# **REPORT**

## **Objective :-**

Analyze the dataset to calculate financial metrics for each account, rank them, and provide a top 20 list.

Metrics to Calculate

* ROI (Return on Investment)
* PnL (Profit and Loss)
* Sharpe Ratio
* MDD (Maximum Drawdown)
* Win Rate
* Win Positions
* Total Positions

## **Overview of the Task**

### Data Exploration and Cleaning

* Load and inspect the dataset to ensure data integrity.
* Handle any missing or inconsistent values.

### Scoring System

* Identify and evaluate the importance of various features.
* Develop a scoring system by assigning weighted scores to different metrics.

Ranking Algorithm

* Create an algorithm to rank accounts based on the calculated metrics.
* Apply the ranking algorithm to generate a ranked list of accounts.

Position Analysis

* Analyze trade positions to assess the distribution of wins and losses across different trading strategies.
* Provide insights based on the performance of different trading strategies.

**DATA EXPLORATION AND CLEANING**

Given data consists of 2 Columns Port ID (150 different accounts) and Trade History of 90 Days.

To clean and simplify this data we created different files with {Port\_ID}.csv

Eventually Checking all files for null and missing values and handling them.

First, we need to aggregate the trade history data into meaningful metrics for each account stored in separate CSV files named {Port\_ID}.csv.

Calculated relevant financial metrics like ROI (Return on Investment), PnL (Profit and Loss), Sharpe Ratio, MDD (Maximum Drawdown), Win Rate, Win Positions, Total Positions storing them into a single csv file for further creating **Scoring System** and **Ranking Algorithm.**

### Metrics and Their Formulas:

1. **ROI (Return on Investment)**

ROI = Total Profit / Total Investment

1. **PnL (Profit and Loss)**

PnL = Sum of Realized Profit

1. **Sharpe Ratio**

Sharpe Ratio = (Mean Return - Risk-Free Rate) / Standard Deviation of Return

1. **MDD (Maximum Drawdown)**

MDD = Maximum observed loss from a peak to a trough

1. **Win Rate**

Win Rate = Number of Profitable Trades / Total Trades

1. **Win Positions**

Win Positions = Sum of Trades with Positive Realized Profit

1. **Total Positions**

Total Positions = Total Trades

**SCORING SYSTEM**

Assigning Weights to the Financial Metrics are as follows:

ROI: 0.25

MDD: 0.15

Sharpe Ratio: 0.2

Win Rate: 0.1

PNL: 0.25

Win Positions: 0.05

Total Positions: 0.05

Score = ROI \* 0.25 + PNL \* 0.25 + Sharpe Ratio \* 0.2 + MDD \*0.15 + Win Rate \* 0.1 + Win Position \* 0.05 + Total Position \* 0.05

To avoid being overly dependent on financial metrics like ROI, PnL, and Sharpe Ratio, we have included metrics such as Win Rate, Win Positions, and Total Positions in our evaluation. This approach helps to prevent the data from becoming overly skewed and provides a more holistic assessment of each account's performance.

One Limitation for this approach would be Win Positions and Total Positions heavily influencing scoring system thats weights assigned to them is very less.

List of Top 20 Accounts on the basis of Evaluated Score :

|  |  |  |
| --- | --- | --- |
| Port ID | score | rank |
| 4020204877254590000.00 | 18405.25 | 1 |
| 3999240873283310000.00 | 10993.44 | 2 |
| 4021669203289710000.00 | 6720.59 | 3 |
| 3960874214179950000.00 | 5078.324 | 4 |
| 3907081197088380000.00 | 4844.319 | 5 |
| 3956076827719370000.00 | 4499.692 | 6 |
| 4028701921959170000.00 | 4458.95 | 7 |
| 3986814617275050000.00 | 4409.188 | 8 |
| 3788465932399410000.00 | 3716.85 | 9 |
| 4022565861939830000.00 | 3608.654 | 10 |
| 3987739404272880000.00 | 3490.136 | 11 |
| 3931992636670880000.00 | 3021.913 | 12 |
| 4008711265867860000.00 | 2857.033 | 13 |
| 3936410995029300000.00 | 2675.201 | 14 |
| 3939318616482040000.00 | 2469.548 | 15 |
| 3998572645139650000.00 | 2422.7 | 16 |
| 3962024093501270000.00 | 2411.826 | 17 |
| 4031493134338250000.00 | 2402.958 | 18 |
| 3944088772635000000.00 | 2342.05 | 19 |
| 4017263283405460000.00 | 2192.94 | 20 |

**RANKING ALGORITHM**

Assumptions

* Rank Variable: The ranking algorithm assumes that the Rank variable, which we have created based on financial and performance metrics, accurately represents the true performance ranking of each account. This rank is used as the target variable for training and evaluation.
* Metric Weights: The weights assigned to each metric (ROI, PnL, Sharpe Ratio, MDD, Win Rate, Win Positions, Total Positions) are assumed to be appropriate and reflective of their relative importance. Adjusting these weights might impact the final rankings.

Findings

* Mean Absolute Error (MAE): The mean absolute error of the predicted ranks is 8.0214408993721. This indicates the average absolute difference between the predicted and actual ranks.
* R-squared (R²): The R-squared value is 0.9532344250745944, suggesting that approximately 95.32% of the variance in the actual ranks can be explained by the model's predictions. This high R-squared value indicates a strong fit of the model to the data.
* Test Loss: The test loss, evaluated as 89.50208282470703, represents the model's performance on the test dataset. This metric helps in understanding the error made by the model when predicting ranks on unseen data.

Limitations

* Model Dependency on Assumptions: The model's effectiveness heavily relies on the accuracy and appropriateness of the assumptions made, particularly the creation of the rank variable and the assignment of weights to various metrics. If these assumptions are flawed, the model's predictions may be inaccurate.
* Potential Overfitting: Given the high R-squared value, there is a possibility of overfitting, where the model performs well on the training data but may not generalize well to new, unseen data.
* Metric Selection and Weighting: The selected metrics and their respective weights might not capture all aspects of account performance. Additionally, the chosen weights are somewhat subjective and may need adjustment based on further validation or domain expertise.
* Data Quality and Availability: The accuracy of the model's predictions is contingent on the quality and completeness of the data. Any missing, incorrect, or biased data can adversely impact the resu
* **POSITION ANALYSIS**

Analyzed the distribution of win and lose positions across different trading strategies. This analysis provides insights into the effectiveness of each trading strategy and the overall performance of the accounts.

### Win and Lose Positions by Trading Strategy

| Trading Strategy | Win Positions | Lose Positions |
| --- | --- | --- |
| SELL LONG | 23,187 | 7,473 |
| BUY SHORT | 27,802 | 7,381 |
| BUY LONG | 0 | 31,297 |
| SELL SHORT | 0 | 36,264 |

### Total Positions

| Position Type | Count |
| --- | --- |
| Win Positions | 84,178 |
| Lose Positions | 127,811 |
| Total | 211,989 |

### Observations

* **SELL LONG**: There are 23,187 win positions and 7,473 lose positions, indicating a relatively higher success rate for SELL LONG trades compared to the other strategies.
* **BUY SHORT**: This strategy shows 27,802 win positions and 7,381 lose positions, which also suggests a strong performance with a considerable number of winning trades.
* **BUY LONG and SELL SHORT**: Both strategies have no winning positions but have significant numbers of losing positions, with 31,297 for BUY LONG and 36,264 for SELL SHORT. This indicates a potentially ineffective strategy or a need for further analysis to understand the reasons behind these losses.

### Implications

The analysis of win and lose positions by trading strategy helps identify which strategies are most successful and which ones may require reevaluation or improvement. This insight is crucial for optimizing trading performance and making informed decisions.

### Conclusion

The position analysis reveals that SELL LONG and BUY SHORT strategies have higher win positions compared to their respective lose positions, indicating their effectiveness. On the other hand, BUY LONG and SELL SHORT strategies have no win positions and a significant number of lose positions, suggesting a need for further investigation and potential strategy adjustment.