



ASSIGNMENT-3

Volatility Voyage

Risk Takers
Finance and Analytics Club,
Indian Institute of Technology, Kanpur



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1 Introduction

This report outlines a systematic trading strategy applied to Bitcoin (BTC-USD) using a combination of the Ichimoku Cloud and Fibonacci Retracement. The goal is to capture high-probability trend-following opportunities while maintaining disciplined risk management.

2 Strategy Design

2.1 Ichimoku Cloud

The Ichimoku Cloud is a comprehensive indicator that provides insights into trend direction, momentum, and support/resistance levels.

The components include:

- **Tenkan-sen (Conversion Line):** Average of highest high and lowest low over the last 9 periods.
- **Kijun-sen (Base Line):** 26-period high-low average.
- **Senkou Span A:** Midpoint of Tenkan and Kijun, projected 26 periods ahead.
- **Senkou Span B:** 52-period high-low average, projected 26 periods ahead.
- **Chikou Span:** Current closing price shifted 26 periods back.

A **buy signal** is generated when:

- Price is above the cloud.
- Tenkan-sen crosses above Kijun-sen.
- Chikou Span is above the historical price.

2.2 Fibonacci Retracement

Fibonacci retracement levels are calculated using the most recent swing high and low. Key levels (23.6%, 38.2%, 50%, 61.8%, 78.6%) act as potential areas of support or resistance, helping to refine entries and exits.

2.3 MACD Signals

The Moving Average Convergence Divergence (MACD) is a momentum indicator that helps identify trend direction and strength. It is calculated by subtracting the 26-period Exponential Moving Average (EMA) from the 12-period EMA:

$\text{MACD line} = \text{EMA}_{12} - \text{EMA}_{26}$

How MACD increases returns:

- **Trend Filtering:** By entering trades only when MACD confirms trend direction, we avoid false breakouts during sideways markets.
- **Momentum Capture:** MACD ensures that trades align with strong directional moves, enhancing profitability.
- **Exit Optimization:** Divergences between price and MACD help in early exit, protecting gains before reversals.

3 Risk Management

3.1 Position Sizing

The strategy implicitly encourages disciplined position sizing. Suggestions include:

- Risking a fixed percentage of capital per trade (e.g., 1%).
- Using ATR (Average True Range) to place volatility-adjusted stop-losses.

3.2 Trade Filtering

To improve signal quality:

- Trades are only taken when cloud signals and Fibonacci levels align.
- Sideways markets are avoided by requiring a clearly formed cloud.

4 Visualizations



Figure 1: BTC-USD Price Chart with Ichimoku Cloud and Buy Signals

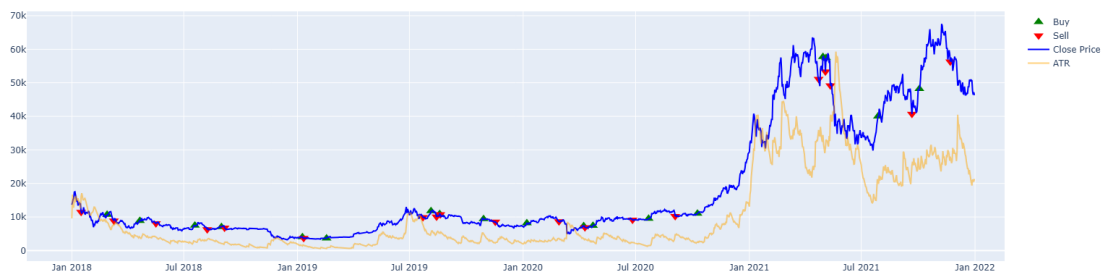


Figure 2: Fibonacci Retracement Levels over BTC Price

5 Conclusion

By combining Ichimoku Cloud for trend confirmation and Fibonacci levels for retracement support, this strategy offers a technically sound and disciplined approach to trading. Emphasis on signal filtering and adaptive risk further strengthens its robustness.



Figure 3: Portfolio Value Over Time