

Spot The Scam

Fraudulent Job Posting Detector

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Introduction

The Problem:

- Technology has increased accessibility to information about employment opportunities
- However, with this, there has also been an increase in fraudulent job postings
 - Collecting personal information, trying to take job seekers' money through upfront fees

Our project:

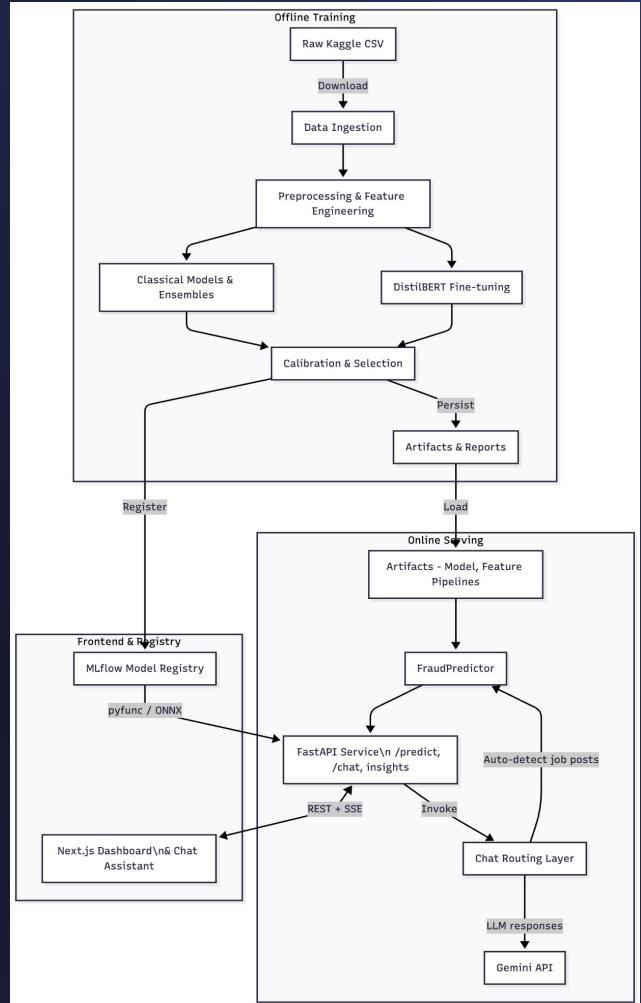
- **Aim:** Improve the accuracy of the identification of fraudulent job postings
- **Our solution:** full-stack application that applies both classical and transformer models to this modern problem

The screenshots demonstrate the 'SPOT THE SCAM' application's features:

- Model Risk Dashboard:** A dashboard for inspecting machine learning models. It includes a form to "Score a job posting" (Job title: Remote Accounts Payable Specialist), a "Awaiting Submission" status, and a "Model snapshot" section for the "linear_svm_C1.0" model. The snapshot shows performance metrics: F1 (VAL: 0.811 - TEST: 0.789), PRECISION (VAL: 0.939 - TEST: 0.92), RECALL (VAL: 0.713 - TEST: 0.691), ROC AUC (VAL: 0.988 - TEST: 0.981), PR AUC (VAL: 0.872 - TEST: 0.845), and BRIER (VAL: 0.012 - TEST: 0.014). It also displays a "GRAY-ZONE POLICY" section with Width: 0.10 and Lower bound: 0.50.
- AI Assistant:** An AI-powered job posting analysis tool. It shows a breakdown of the job posting based on pipeline analysis, highlighting 1. Fraudulent Activity Assessment (Overall Assessment: legitimate, 1.9% fraud probability) and 2. Key Red Flags and Positive Signals (Red Flags: has_company_logo).

Methods

- Kaggle job-post datasets merged. Used 70/15/15 split for model training, validation, and testing.
- Classical models: Logistic Regression, Linear SVM, LightGBM, XGBoost
- Transformer model: fine-tuned DistilBERT classifier
- All candidates tuned and ranked by validation F1; best calibrated model evaluated on test
- Gemini API chatbot wraps the model using conversation history, job fields, and model outputs to produce natural language responses



Results

Table 1: Performance of `ensemble_top3` on validation and test splits.

Split	F1	Precision	Recall	ROC AUC	PR AUC	Brier
Validation	0.8561	0.9297	0.7933	0.9890	0.9053	0.0103
Test	0.7721	0.8537	0.7047	0.9863	0.8659	0.0143

- Validation winner: calibrated classical ensemble `ensemble_top3`, selected over transformer baselines by validation F1
- Generalizes well: strong F1 on validation and test with high ROC/PR AUC and low Brier (see table)

References

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GitHub Repo



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