes.



## Page 3 – Reports

- Option to download a PDF report.
- JSON export for integration with university portals or job boards



The screenshot shows a Windows Notepad window titled "Resume\_Analysis\_Report\_Data\_Visualization\_Specialist\_2025-08-16 - Notepad". The content of the window is a resume analysis report. It includes sections for resume details, quick results, skills analysis, recommendations, and next steps. The report is generated on 16/8/2025 from the file "CV Resume 2025 - Milan.pdf". The job role is Data Visualization Specialist, and the category is technical > data\_science\_and\_ml. The overall match score is 22%, with a resume grade of B-. The skills section lists matched skills like excel and missing skills like tableau, power bi, python, d3.js, data visualization, sql, storytelling, r, dashboard design. The recommendations section provides tips for improving the resume, such as adding quantifiable achievements and optimizing for ATS. The next steps section lists five actions to take. The bottom of the window shows the Windows taskbar with various icons and system status information.

```
RESUME ANALYSIS REPORT
Generated on: 16/8/2025
Resume: CV Resume 2025 - Milan.pdf
Job Role: Data Visualization Specialist
Category: technical > data_science_and_ml

==== QUICK RESULTS ====
Overall Match Score: 22%
Resume Grade: B-
ATS Health: Fair

==== SKILLS ANALYSIS ====
Matched Skills: excel
Missing Skills: tableau, power bi, python, d3.js, data visualization, sql, storytelling, r, dashboard design
Keywords Used: "designed", "presented", "created", "developed", "communicated"

==== RECOMMENDATIONS ====
• Add Quantifiable Achievements: Include specific metrics and numbers to demonstrate the impact of your work and showcase measurable results.
• Include Missing Technical Skills: Add relevant tools and technologies mentioned in the job description to better match requirements.
• Optimize for ATS: Use standard section headers and simple formatting for better parsing by applicant tracking systems.
• Add Relevant Keywords: Naturally incorporate industry-specific terms and skills throughout your resume content.
• Include Relevant Projects: Showcase 2-3 projects with brief descriptions of tools used and business outcomes achieved.
• Improve Skills Section: Create a dedicated technical skills section listing relevant tools, languages, and technologies.
• Enhance Professional Summary: Write a compelling summary that highlights your expertise and aligns with job requirements.
• Add Certifications: Include relevant certifications and professional credentials that demonstrate your qualifications.

==== NEXT STEPS ====
1. Review and implement the recommendations above
2. Consider taking courses in missing skill areas
3. Update your resume with relevant keywords and achievements
4. Practice presenting your experience in quantifiable terms
5. Consider industry certifications to strengthen your profile
```

## Web pages

# AI-Powered Resume Analyzer

Instantly check ATS compatibility, detect skill gaps, and get actionable recommendations to make your resume job-ready.

- ✓ ATS compatibility check
- ✓ Skill gap insights
- ✓ Personalized tips
- ✓ Job-role match scoring

 Start Analysis    Bulk Analysis



## Resume Match Analyzer

Upload your resume and select a job role to get instant feedback.

Select Category: technical

Select Subcategory: data science and ml

Select Job Role: Data Visualization Specialist

Paste Job Description here (optional): excellent in objection handling  
• Founder mindset — ownership, hustle, high standards, and adaptability  
• Bonus: Previous experience at a startup studio, IT consultancy, or staff augmentation firm

Upload Resume (PDF/DOCX): CV Resume 2025 - Milan.pdf



## Quick Results

Real-time analysis results will appear here.

Match Score: 22%

RESUME GRADE: B-

ATS HEALTH: Fair

Matched Skills: excel

Missing Skills: tableau, power bi, python, d3.js, data visualization, sql, storytelling, r, dashboard design

Keywords Used: "designed", "presented", "created", "developed", "communicated"

Detailed Analysis

Show Recommendations

## Detailed Analysis

### Professional Summary

resume shows strong design skills but could benefit from more quantifiable achievements and ATS optimization.

### Issues Breakdown

Work Experience
relevant Titles: 1 issue
Career Gaps Or Inconsistencies: 3 issues
Missing Metrics: 4 issues

Education
Missing Details: 2 issues

Profile Summary
Keywords: 2 issues
No Generic: 1 issue

Skills Section
Missing Hard Skills: 3 issues
Unbalanced Ratio: 1 issue

### Priority Fixes

- Add metrics to 3-5 work experience bullet points
- Include 2-3 more technical skills from job description
- Rewrite profile summary to be more specific

### Skills Gap Analysis:

#### Skills Improvement Priority



#### Learning Time Investment



### Learning Resources:

#### Free Resources

#### Premium Courses

- python:** FreeCodeCamp Python Tutorial (Tech)
- data visualization:** Data Visualization with Tableau (Coursera Audit) (Tech)
- sql:** SQL for Data Science (Coursera Audit) (Tech)
- Soft Skills:** Effective Communication Skills (Alison) (Various)
- Soft Skills:** Leadership Skills (edX Audit) (Various)
- Soft Skills:** Creative Problem Solving (Alison) (Various)
- Soft Skills:** Teamwork Skills (FutureLearn) (Various)

### Issues Breakdown

**Work Experience (15% issues):** Consider adding more quantifiable achievements and specific metrics to demonstrate impact.  
**Education (5% issues):** Include relevant coursework or certifications that align with the job requirements.  
**Skills (25% issues):** Add technical skills mentioned in the job description, particularly relevant tools and technologies.  
**ATS Compatibility (10% issues):** Use standard section headings and avoid complex formatting that might confuse ATS systems.

### Recommendations

- Quantify Achievements:** Add specific numbers and percentages to your accomplishments to demonstrate impact.
- Add Missing Keywords:** Include relevant industry terms and skills naturally throughout your content.
- Technical Skills Section:** Create a dedicated section for technical skills and list programming languages, tools, and platforms.
- Project Examples:** Include 2-3 relevant projects with brief descriptions of tools used and outcomes achieved.

### Suggested Courses

#### Free Courses

#### Paid Courses

- python:** Coursera Python for Everybody Specialization (Tech)
- python:** Udemy The Complete Python Bootcamp (Tech)
- python:** edX Python for Data Science (Tech)
- data visualization:** Tableau Desktop Specialist Certification (Tech)
- data visualization:** Coursera Data Visualization with Tableau Specialization (Tech)
- Soft Skills:** LinkedIn Learning Communication Foundations (Various)
- Soft Skills:** Coursera Leading People and Teams Specialization (Various)

DOWNLOAD  
REPORT

## Technology Stack

Layer / Module	Tools / Frameworks Used	Purpose / Justification
Frontend	HTML · CSS · Bootstrap JavaScript	Simple, responsive interface for resume uploads and result viewing
Backend	Python · Flask	Lightweight server for orchestrating parsing, ML models, and scoring
NLP / ML Models	spaCy · scikit-learn · TF-IDF Logistic Regression, SVM RandomForest	Resume parsing, preprocessing, section classification, scoring
ATS Compliance Engine	Regex · Rule-based Checks ML Classifier	Simulates ATS filtering, validates headers, formatting, keywords
Dashboard & Visualization	Custom ML Feedback System	Generates section-specific suggestions & role-based personalization
Report Generation	Chart.js, Recharts Bootstrap	Interactive score gauges, section breakdown charts recommendations table
Hosting	Render-GitHub Pages	Creates downloadable PDF reports with scores & feedback

## Real World Impact

- **Students (Tier-2 & Tier-3 Colleges):** Get clear, structured feedback to make resumes job-ready without costly career services.
- **Job Seekers & Early Professionals:** Identify weaknesses, add missing skills, and improve ATS compliance — reducing silent rejections.
- **Recruiters & Employers:** Receive better-quality resumes that are ATS-friendly, saving time in shortlisting.
- **NGOs & Government Skill Programs:** Integrate this tool to scale employability support in rural and semi-urban areas.
- **Universities & Placement Cells (Bulk Scanning):** Entire batches of resumes can be evaluated at once, producing batch-level analytics (common weaknesses, missing skills, average scores)

- 
- helping institutions design targeted training and boost placement readiness.
  - **Skill Gap Insights (Future Scope):** Aggregated usage data highlights industry trends and student weaknesses, guiding curriculum updates and employability programs.

## Future Enhancement

The current Resume Analyzer provides strong support for single-resume parsing, scoring, and feedback. In the future, it can be expanded with the following capabilities:

1. **Job Description Matching** – Compare resumes against job postings to provide a match score and highlight missing keywords.
2. **Grammar & Readability Analysis** – Detects grammar errors, redundant phrasing, and readability issues to improve professionalism.
3. **Resume Rewriting Assistant** – Suggest impactful rewrites with action verbs, measurable results, and better formatting.
4. **Multi-Language Support** – Enable Hindi and regional language support to increase accessibility for students in Tier-2/Tier-3 regions.
5. **Career Platform Integrations** – Integrate with LinkedIn, job portals, and university systems for seamless adoption.

## Conclusion

The AI Resume Analyzer transcends conventional resume tools by acting as a comprehensive career intelligence platform. Leveraging NLP, AI scoring, and ATS compliance algorithms, it provides automated, data-driven, and role-specific insights, enabling candidates to optimize their resumes for recruiter and system evaluation.

Its scalable architecture and modular design allow universities, placement cells, and skill development programs to perform batch resume analysis, generate actionable feedback, and enhance employability outcomes. By bridging the gap between candidate potential and recruiter requirements, the platform streamlines recruitment, reduces manual evaluation overhead, and maximizes talent visibility.