**Finlatics Project – AlgoTrading’24**

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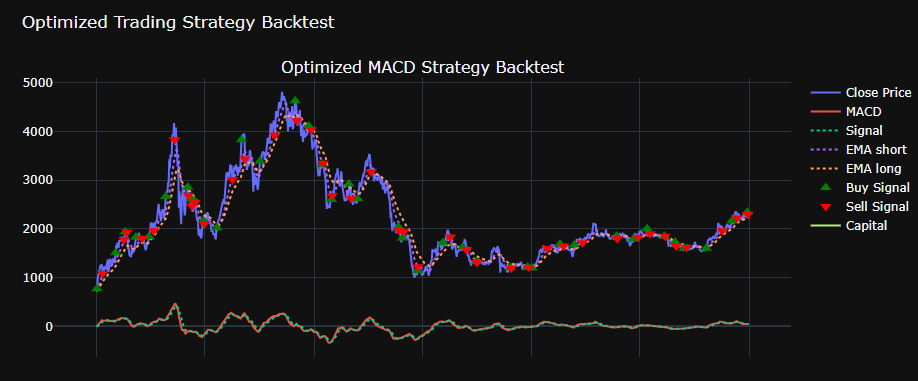
Problem Description

The task involves developing algorithmic trading strategies for the ETH/USDT cryptocurrency market with the objective of outperforming benchmark returns. Participants are required to create trading algorithms that can generate returns while effectively managing risk in the ETH/USDT market.

Strategy

This strategy combines Moving Average Convergence Divergence (MACD) and a trailing stop-loss approach for trading. The calculate\_macd function computes MACD and signal lines based on exponential moving averages of closing prices. The apply\_trading\_strategy function then generates buy and sell signals using MACD crossovers and trailing stop-loss levels.

When the MACD line crosses above the signal line, it triggers a buy signal, and when it crosses below, a sell signal is generated. This strategy utilizes reinforcement learning to determine the parameters for short moving averages, long moving averages, and the value of the trailing stop loss. The reinforcement learning process helps optimize these parameters based on historical data and market conditions, aiming to improve trading performance. The calculated short and long moving averages are used in the MACD calculation to identify trends, while the trailing stop loss value is dynamically adjusted to protect profits and manage risk. This adaptive approach enhances the strategy's responsiveness to market dynamics, potentially leading to more effective trading decisions and improved overall performance.

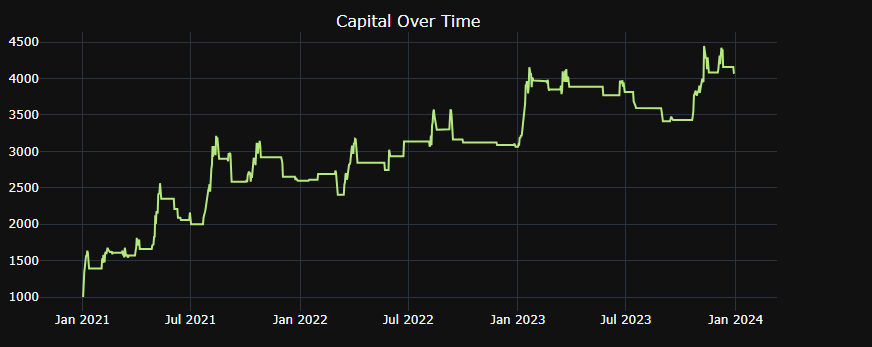


Using reinforcement learning, we find optimal parameters via best\_parameters(), then fit the model for maximum profit and minimum risk, creating a robust and adaptive trading strategy.

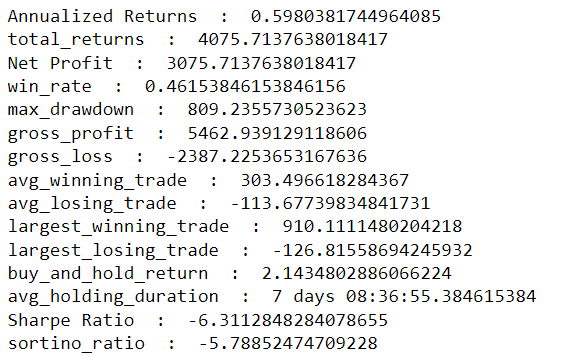
The following are the parameters we find out work best for ETH/USDT market:



The equity curve we get after applying these parameters:



Strategy Metrics



The performance of the trading strategy reveals a strong total return of 4075.71, with a net profit of 3075.71 and annualized returns of 59.80. Despite a win rate of 46.15, the gross profit significantly exceeds the gross loss (5462.94 vs. -2387.23). Average winning trades generate 303.50, while losing trades average -113.68. The largest winning and losing trades are 910.11 and -126.82, respectively. The buy-and-hold return is 2.14. The strategy exhibits a substantial max drawdown of 809.24, indicating risk. The Sharpe and Sortino ratios are negative, suggesting high volatility and potential risk. Average holding duration is about 7.36 days. The use of stop loss minimizes losses, even though there are more losing trades than winning ones, as evidenced by the smaller average loss compared to the average win.