Team Hokkien Mee is Red

DATATHON UM 2024

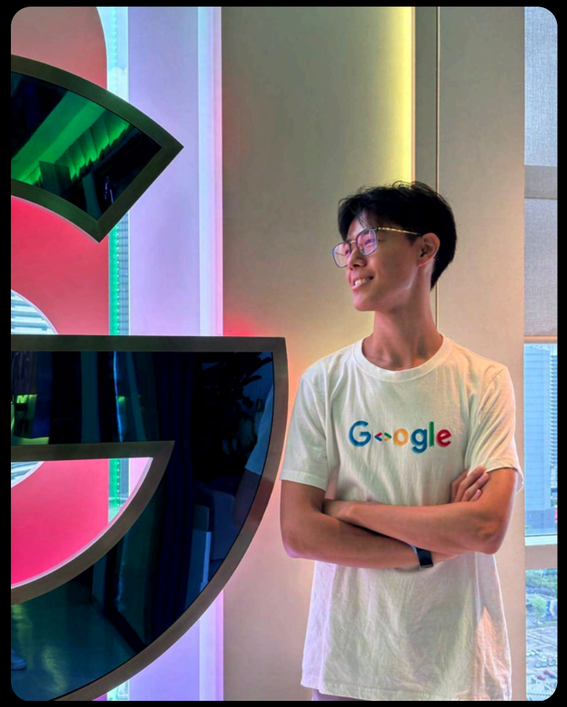


Sim Sze Yu

John Ong Ming Hom

Lei Wing Teng

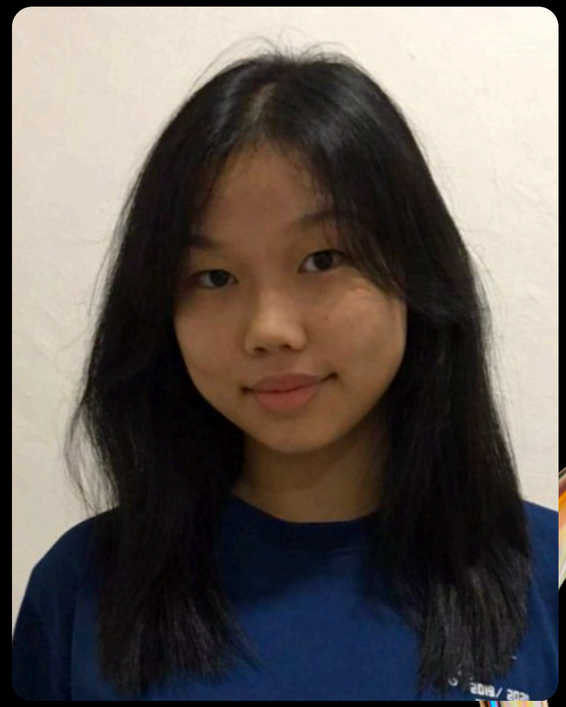
OUR TEAM



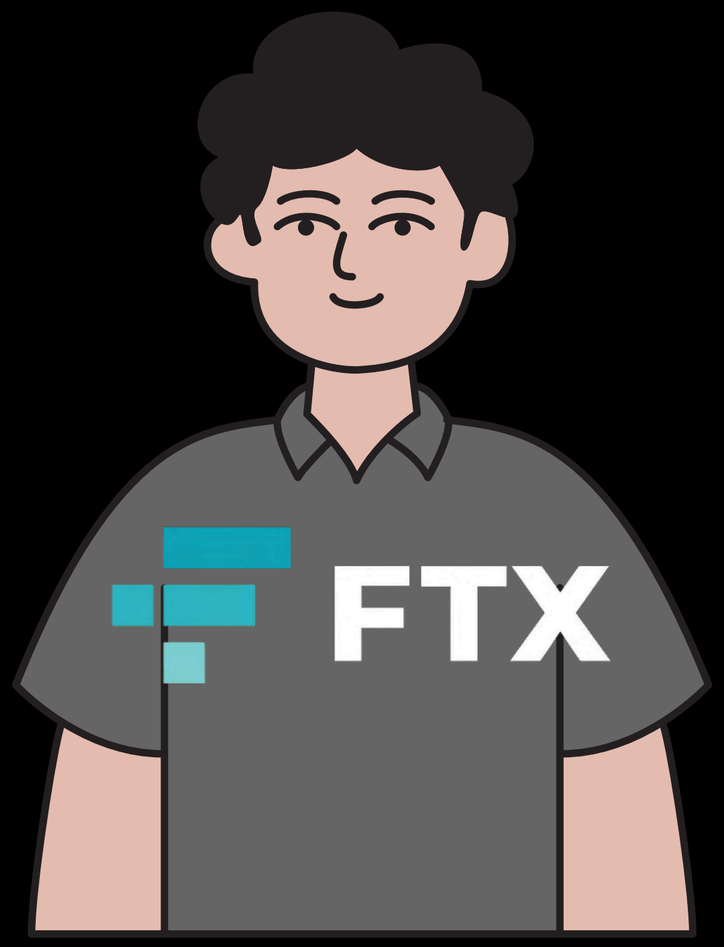
SIM SZE YU



JOHN ONG MING HOM



LEI WING TENG



SAM



BANK MAN



DATA SCIENCE STUDENT



CRYPTO

IDENTIFYING PATTERNS – WHAT MOVES THE PRICE?





RESEARCH QUESTIONS & PROBLEM STATEMENTS

How accurately can we predict the close price using a combination of fundamental, technical, and blockchain-specific features?

Can we identify key factors that contribute to significant hourly price changes or extreme price volatility in crypto markets?

What thresholds must be crossed for maximum profit gain?

OBJECTIVE: CREATE A TRADING STRATEGY THAT IS CONSISTENT IN VIOLATILE CRYPTO MARKET

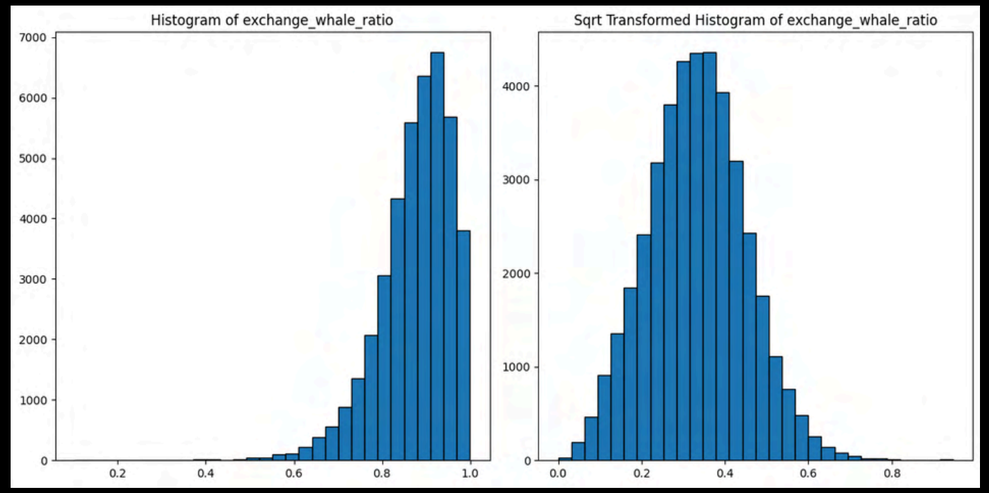
DATA CLEANING

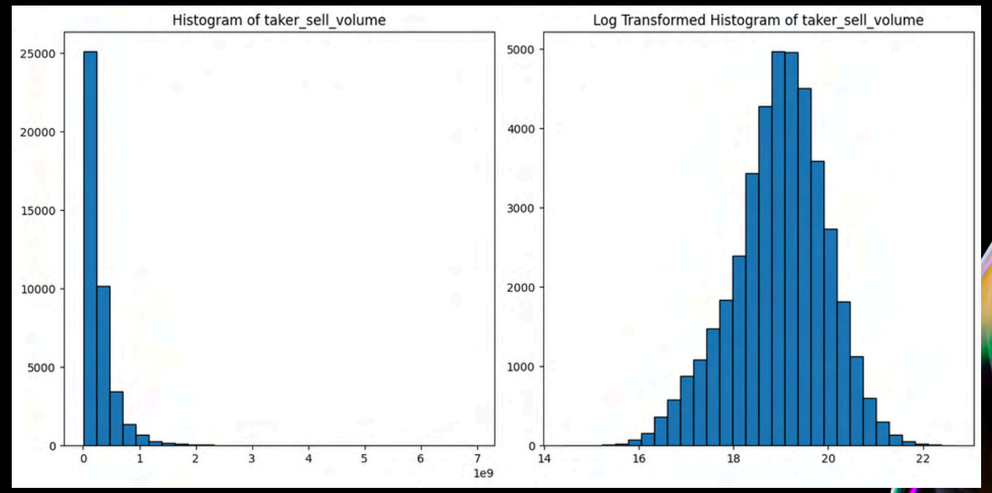
We use linear interpolation to handle null or zero value

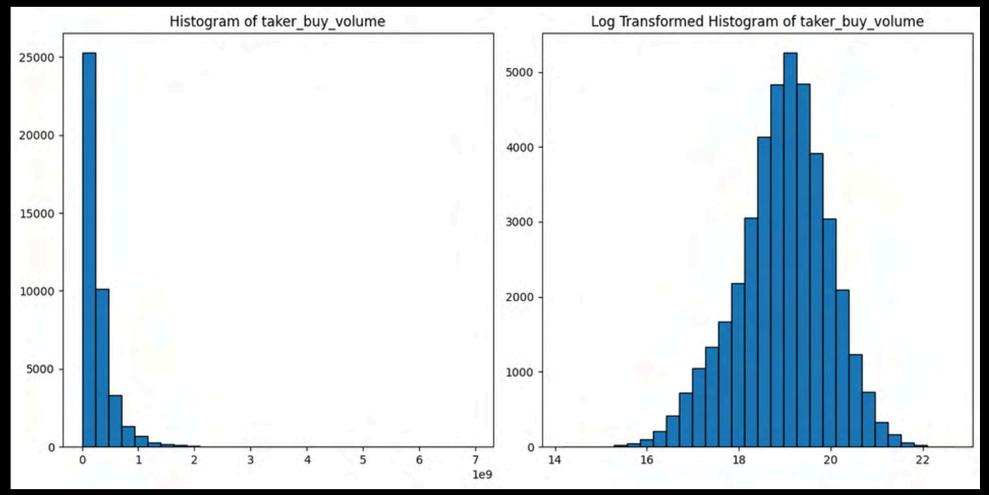
	Null Values	Zero Values
difficulty	93	0
estimated_leverage_ratio	0	0
addresses_count_active	0	93
addresses_count_sender	0	93
addresses_count_receiver	0	93
exchange_whale_ratio	0	93
coinbase_premium_gap	25	13
coinbase_premium_index	25	13
coinbase_premium_gap_usdt_adjusted	25	0
coinbase_premium_index_usdt_adjusted	25	0
transactions_count_inflow	1	93
transactions_count_outflow	1	96
tokens_transferred_total	1	93
tokens_transferred_mean	94	0
tokens_transferred_median	1	93
transactions_count_inflow.1	1	93
transactions_count_outflow.1	1	93
long_liquidations	1	3620
short_liquidations	1	2814
long_liquidations_usd	1	3620
short_liquidations_usd	1	2815

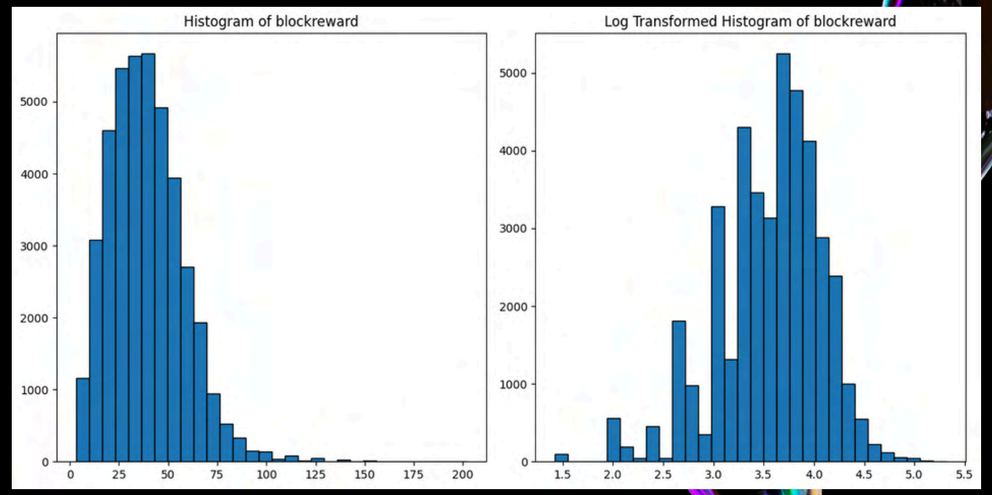
DATA TRANSFORMATION

APPLYING TRANSFORMATION BASED ON SKEWNESS

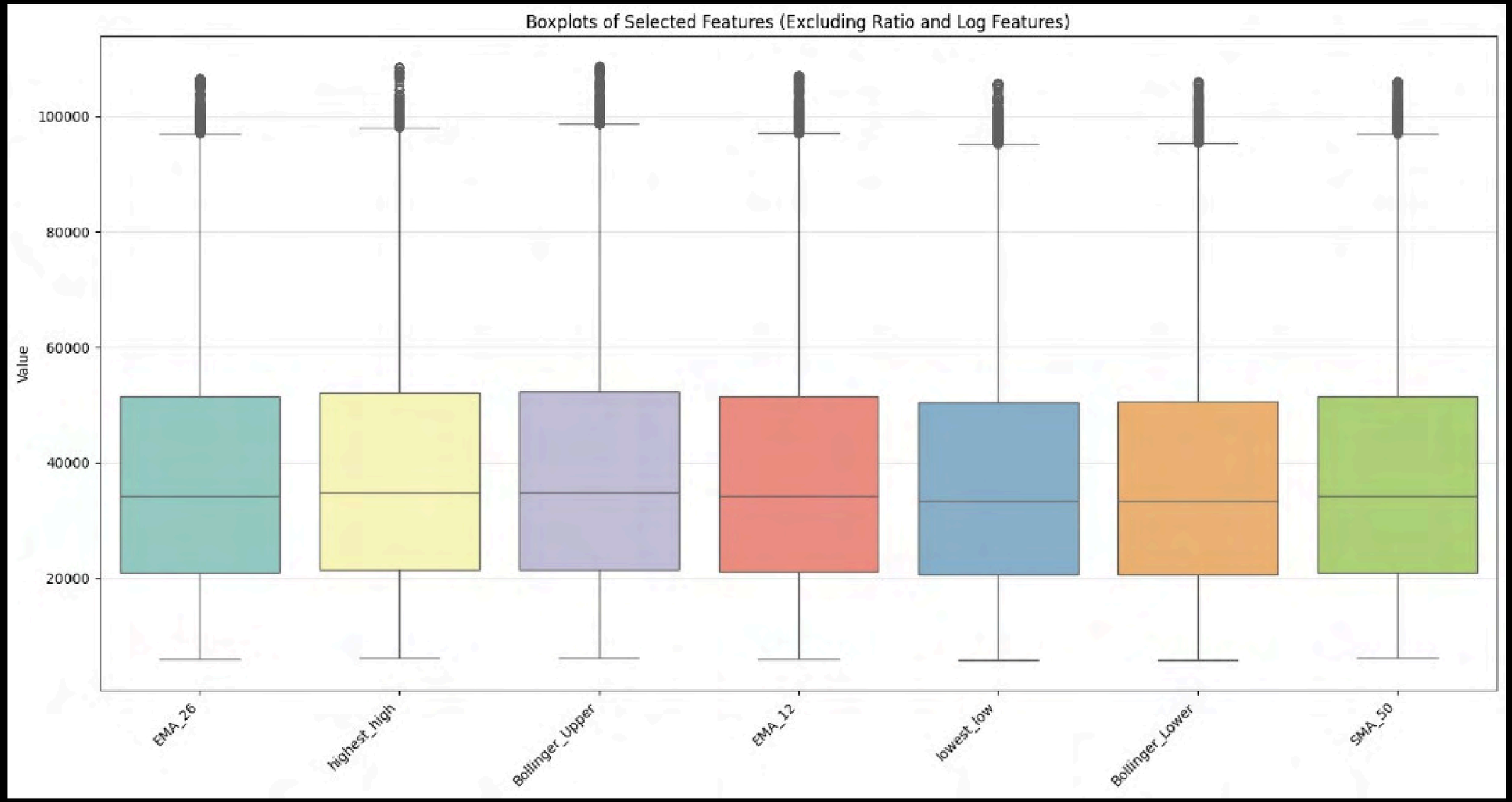








IDENTIFYING OUTLIERS

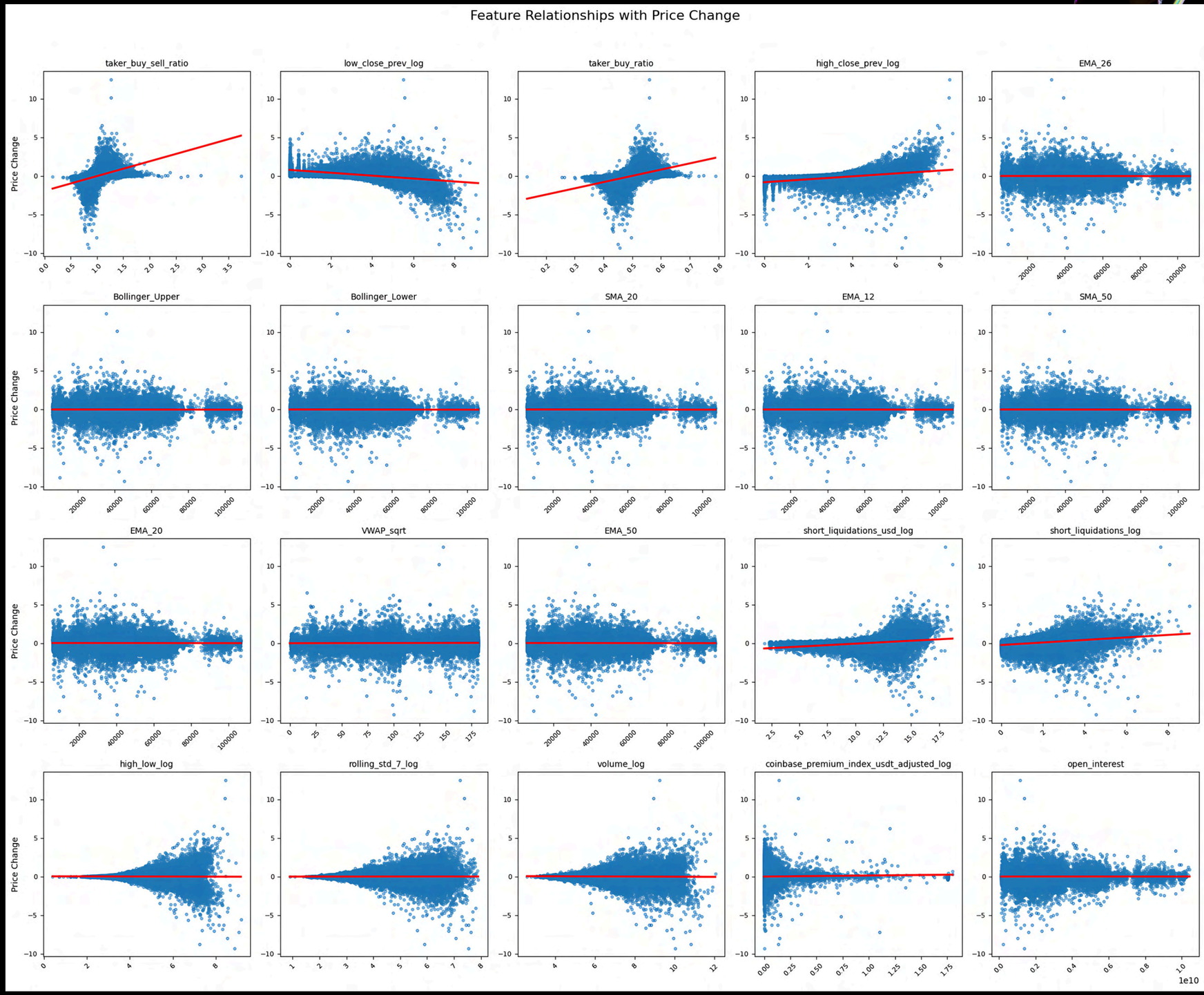


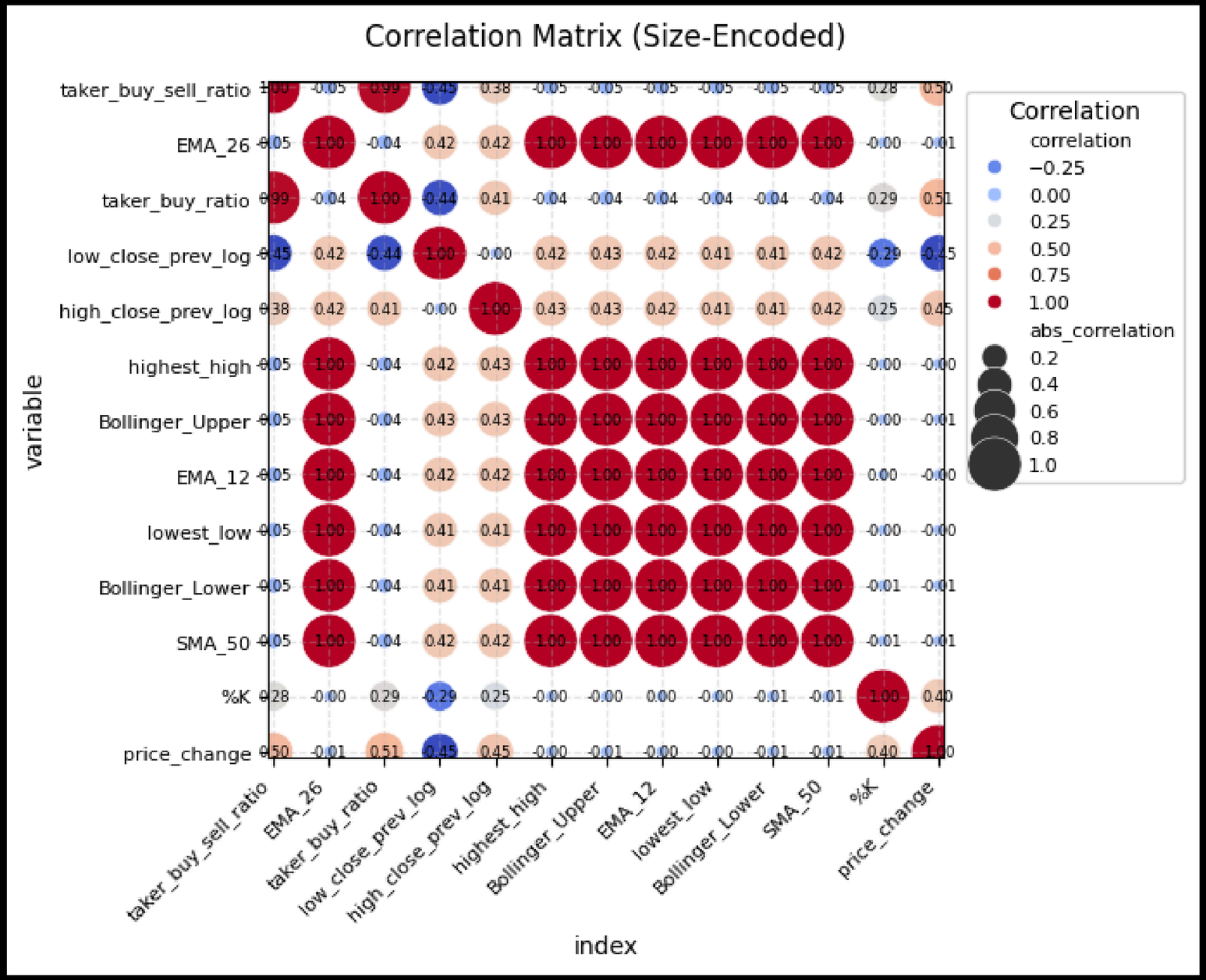
FEATURE ENGINEERING

COMBINING THESE INDICATORS FOR BETTER PREDICTIONS

- RELATIVE STRENGTH INDEX (RSI)
- MOVING AVERAGE CONVERGENCE DIVERGENCE
- BOLLINGER BANDS
- VOLUME WEIGHTED AVERAGE PRICE (VWAP)
- AVERAGE TRUE MEAN (ATR)
- ON-BALANCE VOLUME (OBV)
- MOVING AVERAGE
- VOLATILITY
- STOCHASTIC OSCILLATOR
- MONEY FLOW INDEX
- WHALE TRANSACTION RATIO
- PRICE MOMENTUM

FEATURE RELATIONSHIPS WITH PRICE CHANGE





CORRELATION MATRIX

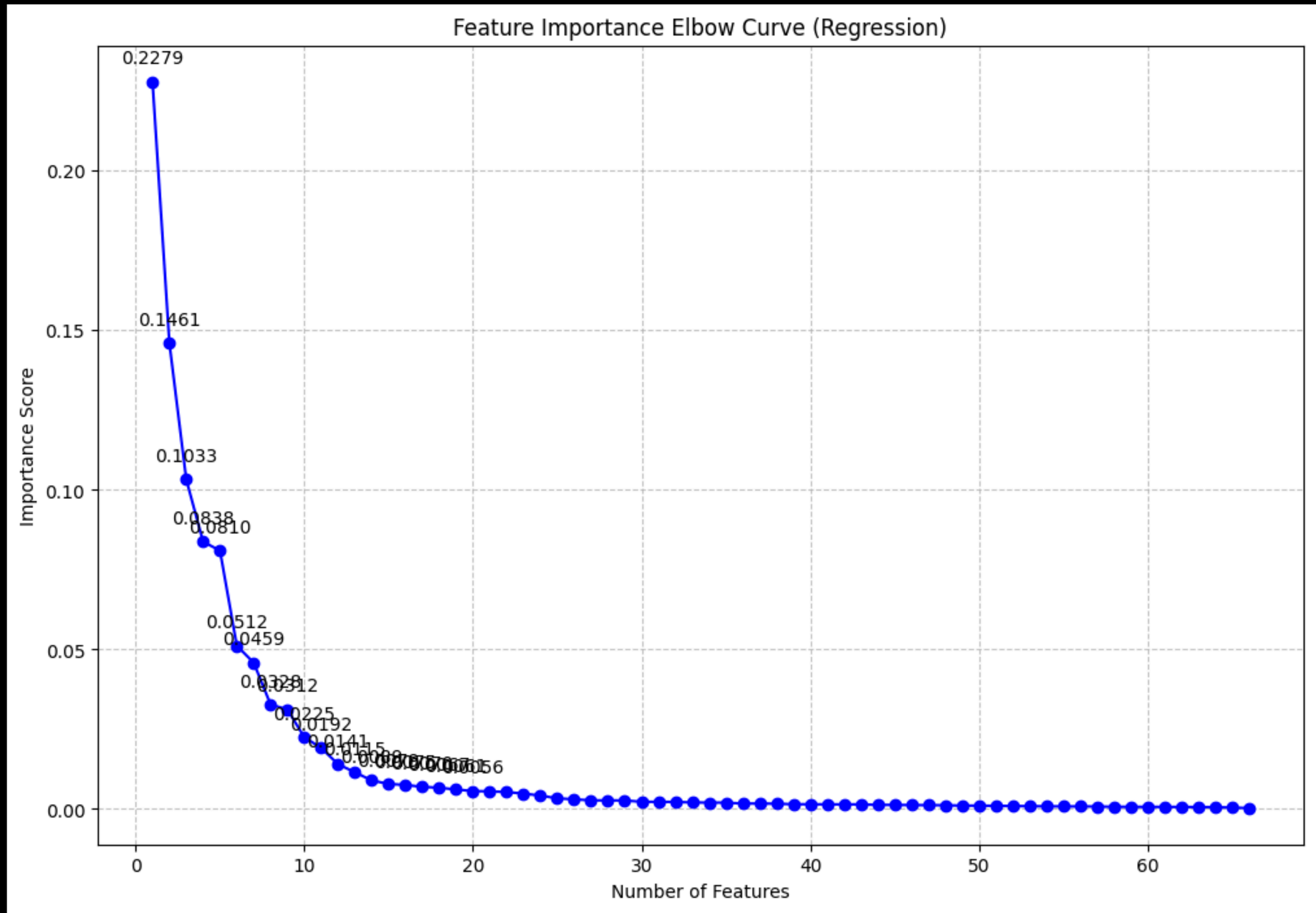
Volume and Taker Buy/Sell Ratios show moderate correlations with price change, suggesting their potential as predictors.

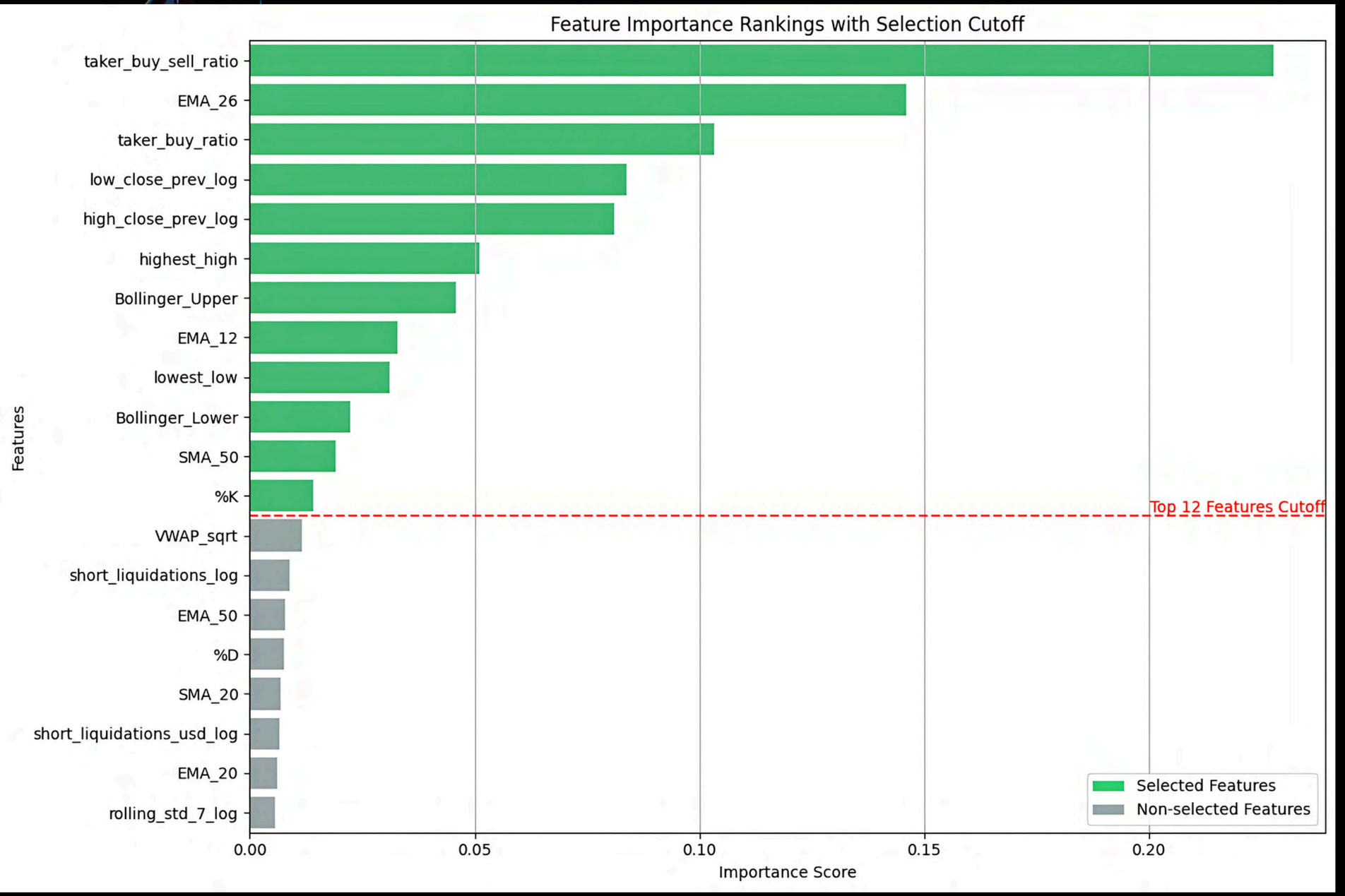
EMA_26 and EMA_12 are highly correlated, as well as Bollinger Upper and Bollinger Lower.

FEATURE IMPORTANCE ELBOW CURVE

Elbow
(Feature Importance Score Gain plateaus)

Optimal no. of features,
n = 12



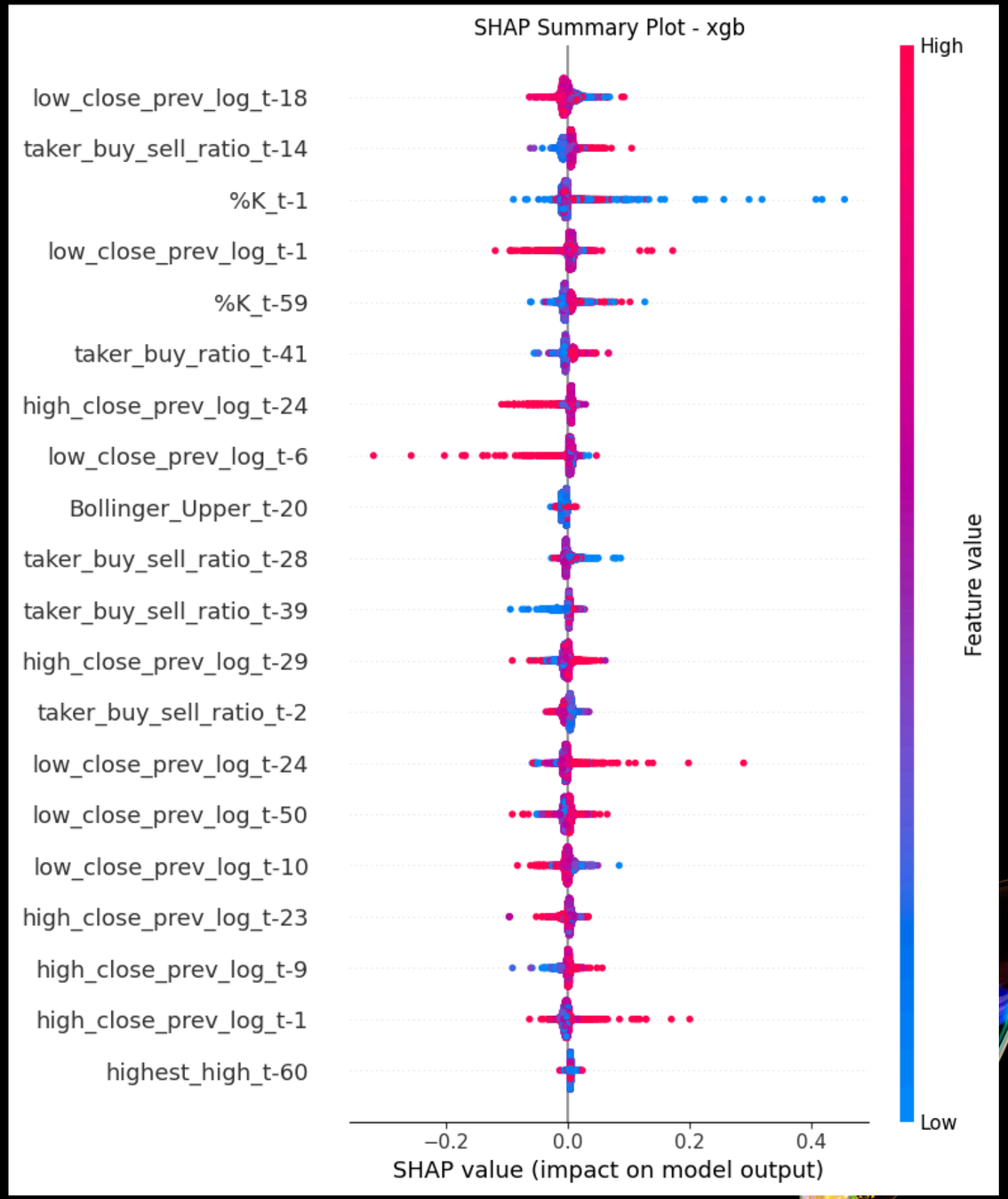


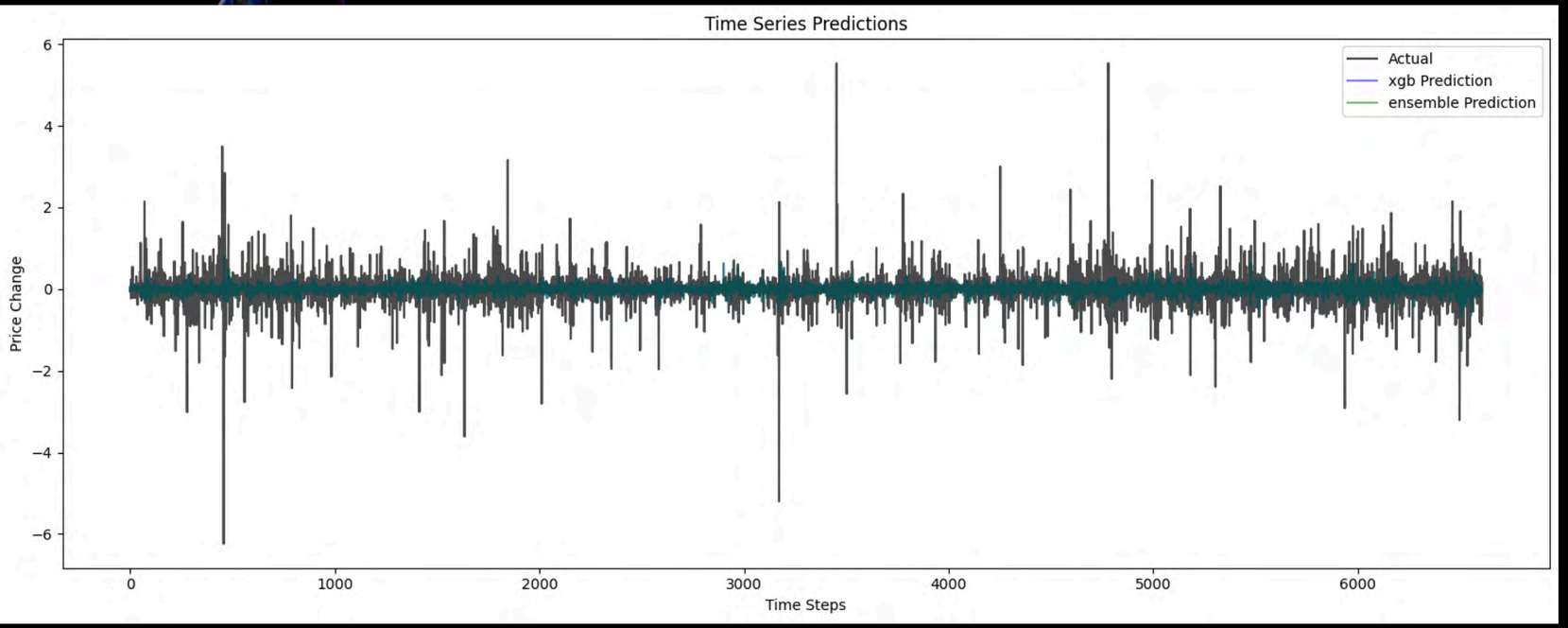
FEATURE SELECTION

Importance score plateaus at n=12

FEATURE IMPORTANCE

- Short liquidations have a strong impact, especially at recent time steps.
- Features with time lags are highly influential, highlighting the importance of time-series characteristics in model performance.





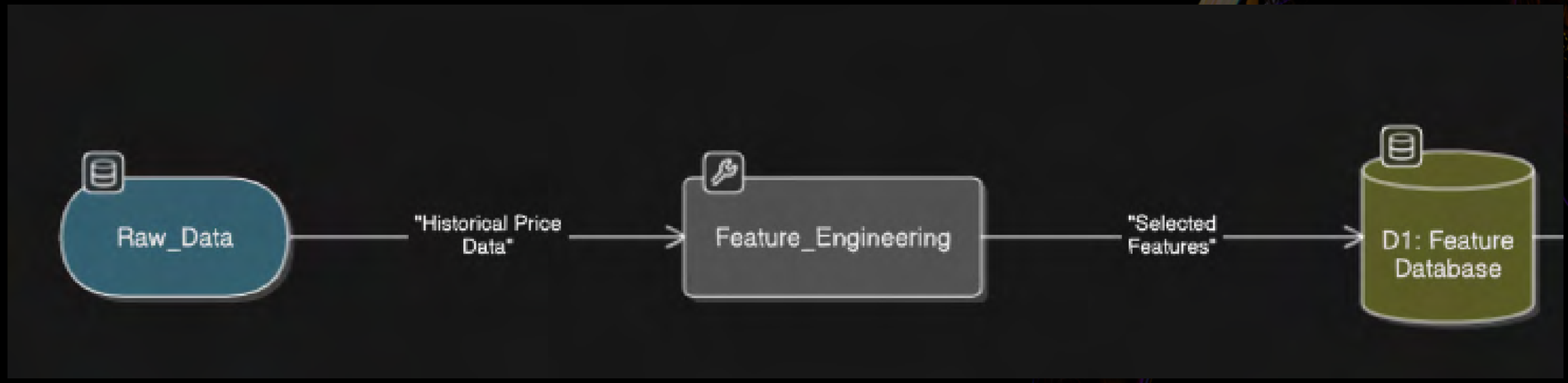
PREDICTIVE MODELLING USING XGBOOST

80% Training 20% Testing

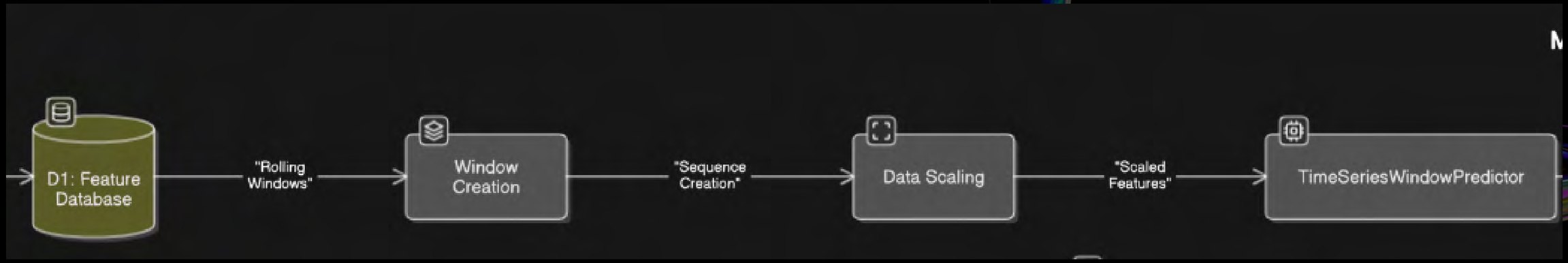
Why XGBoost?

- Non-linear relationships
- Handle many features
- Handle missing data well
- Regularization prevents overfitting

DATA PIPELINE



Create More Features and Select Relevant Features

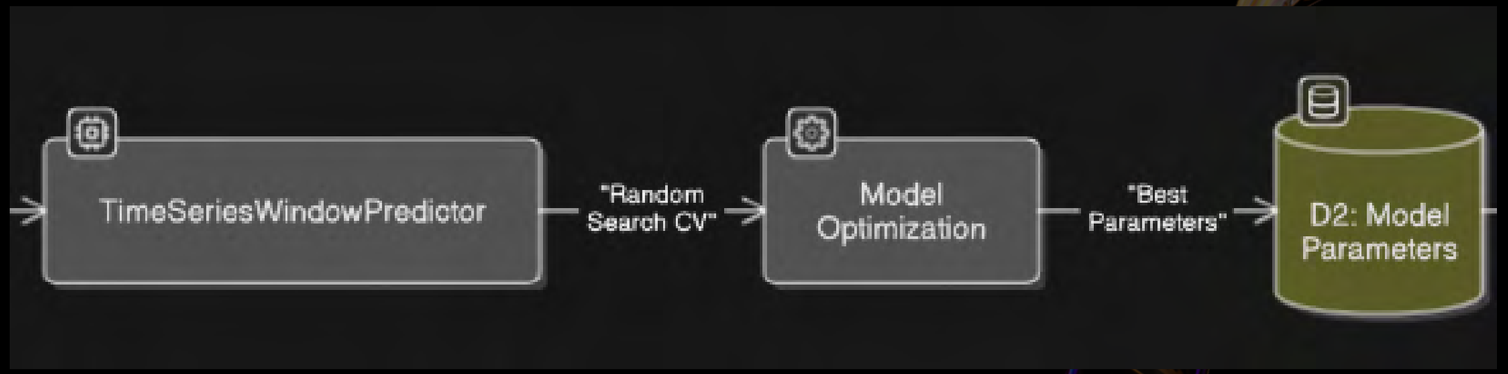


Create 60 hours sliding windows to predict next hour price change

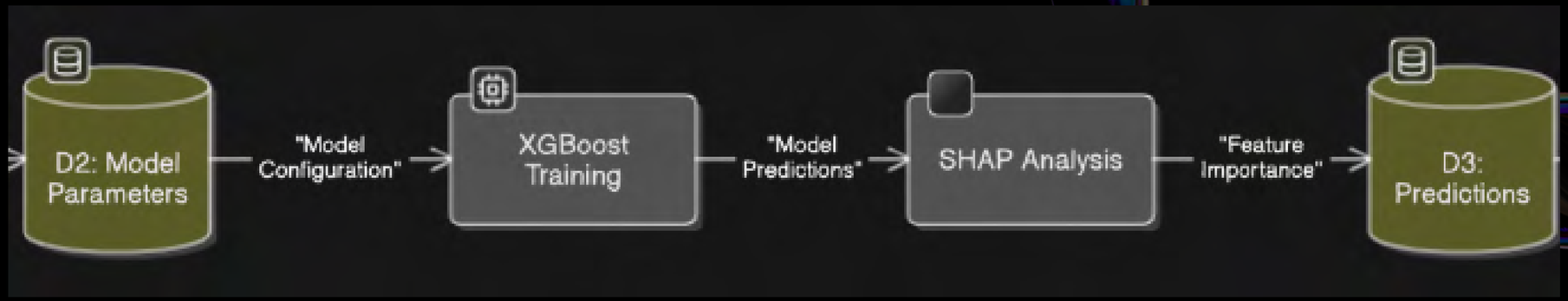
X = 60 hours data;

y (target) = next hour price change

ML MODEL ARCHITECTURE

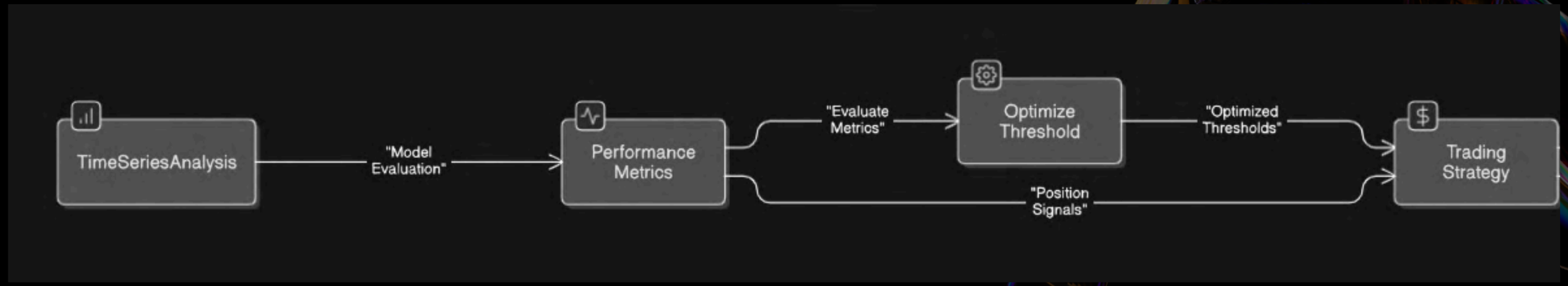


Fine tune Hyperparams of XGBoost Regressor Using Random Search CV

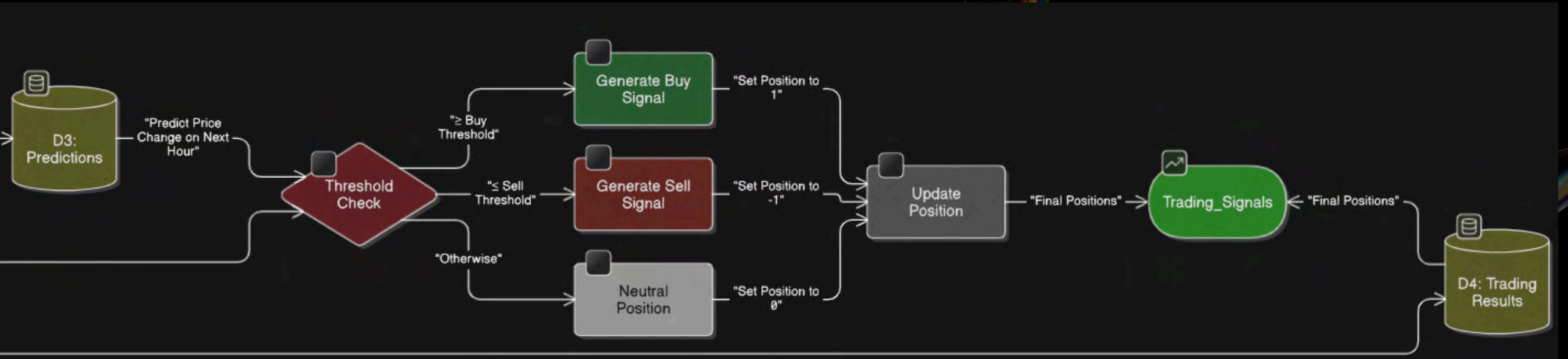


Model is Ready to Predict the Next hour Price Change

ML MODEL ARCHITECTURE



Find the Best Buy and Sell Threshold (based on price change)

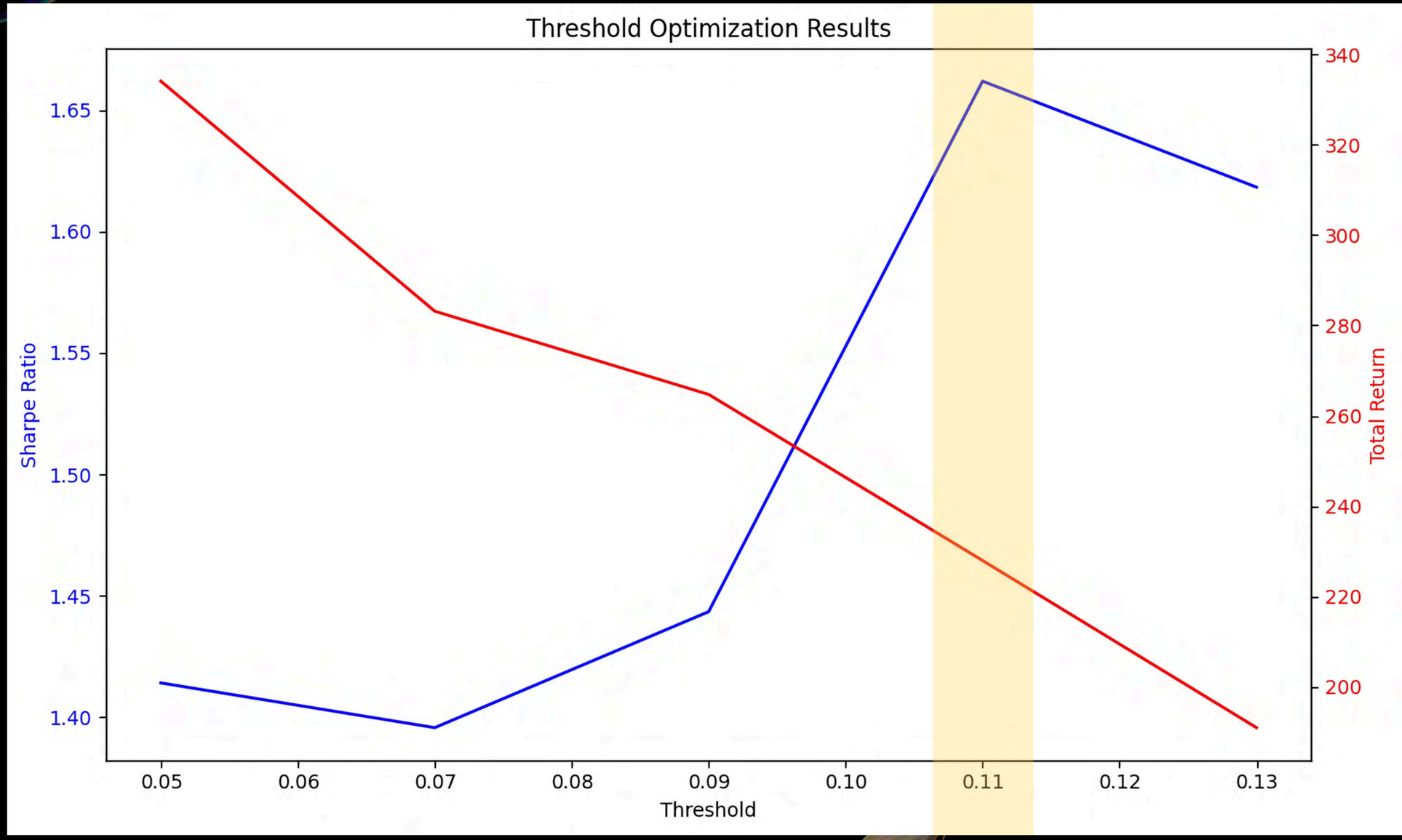


> Buy Threshold = Buy; < Sell Threshold = Sell; else Neutral

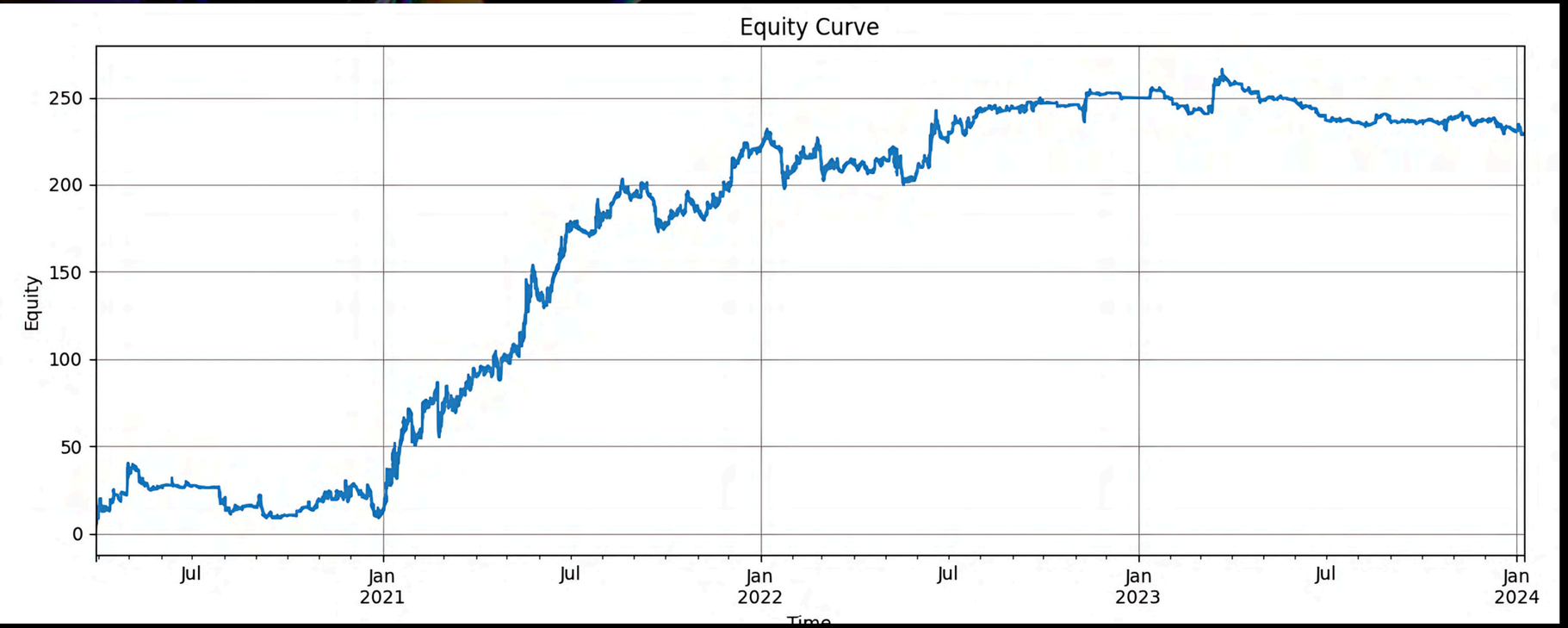
TRADING SIMULATION

Best Sharpe ratio:
1.66

Best Buy Threshold= 0.110,
Best Sell Threshold = -0.110



BACKTEST PERFORMANCE RESULTS



Trading Statistics:

Total Return: 227.93%

Sharpe Ratio (Annualized): 1.66

Max Drawdown: -0.78%

Win Rate: 23.17%

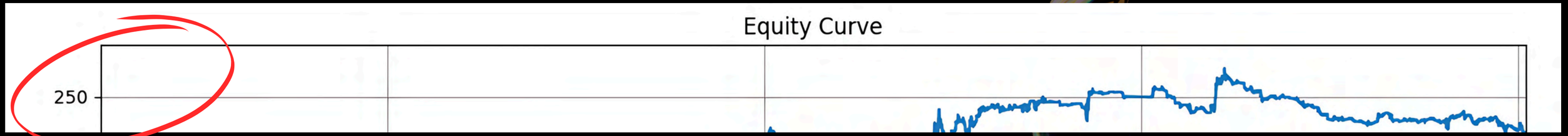
Total Number of Trades: 15498

Total Trading Fees: 3.0996

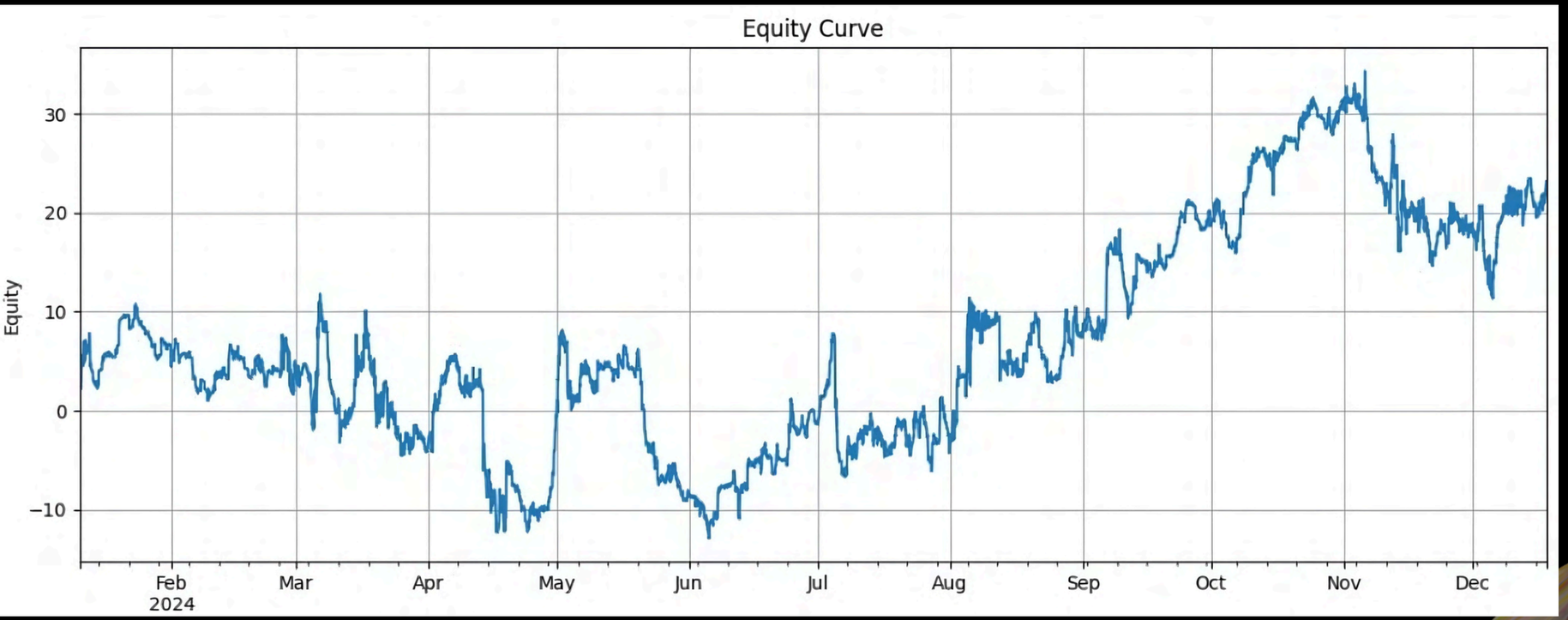
Trading Period (hours): 33099

Trades per Hour: 0.4682

Profit Factor: 1.08



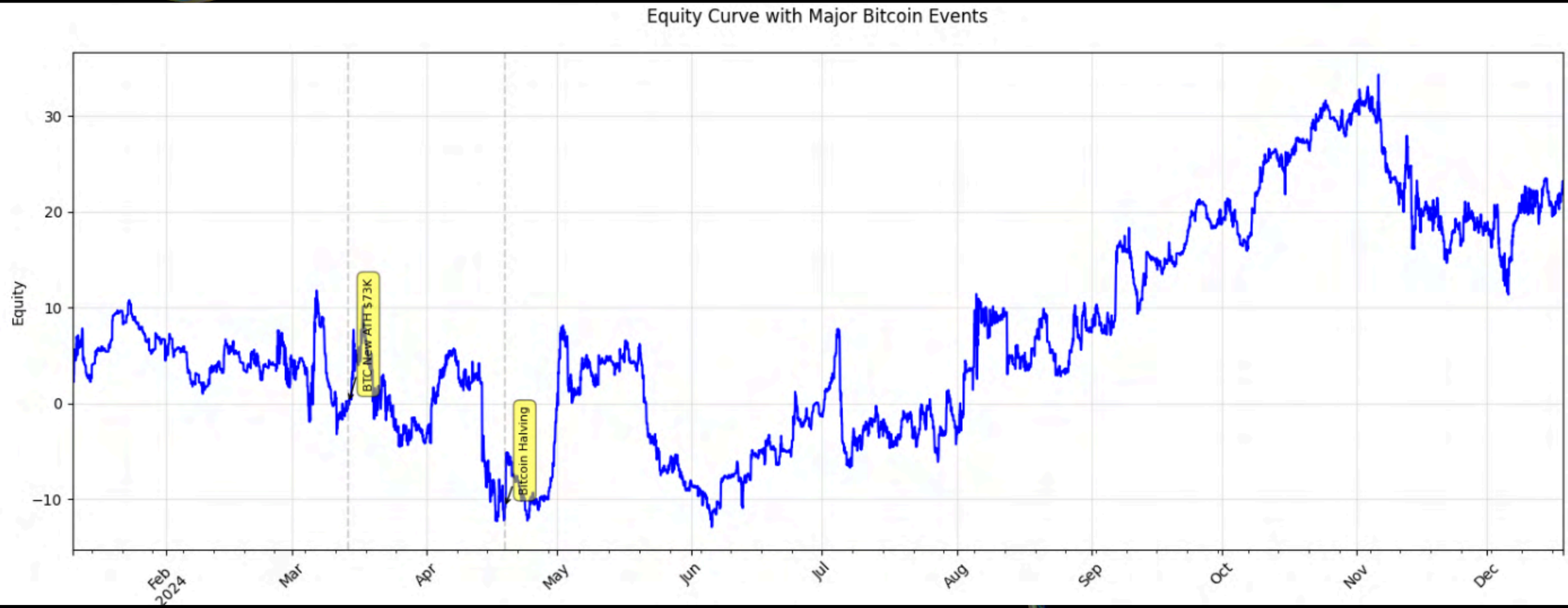
FORWARD TEST



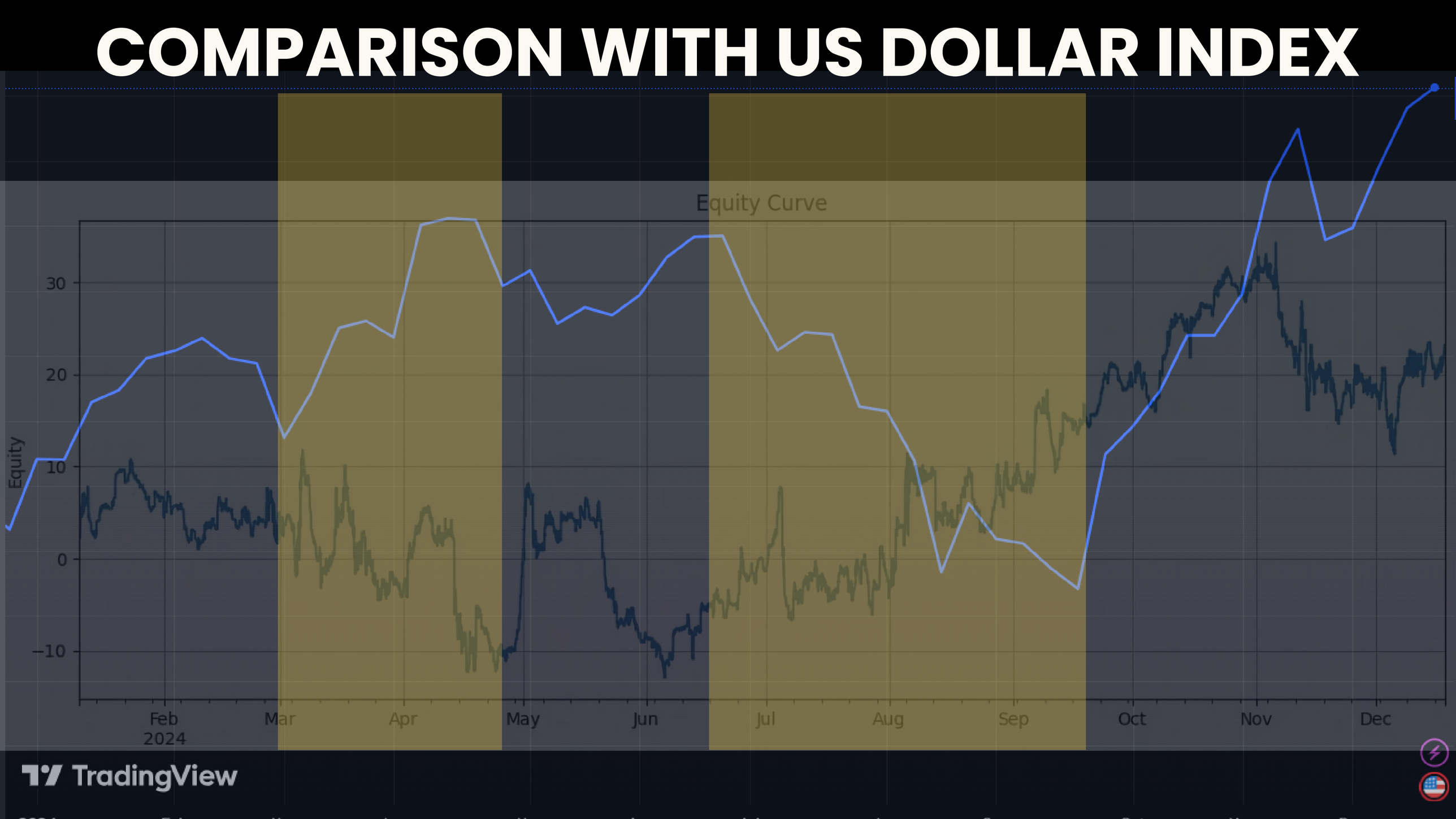
Trading Statistics:

Total Return: 21.75%
Sharpe Ratio (Annualized): -1.00
Max Drawdown: -2.10%
Win Rate: 37.18%
Total Number of Trades: 5726
Total Trading Fees: 1.1452
Trading Period (hours): 8230
Trades per Hour: 0.6957
Profit Factor: 1.03

BITCOIN MAJOR EVENTS LABEL (FORWARD TEST)



COMPARISON WITH US DOLLAR INDEX



THANK YOU

Sam believes he is on the path to becoming a bitcoin milionaire



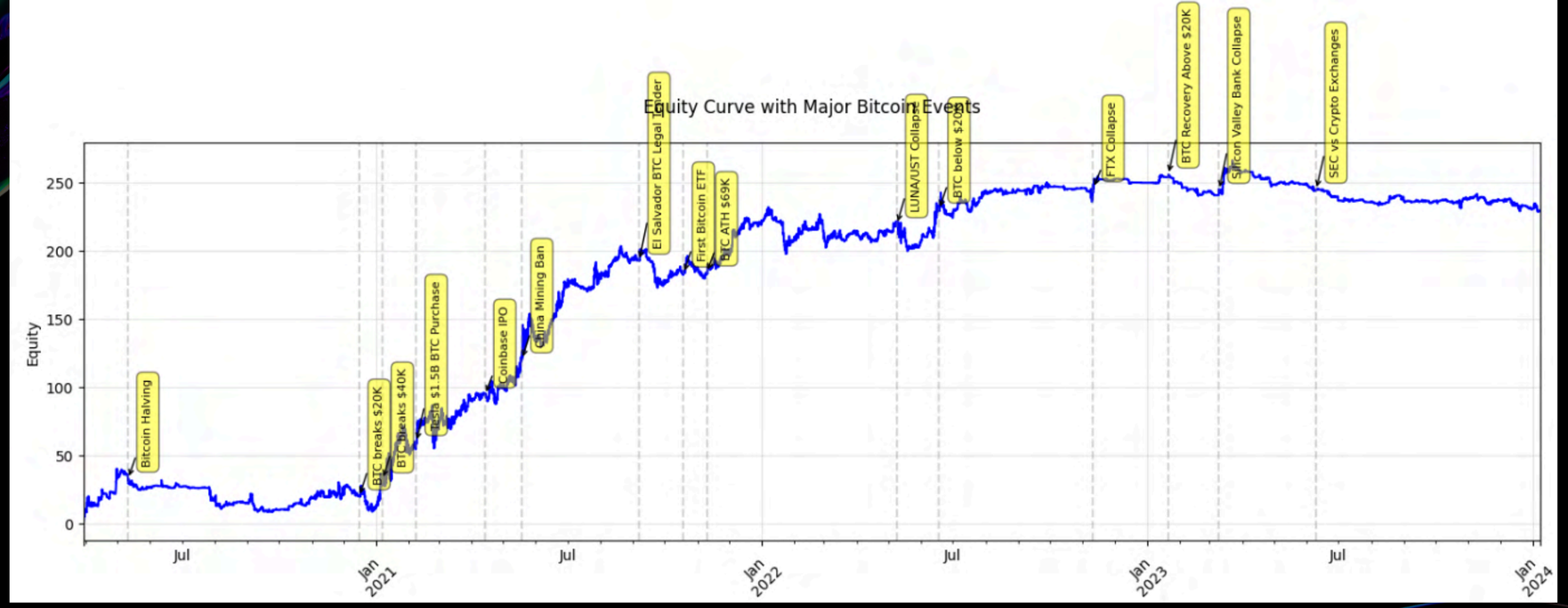
Team Hokkien Mee is Red

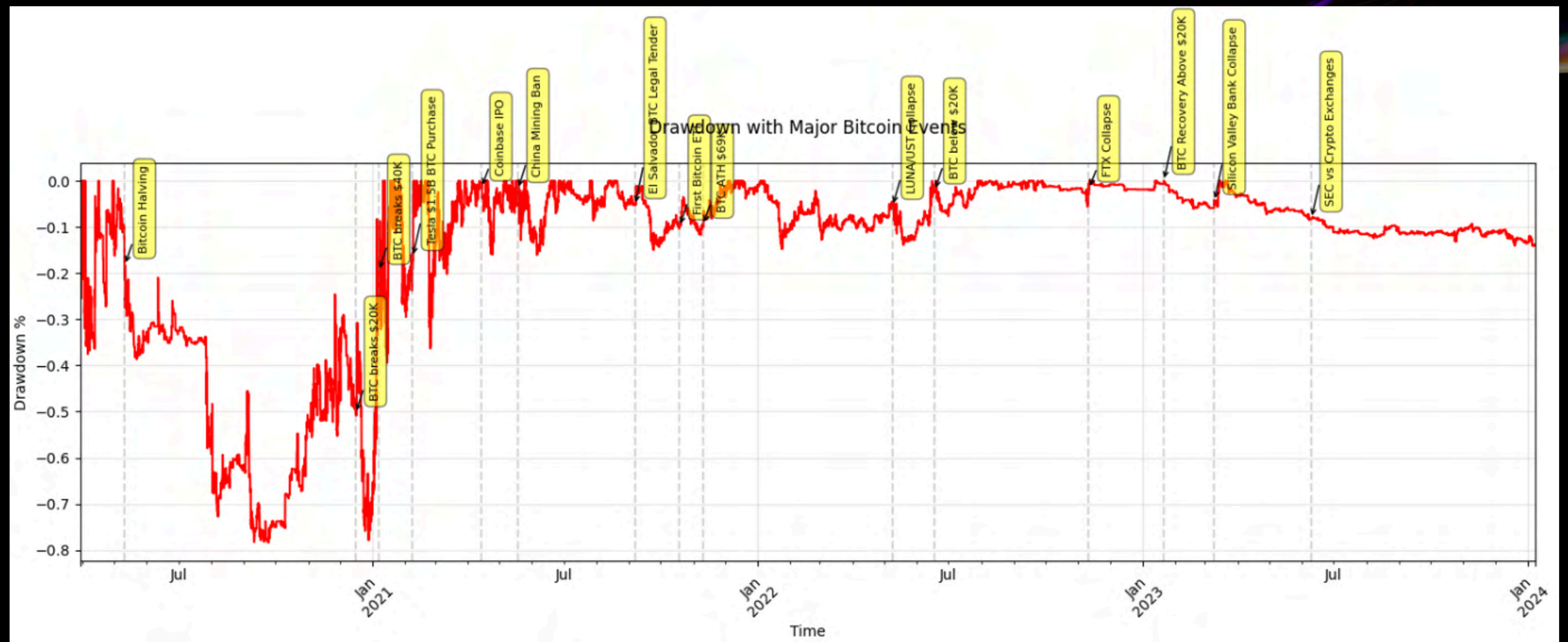
Q&A

DASHBOARD

COLAB

BACK TEST (LABEL)





FORWARD TEST (LABEL)

