AI-Powered Resume Screening Bias Reduction System

Deployment Plan Presentation

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Data Science Porjects in Business

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Project Overview

Problem: Hiring is slow, costly, and biased.

Solution: AI system to automate resume screening, reduce bias, and improve job-candidate matching.

Key Deliverables:

- NLP resume parser
- Candidate ranking with Logistic Regression
- Blind screening for fairness
- Dashboard for recruiters

The problem

Hiring firms

A recruitment firm processes thousands of resumes monthly for a variety of job roles.

Traditional resume screening is manual, time-consuming, and varies significantly between recruiters.

The company aims to improve efficiency, consistency, and fairness in early-stage candidate evaluation.

Context

With growing pressure to reduce bias and increase hiring efficiency, organizations are exploring AI-based screening solutions.

There is a risk of perpetuating historical bias if models are not designed responsibly.

Recruitment teams need interpretable tools that can be integrated into existing workflows.

Problem statement

Hiring companies lack a scalable and unbiased method to screen resumes quickly and consistently.

Manual processes are error-prone and may introduce unconscious bias, leading to unfair or suboptimal hiring decisions.

Goals & Metrics

Goals

- Cut resume screening time by 50%
- Reduce bias via anonymized resumes
- Improve job match quality with skill-based ranking
- Increase the success fee rate by ensuring better candidate-job fit

KPIs

- Time saved
- Candidate retention after hire
- Diversity pre/post AI
- Cost reduction in screening

Deployment Architecture

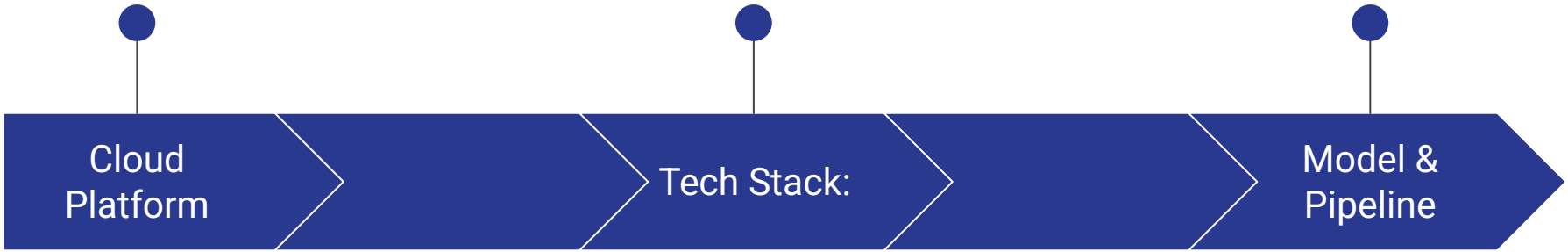
AWS

Python, Scikit-Learn, Pandas

TfidfVectorizer + LogisticRegression

Streamlit for front-end interface

Exported as .pkl files



Compliance & Ethical Considerations

Data Privacy & Compliance

- Resumes are anonymized before processing to protect personal identifiable information (PII)
- The system is designed to comply with **GDPR** and other local data protection laws
- Secure storage and transmission using encrypted channels (e.g., HTTPS, encrypted S3 buckets)

Bias Mitigation

- Model trained on balanced and diverse resume datasets to reduce bias
- Regular audits using fairness metrics (e.g., disparate impact ratio)
- Transparent explanations of scoring to enable human oversight

Interpretability & Transparency

- AI decisions are supplemented with human-readable justifications
- Recruiters can access keyword matches and rationale behind resume scores
- No black-box decision-making: final hiring decisions remain with humans

Continuous Monitoring

- Post-deployment reviews for drift and bias
- Feedback loop from recruiters to update and improve model performance
- Scheduled retraining based on new resume and hiring data

Deployment Requirements

Model Training Hardware – AWS

- Use AWS EC2 instances (e.g., `g4dn.xlarge` or `p3`) with GPU acceleration
- Enables efficient training of NLP models like BERT or spaCy on resume datasets
- Amazon S3 is used to store and access large training datasets

Model Inference Hardware – AWS

- Deploy using AWS EC2 (e.g., `t3.medium` or `m5.large`) for real-time inference
- Optimized for low-latency processing of resumes in live production
- Auto-scaled via Elastic Load Balancer for reliability under high load

Software & Tools

- Python 3.9 with libraries: `scikit-learn`, `pandas`, `spaCy`, `joblib`, `Streamlit`
- Streamlit powers an intuitive recruiter-facing interface
- Docker containers ensure consistency across dev, test, and prod
- CI/CD pipelines managed through GitHub Actions + AWS CodePipeline

Personnel

- Recruiters (dashboard users)
  - Use the Streamlit-powered dashboard to view ranked resumes
  - Receive AI-driven recommendations with explanations and keyword highlights
  - Provide feedback on model predictions to support continuous improvement
  - Final hiring decisions remain fully under human control
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- Data team for model maintenance
  - Maintain and monitor model performance and fairness post-deployment
  - Conduct periodic retraining with updated resume and hiring outcome data
  - Ensure compliance with ethical and legal standards
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Change Management Plan

Stakeholders

- Recruiters, hiring managers, Data Science & Engineering Team, HR, IT & Infrastructure Team, Business Leadership / Executive Sponsors

Change Drivers

- Reduce manual screening load
- Inconsistent Evaluation Criteria
- Bias in Hiring Decisions
- Data-Driven Decision Making

Training

- How to use dashboard
- How to interpret rankings

Communication

- Internal demos, quickstart guides, Email Updates, Help Desk/Support, User Testimonials/Case Studies

Testing Strategy

- **Unit Testing:** Each preprocessing and model component
- **Integration Testing:** End-to-end flow with resume upload → ranking
- **Model Validation:** Accuracy, recall, fairness evaluation
- **Security Tests:** Input sanitization, data masking

Go-Live Strategy

- **Phase 1: Internal beta with dummy resumes**
- **Phase 2: Recruiter feedback + UI improvements**
- **Phase 3: Gradual rollout with real data**
- **Roles:**
- **Dev team → system ops**
- **HR → usage + feedback**

Data Readiness & Security

- Resume anonymization (via NLP preprocessing)
- Data validation before scoring
- Encryption of stored resumes
- Access controls + audit logging

Post-Deployment Plan

- **Monitoring:**
  - System uptime, usage metrics
  - Model performance dashboard
- **Retraining Schedule:** Monthly or quarterly
- **Feedback Loops:** Recruiter insights to improve logic
- **Scalability:** Add job-specific models in the future

Summary & Next Steps

- AI resume screener is lightweight, fast, and ethical
- Fully compatible with modern hiring workflows
- Next Steps:

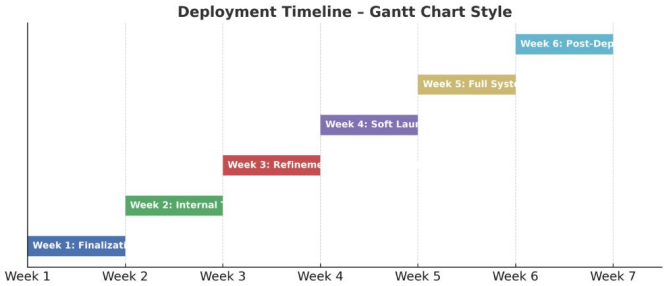
❖ Upload code + model to GitHub

❖ Prepare dashboard for live demo

❖ Final presentation + feedback session

Deployment Timeline (6-Week Plan)

- **•Week 1: Finalization & Packaging**
  - –• Finalize model training and testing
  - –• Export model and vectorizer as .pkl files
  - –• Prepare Streamlit dashboard
  - –• Review code for GDPR and anonymization
- **•Week 2: Internal Testing**
  - –• Run unit and integration tests
  - –• Test with anonymized sample resumes
  - –• Gather feedback from recruiters
  - –• Identify bugs and usability issues
- **•Week 3: Refinement & Security Audit**
  - –• Apply UI/UX improvements
  - –• Add input sanitization and encryption
  - –• Conduct internal security and compliance review
- **•Week 4: Soft Launch (Pilot Phase)**
  - –• Deploy internally to selected recruiters
  - –• Monitor system performance and relevance
  - –• Collect feedback
- **•Week 5: Full System Rollout**
  - –• Launch to all recruiters
  - –• Provide training materials
  - –• Start tracking key KPIs (time saved, usage)
- **•Week 6: Post-Deployment Monitoring**
  - –• Evaluate model accuracy and bias metrics
  - –• Plan retraining schedule
  - –• Begin planning additional features



Post-Deployment Tuning

Collaboration with IQ Testing Company:

- Partner with an **IQ testing company** to enhance candidate assessments by integrating cognitive ability data into the screening process.

User Feedback Integration:

- Collect feedback from users to identify areas for improvement in the system.

Regular Reporting and Updates:

- Provide quarterly reports on model performance and diversity metrics.

THANK YOU FOR YOUR ATTENTION!