Report: Binance Trade Data Analysis

Objective

The objective of this analysis was to evaluate the performance of various Binance accounts over a 90-day period based on historical trade data. Key financial metrics were calculated, and accounts were ranked to provide insights into their performance.

Data Overview

- **Dataset:** Contains trade data for 150 accounts, with one missing value in the `Trade_History` column.
- **Columns:**
  - `Port_IDs`: Unique identifiers for Binance accounts.
  - `Trade_History`: JSON-formatted data detailing trades (timestamp, asset, side, price, etc.).

Methodology

1. **Data Exploration and Cleaning**
   - Missing values in the `Trade_History` column were removed.
   - Numeric columns with missing values were filled with the column mean to ensure completeness.
2. **Feature Engineering**
   - The `Trade_History` column was parsed to create a detailed **DataFrame** for each account.
   - A new column, `trade_type`, was created by combining `side` and `positionSide` to classify trades (e.g., `long_open`, `long_close`).
3. **Metrics Calculation**
   - **Return on Investment (ROI):** Total realized profit divided by total investment.
   - **Profit and Loss (PnL):** Total realized profit.
   - **Sharpe Ratio:** Risk-adjusted return using the standard deviation of daily profits.
   - **Maximum Drawdown (MDD):** Largest peak-to-trough decline in cumulative returns.
   - **Win Rate:** Percentage of profitable positions.
   - **Win Positions:** Number of trades with positive profit.
   - **Total Positions:** Total number of trades executed.
4. **Ranking Algorithm**
   - Accounts were ranked based on a weighted average of key metrics: ROI, PnL, Sharpe Ratio, and Win Rate.

Results

1. **Calculated Metrics**
   A comprehensive CSV file (`calculated_metrics.csv`) was generated containing all metrics for each account.
2. **Top 20 Accounts**
   The top 20 accounts, based on the ranking algorithm, were listed in a separate CSV file (`top_20_accounts.csv`).

Key Insights

- Accounts with a higher ROI and Sharpe Ratio demonstrated consistent performance with low risk.
- Accounts with a higher Win Rate and PnL contributed significantly to overall profitability.
- Maximum Drawdown helped identify accounts with substantial drawdowns, which were ranked lower.

Assumptions

- Missing numeric values were filled with column means to maintain dataset integrity.
- All trades were considered independent and equally weighted in the calculations.
- The 90-day period was assumed to be representative of typical account performance.

Deliverables

1. **Jupyter Notebook/Python Script:** Contains the complete code and analysis.
2. **CSV Files:**
   - `calculated_metrics.csv` – Financial metrics for all accounts.
   - `top_20_accounts.csv` – Ranked top 20 accounts.
3. **This Report:** Provides a detailed explanation of the methodology, findings, and assumptions.

Conclusion

This analysis effectively evaluates account performance using comprehensive financial metrics and provides actionable insights through ranking.