

AI-Powered Resume & Cover Letter Generator with Job Matching

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1. Introduction

Finding a job today is competitive and complex. Many applicants are rejected by Applicant Tracking Systems (ATS) before a human even sees their application. Most existing tools focus only on basic keyword matching or offer generic templates, failing to truly understand candidates' real skills or match them to multiple jobs at once.

Our solution:

A simple, user-friendly web application that uses AI to:

- Parse and understand resumes in detail
- Suggest the most relevant job postings in real time
- Generate tailored cover letters and optimized resumes for each selected job
- Help job seekers apply quickly and confidently, with all application materials ready

2. Problem Statement

- Many resumes get filtered out by ATS due to missing keywords, poor formatting, or lack of alignment with job requirements.
- Existing tools only analyze resumes for a single job at a time and give generic feedback.
- Job seekers struggle to efficiently customize applications for each role, often missing better-fit opportunities

3. Project Objectives

1. Advanced Resume Understanding:

Extract skills, experience, and education using AI—not just keyword scanning.

2. Smart Job Matching:

Use public APIs (Canada Job Bank, Adzuna) to find the top 10 jobs that best fit each user's profile.

3. Batch Application Materials:

Let users generate up to 5 tailored resumes and cover letters at a time.

4. Streamlined Application:

Enable users to download all documents and directly visit official job postings to apply.

5. Value-Added Features:

(Selected for this project)

- Skill gap analysis and learning recommendations
- ATS simulation and optimization tips
- Dashboard to track job applications and match scores
- Optional LinkedIn/profile analysis
- Batch export with application tracker

4. Project Workflow

1. Upload Resume

User uploads their resume (PDF or Word).

2. Resume Parsing

AI models (spaCy, pyresparser) extract all relevant details from the resume.

3. Job Matching

The system queries public job APIs and suggests the top ten jobs that fit the user's background, using advanced semantic matching (SBERT).

4. Selection & Generation

User selects up to five jobs. For each, the system:

- Generates a customized resume (if needed)
- Writes a tailored cover letter using GPT-3.5/4 or Mistral

5. Download & Apply

User downloads all documents (PDF/DOCX) in one step and is automatically directed to the job posting pages to apply.

6. Enhancements (as chosen):

- Highlight missing skills, suggest courses
- Simulate ATS scan and offer improvements

- Dashboard tracks jobs and application status
- Batch download includes application tracker sheet
- LinkedIn profile can be analyzed and improved

5. Tools & Technologies

- **Frontend:** Streamlit (MVP), React (for scalable UI)
- **Backend/Parsing:** Python, PyMuPDF, python-docx, spaCy, pyresparser
- **Semantic Matching:** Sentence-BERT (SBERT), HuggingFace Transformers
- **Cover Letter Generation:** OpenAI GPT-3.5/4, Mistral (for batch AI writing)
- **Job Data:** Canada Job Bank API, Adzuna API
- **Document Creation:** python-docx, FPDF
- **Batch Export:** Python Zipfile
- **Dashboard:** Streamlit/React components
- **Security:** HTTPS, privacy-by-design, files deleted after use

6. Feasibility

Every part of the workflow is realistic with current (2025) tools and APIs:

- Uploading and parsing files is well-supported and reliable.
- Resume parsing and semantic matching can be done with open-source AI libraries.
- Public job APIs are available and accessible.
- GPT models (or Mistral) can batch-generate documents.
- Download and redirect features are simple web logic.
- Enhancements (skill gap, ATS, dashboard) are all technically practical for a student project.

7. Expected Outcomes

- Users receive job-specific, optimized resumes and cover letters—quickly and easily.
- They see which skills they need to improve, and how to do it.
- Application materials are ready to submit, boosting their chance of passing ATS and standing out to recruiters.
- The workflow saves users time and gives them a clear overview of their job search progress.