FORECASTING CRYPTO

APEX PATTERN DEPLOYERS

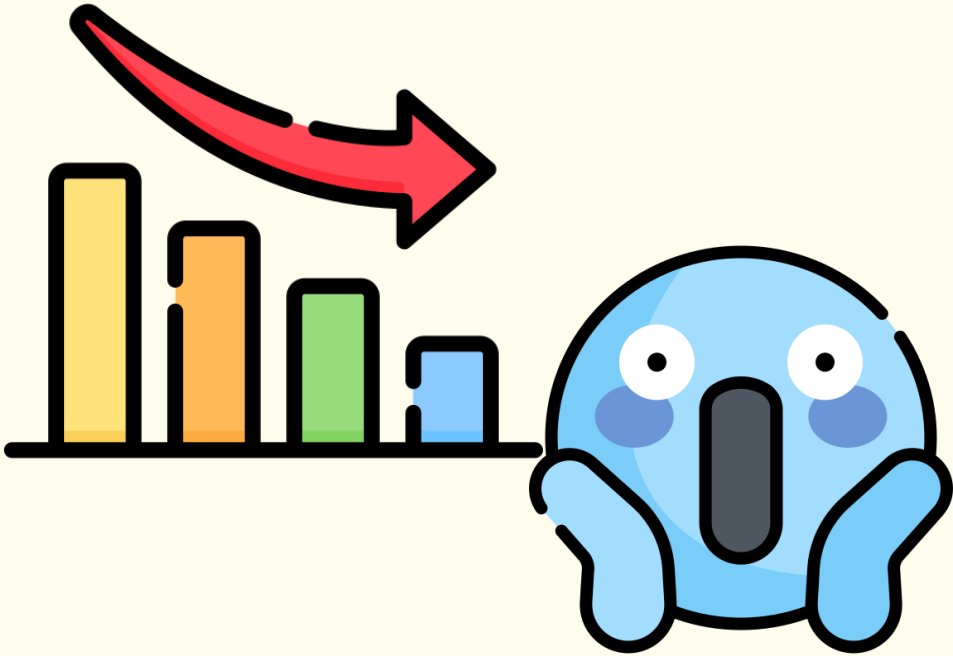
Today’s Discussion

- What’s the problem?
- How do we solve it?
- What now?

WHAT’S THE PROBLEM?

Understanding the Business

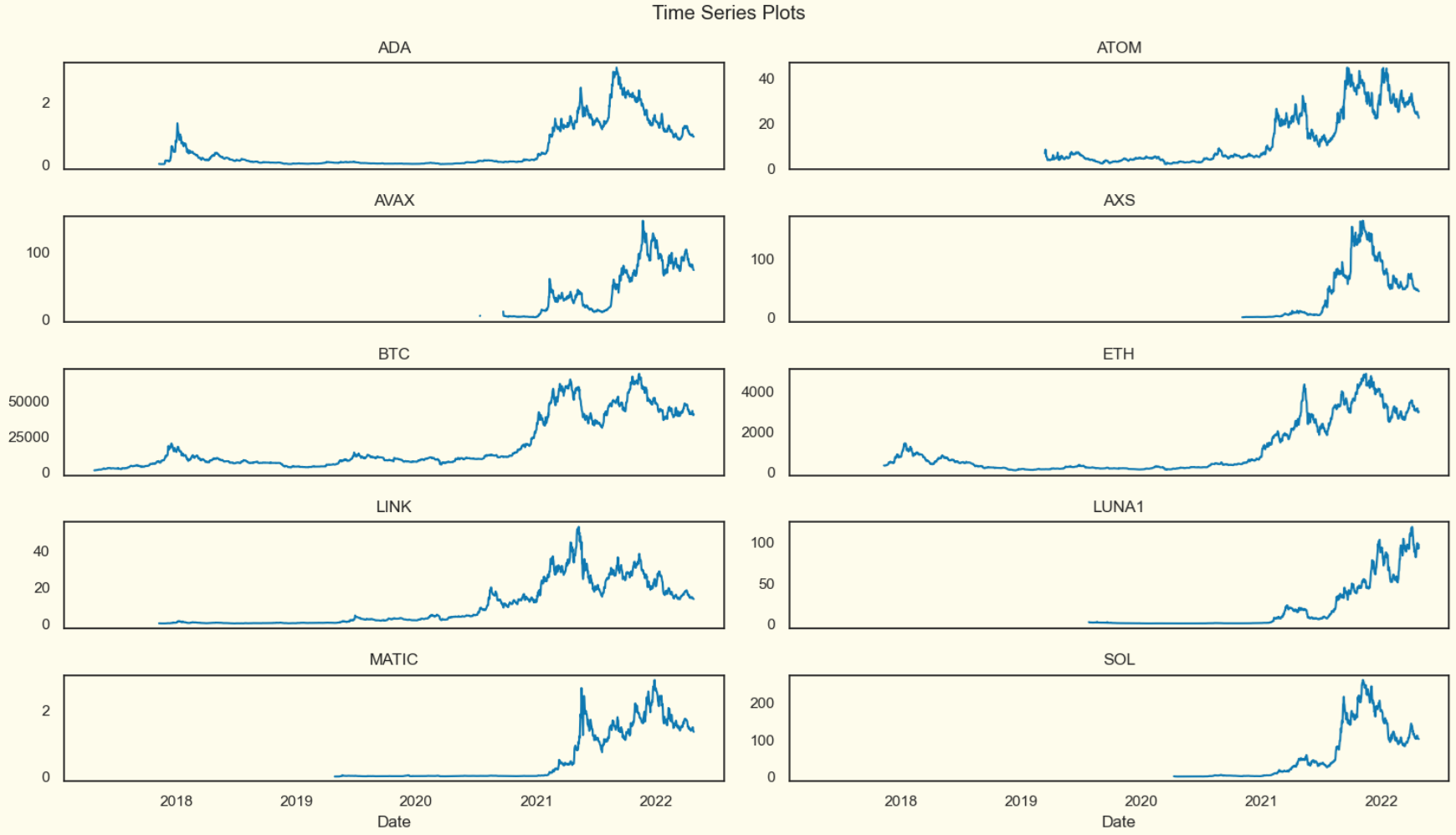
Time Series Forecasting



Cryptocurrencies

WHAT'S THE PROBLEM?

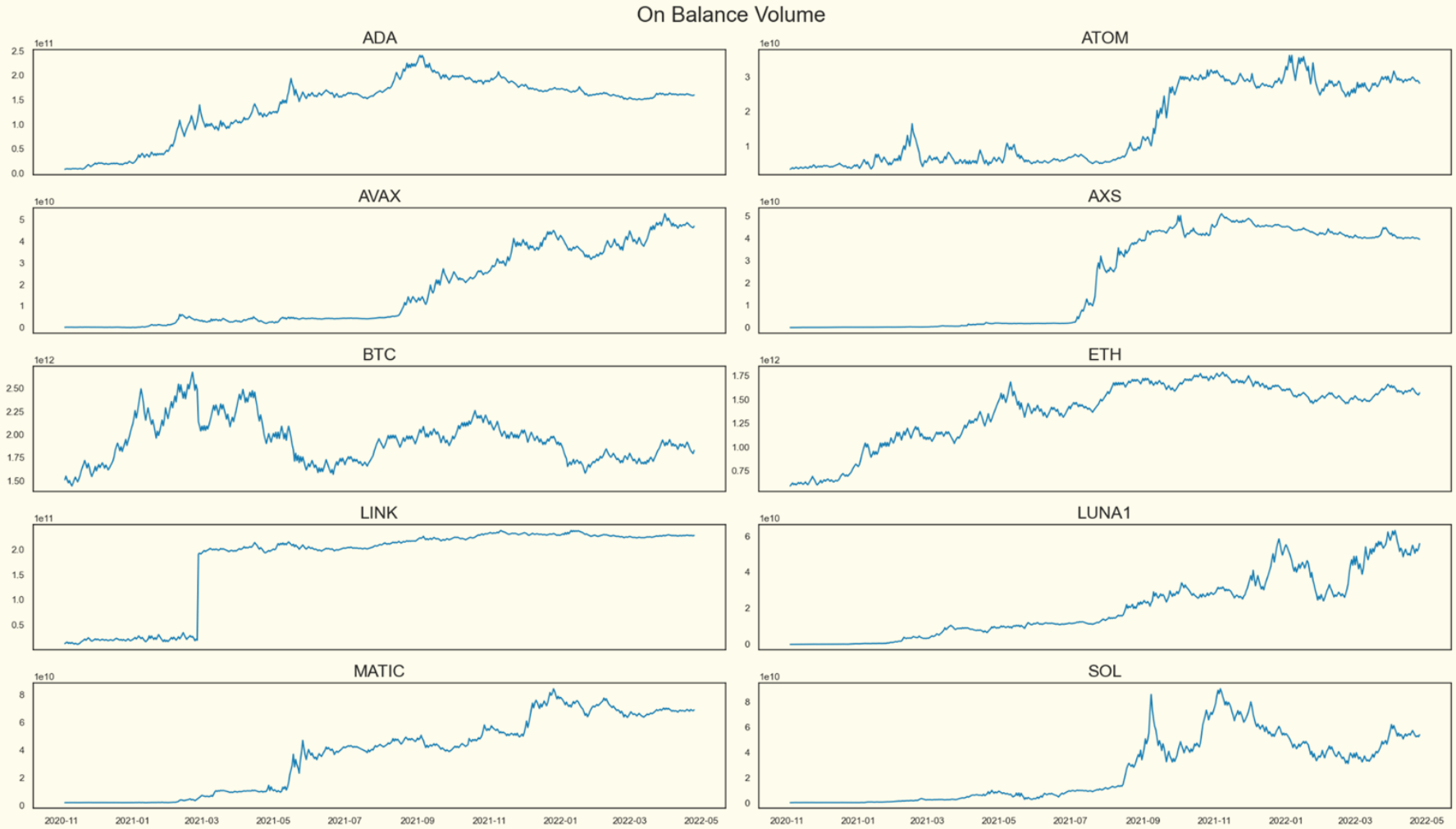
Understanding the Data


Time Series Plots
ADA
ATOM
AVAX
AXS
BTC
ETH
LINK
LUNA1
MATIC
SOL
2018
2019
2020
2021
2022
Date

Volume - OBV (on-balance volume)

Volume indicates interest in a given cryptocurrency.

If the volume increases sharply without a significant change in price, the price will eventually jump upward or fall downward as a consequence.

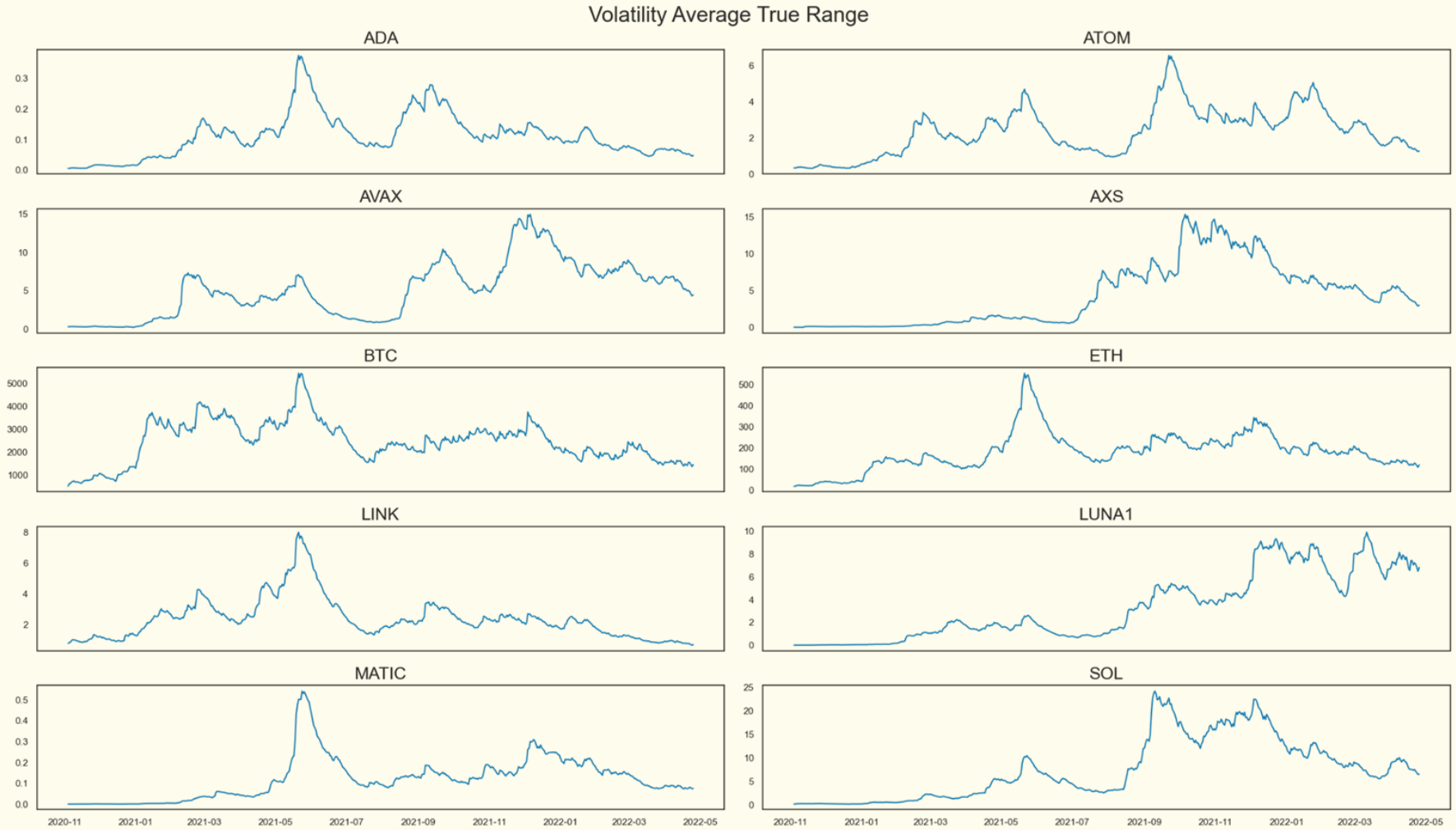

On Balance Volume
ADA
1e11
2.5
2.0
1.5
1.0
0.5
0.0
ATOM
1e10
3
2
1
AVAX
1e10
5
4
3
2
1
0
AXS
1e10
5
4
3
2
1
0
BTC
1e12
2.50
2.25
2.00
1.75
1.50
ETH
1e12
1.75
1.50
1.25
1.00
0.75
LINK
1e11
2.0
1.5
1.0
0.5
LUNA1
1e10
6
4
2
0
MATIC
1e10
8
6
4
2
0
SOL
1e10
8
6
4
2
0
2020-11
2021-01
2021-03
2021-05
2021-07
2021-09
2021-11
2022-01
2022-03
2022-05

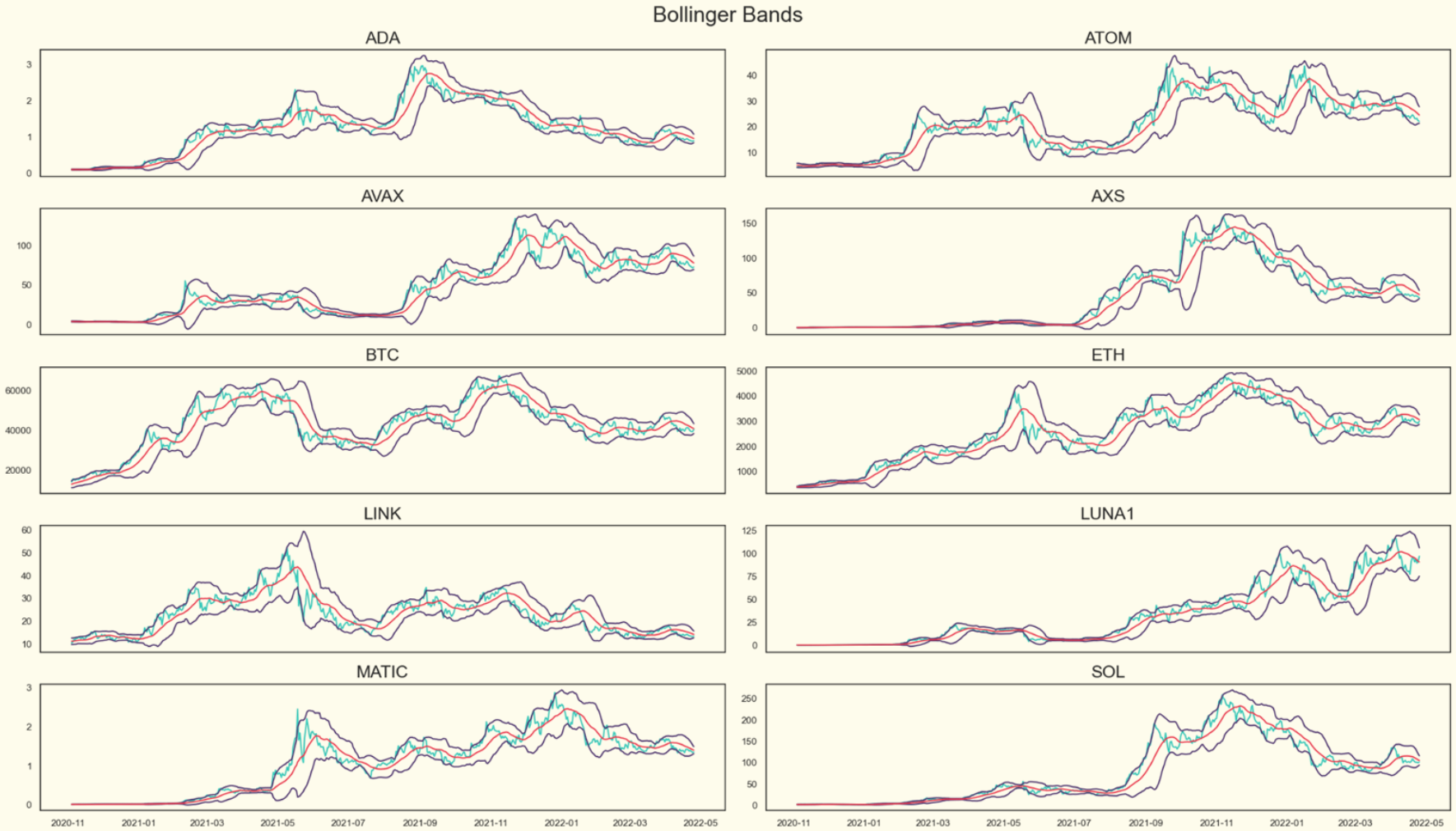
Volatility - ATR (average true range), BB (Bollinger bands)

Volatility indicates the risk of a given cryptocurrency, based on the rate at which its value increases or decreases over time.

ATR shows market volatility by using a 14-day moving average, with high values indicating more volatility and low values indicating less volatility.

Bollinger Bands are placed above and below a moving average. The bands automatically widen when volatility increases and contract when volatility decreases.

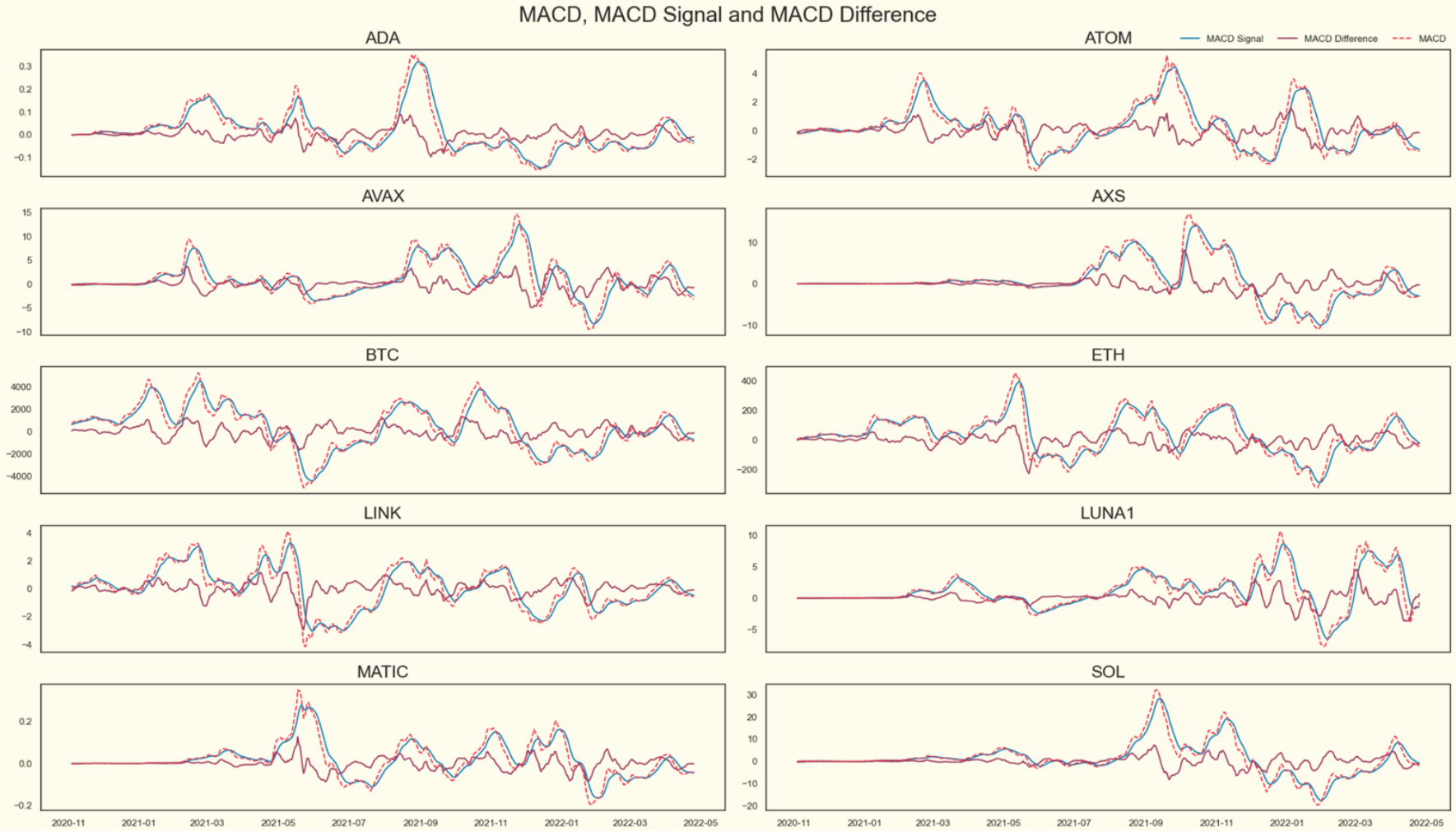

Volatility Average True Range
ADA
ATOM
AVAX
AXS
BTC
ETH
LINK
LUNA1
MATIC
SOL
2020-11
2021-01
2021-03
2021-05
2021-07
2021-09
2021-11
2022-01
2022-03
2022-05


Bollinger Bands
ADA
ATOM
AVAX
AXS
BTC
ETH
LINK
LUNA1
MATIC
SOL
2020-11
2021-01
2021-03
2021-05
2021-07
2021-09
2021-11
2022-01
2022-03
2022-05

Trend - MACD (moving average convergence divergence)

Trends indicate if the value of a given cryptocurrency is moving up or down.

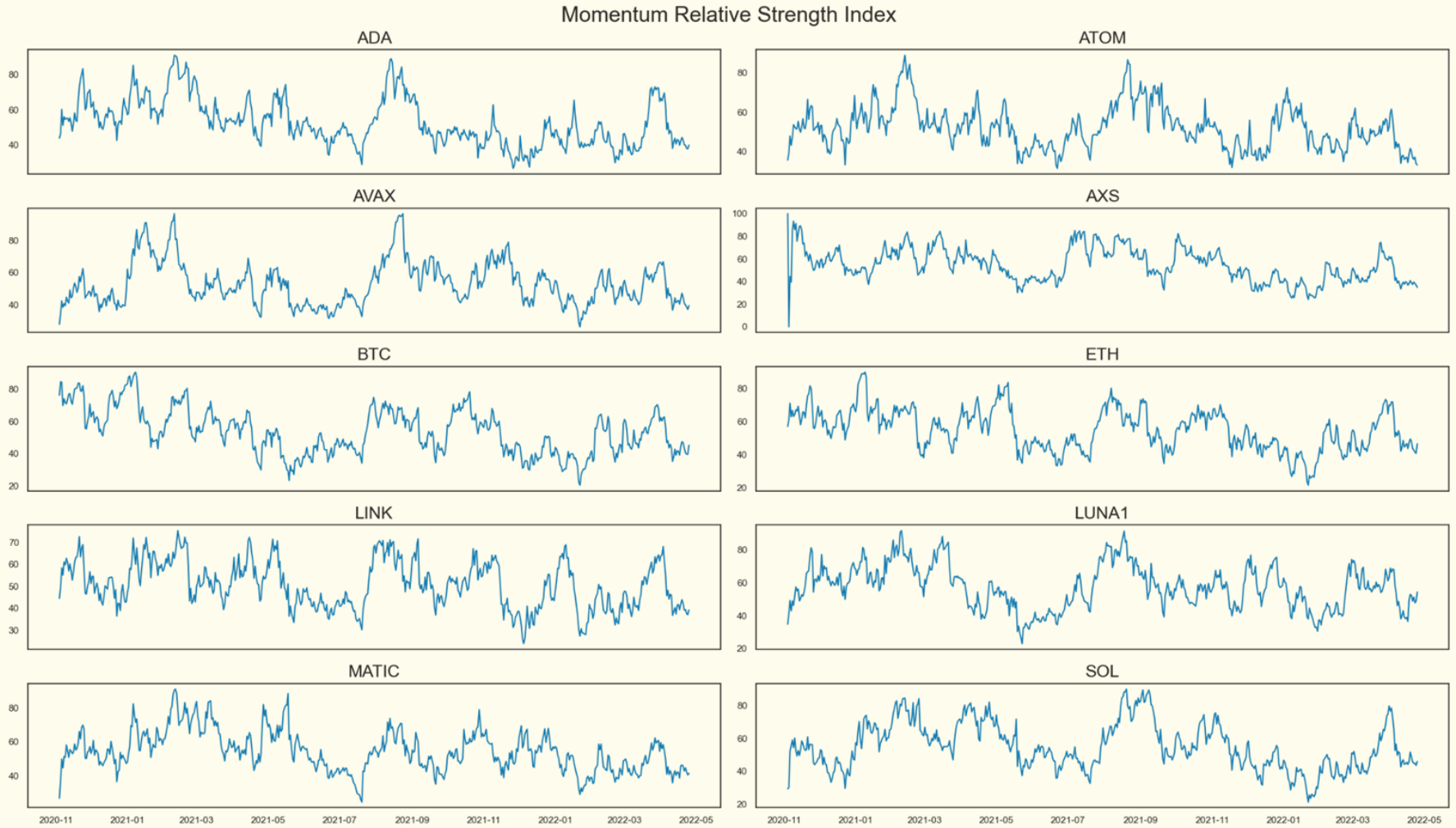
MACD can signal when it is best to buy or sell based on how far above or below baseline the exponential (recent) moving average is.


MACD, MACD Signal and MACD Difference
ADA
ATOM
MACD Signal
MACD Difference
MACD
AVAX
AXS
BTC
ETH
LINK
LUNA1
MATIC
SOL
2020-11
2021-01
2021-03
2021-05
2021-07
2021-09
2021-11
2022-01
2022-03
2022-05

Momentum - RSI (relative strength index)

Momentum indicates the strength or weakness in a cryptocurrency's price.

RSI measures the magnitude of recent price changes, with 70 or above indicating potential overvaluation which may lead to a trend reversal, and 30 or below indicating potential undervaluation.


Momentum Relative Strength Index
ADA
ATOM
AVAX
AXS
BTC
ETH
LINK
LUNA1
MATIC
SOL
2020-11
2021-01
2021-03
2021-05
2021-07
2021-09
2021-11
2022-01
2022-03
2022-05

HOW DO WE SOLVE IT?

Preparing the Data

Exogenous Variables

S&P
VIX
GOLD

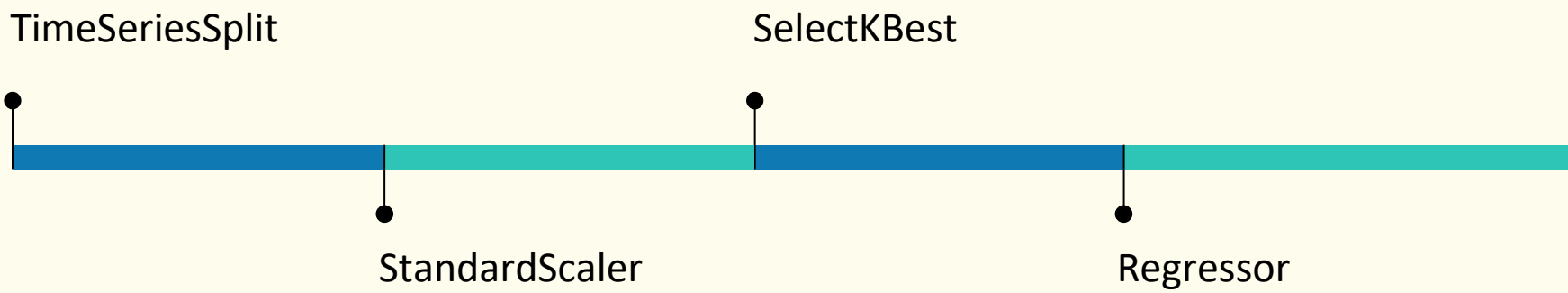
MATIC
LUNA
LINK
ATOM
BTC
SOL
AXS
ADA
AVAX
ETH

Training Data

	Y
Jan 02	
Jan 03	
Jan 04	
Jan 05	
Jan 06	
Jan 07	
Jan 08	???

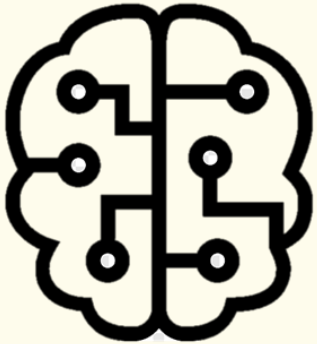
	X1	X2	X3
Jan 01			
Jan 02			
Jan 03			
Jan 04			
Jan 05			
Jan 06			
Jan 07			

Pipeline



HOW DO WE SOLVE IT?

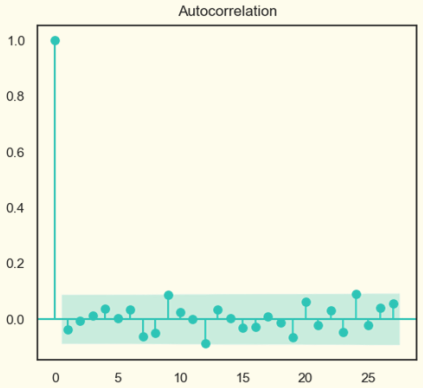
Modelling the Data

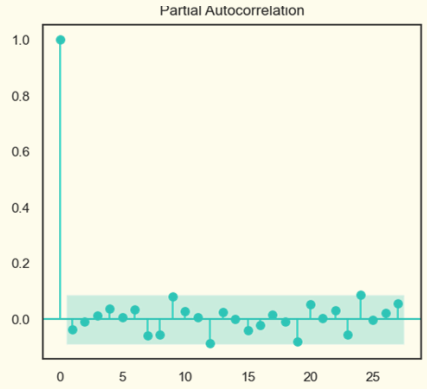


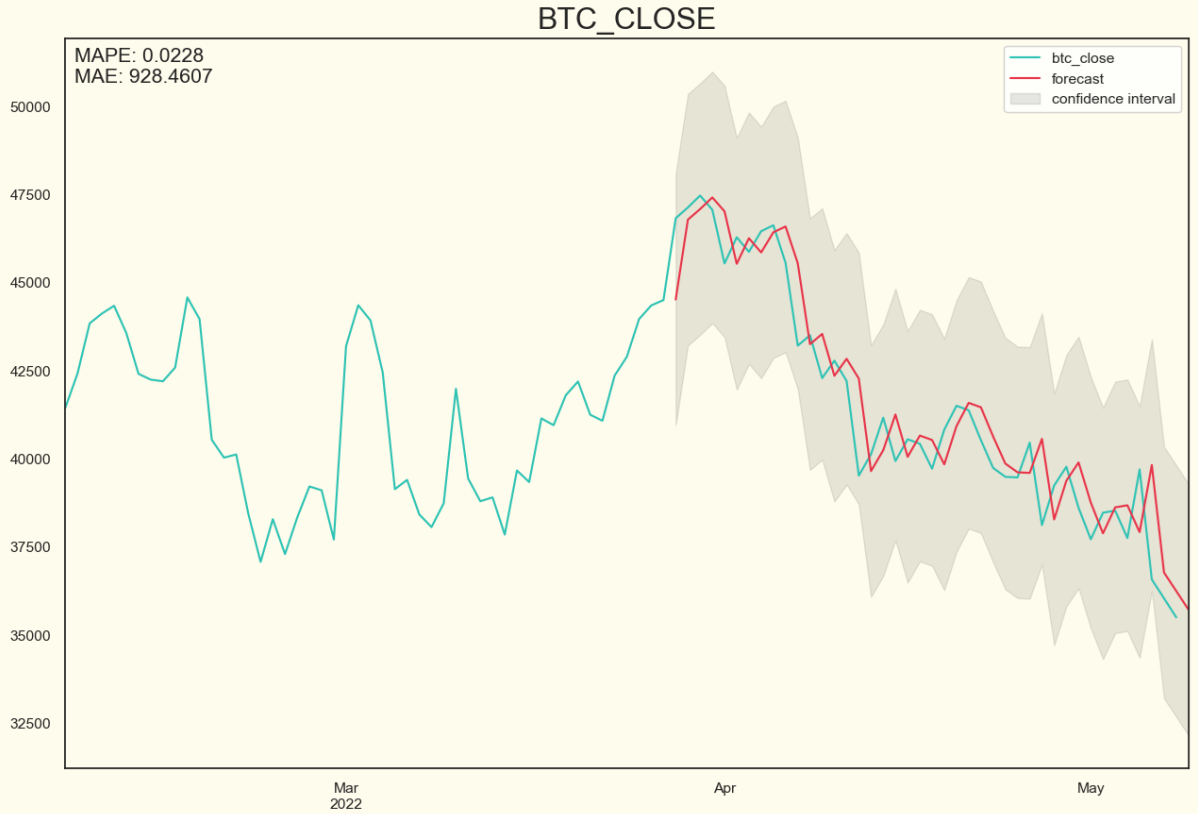
Machine Learning

Time Series

Time Series Model

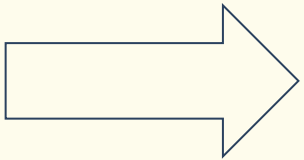






Machine Learning Models

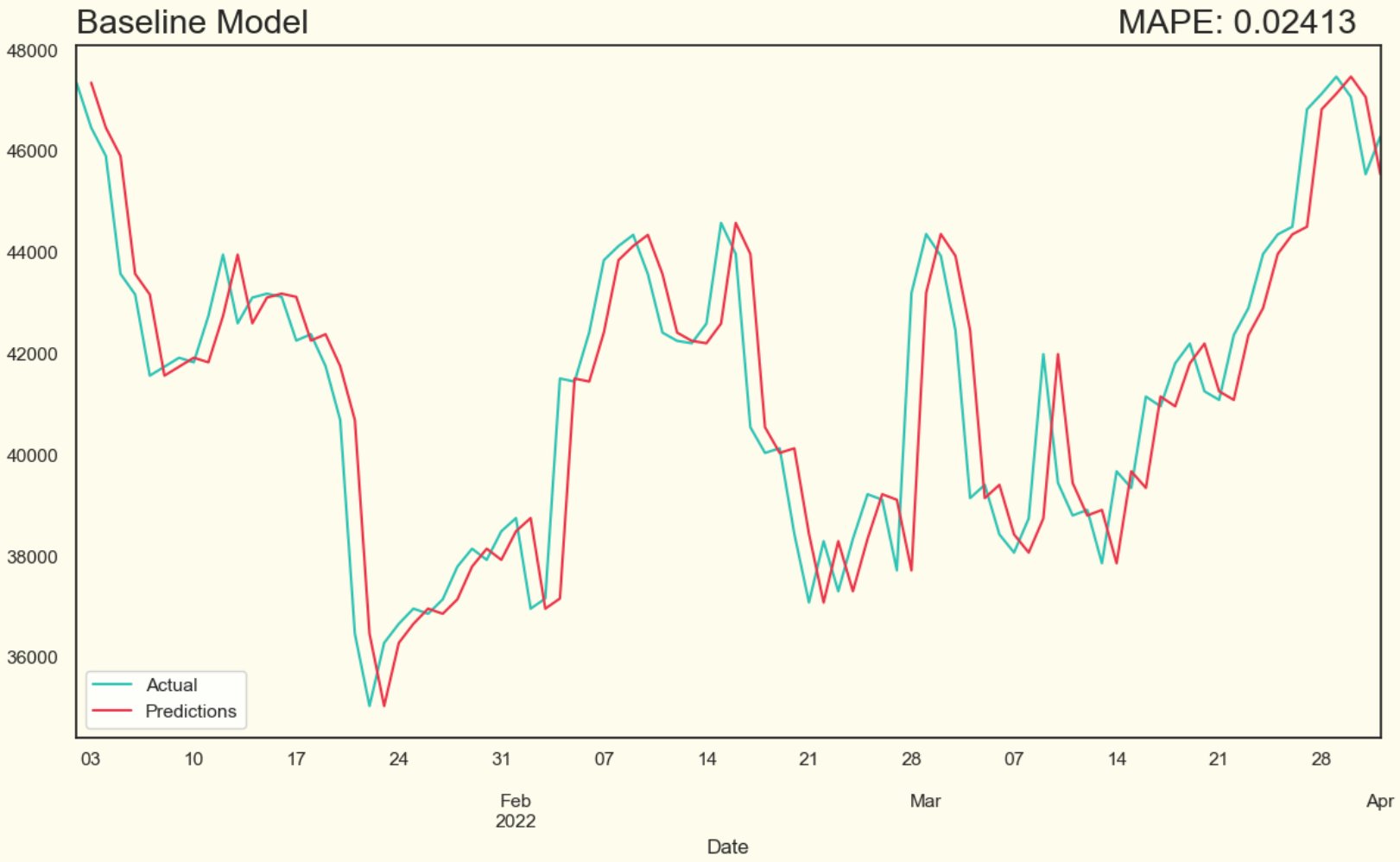
- Decision Tree Regressor
- MLP Regressor
- Gradient Boosting Regressor
- XGB Regressor
- KNeighbors Regressor
- Linear Regressor
- Random Forest Regressor



MAPE
as a metric

WHAT NOW?

Evaluating the Model


Baseline Model
MAPE: 0.02413
48000
46000
44000
42000
40000
38000
36000
Actual
Predictions
03
10
17
24
31
07
14
21
28
07
14
21
28
Feb
2022
Mar
Apr
Date


LinearRegression
Train MAPE: 0.04195
90000
80000
70000
60000
50000
40000
30000
20000
Actual
Predictions
LinearRegression vs Baseline
0.50
0.25
0.00
−0.25
−0.50
−0.75
−1.00
Baseline Error
Model Error
03
10
17
24
31
07
14
21
28
07
14
21
28
Feb
2022
Mar
Apr
Date

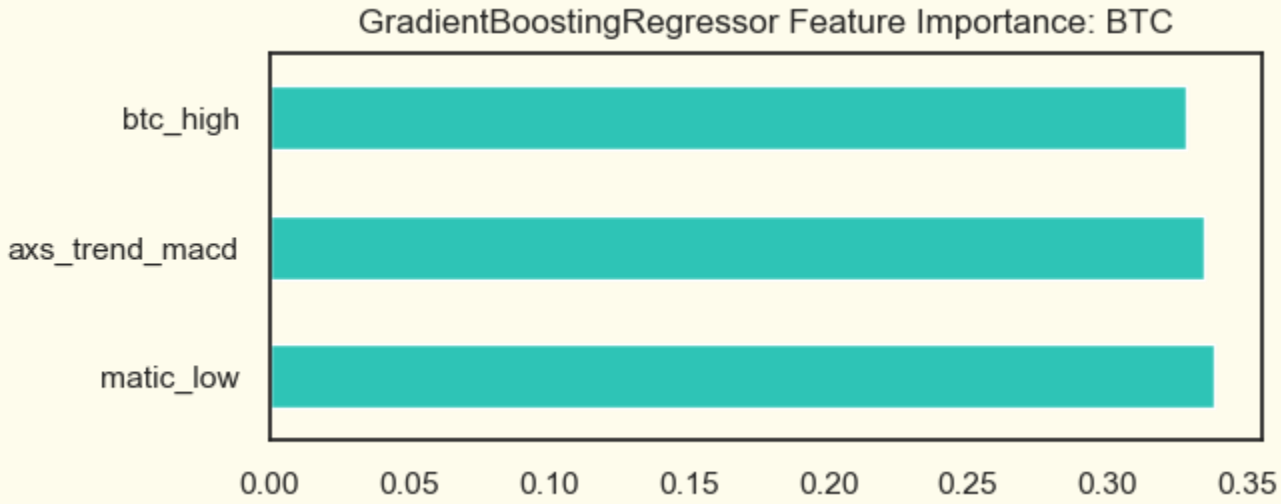

DecisionTreeRegressor
Train MAPE: 0.01859
48000
46000
44000
42000
40000
38000
36000
Actual
Predictions
DecisionTreeRegressor vs Baseline
0.15
0.10
0.05
0.00
−0.05
−0.10
−0.15
Baseline Error
Model Error
03
10
17
24
31
07
14
21
28
07
14
21
28
Feb
2022
Mar
Apr
Date


GradientBoostingRegressor
Train MAPE: 0.01834
48000
46000
44000
42000
40000
38000
36000
Actual
Predictions
GradientBoostingRegressor vs Baseline
0.10
0.05
0.00
−0.05
−0.10
−0.15
−0.20
Baseline Error
Model Error
03
10
17
24
31
07
14
21
28
07
14
21
28
Feb
2022
Mar
Apr
Date

Best Performing Models

COIN	Model	MAPE
ADA: Cardano	GradientBoostRegressor	0.03222
ATOM: Cosmos	RandomForestRegressor	0.01944
AVAX: Avalanche	DecisionTreeRegressor	0.02494
AXS: Axie Infinity	GradientBoostRegressor	0.04438
ETH: Ethereum	MLPRegressor	0.02149
LINK: Chainlink	DecisionTreeRegressor	0.02693
LUNA1: Terra	GradientBoostRegressor	0.03155
MATIC: Polygon	MLPRegressor	0.02525
SOL: Solana	XGBRegressor	0.04079
BTC: Bitcoin	GradientBoostRegressor	0.01834

Feature Importance



WHAT NOW?

Deploying the Model

Predictions: May 10

COIN	Closing Price
ADA: Cardano	0.8783235022
ATOM: Cosmos	26.01907178
AVAX: Avalanche	65.1450386
AXS: Axie Infinity	50.75635499
BTC: Bitcoin	47128.00391
ETH: Ethereum	2833.012889
LINK: Chainlink	14.34740142
LUNA1: Terra	58.51585197
MATIC: Polygon	1.360077
SOL: Solana	81.09105

Conclusions

- Updating daily
- Develop dashboard
- Prediction windows

We are not financial advisors and this is not financial advice

Thank you!