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CRYPTO TRADING CHALLENGE

STRATEGY PRESENTATION

Team 31

Introduction

Over the span of the presentation we discuss the trading strategies and ideas implemented on BTCUSDT over the span of 1 January 2018 to 12 January 2022 working on time frames ranging from 3m, 5m to 1d.

With a major focus on BTCUSDT markets, we first study characteristics of BTCUSDT followed by creating a generalized weight combining engine to attain desired risk return characteristics

Analysing the BTCUSDT Market

BTCUSDT which is considered as one of the most developed crypto trading pair(based on EMH*) when compared to that of S&P 500, shows the following insights:

4X Value at Risk(VaR)

5X Realized Volatility

The above facts indicate that BTCUSDT have a significantly higher noise factor in signals and the markets are less developed compared to USA markets which will be used to change parameters and thresholds of strategies accordingly

Literature indicates a greater predictive power in BTCUSDT(cryptocurrencies) volume data since cryptocurrencies movements remain majorly sentiment (heavily correlated with volume) driven

EMH - Efficient Market Hypothesis

Exploratory Strategies

After an in-depth analysis and implementation of multiple technical indicators, candlestick patterns and ML based models using research papers, we selected the following strategies based on:

- Cumulative and Static Returns
- Drawdown
- Trade Efficiency(Avg. Gain/Trade)
- Correlation with other existing strategies while combining

Parameter selection during strategy creation are based on the following ideologies:

- Hypothesis based parameters
- Using industry standard parameters(by adjusting for characteristics for BTCUSDT)
- Overfitting evaluation - plotting return characteristics to see stability w.r.t. parameters
- Testing effectiveness of parameters for similar crypto assets

Strategies

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Darvas Box

A momentum based strategy relying on breakout signals.

Supertrend Indicator

An indicator based-strategy that provides dynamic resistance and support levels with adjustable sensitivity for better performance and risk management.

Keltner Channels

Uses moving average like bands to determine volatality of the market

ARIMA GARCH

A statistical model that captures changing volatility while determining the auto regressive moving average.

Volume Weighted Average Price

VWAP serves as a market price substitute, incorporating trading volume as weights to reflect the market's perception.

Chaikin Money Flow(CMF)

A strategy that quanitifes the buying and selling pressure to provide a sentiment driven perspective to highly sentiment drive crypto market.

Chaikin Money Flow (CMF)

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Indicator based on volume accumulation/distribution, by quantifying buying and selling pressure in the market.

$$MF = \frac{(Close - Low) - (High - Close)}{High - Low} \times Volume$$

$$CMF = \frac{MF\ (20\ \text{day Rolling Mean})}{Volume\ (20\ \text{day Rolling Mean})}$$

P**arameters:–**

1. ***Lookback period:*** Set at 20 periods, consistent with industry norms to avoid overfitting; this volume-weighted indicator aligns with stock behavior.

2. ***Threshold:*** Set as 0 as the buying and sellling pressure metric is symmetric about 0.

Keltner Channels

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Keltner Channels functions as volatility based bands where the metric used is Average True Range(ATR). The strategy aims to follow the trend during band breakouts.

$$UpperBand = SMA + multiplier \times ATR$$

$$LowerBand = SMA + multiplier \times ATR$$

Parameters:–

1. *Moving Average Window:*

30 periods instead of industry norm of 14 since crypto markets are more noisy and thus require greater smoothening to represent similar performances.

2. *ATR window:*

We choose length as 14 periods, to show the impact of volatility in a time frame which is much more frequent than that of the smoothing window.

SMA: Simple Moving Average

Keltner Channels

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3. *ATR Multiplier:*

We use the multiplier as 3 instead of the stock's standard 2 or 2.5 to avoid misrepresentation bias and overfitting due to cryptocurrencies being more volatile and having more outlier movements compared to that of stocks.

Keltner Channels on BTC 2018-2021

CMF on BTC 2018-2021

Weighted Combiner

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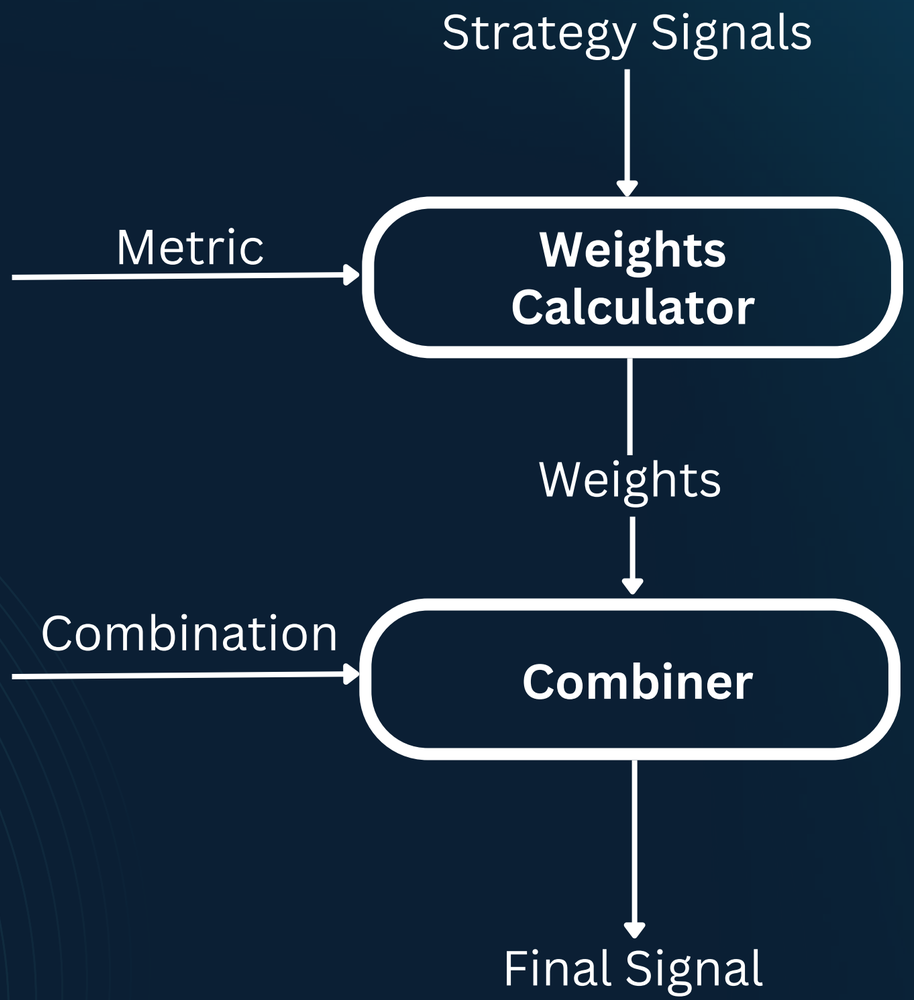
- **Strategy Signals** : Signals of Individual Strategies.
- **Metric** : PnL, Drawdown, Sharpe.
- **Combination** : Best-Till-Now, Best-Recent, Exponential Decay.



Final Strategy

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Keltner Channels

BTCUSDT being sentiment driven, breakout strategies show greater profitability.

CMF

Compared to stocks, volume has a much greater explanatory power in BTC since volume strongly reflects changing sentiments in BTC

Low Correlation

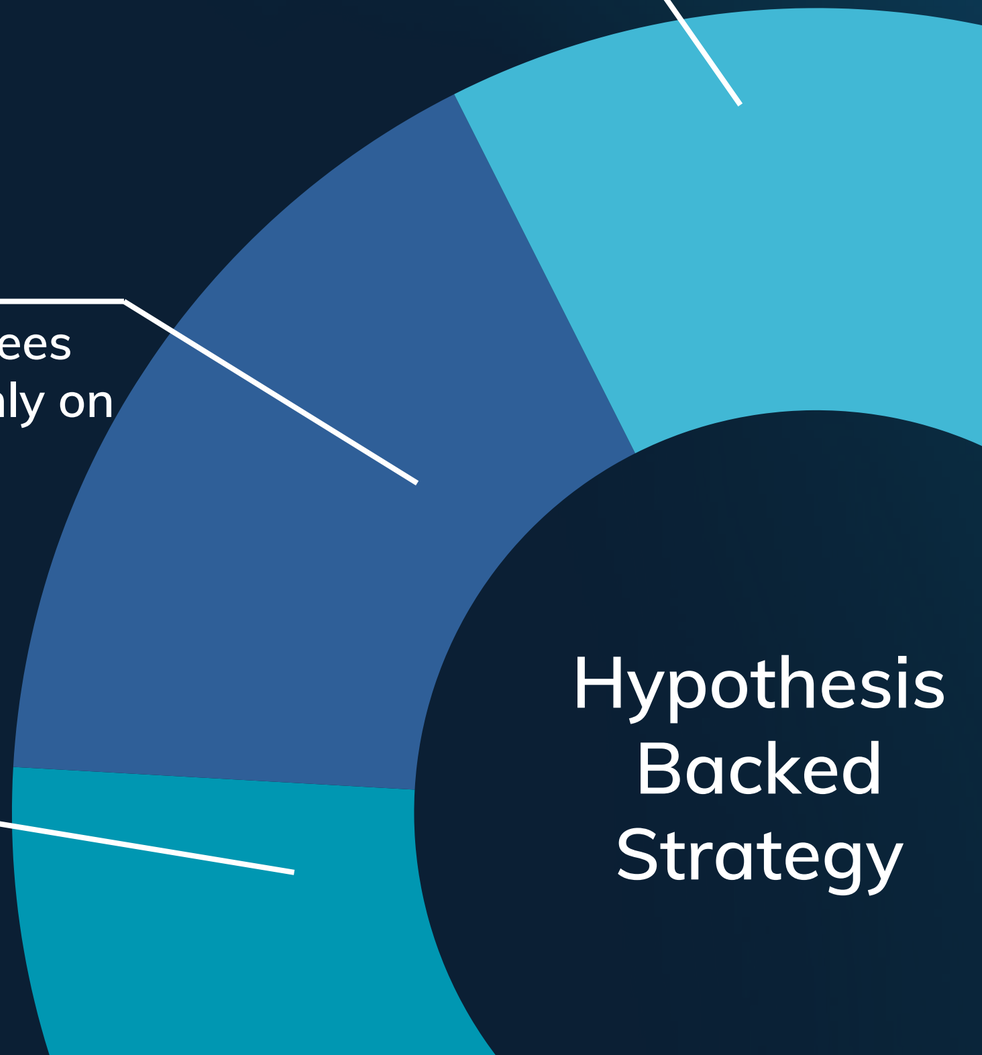
Correlation between positions held by CMF and Keltner Strategies is merely 24.92%

Signal Threshold

A threshold of 0.3 guarantees that the strategy trades only on strong signals

Window Size

A window size of 500 avoids any excess noise present in market deviations



Risk Management

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Weighted Strategy

A weighted combiner strategy that makes use of the current market dynamics to a greater extent and avoid loss making strategies by minimizing their respective weights. shows exemplary performance.
On assigning weights based on:

- Previous P&L - 6500% returns and a static drawdown of 27%
- (Window P&L)/(Window Drawdown) - 3300% returns at a much reduced static drawdown of 21%

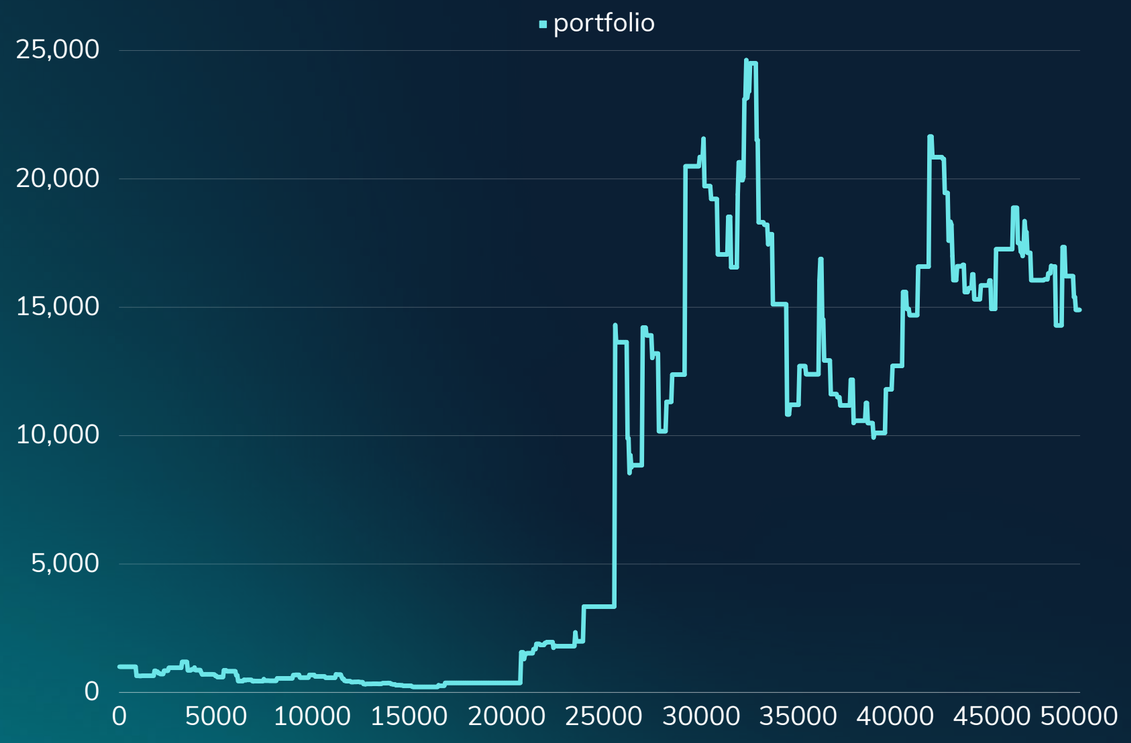
Stop Loss and/or Take Profit

In a highly noisy market, the effectiveness of stop losses drops multi-fold since high potential positions can get squared off due to market noise. Static stop losses are not able to cope with the dynamic nature of the market

Signal Confirmation

Avoiding overtrading by keeping thresholds for confirmation of signals to ensure only strong signals are traded

Strategy Robustness

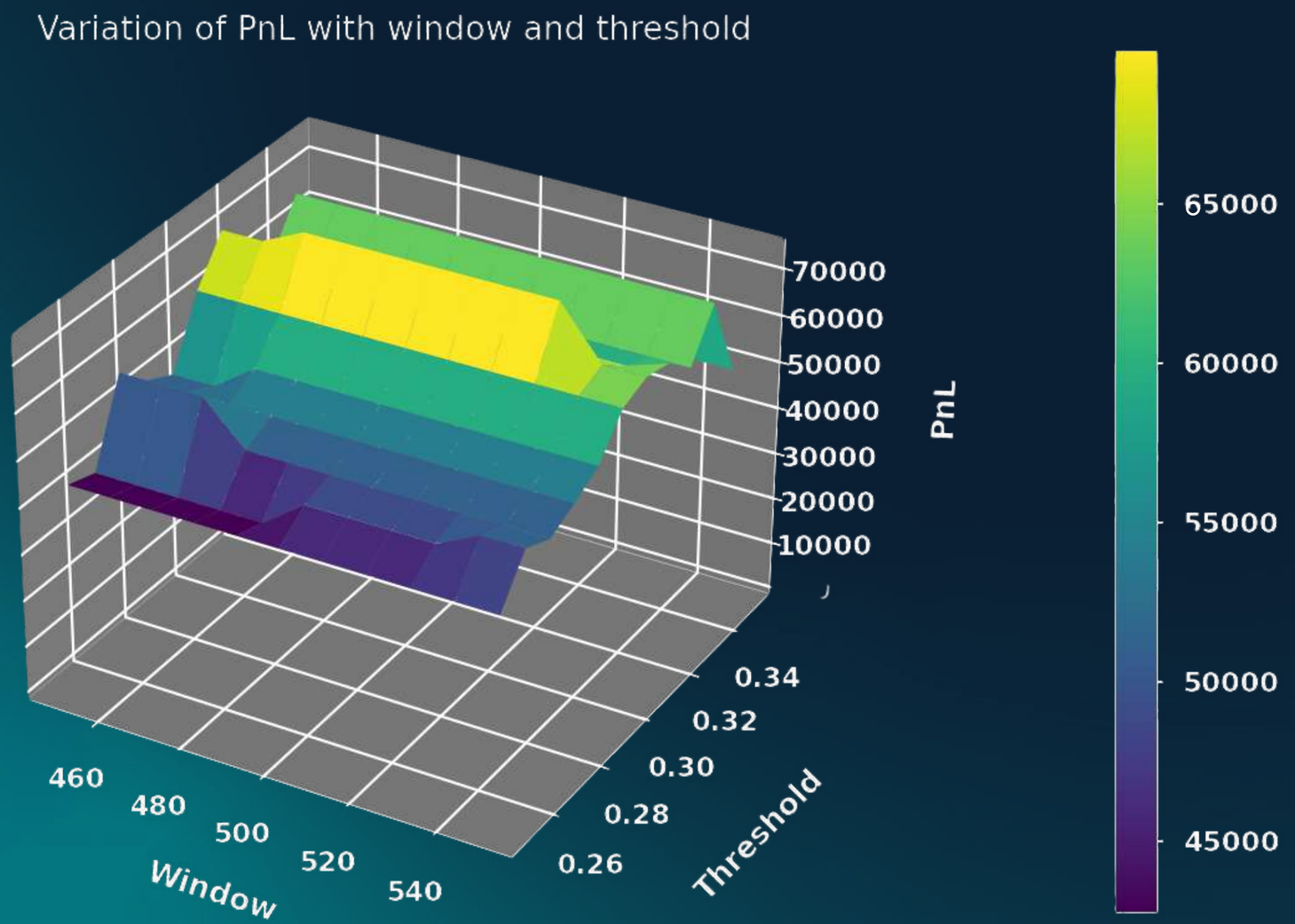


ADA 2018-2023 data

ETH 2018-2023 data

The strategy performs well on both ADA and ETH also with **high returns** and **less drawdowns**

Strategy Robustness



To check for overfitting, we plotted the variation of PnLs with window and threshold.

As observed, the strategy shows very low sensitivity towards both parameters

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RESULTS

Peak Portfolio
80,311

Final Portfolio
64,339

Sharpe Ratio
>3

Sortino Ratio
>25

Profit factor
2.55

Max Drawdown
27.63%

Conclusion

The above generated framework can be effectively used and extended to match the risk-return preferences of individual investors based on selection of strategy as well as weighting logics.

Through the course of this competition, we have aimed at not only developing a strategy for trading cryptocurrencies profitably, but also developing a generalised framework to combine any set of strategies based on a variety of possible metrics.