

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 shows the 'Model Risk Dashboard' interface. It features a form to 'Score a job posting' with fields for 'Job 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 is a 'Model snapshot' section for 'linear_svm_C1.0' with a 'classical' classifier. It displays validation and test scores for various metrics: F1 (0.811), Precision (0.939), Recall (0.713), ROC AUC (0.988), PR AUC (0.872), and BRIER (0.012). A 'GRAY-ZONE POLICY' section shows a width of 0.10 and a lower bound of 0.50.

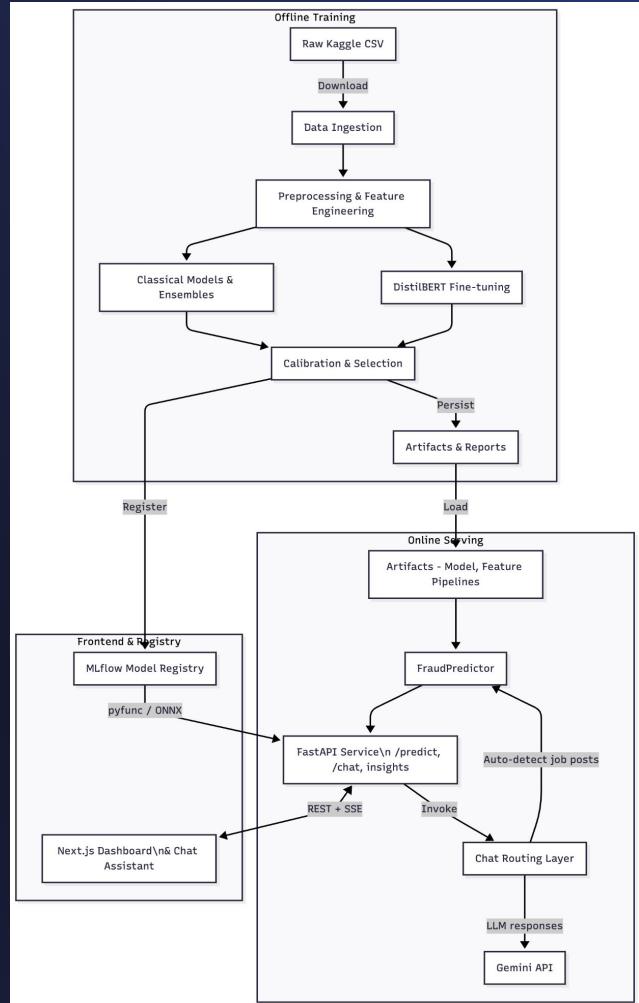
The bottom screenshot shows the 'AI Assistant' interface. It displays a job posting breakdown based on pipeline analysis. The breakdown includes:

- 1. Fraudulent Activity Assessment:**
 - Overall Assessment: The pipeline identifies the job posting as **legitimate** with a low fraud probability of 1.9%. This suggests the system views the posting as genuine.
 - Reasoning: The analysis weighs various factors, concluding that the positive signals outweigh the red flags, leading to the "legitimate" classification.
- 2. Key Red Flags and Positive Signals:**
 - Red Flags (Minor):
 - has_company_logo

At the bottom, there is a text input field with placeholder text: "Ask a question about job fraud detection...".

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)

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GitHub Repo



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