Presented by BYTeminds

Algorithmic Trading Model Development for BTC/USDT Crypto Market

Members:

Manan Chugh

Mishita Jain

Piyush Sinha

Sarthak Sharma

DOMAIN DESCRIPTION

Algorithmic trading in cryptocurrencies uses computer programs and mathematical models.

The objective is to leverage machine learning for consistent profits and outperform benchmarks.

The focus is on safeguarding investments in the dynamic crypto market.

A user-friendly model is designed to adapt to market fluctuations.

Quick and accurate decision-making is emphasized in the approach.

The challenge involves effectively applying machine learning to navigate market changes.

The goal is to minimize risk and capital inactivity in cryptocurrency trading

More On Problem Statement

What is Bitcoin?

Bitcoin is a type of digital currency, also known as cryptocurrency. It exists only in electronic form and is not physical like coins or banknotes.

How to Get Bitcoin:

You can buy Bitcoin on online platforms known as cryptocurrency exchanges.

To get started, you need to create an account on a reliable exchange.

Wallets:

Your Bitcoin is stored in a digital wallet, which is like a virtual bank account.

There are online wallets (on exchanges) and offline wallets (more secure, like hardware or paper wallets).

More On Problem Statement

Selling Bitcoin:

You can sell your Bitcoin on the same exchange where you bought it.

The goal is to sell it at a higher price than what you paid.

Market Price:

The price of Bitcoin is determined by supply and demand on the market.

It can be quite volatile, meaning it can go up or down quickly.

Risks:

Bitcoin trading carries risks due to price fluctuations.

Only invest what you can afford to lose.

Approach

1. Building a model to predict prices of bitcoin after 6 hours using an ML model
2. Analyzing previous market trends
3. Using mean reversion and forecast to capture high profits in rising market and bail out in slumping market

STEPS TO VICTORY

01. Data Acquisition & Preprocessing

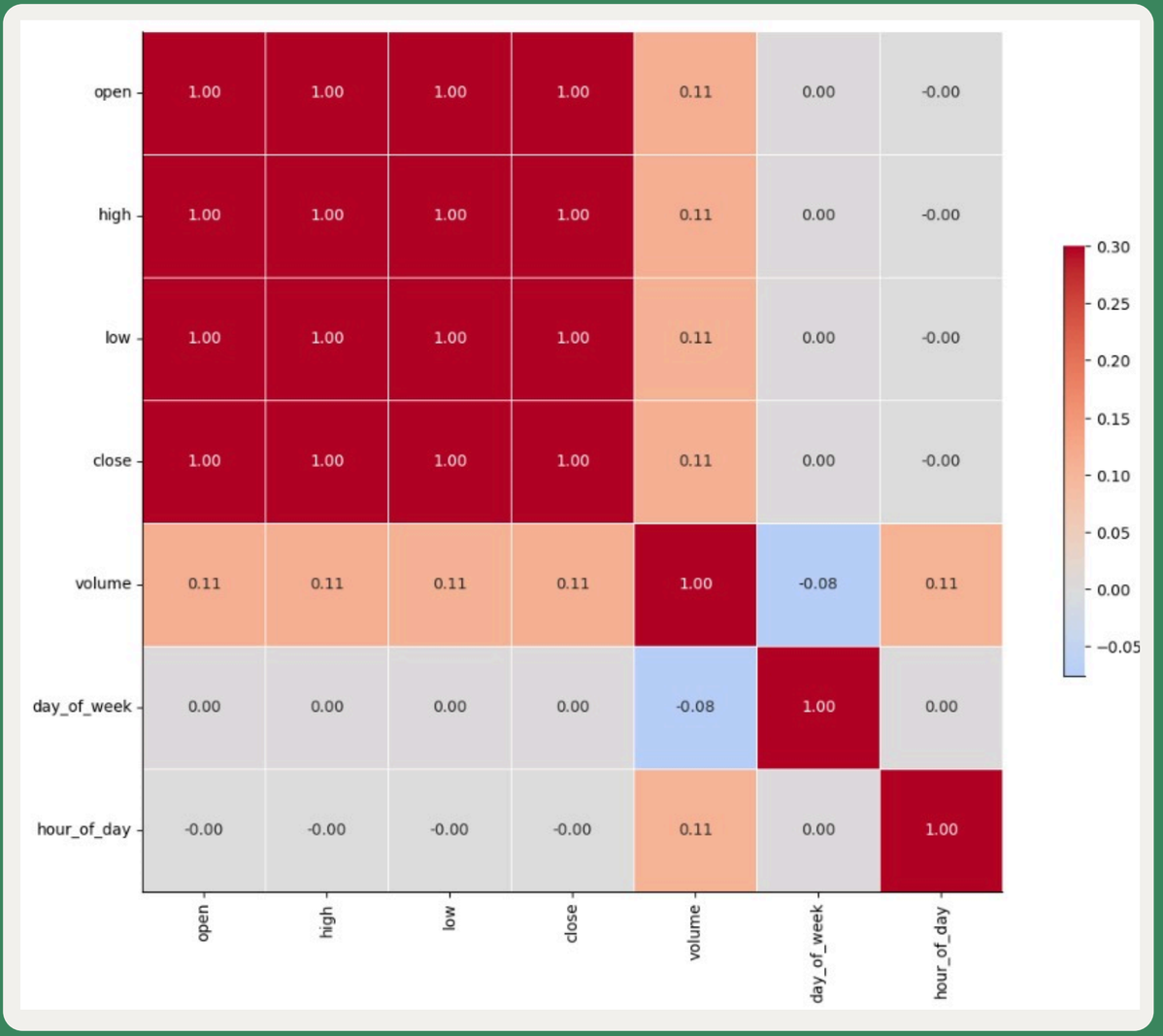
02. Data Model

03. Risk Management & Back testing

04. Optimization

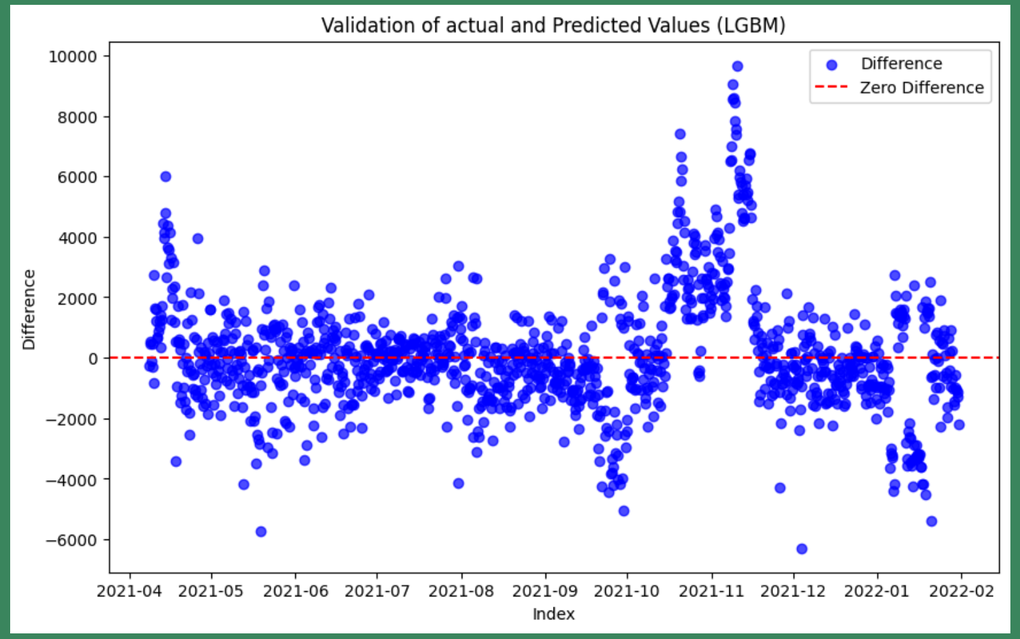
Feature Selection

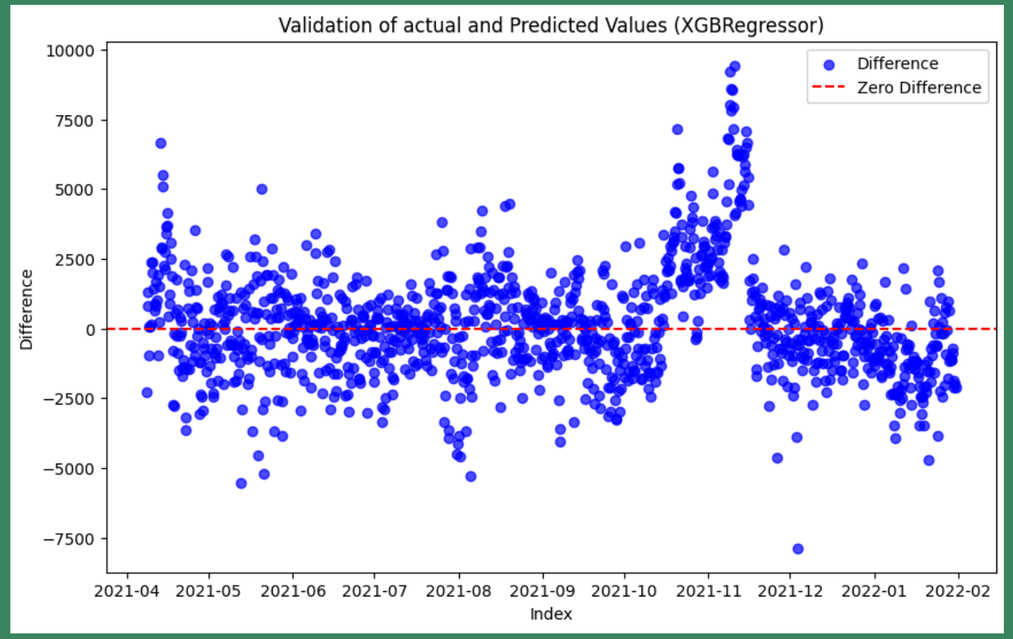
Selecting features on the basis correlation values

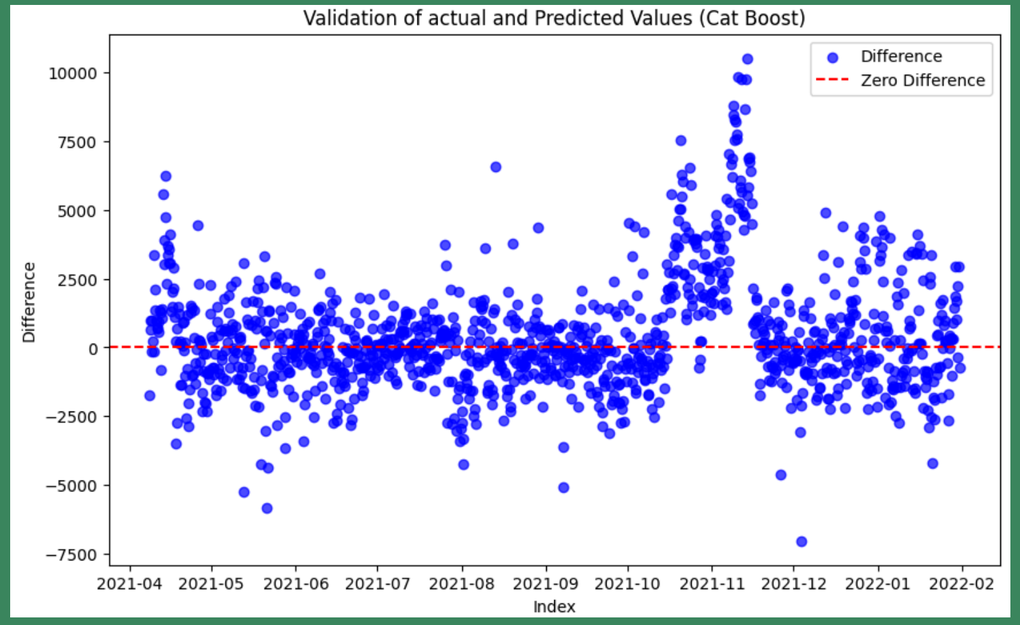


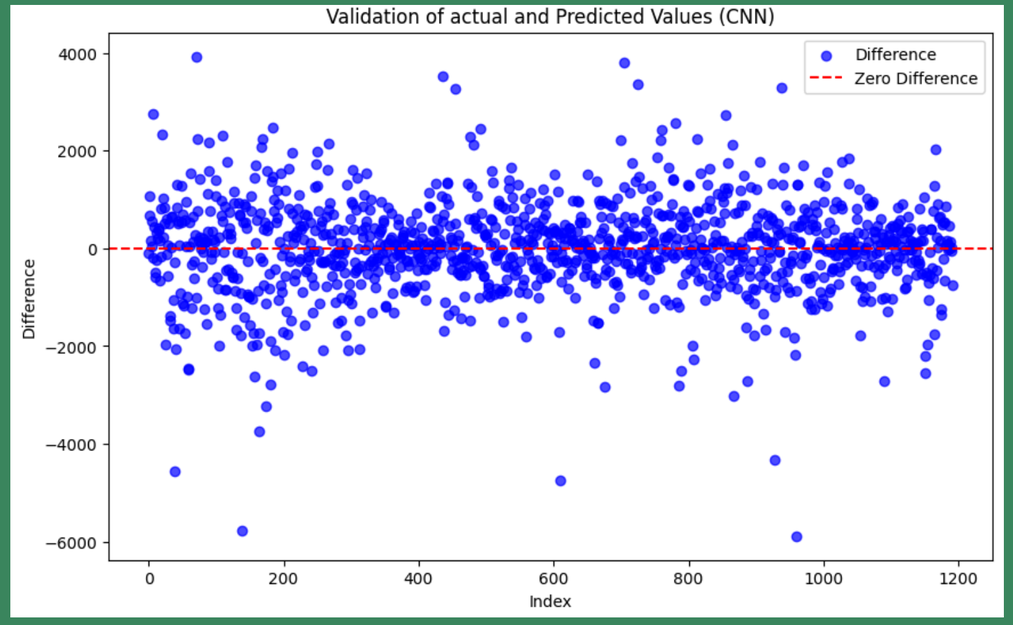
Models Tested

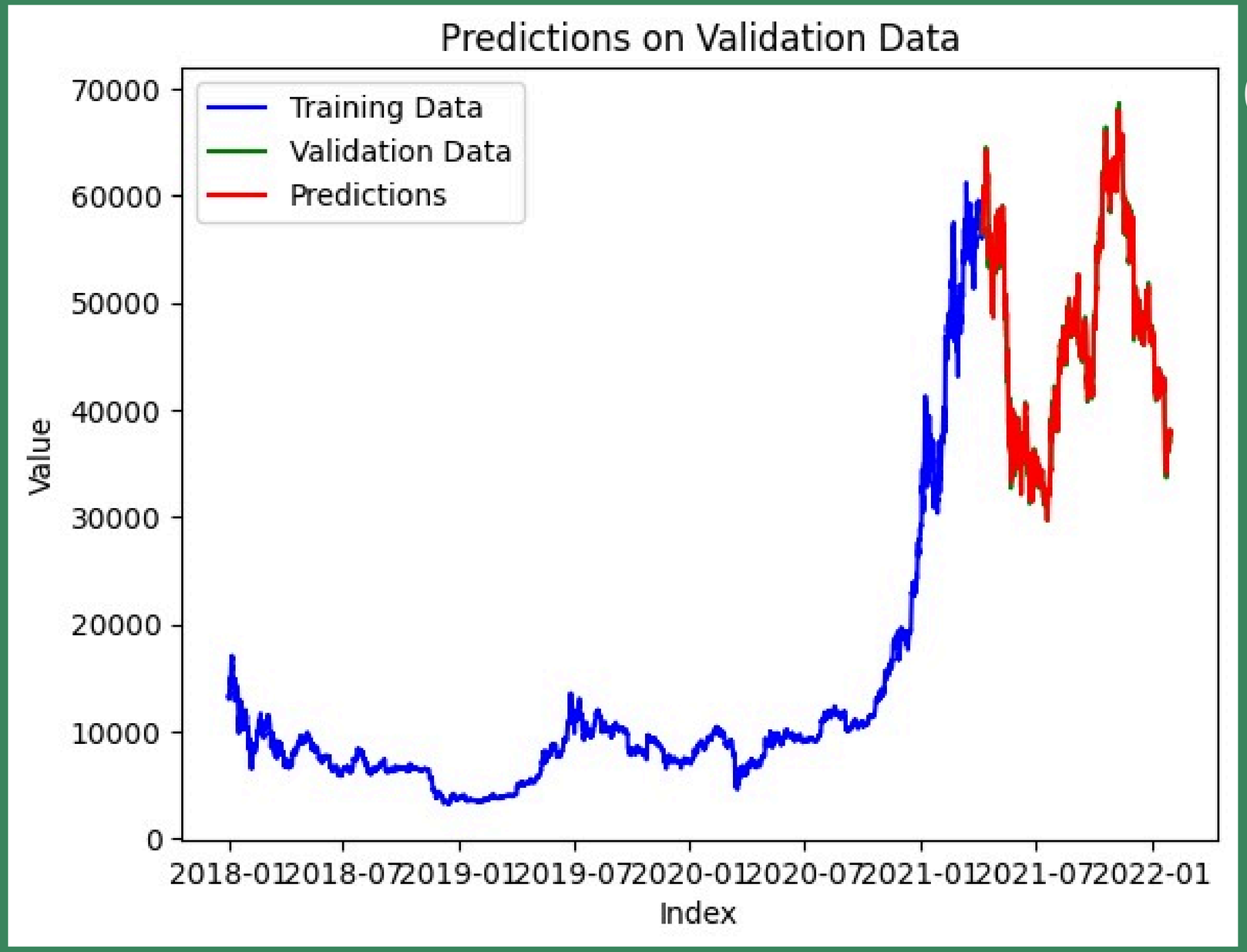
- XGBRegressor
- CatBoostRegressor
- LGBMRegressor
- CNN


Validation of actual and Predicted Values (LGBM)
Difference
Zero Difference
Difference
Index
10000
8000
6000
4000
2000
0
−2000
−4000
−6000
2021-04
2021-05
2021-06
2021-07
2021-08
2021-09
2021-10
2021-11
2021-12
2022-01
2022-02


Validation of actual and Predicted Values (XGBRegressor)
Difference
Zero Difference
Difference
Index
10000
7500
5000
2500
0
−2500
−5000
−7500
2021-04
2021-05
2021-06
2021-07
2021-08
2021-09
2021-10
2021-11
2021-12
2022-01
2022-02

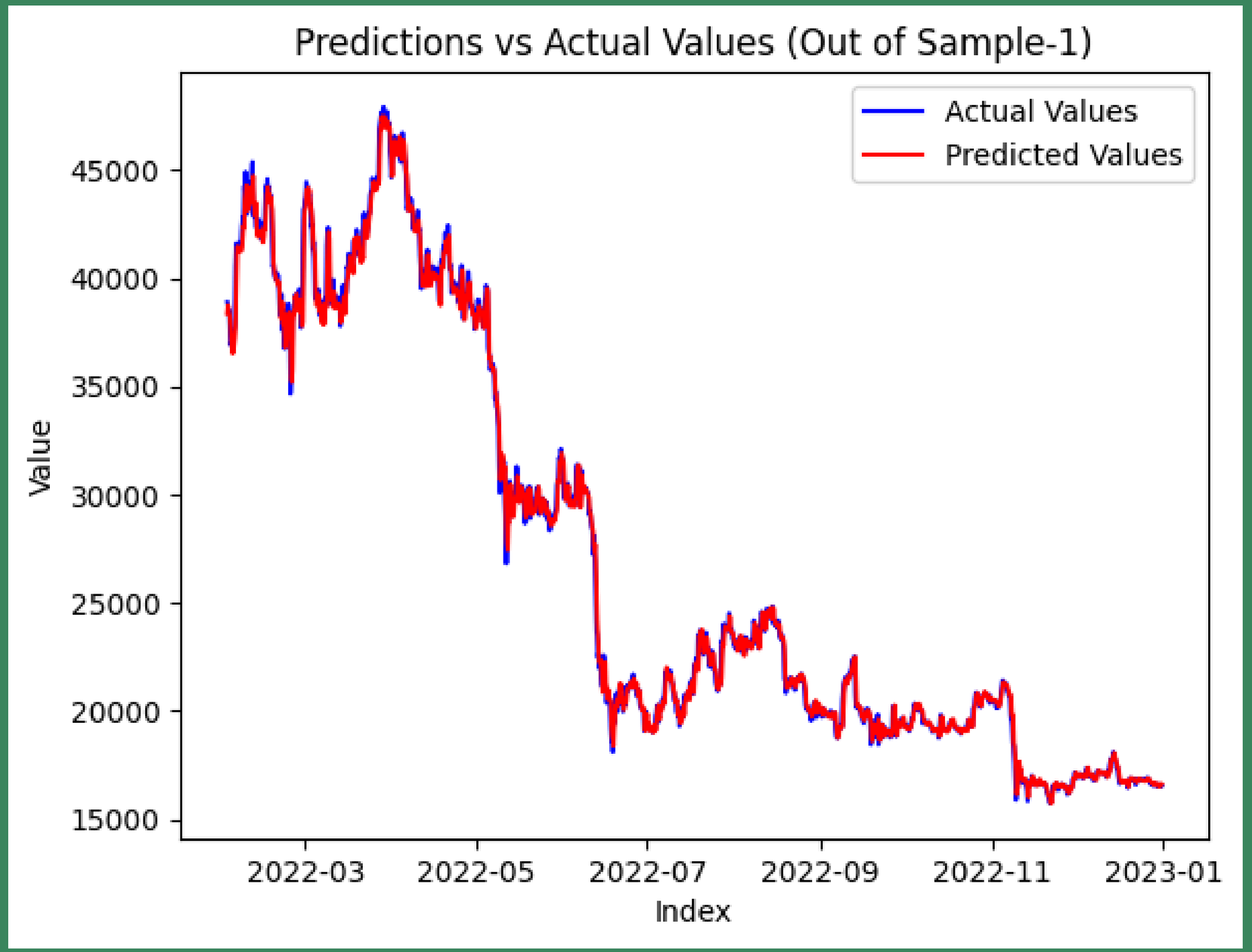

Validation of actual and Predicted Values (Cat Boost)
Difference
Zero Difference
Difference
Index
10000
7500
5000
2500
0
−2500
−5000
−7500
2021-04
2021-05
2021-06
2021-07
2021-08
2021-09
2021-10
2021-11
2021-12
2022-01
2022-02


Validation of actual and Predicted Values (CNN)
Difference
Zero Difference
Difference
Index
4000
2000
0
−2000
−4000
−6000
0
200
400
600
800
1000
1200



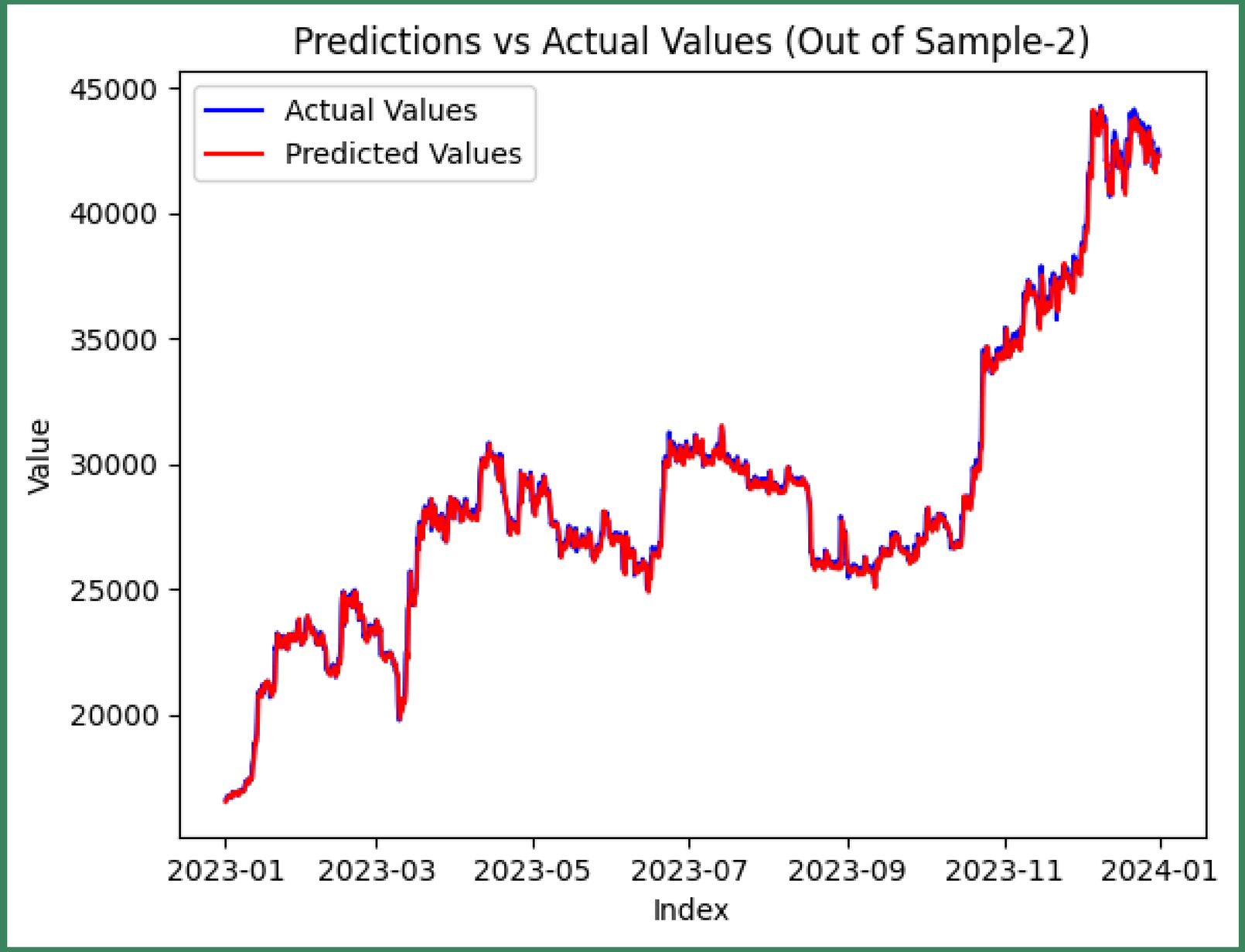
CNN + LSTM Model

Trained on dataset
from January 1, 2018
to January 31, 2022



CNN Model

Tested on dataset
from February 1, 2022
to December 31, 2022



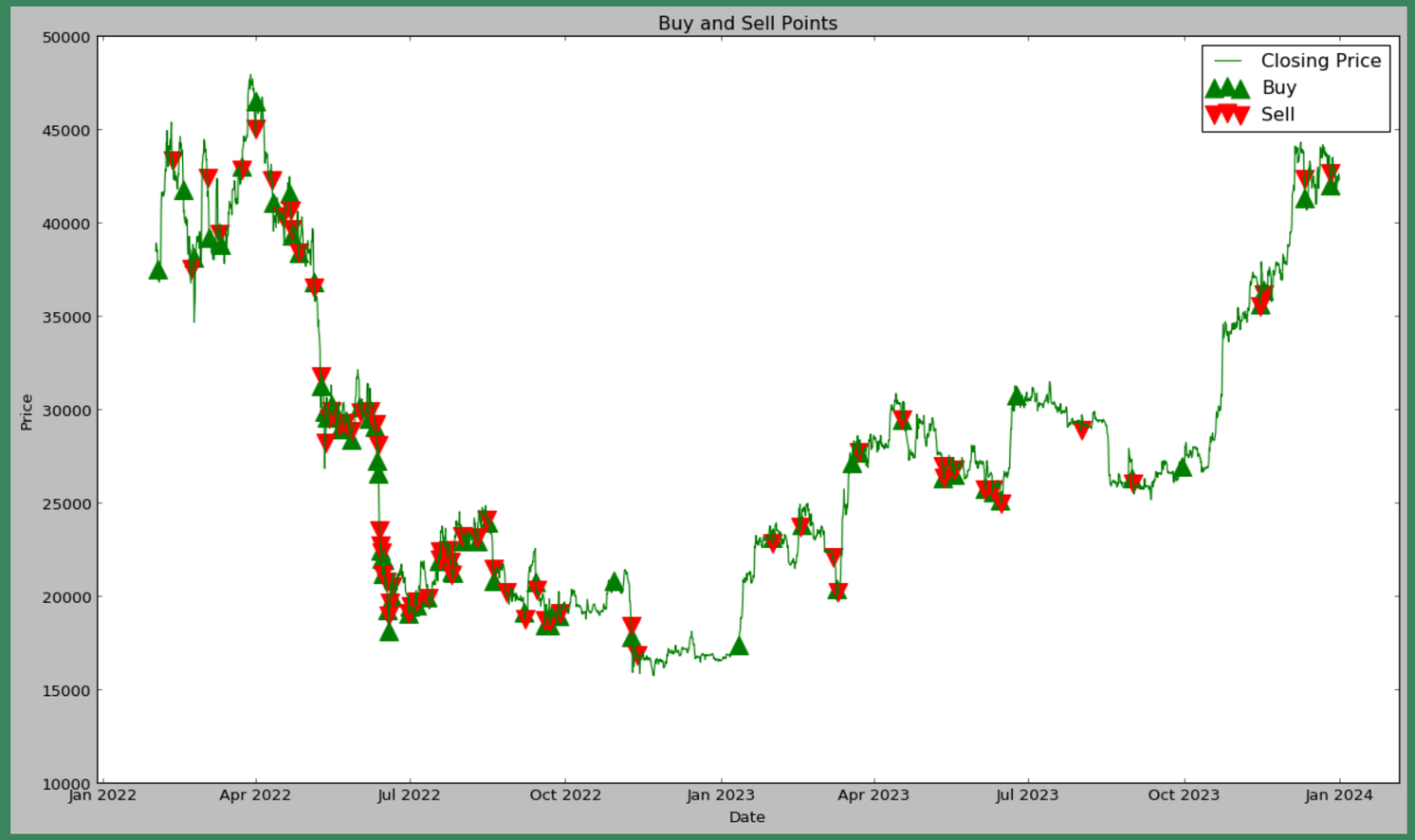
CNN + LSTM Model

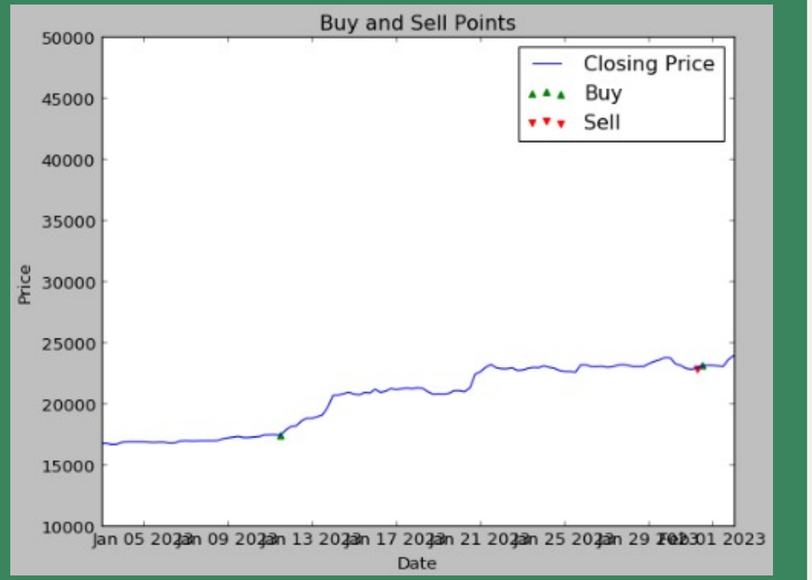
Tested on dataset
from January1, 2023 to
December 31, 2023

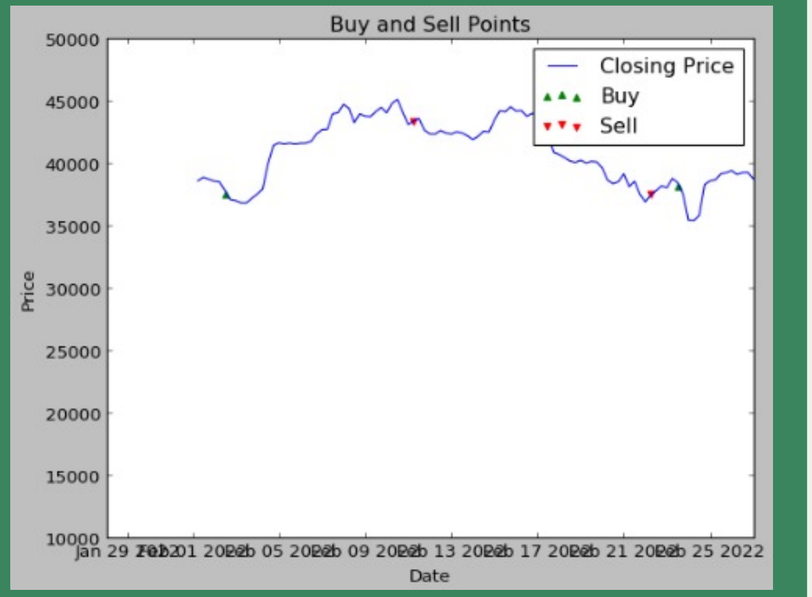
STRATEGIES

- Stop-Loss
- Peak Capture Strategy
- Drawdown Management

Buy & Sell Points







Metric Analysis

Profit and Loss:
16662.72127000004

The profit and loss indicate a net gain of $16662.72.

Sharpe Ratio:
1.0320492971720576

The Sharpe Ratio of 1.03 suggests the risk-adjusted performance of the portfolio, with higher values generally indicating better risk-adjusted returns.

Win%:
51.42857142857142

The "Win%: 51.42" represents a win rate of approximately 51.42%, indicating that, out of a given number of trades or events, around 53.42% ended in a successful or profitable outcome.

Max Drawdown:
3.1%

This is the biggest decrease in investment value, measuring a loss of 3% from the highest to the lowest point.

Risk Reward Ratio:
1.4042321482840108

For every unit of risk, there's an expected reward of 1.40 units, indicating the potential gain compared to potential loss in trading or investing.

Other Metrics

Final Portfolio Value: 116662.72127000004
Cumulative Returns: 0.1666272127000004
Total Closed Trades: 70
Total Won Trades: 36
Average Winning Trade: 1393.5213444444444
Average Losing Trade: 992.3724835294114
Largest Winning Trade: 8521.610754999994
Sortino Ratio: 14.036250482345837
Average Holding period: 4.757142857142857
Average Dip: 0.034815624215261 4
Max Dip: 0.11952433208110744

Bibliography

01.

CodeBasics Youtube Channel

https://www.youtube.com/@codebasics

02

Trading View

https://in.tradingview.com/symbols/BTCUSD/

03.

Science Direct

https://www.sciencedirect.com/science/article/abs/pii/S037704271930398X

04.

CoinMarketCap

https://coinmarketcap.com/currencies/bitcoin/