

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

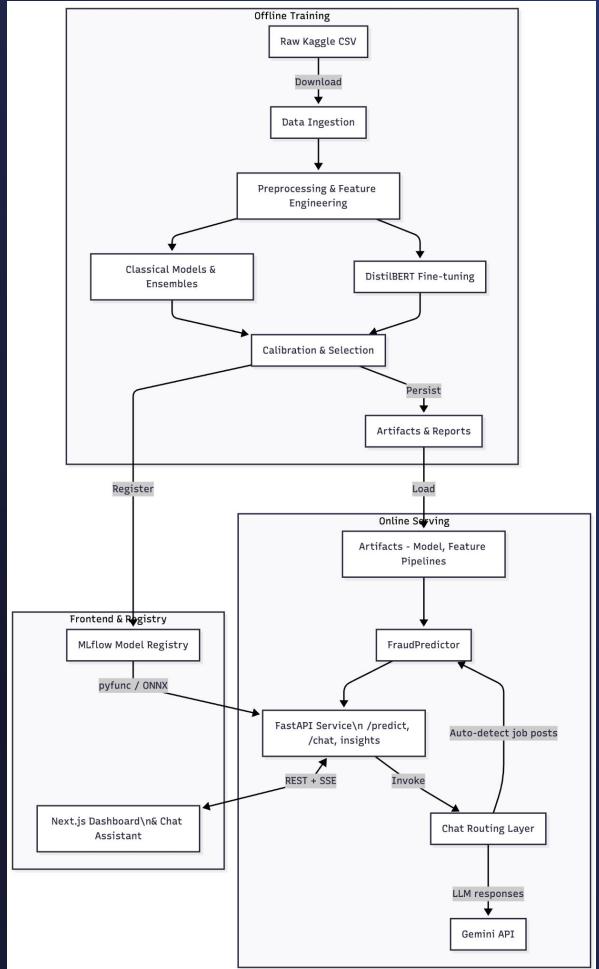
Our project:

- 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 top screenshot displays the 'Model Risk Dashboard' of the 'SPOT THE SCAM' application. It features a form titled 'Score a job posting' where users can input job details like title, description, requirements, company profile, and benefits. Below this is a 'Job overview' section with fields for location (Remote), employment type (Contract), required experience (2+ years), required education (Associate Degree), industry (Accounting), and function (Finance). To the right, a 'Model snapshot' section for 'linear_svm_C1.0' provides validation and test scores for various metrics: F1 (0.811 - TEST: 0.789), Precision (0.939 - TEST: 0.92), Recall (0.713 - TEST: 0.691), ROC AUC (0.988 - TEST: 0.981), PR AUC (0.872 - TEST: 0.845), and BRIER (0.012 - TEST: 0.014). A 'GRAY-ZONE POLICY' section shows width and lower bound values. The bottom screenshot shows the 'AI Assistant' interface, which uses Google Gemini to analyze a job posting. It highlights factors like proficiency, backend frameworks, and design work. It then provides a breakdown of the pipeline analysis, identifying 1. Fraudulent Activity Assessment (low fraud probability) and 2. Key Red Flags and Positive Signals (one red flag: has_company_logo). An AI-generated response suggests applying for the job if it meets certain criteria.

Methods

- Kaggle job-post datasets merged. Text fields combined into a single text_all feature
- Classical models: Logistic Regression, Linear SVM, LightGBM, XGBoost
- Transformer model: fine-tuned DistilBERT on text_all
- 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



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)

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Thanks

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