



Quant Team Inductions

25 Batch

Round 2

Dataset & Instructions

You are given the OHLC market data of 20 stocks. There is 1 task for this round.

You are provided with training data for the first 3500 days. You can test your work on the cross-validation dataset which contains the data for the next 500 days (please note that each number in the Date column represents a business day).

Make sure that in no case you are using the future data anywhere to determine the weights else that submission will not be evaluated. You can only use the data till date D to determine weights for the date D+1.

We have attached a notebook.ipynb file with the question which must be followed. Make sure that you refer to the sample output csv formats given and follow them exactly. You are allowed to modify existing boilerplate code and add functions as you wish.

Tasks

Create **any 2** out of these 5 strategies to assign weights to each stock each day. Make sure you exactly follow the given steps and examples in your code. In the given notebook there are functions for each strategy which you must complete. After that, edit and run the function 'task1' which will calculate the performances of all the strategies and generate the output file. Make sure you follow the sample weights dataframe format to be able to use the given backtester correctly.

1. Strategy - 1

We're looking to calculate the average weekly returns for each stock over the past year. Here's how we approach it:

a. Consider a full year of trading consists of 50 weeks, and each week contains 5 business days.

b. For each week,

Weekly Returns = (Closing price on last day of current week - Closing price on last day of previous week) /
Closing price on day day of previous week

(Assume closing price for week 0 to be 1).

Example, given this 11-day closing price sequence: 2, 2, 2, 3, 3, 4, 4, 5, 5, 6, 7

Week 1 return (days 1-5): $(3-1)/1 = 200\%$

Week 2 return (days 6-10): $(6-3)/3 = 100\%$

Week 3 is incomplete, so we ignore it.

- c. We perform this calculation for all 50 latest completed weeks for each stock. Then, we take the average of these 50 weekly returns to get the mean historical return for each stock.

(Each week has the same weekly return value across all its trading days. Weeks run from day $[5k+1]$ to day $[5k+5]$. For instance, if you're looking at dates 306-310, the system analyzes returns from day 56 through 305 (the previous 50 weeks). Similarly, for dates 2441-2445, it examines returns from day 2191 through 2440.)

d. Weight Assignment:

- i. We rank the stocks based on their mean historical returns. (decreasing order)
- ii. We assign equal negative weights to the top 6 performing stocks, such that their sum is -1.
- iii. We assign equal positive weights to the bottom 6 performing stocks such that their sum is 1.
- iv. All other stocks in between are assigned a weight of 0.

2. Strategy - 2

We're looking to compare the long-term trends to the short-term trends assuming that stocks will revert to their long term average. The steps are as follows:

- a. Long-term moving average (LMA): Average of the closing price of the last 30 business days.
- b. Short-term moving average (SMA): Average of the closing price of the last 5 business days.

- c. Find the relative position of the SMA with respect to LMA.
- d. Relative position = $(SMA - LMA) / LMA$
- e. Weight Assignment:
 - i. We rank the stocks based on their relative position of the SMA with respect to LMA (decreasing order)
 - ii. We assign equal positive weights to the bottom 5 performing stocks, such that their sum is 1.
 - iii. We assign equal negative weights to the top 5 performing stocks such that their sum is -1.
 - iv. All other stocks in between are assigned a weight of 0.

3. Strategy - 3

We're looking to capture the trends which have reached their peaks or lows to determine the weights.

- a. Calculate the ROC = $100 * (\text{Latest Closing Price} - \text{Closing Price 7 business days ago}) / (\text{Closing Price 7 business days ago})$.
- b. Weight Assignment:
 - i. We rank the stocks based on their calculated ROC (decreasing order).
 - ii. We assign equal positive weights to the bottom 4 performing stocks, such that their sum is 1.

- iii. We assign equal negative weights to the top 4 performing stocks such that their sum is -1.
- iv. All other stocks in between are assigned a weight of 0.

4. Strategy - 4

We are looking for Support and Resistance values.

- a. Resistance: 21 day Simple Moving Average of closing prices + 3 * Std Dev.
- b. Support: 21 day Simple Moving Average of closing prices - 3 * Std Dev.
- c. Calculate the proximity of the latest closing price with the support and resistance values
 Proximity to Resistance = $(\text{Latest Closing Price} - \text{Resistance}) / \text{Resistance}$
 Proximity to Support = $(\text{Latest Closing Price} - \text{Support}) / \text{Support}$.
- d. Weights:
 - i. We rank the stocks based on their proximity to Support (increasing order).
 - ii. We assign equal positive weights to the top 4 stocks.
 - iii. Then we rank the remaining stocks based on their proximity to Resistance (decreasing order).
 - iv. We assign equal negative weights to the top 4 stocks.
 - v. Remaining stocks are assigned 0 weights.

5. Strategy - 5

a. Calculate a metric $\%K = 100 * (\text{Closing Price} - 14 \text{ day Low}) / (14 \text{ day High} - 14 \text{ day Low})$.

b. Weights:

- i. Find 3 stocks with the highest %K value and assign them equal negative weights
- ii. Find 3 stocks with the lowest %K value and assign them equal positive weights.

Submission Format

Submit a .zip file containing all the files (csv, ipynb etc.) in [the Google form](#).

Ensure your code is clean, well-commented, and outputs are clearly visible.

Evaluation:

1. Task - 60%
2. Coding methods and clarity - 40%

Deadline: 9th September, 2025. No requests for extensions will be entertained.

*Please Note: Any submissions generated with AI will be disqualified, and students found using AI will be **blacklisted from all future inductions.***