Model Evaluation Report: Crypto Volatility Spike Prediction

Session ID: 20251120_085507 **Experiment ID:** 17

Executive Summary

This report evaluates models trained to predict 60-second forward volatility spikes in cryptocurrency markets. The primary evaluation metric is PR-AUC (Precision-Recall Area Under Curve).

Key Results: - Best performing model: **logisticlogistic_regression_20251120_085507** - Best PR-AUC achieved: **[0.5693]**

Experimental Setup

Products

- **Included:** BTC-USD, ETH-USD, SOL-USD
- **Excluded:** USDT-USD (stablecoin, minimal volatility)

Target Definition

- **Prediction horizon:** 60 seconds
- **Volatility proxy:** Rolling standard deviation of midprice returns
- **Threshold:** 95th percentile (computed per-product)
- **Label:** 1 if forward volatility ≥ threshold, else 0

Features

- **Total features:** [111]
- **Feature windows:** 30s, 60s, 300s, 900s
- **Feature categories:** Price dynamics, returns, spreads, trade intensity, microstructure, order book (L2), temporal

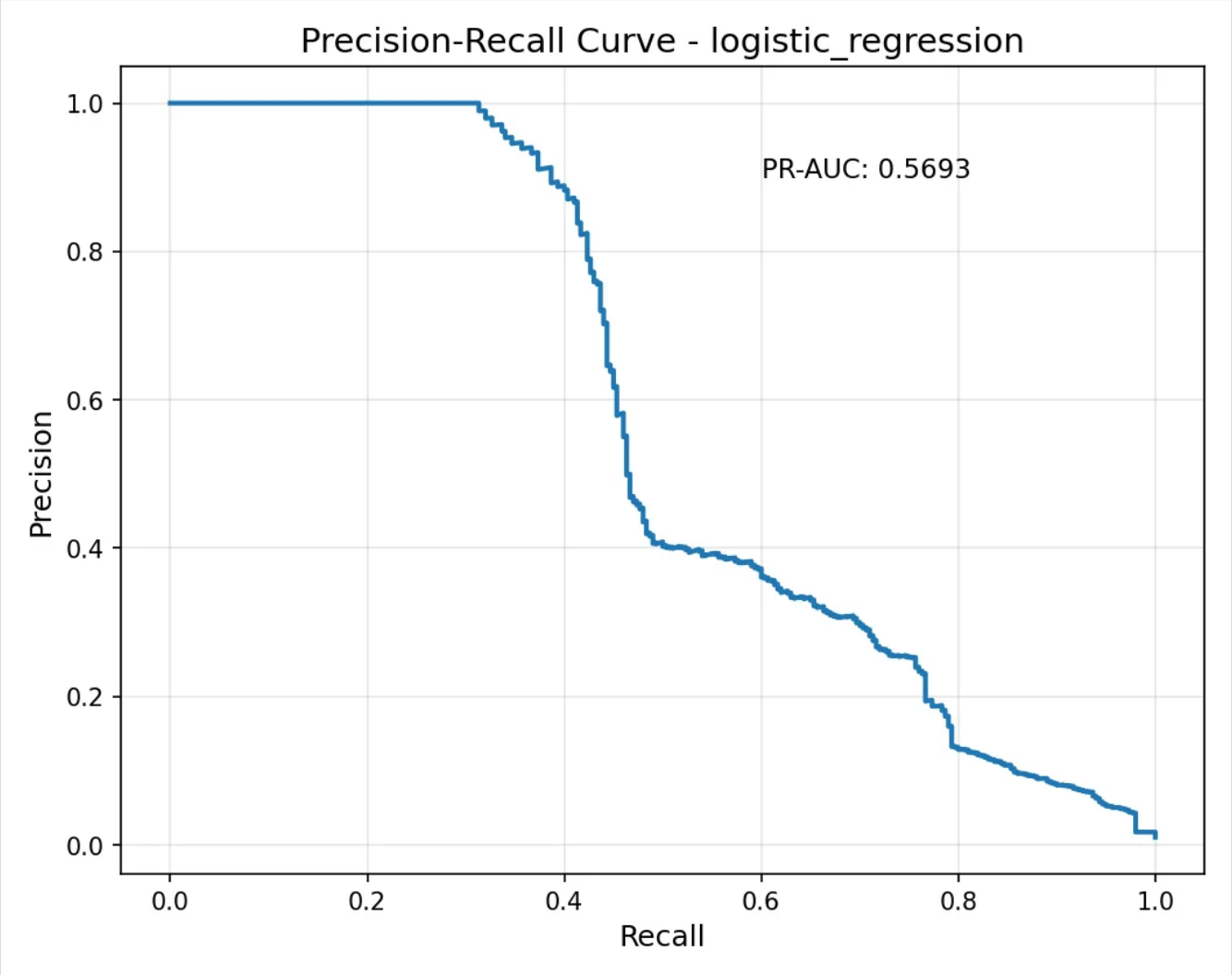
Model Comparison

Test Set Performance

Model	PR-AUC	ROC-AUC	Precision	Recall	F1	Training Time (s)
Baseline (Z-score)	[0.0443]	[0.8332]	[0.0432]	[0.73]	[0.0815]	N/A
Logistic Regression	[0.5693]	[0.9632]	[0.1536]	[0.7933]	[0.2574]	[5.3min]
XGBoost	[0.0895]	[0.8556]	[0]	[0]	[0]	[8.1s]

Visualizations

4.1 Precision-Recall Curves



Confusion Matrix