

AI-Assisted Recruitment System

Bridging the Gap Between Talent and Opportunity with NLP

Team: Cadence Design 1B



The Recruitment "Black Hole"

Problem: Hiring managers drown in data,
Qualified candidates are overlooked

The Recruitment "Black Hole"

Problem: Hiring managers drown in data,
Qualified candidates are overlooked

Goal: Use AI to improve transparency and
fairness in hiring.

AI Assisted Recruitment can:

reduce hiring time by up to

30%

improve selection accuracy by

25%



Project Objectives



Efficiency

Automate screening to save time.



Project Objectives



Efficiency

Automate screening to save time.



Accuracy

Use Semantic Search (BERT/RoBERTa) instead of keyword matching.



Project Objectives



Efficiency

Automate screening to save time.



Accuracy

Use Semantic Search (BERT/RoBERTa) instead of keyword matching.



Fairness

Focus on skills, not demographics.



Project Objectives



Efficiency

Automate screening to save time.



Accuracy

Use Semantic Search (BERT/RoBERTa) instead of keyword matching.



Fairness

Focus on skills, not demographics.



Feedback

Provide candidates with actionable gap analysis.

Business Impact for Cadence Design Systems



Reduced Time-to-Hire

Instantly rank top candidates.



Bidirectional Value

Matches Resumes-to-Jobs AND
Jobs-to-Candidates.



Bias Mitigation

Content-based scoring reduces human
bias.

Technical Approach & Timeline

Phase 1: Data Cleaning

19k+ Job Posts, 2.4k+ Resumes.

Python, spaCy, Scikit-Learn, Hugging Face (Transformers).

Phase 2: Model Development

TF-IDF vs. Transformers, Groq (Llama 3) for natural language explanations.

Phase 3: Web App Development

FastAPI, Next.js, Tailwind CSS

Phase 1: Data Pipeline & Cleaning

<p>Input</p> <p>Parsed PDFs into raw text</p>	<p>Cleaning</p> <p>Removed HTML tags, normalized whitespace.</p>
<p>Skill Extraction</p> <p>Used spaCy to extract nouns/proper nouns (skills) vs. filler words.</p>	<p>Result</p> <p>Clean, vectorized data ready for matching.</p>

Phase 2: Modeling Strategy

Our approach evolved from simple frequency analysis to understanding deep semantic meaning.

Baseline: TF-IDF (Frequency based).

Advanced: BERT (Semantic context).

Advanced: RoBERTa (optimized for longer text).

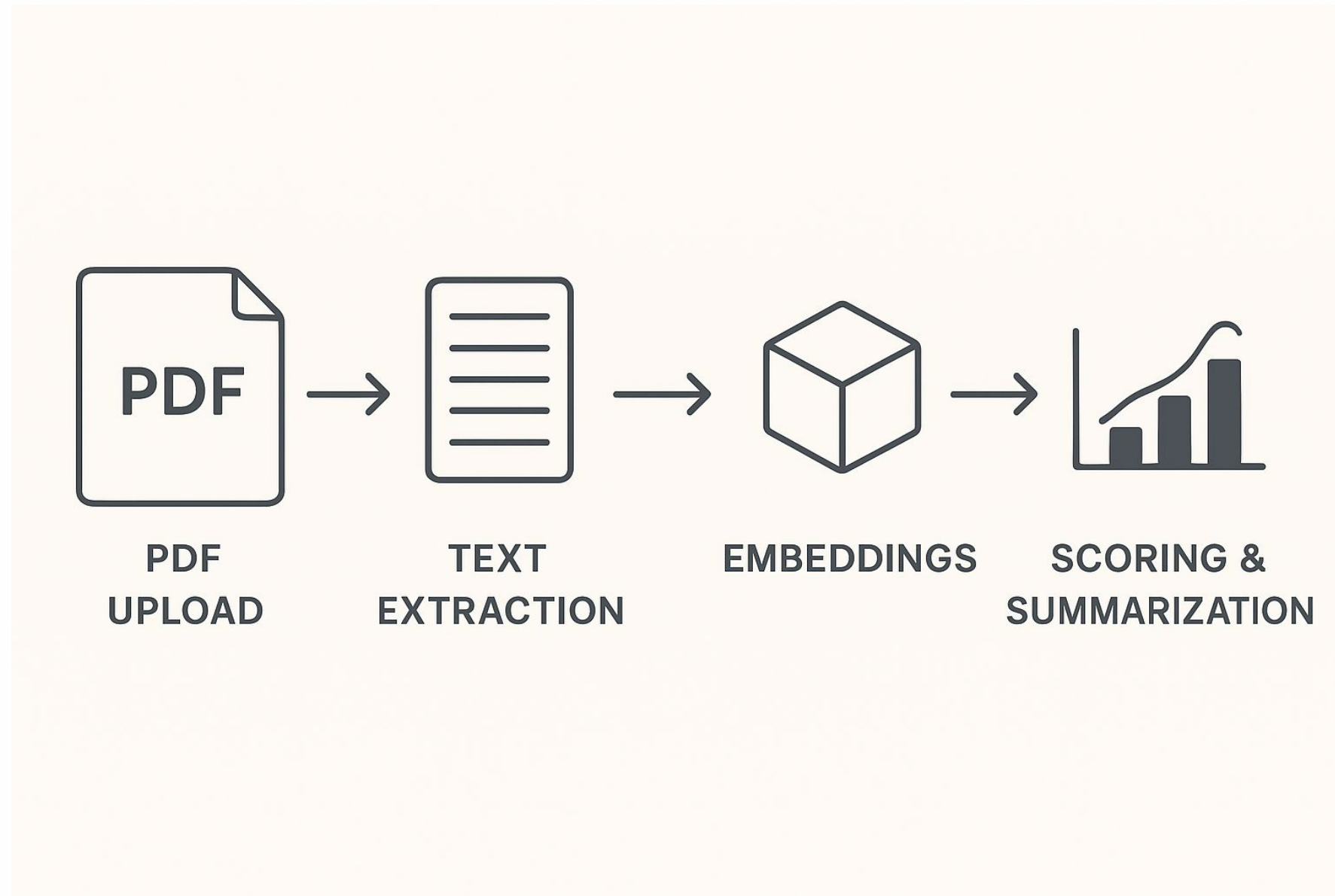
Metric: Cosine Similarity to measure distance between Job Vector and Resume Vector.

Model Comparison Results

Model	Cosine Similarity (0%- 100%)	Key Insight
TF-IDF	44%	Failed to capture context (e.g., "Manager" vs "Lead").
BERT	75%	Strong understanding of related terms (e.g., "Python" = "Coding").
RoBERTa	84%	Highest raw confidence and best performance on long text.

Conclusion: RoBERTa is the most powerful, but BERT offered balanced speed/accuracy.

Solution Architecture



Phase 3: App Development Features



Dual Mode

Search for Jobs or Search for Candidates.



Match Cards

Visual display of "Excellent", "Good", or "Weak" match.



Explainability

"Why this fits" narrative summary.



Skill Gap Analysis

Highlights exactly which skills are missing.

AI Recruitment System

Intelligent job-resume matching powered by BERT & RoBERTa

Model:

BERT

RoBERTa

Resume to Jobs

Find best jobs for a resume

Job to Candidates

Find best candidates for a job

Upload Job Description PDF

Upload a job description PDF to find matching candidates

60c979a31226ae3442373396_Web Developer JD - File.pdf

0.07 MB

Find Matches

Match Results

Found 10 matches using BERT model

#1

Candidate #28126340

Excellent Match

INFORMATION-TECHNOLOGY

Similarity Score

89.2%

Recruiter Insight

This candidate is a technical powerhouse, with a strong foundation in languages like Java, SQL, and PHP, making them a compelling fit for our role. What really stands out is their versatility in both front-end development with HTML and CSS, and back-end expertise with Oracle - it's a rare combination that could bring significant value to our team. While there are some development opportunities to strengthen their skills in areas like Python and Agile, their existing skillset and eagerness to grow make them an exciting prospect to bring on board and help shape into a well-rounded technical leader.

Strongly Recommended

Candidate demonstrates 89.2% compatibility with the job requirements. Strong skill alignment of 68.8% indicates relevant experience.

Matching Skills (11)

Missing Skills (5)

Extra Skills (2)

go css php oracle r html sql java

ruby agile excel python communication

mysql photoshop

+3 more

Skill Match Ratio

68.8%

Missing 5 key skills: ruby, agile, excel, python, communication

View Full Resume

INFORMATION TECHNOLOGY COORDINATOR Professional

Profile

B.S.

graduate with a record of success implementing IT solutions.

Demonstrated commitment to quality and customer service, detail oriented, strong team player, self motivated, demonstrated exceptional analytical skills, proven ability to

Ethical AI Considerations

Bias Mitigation: Scores based on semantic fit, ignoring names/gender.

Human-in-the-Loop: Tool is for "Screening," not "Deciding."

Transparency: We explain the "Why" behind every score.



Future Roadmap



Feedback Loop

Allow recruiters to rate matches to retrain the model.



Learning Paths

Suggest Coursera/Udemy courses for missing skills.



Cloud Deployment

Scale architecture for high volume.



Demo

Thank You!