

## 1 Introduction

This project provides a comprehensive analysis of historical trade data from Binance accounts. It calculates key financial metrics such as ROI (Return on Investment), Sharpe Ratio, Maximum Drawdown (MDD), and other trading performance indicators. The goal is to rank accounts based on their performance and identify the top 20 performing accounts.

## 2 Dataset Information

The dataset contains the following fields:

- **Port\_IDs**: Unique identifiers for each account.
- **Trade\_History**: A nested column containing detailed trade information, including:
  - **timestamp**: The time of the trade.
  - **asset**: The cryptocurrency being traded.
  - **side**: BUY or SELL.
  - **price**: The price at which the trade occurred.
  - **quantity**: The money involved in the trade.
  - **realizedProfit**: The profit or loss from the trade.

## 3 Objective

The objective of this project is to:

1. Analyze historical trade data for multiple Binance accounts over 90 days.
2. Calculate key financial metrics for each account.
3. Rank accounts based on a composite score derived from these metrics.
4. Identify the top 20 performing accounts.

## 4 Metrics to Calculate

The following metrics are calculated for each account:

1. **ROI (Return on Investment)**: Measures account profitability as a percentage of investment.
2. **PnL (Profit and Loss)**: Total profit or loss for the account.
3. **Sharpe Ratio**: A risk-adjusted return metric that evaluates performance relative to volatility.
4. **MDD (Maximum Drawdown)**: The largest drop from peak portfolio value to trough during the analysis period.
5. **Win Rate**: Percentage of trades that were profitable.
6. **Win Positions**: Total number of trades with positive realized profit.
7. **Total Positions**: Total number of trades executed.

## 5 Steps to Complete

### 5.1 1. Data Exploration and Cleaning

Load the dataset and inspect for missing or invalid values. Handle missing values by filtering out incomplete rows or imputing missing data where possible. Parse Trade\_History into individual trades for detailed analysis.

### 5.2 2. Feature Engineering

Extract relevant features from Trade\_History, such as:

- **win\_positions**: Number of profitable trades.
- **positionSide**: Classify trades as long\_open, long\_close, etc., using side and positionSide.

Calculate realized profit/loss for each trade.

### 5.3 3. Metrics Calculation

Compute the following metrics for each account:

- ROI, PnL, Sharpe Ratio, MDD, Win Rate, Win Positions, and Total Positions.

### 5.4 4. Ranking Algorithm

Normalize metrics to standardize values across different scales. Assign weights to metrics based on their importance:

- ROI: 30%
- PnL: 20%
- Sharpe Ratio: 20%
- MDD: 10%
- Win Rate: 10%
- Win Positions: 10%

Calculate a composite score for each account using weighted averages. Rank accounts based on their composite scores.

## 6 Additional Notes

- **Win Positions**: Represents the number of trades with positive realized profit.
- **Position Identification**:
  - Combine side and positionSide to classify trades (e.g., long\_open, long\_close).
  - Use quantity to indicate money in the trade and realizedProfit to measure profitability.

## 7 Insights from Binance Analytics

The power of analytics in trading is undeniable, especially in volatile markets like cryptocurrencies. Tools like those provided by Binance enable traders to:

1. Perform technical analysis using historical price charts and technical indicators (e.g., moving averages, RSI).
2. Conduct fundamental analysis by evaluating an asset's use case, team, partnerships, and transaction volumes.
3. Leverage real-time market data to identify trading opportunities quickly.

By combining technical and fundamental analysis with historical trade data, traders can make informed decisions about their portfolios.

## 8 Deliverables

1. **Jupyter Notebook or Python Script:** Contains all code for data preprocessing, metric calculation, ranking algorithm implementation, and visualization.
2. **CSV Files:**
  - `metrics.csv`: Contains calculated metrics for all accounts.
  - `top_20_accounts.csv`: Contains details of the top 20 ranked accounts based on composite scores.
3. **Documentation:** A concise report summarizing methodology, findings, assumptions, and conclusions.

## 9 Conclusion

This project analyzes Binance trade data to measure account performance using key financial metrics like ROI, Sharpe Ratio, MDD, etc. By ranking accounts based on a composite score derived from these metrics, it identifies top-performing accounts that exhibit high profitability and effective risk management strategies.

The insights gained from this analysis can help traders optimize their strategies and improve decision-making in volatile cryptocurrency markets.