Spot the Scam

Job Posting Fraud Detection System

Introduction

Spot the Scam is an uncertainty-aware fraud detection system designed to identify fraudulent job postings with calibrated probabilities and transparent decision-making.

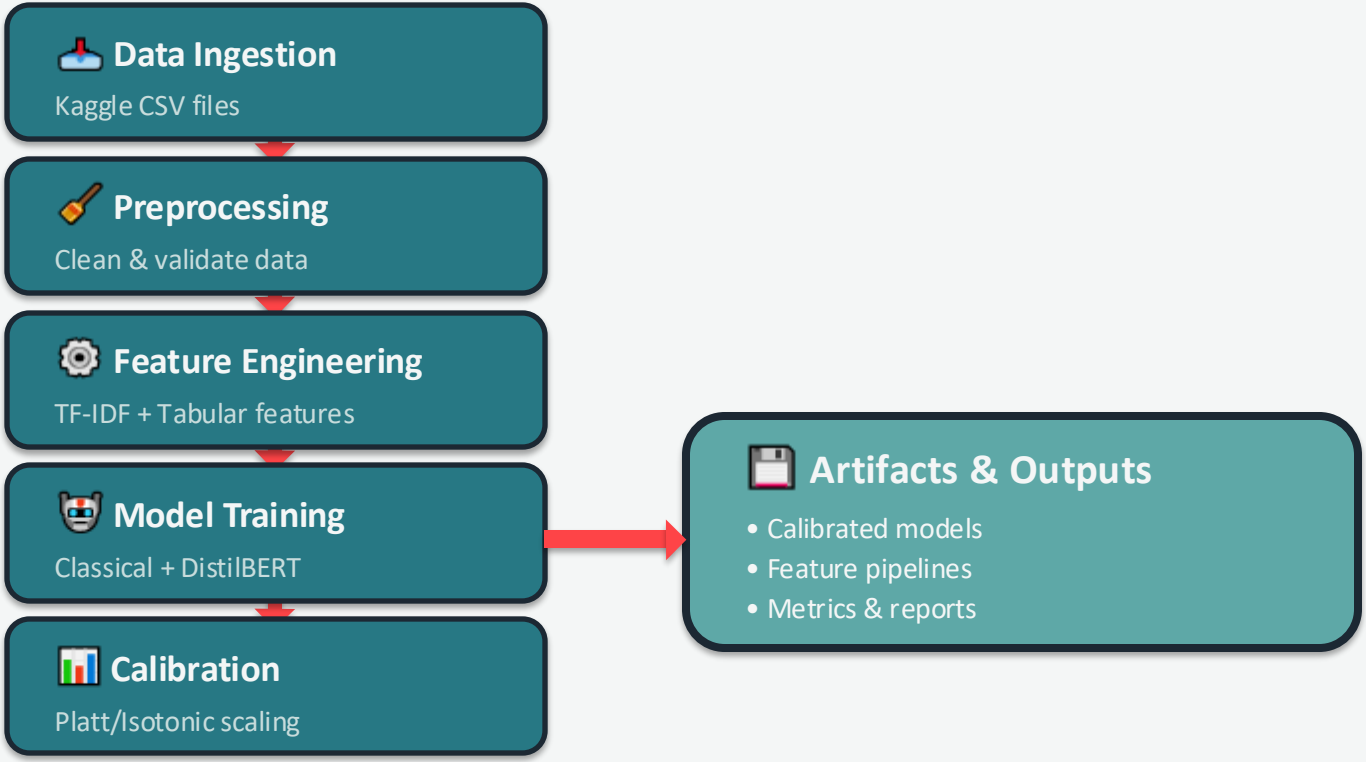
The system combines classical machine learning models with transformer-based approaches (DistilBERT) to deliver high-precision fraud detection.

Built with reproducibility and explainability at its core, featuring gray-zone review policy for uncertain predictions and comprehensive model monitoring.

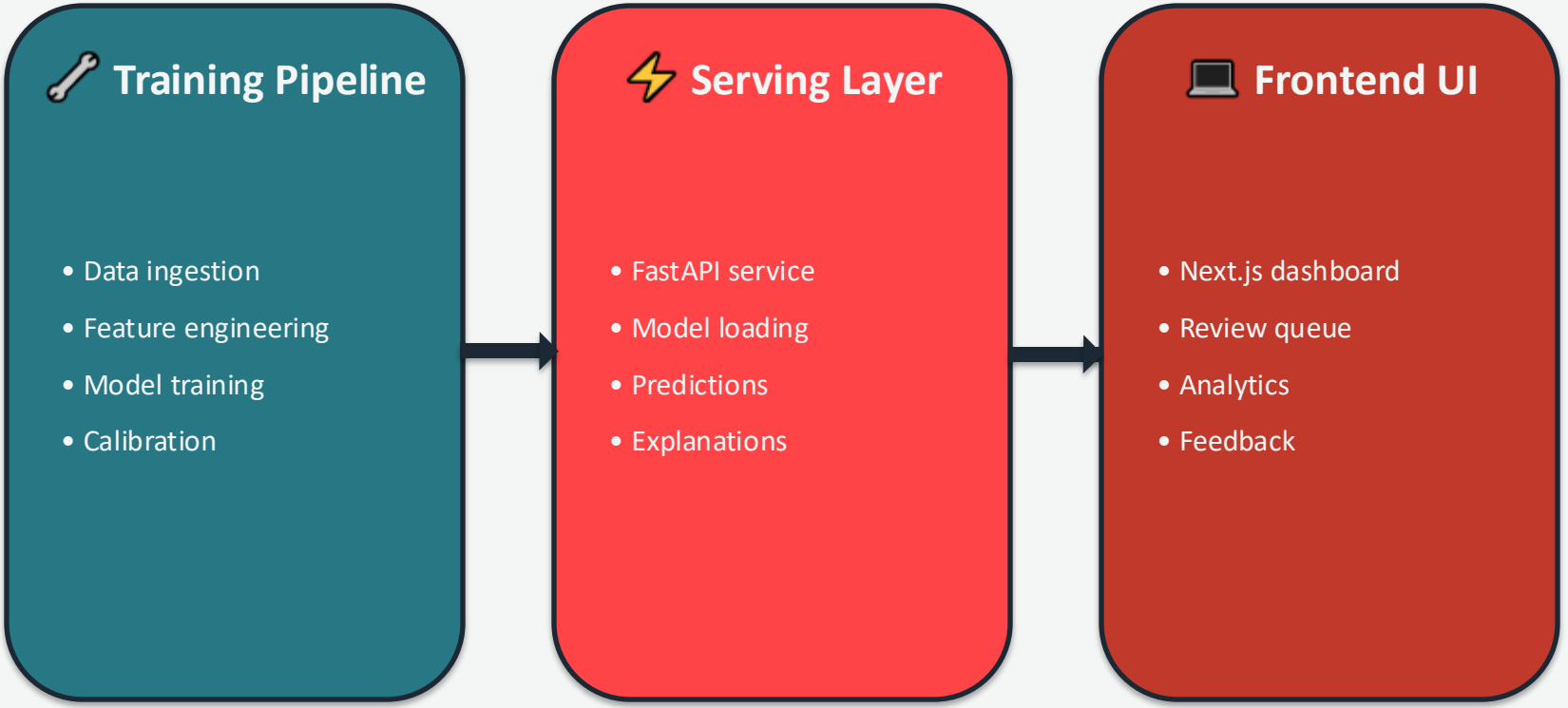
01

System Overview

Training Pipeline



System Architecture



02

Performance & Results

Model Performance Metrics

Key Insights

✓ High Precision (0.92): Minimizes false positives for legitimate jobs

✓ Excellent Class Separation (ROC-AUC 0.97): Clear distinction between fraud and legitimate postings

✓ Well-Calibrated Probabilities: Low Brier score (0.014) and calibration error (0.009) ensure reliable uncertainty estimates

✓ Gray-Zone Policy: ~10% of predictions flagged for human review to handle uncertain cases

03

Technology & Implementation

Technology Stack

Backend & ML:

- Python 3.12, FastAPI, scikit-learn
- HuggingFace Transformers, LightGBM
- MLflow for tracking, ONNX for deployment

Frontend & Infrastructure:

- Next.js 14, shadcn/ui, Tailwind CSS
- Docker Compose, VS Code devcontainer
- Reproducible development environments

Key Features

Explainable AI

Natural language rationales

Calibrated

Reliable probabilities

Human-in-Loop

Expert feedback

Production Ready

Containerized deployment

04

Achievements & Future

Key Achievements

✅ End-to-End Pipeline: Complete workflow from data ingestion to deployment

✅ Transparent AI: Explainable predictions with calibrated uncertainty estimates

✅ Human Feedback Integration: Continuous improvement through expert review

✅ Production Deployment: Containerized serving with monitoring and analytics