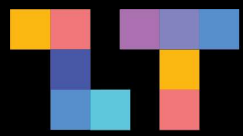


Mid Prep



ZeltaLabs



untrade

CRYPTO TRADING CHALLENGE



Problem Statement: Algorithmic Trading Strategy Development for BTC/USDT Crypto Market

Domain Description

Algorithmic trading is a domain within the finance industry that involves the use of computer programs and mathematical models to execute trading strategies. It requires a deep understanding of financial markets, data analysis, statistical modeling, and programming expertise.

The motivation behind this problem statement is to harness the potential of algorithmic trading to not only generate returns but to do so consistently and robustly in the cryptocurrency market.

Participants are encouraged to leverage their expertise to create strategies that can outperform benchmarks, safeguard capital, and operate with statistical soundness. This challenge is rooted in the recognition that algorithmic trading can be a transformative force in cryptocurrency trading, offering traders the ability to adapt to market dynamics and seize opportunities with precision and agility.

Problem Description

The problem consists of developing algorithmic trading strategies for the BTC/USDT cryptocurrency market, aiming to outperform benchmark returns. Participants are required to create trading algorithms that can generate returns while managing risk effectively in the specific BTC/USDT market. The problem can be divided into the following tasks:

- 1. Data Acquisition:** Participants are advised to use historical price and trading volume data for the BTC/USDT trading pair from January 1, 2018, to December 31, 2022, for strategy development and testing.
- 2. Data Preprocessing:** Clean and preprocess the acquired data, with a specific focus on the provided timeframes (January 1, 2018, to December 31, 2022), to ensure its quality and compatibility for analysis. Handle missing data, adjust for splits, and perform any necessary data transformations within this defined period.
- 3. Strategy Design:** Design algorithmic trading strategies that utilize statistical and mathematical models tailored to the BTC/USDT market. This may include trend-following, mean-reversion, momentum centric, machine learning, or other quantitative approaches.
- 4. Backtesting:** Implement the strategies and conduct extensive backtesting using historical data of the BTC/USDT market to assess their performance. Participants should take into account transaction costs and slippage in their simulations. These costs are to be considered at a rate of 0.10 percent per transaction.



5. Risk Management: Develop risk management rules and mechanisms specific to the BTC/USDT market to protect capital and reduce drawdowns.

6. Optimization: Fine-tune the strategies to maximize returns while maintaining acceptable risk levels in the BTC/USDT market. Participants may need to adjust parameters and rules based on the backtesting results.

Data and Resources

Participants can use publicly available cryptocurrency market data sources, API services, or simulated data for BTC/USDT. Access to historical data for the BTC/USDT trading pair from January 1, 2018, to December 31, 2022, may be provided or suggested as a resource.

Deliverables

Participants should submit the following deliverables:-

1. Algorithm Code:- The source code of the algorithmic trading strategies developed for the BTC/USDT market, along with documentation explaining the logic and parameters used. Code submissions must be made using Google Colab Notebook, Jupyter Notebook, or any other web-based interactive computing platform on Zelta Labs' GitHub repository by a specified deadline.

2. Backtesting Results:- Detailed backtesting results specific to the BTC/USDT market, using the four-year historical data, including performance metrics (e.g., Sharpe ratio, annualized returns, maximum drawdown) and visualizations (e.g., equity curve, trade history). The objective is not just to generate profits but to do so with statistical soundness and robustness.

3. Risk Management Plan:- A clear description of the risk management mechanisms specific to the BTC/USDT market, including stop-loss rules, position sizing, and risk-reward ratios.

4. Presentation:- A presentation summarizing the strategy, its rationale, backtesting results, and risk management approach, all tailored to the BTC/USDT market.

5. Report:- A comprehensive report detailing the development process, strategy optimization, and any insights gained during the project, with a focus on the BTC/USDT market.



Judging Criteria

The judging criteria will be based on the following aspects, with a focus on the BTC/USDT market:-

1. **Performance (40 points):-** Evaluation of the strategy's historical performance in the BTC/USDT market, including risk-adjusted returns, consistency, and drawdowns

<u>ASSET CLASS</u>	<u>AVERAGE ANNUAL RETURNS</u>	<u>MAXIMUM DRAWDOWNS</u>
BTC/USDT	100%	1.5%
BTC/USDT	150%	2%
BTC/USDT	300%	4%
BTC/USDT	450%	6%
BTC/USDT	600%	8%

In this competition, crafting algorithmic trading strategies closely aligned with given parameters—annual returns and drawdowns—is key.

Aim for the sweet spot: impressive returns and prudent risk management. Strategies inherently robust, not exceeding 7-8 percent drawdowns, define excellence for us and participants devising these strategies will have an inherent advantage in the competition.

2. **Strategy Logic (20 points):-** Assessment of the soundness and effectiveness of the mathematical and statistical models used in the strategy, with a focus on BTC/USDT market dynamics.

3. **Risk Management (20 points):-** Evaluation of the risk management mechanisms specific to the BTC/USDT market and their effectiveness in preserving capital.



4. Code Quality and Data Visualization (10 points):- Review of the clarity, organization, and efficiency of the code tailored to the BTC/USDT market. We will also assess the implementation of Object-Oriented Programming (OOP) principles, which promote code modularity and maintainability.

5. Presentation (5 points):- Assessment of the quality and clarity of the presentation materials in English, focusing on the BTC/USDT market.

6. Report (5 points):- Evaluation of the completeness and depth of the written report, with a specific emphasis on insights and analysis related to the BTC/USDT market.

Avoiding Overfitting

Participants are strongly advised to be vigilant against overfitting when developing algorithmic trading strategies for the BTC/USDT cryptocurrency market.

Overfit strategies may appear highly profitable during backtesting, but they often lack robustness and can result in significant losses in live trading (front test of strategy).

Requested Metrics for Strategy

We require participants to organize and assess their trading strategies based on a set of comprehensive metrics.

These metrics provide a multifaceted view of each strategy's performance and risk characteristics, simplifying the evaluation of its robustness and effectiveness.

This structured approach allows us for a thorough analysis and comparison of trading strategies.

Certainly, here are the metrics presented in numerical order:

1. Gross Profit
2. Net Profit
3. Total Closed Trades
4. Win Rate (Profitability %)
5. Max Drawdown
6. Gross Loss
7. Average Winning Trade (in USDT)
8. Average Losing Trade (in USDT)
9. Buy and Hold Return of BTC
10. Largest Losing Trade (in USDT)
11. Largest Winning Trade (in USDT)
12. Sharpe Ratio
13. Sortino Ratio
14. Average Holding Duration per Trade



Hypothetical Example of above Comprehensive metrics:-

Strategy Description: A mean-reversion strategy aims to profit from the tendency of BTC/USDT prices to revert to their mean or average price. When the price moves significantly away from the mean, the strategy opens a trade with the expectation that the price will return to the mean.

Certainly, let's analyze the mean-reversion trading strategy for BTC/USDT using the provided metrics, considering a starting capital of \$100,000.

1. Gross Profit: \$50,000

- This represents the total profit generated from all closed trades. It indicates that the strategy was successful in capturing profits from price fluctuations.

2. Net Profit: \$47,000

- After accounting for fees, commissions, and brokerage costs, the strategy generated a net profit of \$47,000. This is the actual amount you would have made.

3. Gross Loss: -\$10,000

- The strategy also incurred losses, totaling \$10,000. This is a normal part of trading, but the strategy managed to outweigh losses with profits.

4. Max Drawdown: -\$7,000

- The maximum drawdown represents the largest loss experienced during the trading period. In this case, the strategy's worst drawdown was -\$7,000.

5. Buy and Hold Return of BTC: 20%

- The strategy's performance is compared to a simple buy and hold approach. If you had invested your initial \$100,000 in BTC I first trade and held it throughout the test period, you would have achieved a 20% return.

6. Sharpe Ratio: 1.2

- The Sharpe ratio is a measure of risk-adjusted return. A ratio of 1.2 indicates that the strategy is generating a good return for the level of risk taken.

7. Sortino Ratio: 1.5

- The Sortino ratio, which focuses on downside risk, is also favorable at 1.5. This suggests that the strategy is efficient in managing losses and generating return.

8. Total Closed Trades: 100

- The strategy executed 100 trades during the test period.



9. Number of Winning Trades: 75

- Out of the 100 trades, 75 were profitable. This gives a win rate (profitability percentage) of 75%.

10. Number of Losing Trades: 25

- The remaining 25 trades resulted in losses.

11. Average Winning Trade (in USDT): \$2,000

- On average, each profitable trade yielded a profit of \$2,000.

12. Average Losing Trade (in USDT): -\$400

- On average, each losing trade resulted in a loss of \$400.

13. Largest Winning Trade (in USDT): \$5,000

- The best single trade generated a profit of \$5,000.

14. Largest Losing Trade (in USDT): -\$1,500

- The largest loss in a single trade was \$1,500.

15. Average Holding Duration per Trade: 2 days

- On average, each trade was held for 2 days before being closed.

Given a starting capital of **\$100,000**, the strategy was able to generate a net profit of **\$47,000**, resulting in a **47% return on investment (ROI) during the test period**. It outperformed a simple buy and hold strategy, which would have yielded a **20% return**, and achieved a favorable risk-adjusted return with a **Sharpe ratio of 1.2 and a Sortino ratio of 1.5**.

Periodic Check-In System

To ensure the smooth progression of the project, we will allocate a dedicated team for periodic check-ins. This team will be available to address any queries or concerns faced by participating teams in their algorithmic trading strategy development.

We will be using a Discord server as the primary channel of communication for all 22 participating teams. This will streamline communication and foster collaboration between Participants and Zelta Tech. Additionally, we have scheduled a Google Meet session three weeks after the competition initiation to provide a platform for more in-depth discussions and updates. We look forward to a productive and collaborative competition. If you have any questions or need further information, please don't hesitate to reach out via Discord.



Additional Reference Points

1. Triumph of Jim Simons

Jim Simons, a mathematician who achieved legendary status as a hedge fund manager. He harnessed mathematics and statistics to consistently beat the financial markets. His algorithms analyzed data, identified patterns, and consistently outperformed traditional strategies, making him the most successful manager on Wall Street.

Simons' story illustrates the transformative power of math and statistics in trading, serving as inspiration for participants aiming to craft innovative and profitable strategies for the BTC/USDT market.

2. Trading Insights

TradingView, a widely used online platform, provides a wealth of resources for traders and investors. It offers real-time market data, advanced charting tools and participants are encouraged to explore TradingView for insights, chart analysis, and strategy development. It can be an invaluable reference to stay informed about market trends.

Thank You and good luck!

Thank you for joining Zelta Tech's Algorithmic Trading Strategy Development competition for BTC/USDT. Your expertise and innovation are vital to this challenge.

Best of luck in crafting strategies that redefine success. It's not just about the profits but the journey of discovery and learning.

