Introduction

In the final project, you need to a implement a trading strategy for SPY, where you can download the historical data here:

- https://finance.yahoo.com/quote/SPY/history?p=SPY (Note that you can change the time period for the historical data to download.)

In other words, you need to submit a function:

action=myStrategy(pastData)

where

- action:

  1 for “buy”, -1 for ”sell”, 0 for “no action” .
  Every time you make an action we will use all the money to buy or sell “SPY”.
  If your hold position is not 0 and make “buy”, it means “no action” because you have no money to buy it.
  If your hold position is 0 and make “sell”, it means “no action” because you have no share to sell.

- pastData:

  Historical data starts from 1/29/1993, with the most recent data being appended at the end of the array. (Example of creating such a data structure is shown below.)

Note that this project is very similar to our homework about Sharpe ratio, except the historical data contains all columns available from the source.

You need to submit your function before the midnight of 2018/01/01. Our evaluation period is from 2018/01/02 to

2018/01/19, during which TA will run your program to see the performance of your trading strategy.

Grading

The grading of the final project is based on two parts:

- (50%) The ranking of your return over the evaluation period.
- (50%) A 4-page report.

Example

MATLAB example of how to read the downloaded csv file:

```
file='SPY.csv';
spyTable=readtable(file);
pastData=table2struct(spyTable);
```

Note that "pastData" is a 1-D structure array with necessary field names. Your "buy" and "sell" actions are based on the price listed in the field name of "AdjClose".

Python example of how to read the downloaded csv file:

Please install pandas first.

```
import pandas as pd
pastData = pd.read_csv('SPY.csv')
pastData.set_index(pastData.Date)
```

Note that "pastData" is a DataFrame with necessary field names. Your "buy" and "sell" actions are based on the price listed in the field name of "AdjClose".

Language and Library

For programing language:
You can use only python and matlab for the function interface.

For library:
You can use any library you want. We will ask you to write down the list of libraries you used in readme, and you also need to write down how to install it. if we still cannot install it successfully or the installation step is too complicated, we will need you to come to TA hour for discussing how to solve it.

Upload Format

We will create two homework in CEIBA named “Final program” and “Final report”.
Please follow the spec or you will get 0.

For program:
You should upload a zip file named r00000001_matlab.zip or r00000001_python.zip which depends on what language you used.
The zip file should include 2 files.
1. myStrategy.m or myStrategy.py
2. readme.txt

In readme.txt you should write down what language and language version you used.
Besides, you should write down the list of libraries (packages) you used, and you also need to write down how to install it.

Note that if we still cannot install it successfully or the installation step is too complicated, we will need you to come to TA hour for discussing how to solve it.

Note that readme is not equal to report

For report:
You should upload a pdf file named r00000001_report.pdf

The A 4-page report which covers at least the following items:

- Introduction
- Your baseline method (Sharpe ratio, average line, chart detection, etc.)
- How to refine the baseline method
  - Optimization strategy
  - Method for training/test
  - Feature normalization, selection, extraction, etc.
  - Any insight and improvement
  - ...
- Conclusions

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Resources

- TA-Lib : Technical Analysis Library

Deadlines

- Submission of program (zip format): 20180101 midnight
- Submission of report (pdf format): 20180115 midnight