

SOCIAL AND TECHNICAL ANALYSIS

CRYPTOCURRENCY INVESTMENTS

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Cryptocurrency Investments

TOPIC OUTLINE

- Problem Identification
- Data Source
- Data Cleaning
- Exploratory Data Analysis
- Preprocessing
- Modeling





Problem Identification

CRYPTOCURRENCY COINS

Cryptocurrency coins are digital assets designed to work as a medium of exchange where ownership records are transactions stored in a blockchain ledger.

SHORT-TERM INVESTMENTS

Identify buy, hold and sell opportunities for short-term holding periods by leveraging technical analysis and social media metrics to predict the price trend for the next 7 days.

Data Source

LunarCRUSH

Cryptocurrency focused platform that delivers community insights to investors, funds, and exchanges.

Assets API provides overall metrics and time series metrics for multiple cryptocurrency coins.

Technical Analysis Metrics/Indicators

TA-Lib is a widely used Python library used by trading software developers to perform technical analysis of financial market data.



Data Cleaning

HIGHLIGHTS



MISSING VALUES

Most metrics were missing values at the beginning of the time series between 27-41 days between Aug - Oct 2019.

NEW METRICS

Social media sources such as Medium and YouTube were only populated from Feb 2020 forward.

DISCONTINUED METRICS

Several metrics were no longer populated or populated with a static value so these were removed. Reddit metrics were removed in July 2021.

REPLACE MISSING VALUES

Only 1 metric had missing values so these were interpolated based on the values before and after.

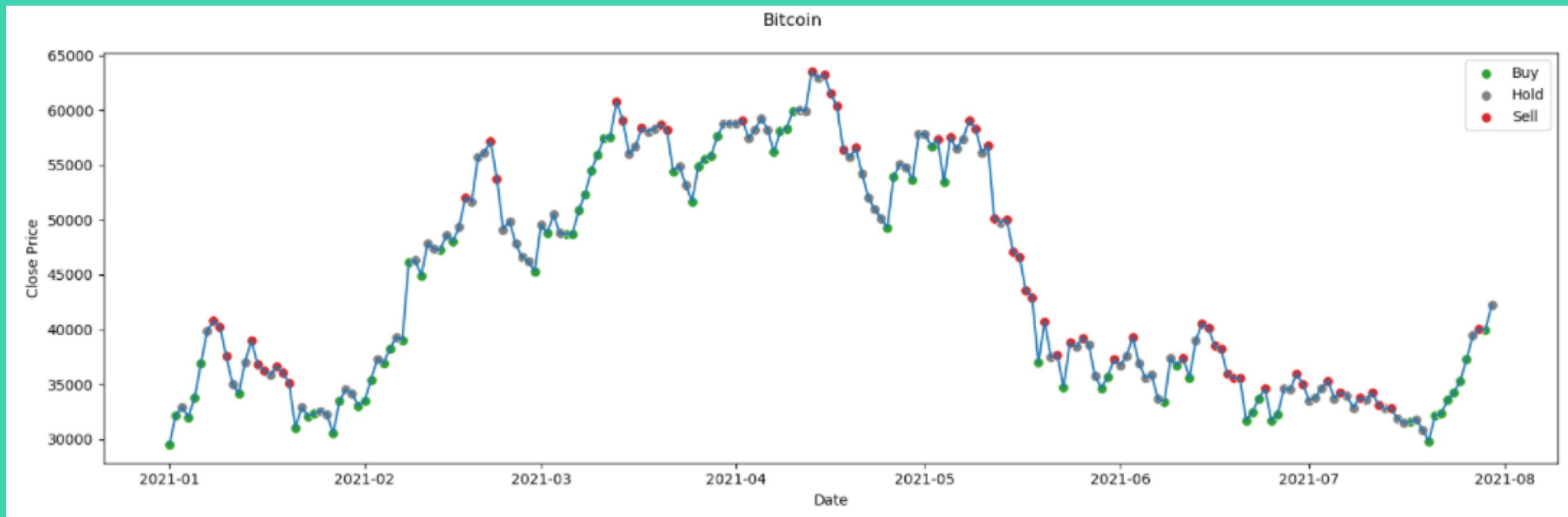
Exploratory Data Analysis

TECHNICAL AND SOCIAL ANALYSIS

Trend Detection

BUY/HOLD/SELL INVESTMENT DECISION

- Buy at the bottom and as the price is on an upward trend
- Sell at the top and as the price is on a downward trend
- Hold when there is trend direction uncertainty



TECHNICAL ANALYSIS

Term used to evaluate investments and identify trading opportunities based on trends and patterns.

Technical Analysis Categories

OVERLAP STUDIES

Moving Averages:
Simple
Exponential
Weighted

Bollinger Bands

MOMENTUM INDICATORS

Relative Strength Index

Moving Average Convergence Divergence (MACD)

Directional Movement Price Oscillators

STATISTICS

Correlation

Linear Regression

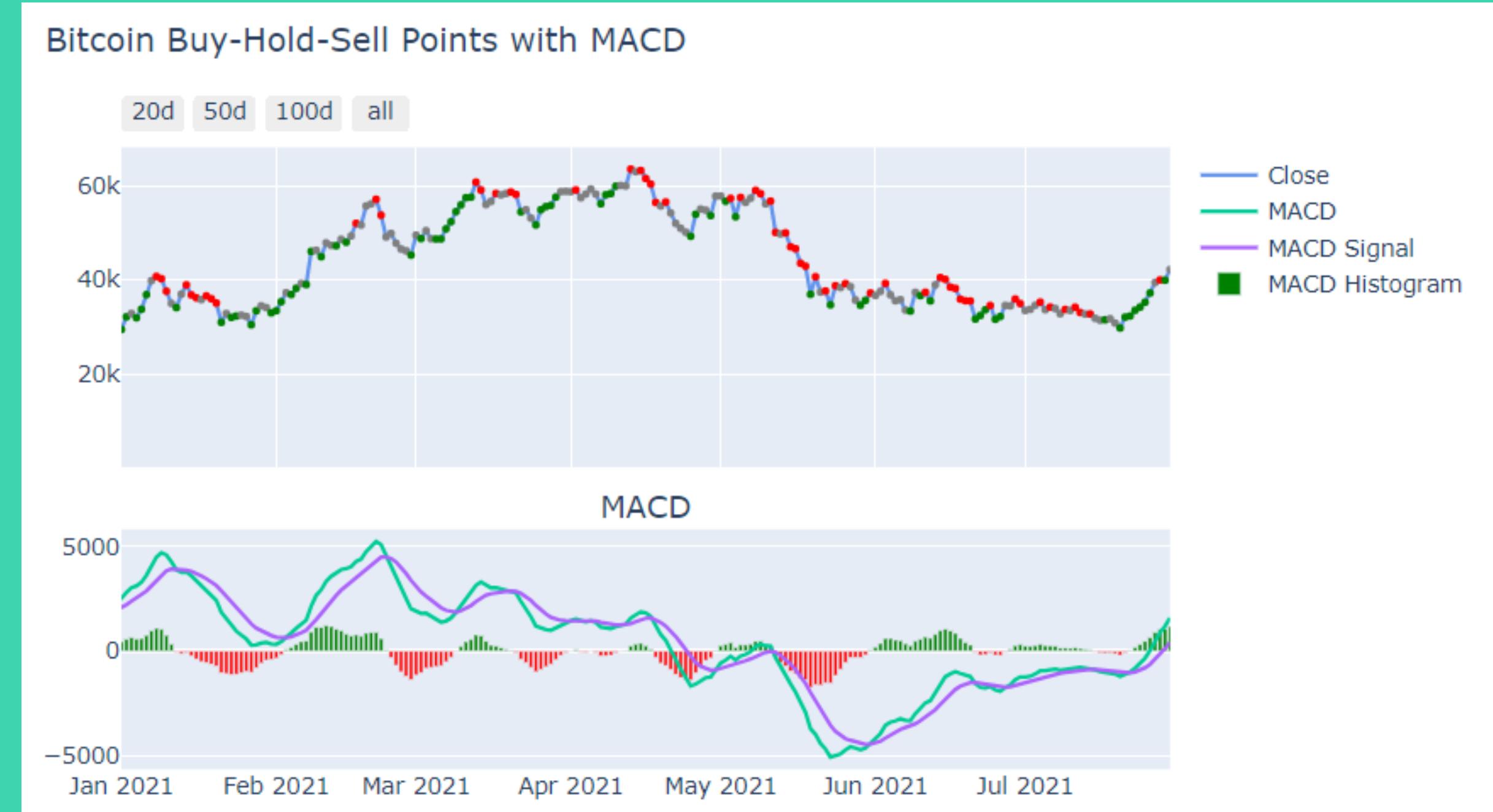
Standard Deviation

MACD

Moving average convergence divergence is a trend following momentum indicator based on moving averages.

The MACD line crosses above the MACD Signal is a bullish sign with potential buy opportunities.

The market will eventually go bearish and drive the MACD back below the signal from a selloff.

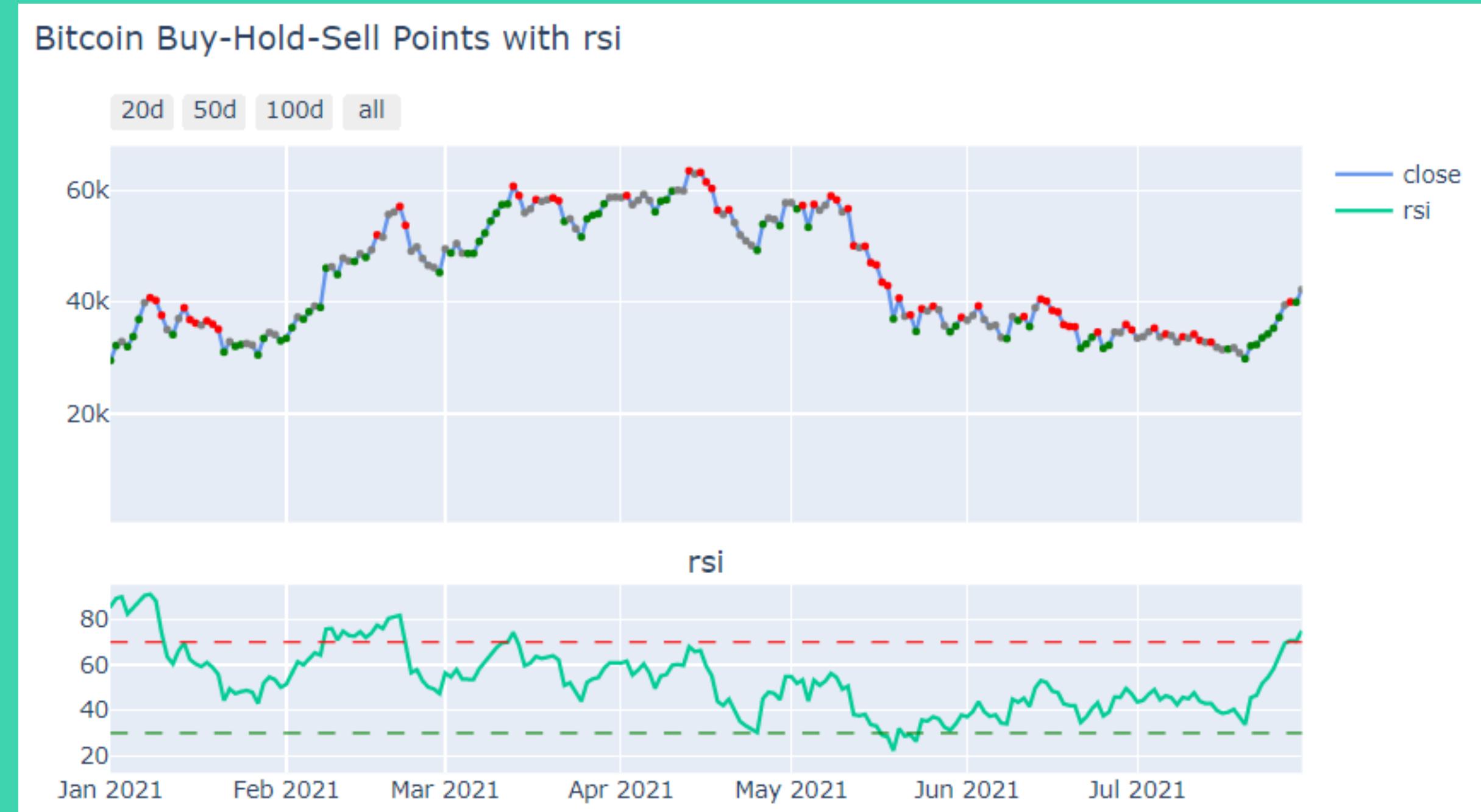


RSI

The Relative Strength Index is another momentum indicator that measures the magnitude of recent price changes.

RSI values range between 0 and 100.

Above 70 is a sign the coin is overbought and below 30 is a sign of oversold.



SOCIAL ANALYSIS

Term used to evaluate investments and identify trading opportunities based market sentiment and activity on social media platforms.

Social Analysis Categories

SOCIAL MEDIA

Tweet Volume
Twitter Sentiment
Global Social Volume
YouTube
Medium
News Outlets

MARKET METRICS

Market Capitalization
Market Coin Dominance
Volatility

SOCIAL METRICS

Proprietary scores:
Social Score
Price Score
Social Impact Score
Galaxy Score

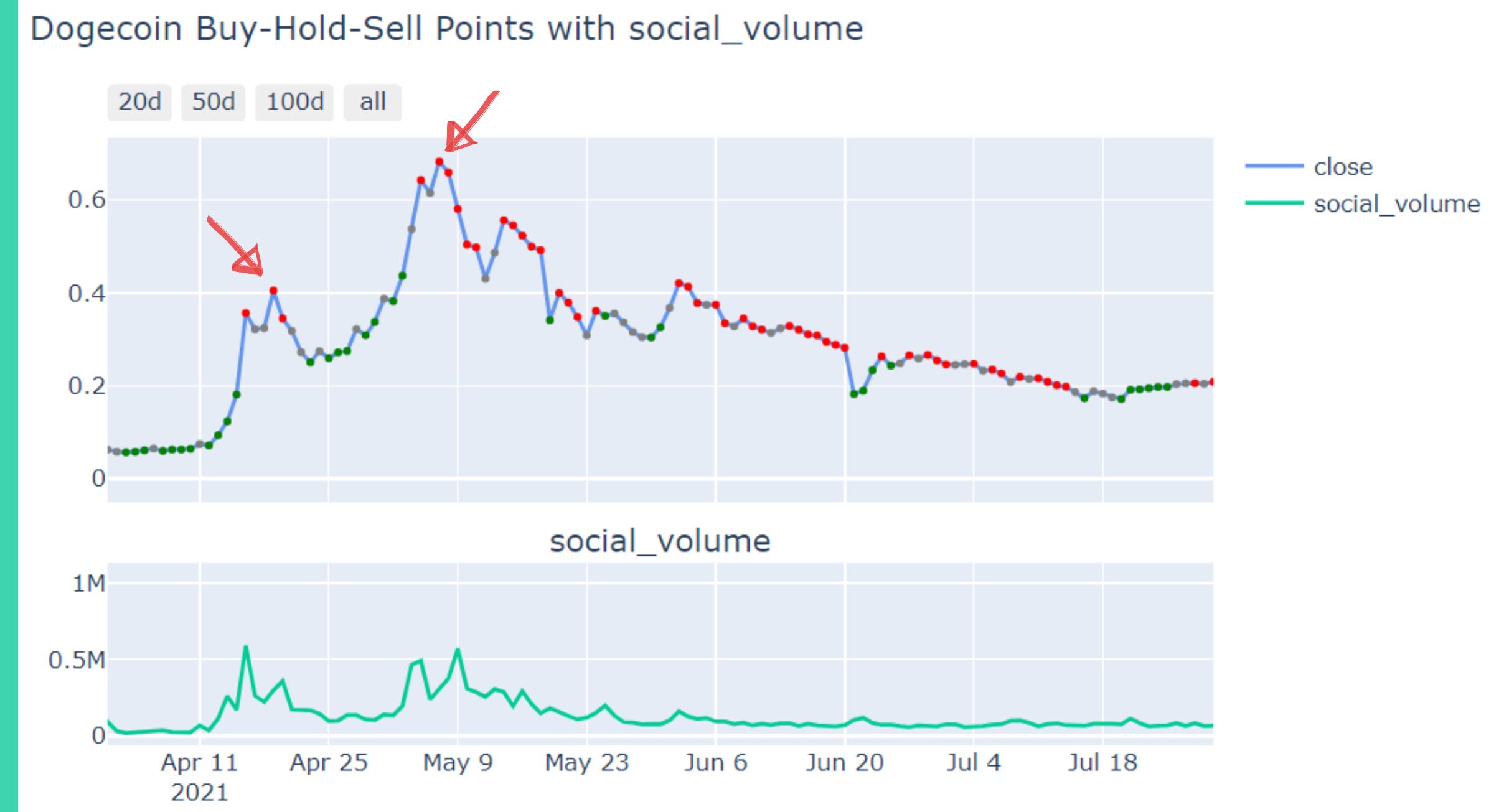
Correlation Analysis

Dogecoin price movement is heavily influenced by social media activity as well as when the coin dominants market capitalization.

	close -	0.9	0.27	0.31	0.51	0.23	0.039	-0.034	0.077	0.049	0.47	0.61	0.83	0.017	0.29	0.79	1	0.055	0.032
close_percent_change_1d -	0.059	0.0016	0.008	0.065	0.019	-0.028	-0.017	-0.024	-0.03	0.045	0.013	0.068	-0.0093	-0.07	0.05	0.055	1	0.36	
close_percent_change_7d -	0.035	-0.0037	-0.0028	0.012	0.04	-0.013	-0.0048	-0.018	-0.0046	0.038	0.019	0.024	-0.0041	0.0092	0.018	0.032	0.36	1	
volume -																			
url_shares -																			
unique_url_shares -																			
social_score -																			
news -																			
price_score -																			
social_impact_score -																			
correlation_rank -																			
galaxy_score -																			
volatility -																			
social_contributors -																			
social_volume -																			
social_volume_global -																			
market_cap_global -																			
market_dominance -																			
close -																			
close_percent_change_1d -																			
close_percent_change_7d -																			

Social Volume

Global social media activity increased in line with the exponential Dogecoin price increases in April and May 2021.



Preprocessing Normalization Methods

MIN-MAX NORMALIZATION

Scale each value between 0 and 1 based on the minimum and maximum values.

Global across the entire time series only.

STANDARDIZATION

Standardize features by removing the mean and scaling to unit variance.

Window and global time series.

% CHANGE NORMALIZATION

Normalize features by the % change in value from a starting value.

Window and global time series.

LONG SHORT-TERM MEMORY (LSTM) MODELING

LSTM is a recurrent neural network (RNN) architecture that are well suited for time series predictions.

Evaluation Metrics

MEAN DIRECTIONAL ACCURACY

MDA utilizes the change in value (positive or negative) and averages if the predictions had the same directional change. Higher is better.

MEAN ABSOLUTE SCALED ERROR

MASE uses MAE but scales the result by dividing by the MAE of actual data and a shifted forward naive forecast. This metric is scale invariant. Lower is better.

TREND ACCURACY

Custom evaluation metric based on directional trend analysis. Predict the correct directional change while also being able to identify large % increase or decreases.

ONE-DIMENSIONAL BASELINE MODEL TREND ACCURACY

48%

BITCOIN

62%

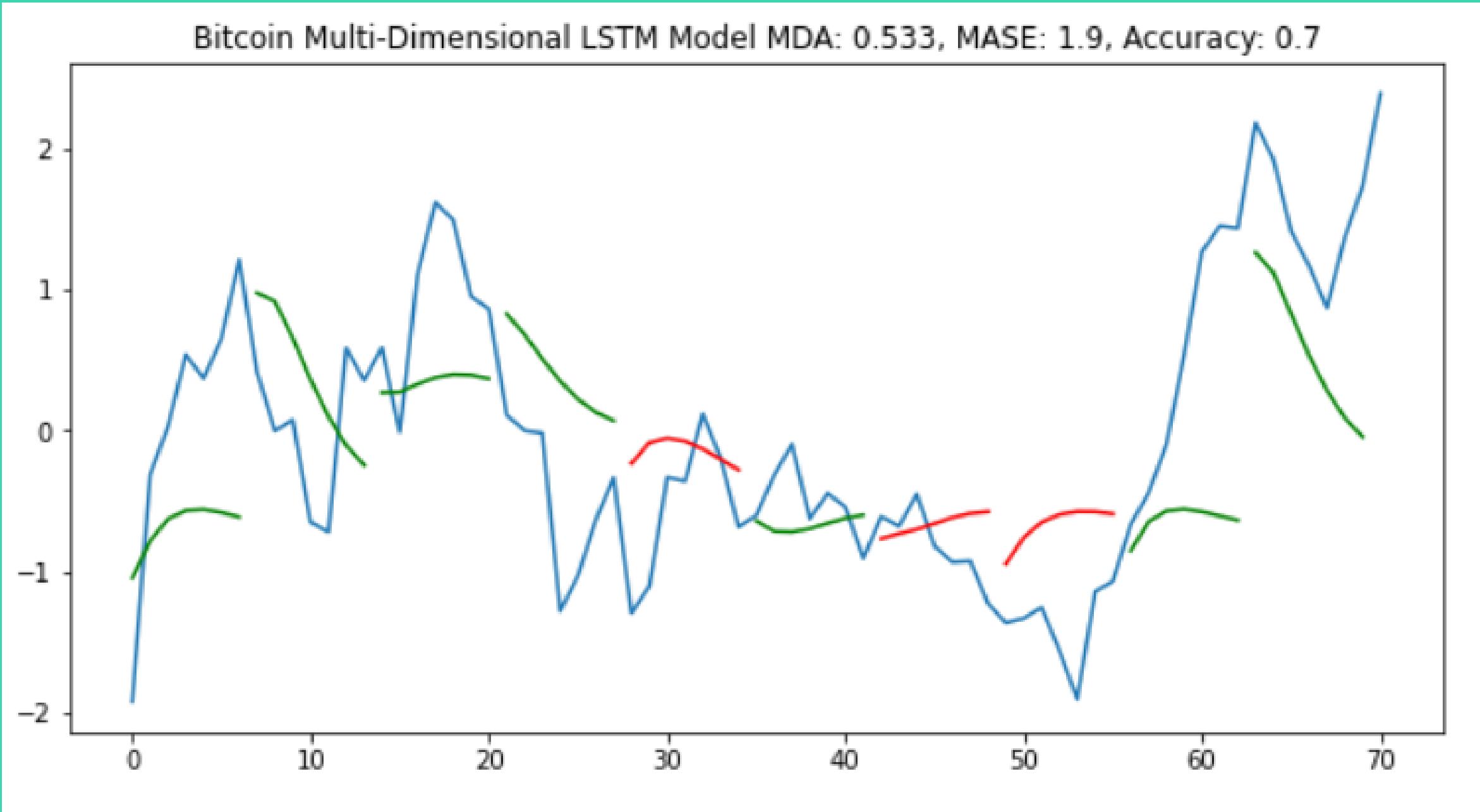
DOGECOIN

70%

Bitcoin

FINAL
MULTIVARIATE
MODEL

CLOSE
LINREG
PERCENT CHANGE 24H RANK
SOCIAL VOLUME 24H RANK
TWEET SENTIMENT BULLISH

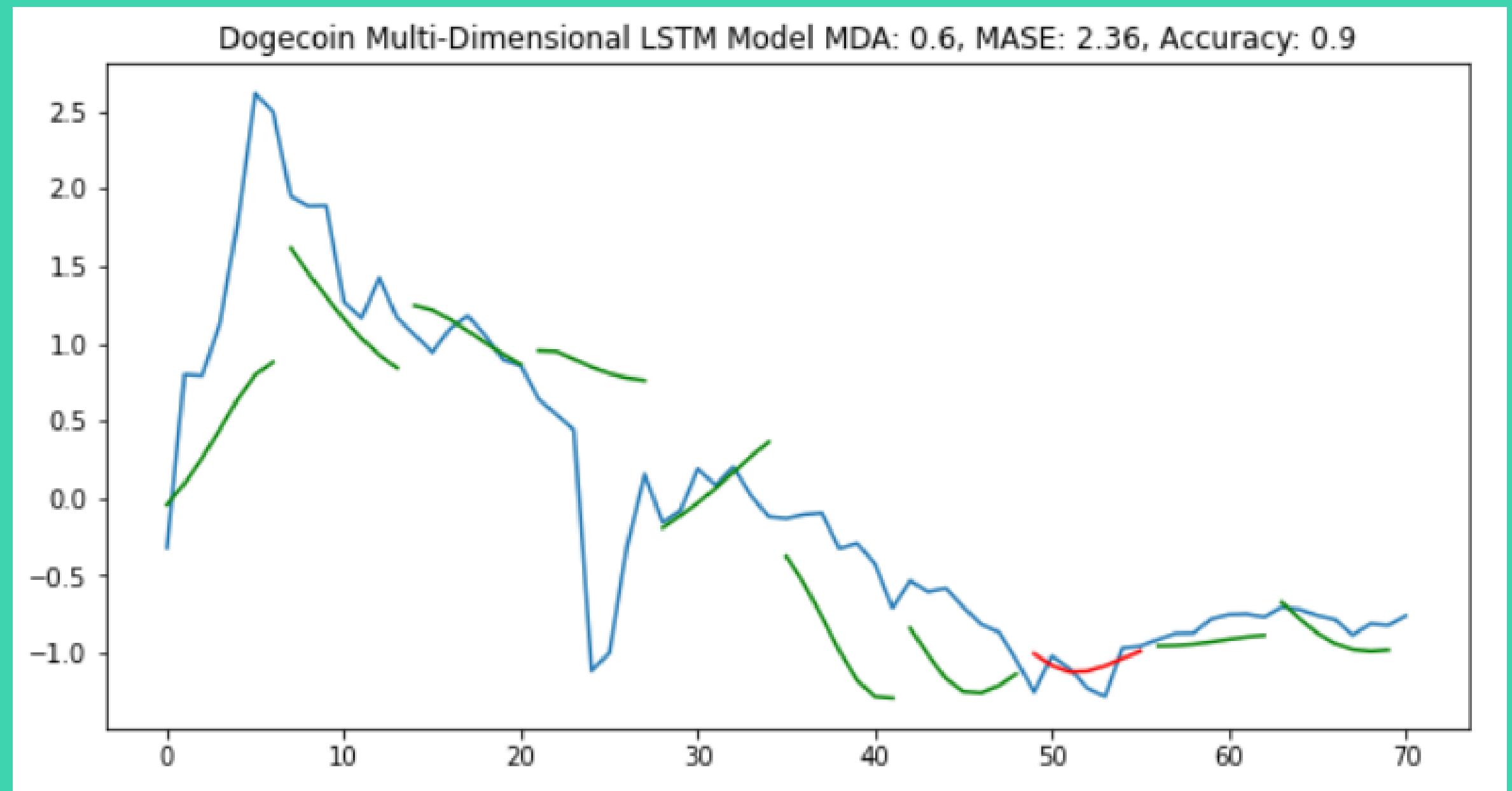


90%

Dogecoin

FINAL
MULTIVARIATE
MODEL

CLOSE
LINREG
MARKET CAP GLOBAL PCT CHANGE
SOCIAL VOLUME GLOBAL MEAN
TWEET SENTIMENT IMPACT NET MEAN



Thank you

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