

The background of the image is a dark blue, high-tech trading environment. A robotic hand with white and black segments is positioned on the right, interacting with a glowing blue circular interface element. In the foreground, a person's hands are visible, typing on a laptop keyboard. The background is filled with various financial data visualizations, including line charts, bar graphs, and circular progress indicators, all rendered in a semi-transparent, glowing blue style. The overall aesthetic is sleek and modern, emphasizing advanced technology and data analysis in the financial market.

CogniWave Trades

Navigating Markets with Cognitive Precision

Siddharth Acharya

Introduction

Objective & Overview

- Given 3-years of 1-minute OHLC dataset for a monthly expiry futures contract
- **Goals:**
 - Create profitable trading strategies and successfully backtest it on the given data
 - Showcase performance and insights of the strategies
- Implemented three distinct strategies in Python
- Strategies include 1D, 15T, and 3T timeframes
- Backtesting using a custom Backtesting Class in Python

Strategy 1: ML-Based Trading Model

Strategy Overview

- Loop through weekly and daily data.
- XGBoost Classifier used on Weekly OHLC Data
 - **1** for bearish and **0** for bullish
 - Retrained every 5 weeks
- EMA is used to exit active trades in case of contradictory signal from the ML model.
- Risk management through ATR indicator
- Closes positions on and before expiry days.

Strategy 1: ML-Based Trading Model

Scenarios

Scenario 1 (Current trade is long, ML model shows 1):

- **IF** $EMA < \text{Low of the week}$:
 - Exit long, enter short.
- **ELSE:** Hold long unless SL/TP is reached.
- **Logic:** Low above EMA indicates retracement, switch trade based on ML signal.

Scenario 2 (Current trade is short, ML model shows 0):

- **IF** $EMA < \text{High of the week}$:
 - Exit short, enter long.
- **ELSE:** hold short unless SL/TP is reached.
- **Logic:** High above EMA indicates potential breakout, switch trade based on ML signal.

Strategy 1: ML-Based Trading Model

Risk Management

- Daily and weekly risk management based on ATR.
- Custom Multiplier * ATR for TP and SL.
- **Daily:** No Take Profit Condition, Stop Loss Multiplier = 0.75.
- **Weekly:** Take Profit Multiplier = 1.5; no Stop Loss.
- Current P&L stored for exit decisions:
- If $\text{Current P\&L} < \text{SL}$ or $\text{Current P\&L} > \text{TP}$, exit position and enter the opposite trade.

Strategy 2: Momentum Reversal Trading Model

Strategy Overview: 3-minute Timeframe

- Signal derived from the change in the 2 previous bars.
- Utilisation of the 3-Minute MACD Indicator for Buy and Sell signals.
- Monitoring consecutive 'up' and 'down' movements.
- Key logic exploits price reversion after continuous market movements.
- Track consecutive 'up' movements without a buy signal from MACD.
- Monitor consecutive 'down' movements without a sell signal from MACD.

Strategy 2: Momentum Reversal Trading Model

Risk & Position Management

- Maintain a fixed Stop Loss (SL) at 15,000, adjustable based on the user's risk tolerance.
- No simultaneous open positions.
- Adherence to specific intraday trading timings.
- Close all positions at 3:00 PM each day

Strategy 3: Price Action Trading Model

15-minute Timeframe

- Candlestick Patterns for detection:
 - Bullish Engulfing and Bearish Engulfing
 - Bullish Doji and Bearish Doji
- List of Support and Resistance Levels till that point
- Trade is based on Candlestick pattern and its proximity to the S/R levels
- SL is based on low or high of previous 2 candles
- Risk-to-Reward Ratio is maintained at 1:1

Key Metrics and Comparison

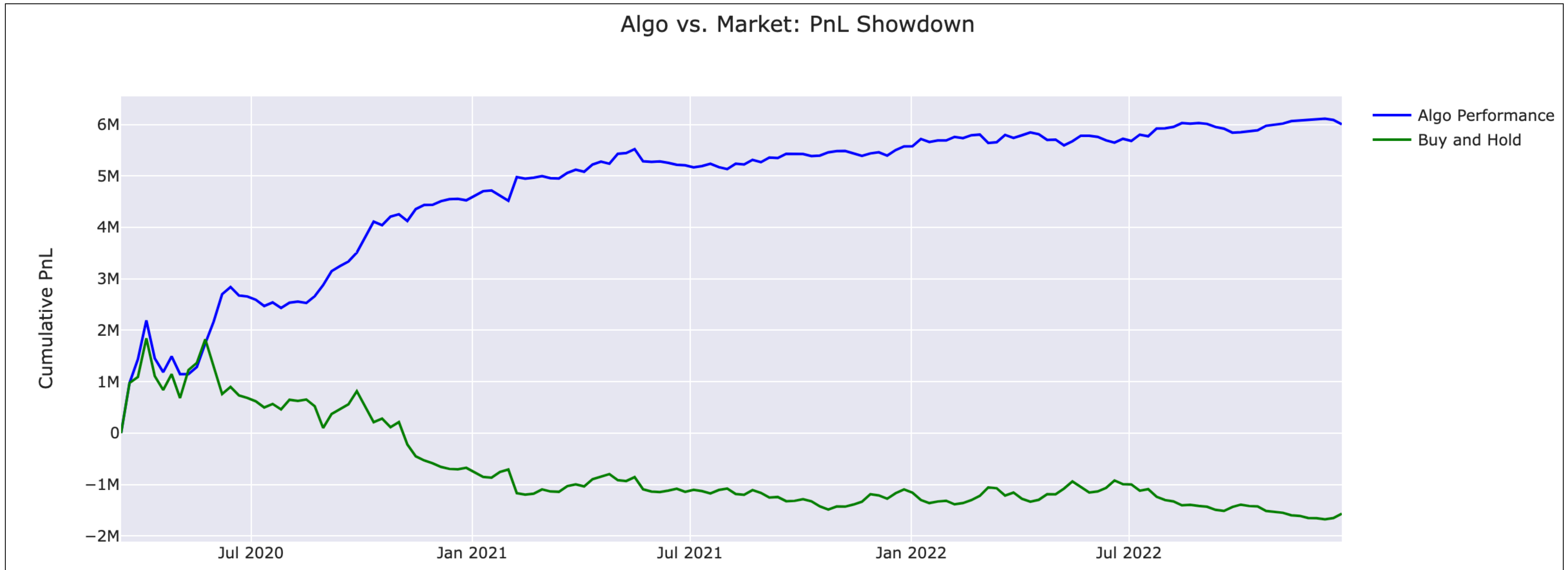
Performance Summary

Metric	Strategy 1 (1D)	Strategy 2 (3T)	Strategy 3 (15T)
Net PnL	60,03,281.52	86,93,804.32	78,60,159.2
Maximum Drawdown	10,44,360.48	4,86,110.27	3,80,578.11
Win Rate	63.79%	45.85%	70.56%
Profit Factor	3.65	1.52	2.70
Gross Profit	82,72,564.00	2,54,41,069.21	1,24,92,879.75
Gross Loss	22,69,282.48	1,67,47,264.89	46,32,720.55

Note: The analysis assumes a fixed trade quantity of 100 units for each trade, with no simultaneous positions opened. All positions are closed on or before expiry. Additionally, a fixed commission of 750 per trade is included in the reported metrics.

Visualisation

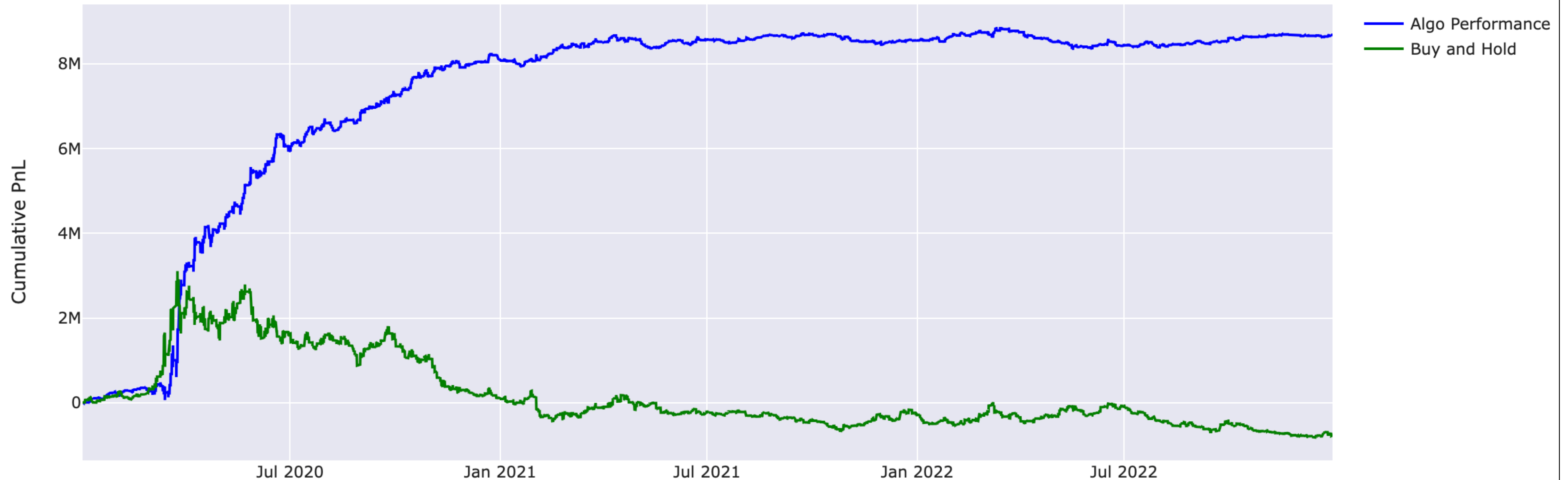
Strategy 1: Equity Growth



Visualisation

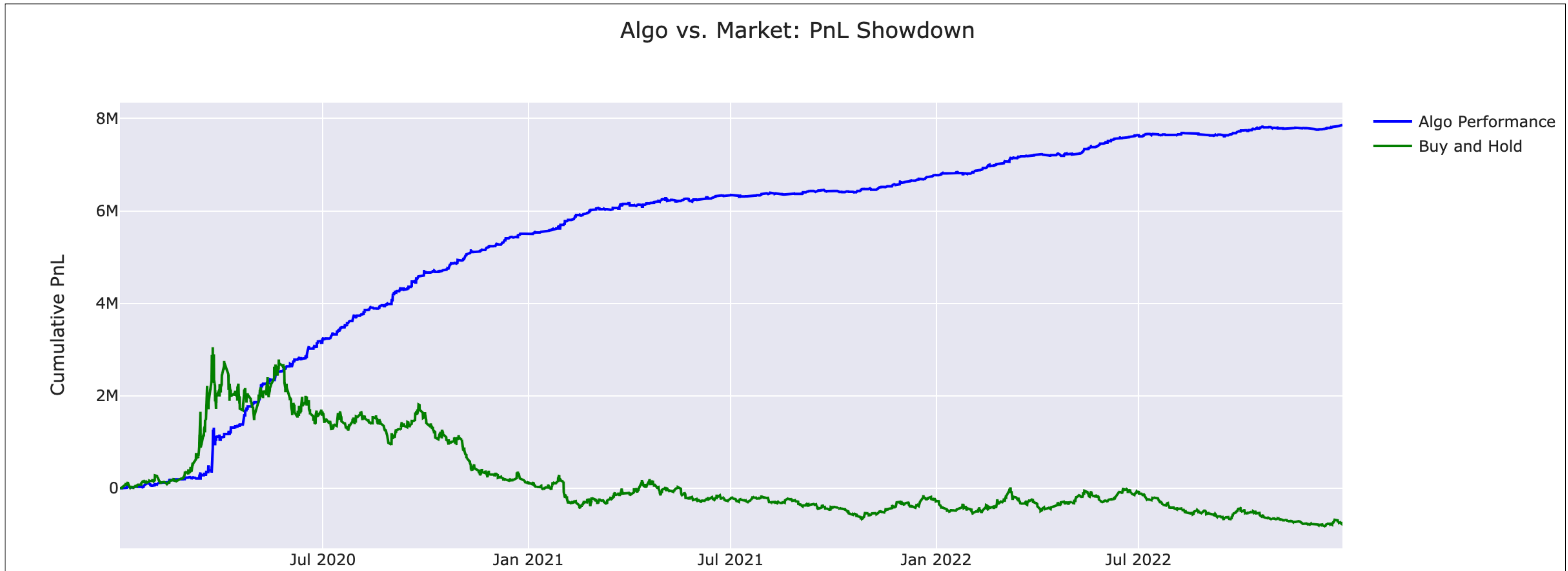
Strategy 2: Equity Growth

Algo vs. Market: PnL Showdown



Visualisation

Strategy 3: Equity Growth



Conclusion

Summary and Thanks

- **Trading Strategies Developed:** 1D (Daily), 3T (3-Minute), 15T (15-Minute)
- **Trading Model Logics:** ML, Momentum Reversal, Price Action
- Utilised Python for creating the models and for backtesting
- Jupyter Notebook Documentation
- Areas for Improvement:
 - Integration of Trailing Stop Loss (SL)
 - Position Sizing
 - Exploration of Combined Strategy Benefits