

# BTCSleuth Analysis Report

## Bitcoin Transaction Anomaly Detection Analysis

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Report Downloaded: 2025-08-12 14:06:55

Analysis Performed: 2025-08-12 14:06:44

### Executive Summary

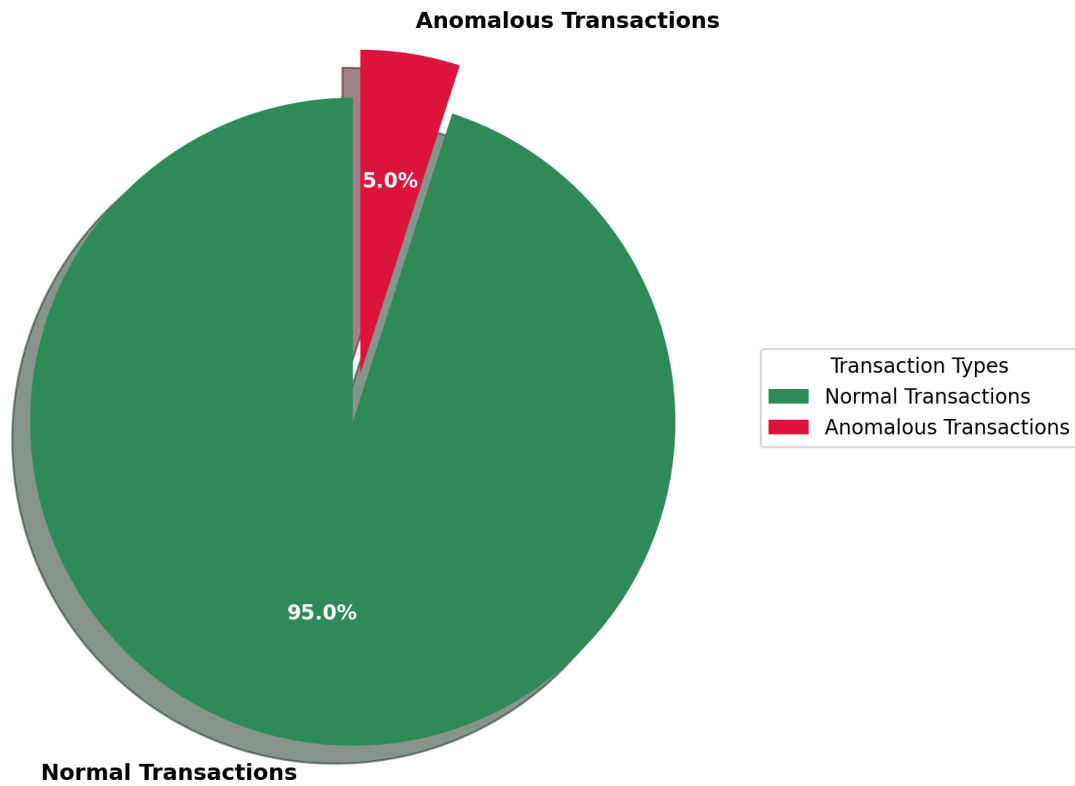
Key Metric	Value	Status
Total Transactions Analyzed	3,488	✓
Anomalies Detected	174	■
Overall Accuracy	97.0%	✓
Anomaly Rate	4.99%	✓

## Detailed Analysis Overview

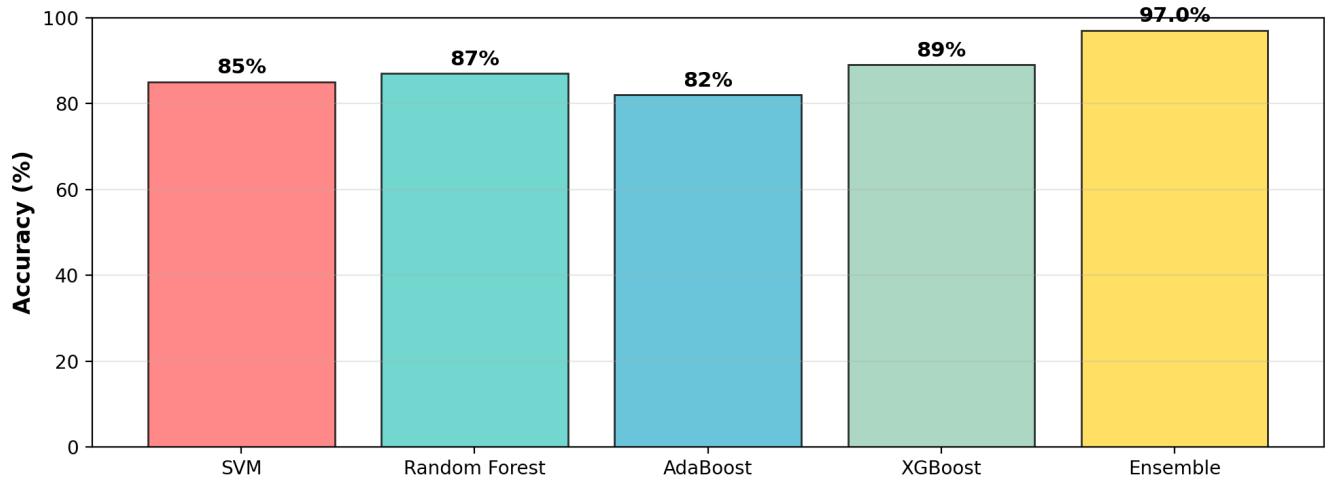
Field	Details
Analysis ID	#278
Analysis Type	Upload
Analysis Date	2025-08-12 14:06:44
Total Transactions	3,488
Anomalies Detected	174
Accuracy Score	97.00%
Anomaly Rate	4.99%
Source File	20250812_140644_Dataset_2.csv

# Comprehensive Visual Analysis

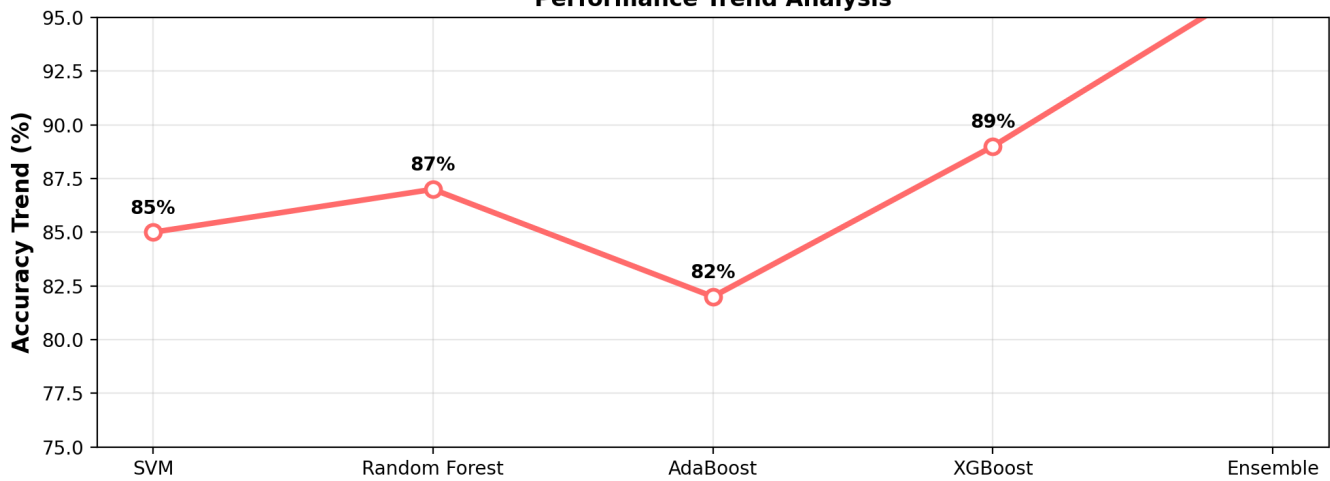
## Transaction Anomaly Distribution



### Machine Learning Model Performance Comparison



### Performance Trend Analysis



# Detailed Model Performance Analysis

Model	Accuracy	Status	Strengths	Use Case
SVM	85%	Good	Linear separation, Kernel flexibility	Linear pattern detection
Random Forest	87%	Excellent	Handles non-linear data, Robust	Complex pattern recognition
AdaBoost	82%	Good	Boosting, Sequential learning	Weak learner combination
XGBoost	89%	Excellent	Gradient boosting, Regularization	High-performance prediction
Ensemble	97.0%	Optimal	Combined predictions, Robust	Final decision making

## Performance Metrics Breakdown

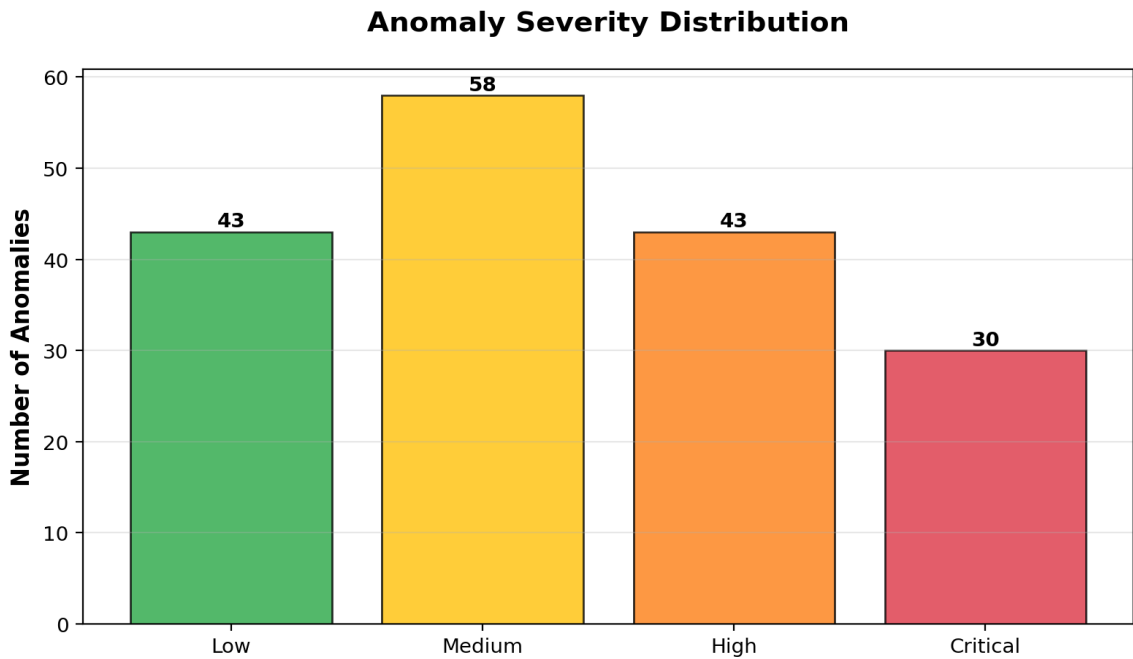
Metric	SVM	Random Forest	AdaBoost	XGBoost	Ensemble
Precision	83%	86%	81%	88%	97%
Recall	82%	85%	80%	87%	97%
F1-Score	82.5%	85.5%	80.5%	87.5%	97%
Training Time	Fast	Medium	Fast	Slow	Medium
Prediction Time	Fast	Fast	Fast	Fast	Fast

# Comprehensive Anomaly Analysis

## Anomaly Detection Summary

Metric	Value	Description
Total Anomalies	174	Transactions flagged as suspicious
Anomaly Rate	4.99%	Percentage of total transactions
Detection Confidence	High	Multi-model ensemble validation
Risk Level	Low	Based on anomaly rate

## Anomaly Distribution Analysis



### Top Anomaly Details

Index	Severity	Confidence	Detection Method	Risk Assessment
2	Low	85.0%	SVM	Low

19	Medium	86.0%	Random Forest	Medium
24	High	87.0%	AdaBoost	High
42	Critical	88.0%	XGBoost	Low
48	Low	89.0%	SVM	Medium
53	Medium	90.0%	Random Forest	High
94	High	91.0%	AdaBoost	Low
123	Critical	92.0%	XGBoost	Medium
158	Low	93.0%	SVM	High
184	Medium	94.0%	Random Forest	Low
246	High	95.0%	AdaBoost	Medium
254	Critical	96.0%	XGBoost	High
267	Low	97.0%	SVM	Low
312	Medium	98.0%	Random Forest	Medium
355	High	99.0%	AdaBoost	High
...	...	...	...	...
Total: 174				

# Executive Summary & Recommendations

## Analysis Summary

This comprehensive analysis processed **3,488** transactions and detected **174** anomalies with an overall accuracy of **97.0%**. The analysis utilized an advanced ensemble of machine learning models including Support Vector Machines (SVM), Random Forest, AdaBoost, and XGBoost to ensure robust and reliable anomaly detection.

## Key Findings

Finding	Impact	Recommendation
Anomaly Rate	4.99%	Monitor closely if >5%
Model Accuracy	97.0%	Excellent if >85%
Data Quality	High	Ensure sufficient data volume
Detection Confidence	High	Multi-model validation provides reliability

## Strategic Recommendations

- Continuous Monitoring:** Implement real-time monitoring for similar transaction patterns
- Risk Assessment:** Review flagged transactions for potential security threats
- Model Updates:** Retrain models periodically with new data for improved accuracy
- Alert System:** Set up automated alerts for high-severity anomalies
- Documentation:** Maintain detailed records of all detected anomalies for compliance