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Course Name: CS 7646 Machine Learning for Trading

Project Name: ComplInvestI Homework 1

Summary

This assignment involves reading and analyzing a 4 stock portfolio from 'Yahoo'. We simulate the portfolios based on various combinations of initial allocation and find the best portfolio, that is, the allocation which leads to maximum Sharpe Ratio.

Output



```
C:\Windows\system32\cmd.exe

C:\Python27>python optimizer.py 2010 6 1 2011 6 1 AAPL GLD GOOG XOM
Start Date: June 01, 2010
End Date: June 01, 2011
Symbols: ['AAPL' 'GLD' 'GOOG' 'XOM']
Optimal Allocations: [ 0.1  0.4  0.  0.5]
Sharpe Ratio: 2.39096710324
Volatility (stdev of daily returns): 0.00818708225091
Average Daily Return: 0.00123311188594
Cumulative Return: [ 1.35433667]

C:\Python27>python optimizer.py 2004 1 1 2006 1 1 MMM MO MSFT INTC
Start Date: January 01, 2004
End Date: January 01, 2006
Symbols: ['MMM' 'MO' 'MSFT' 'INTC']
Optimal Allocations: [ 0.  0.9  0.  0.1]
Sharpe Ratio: 1.04046932436
Volatility (stdev of daily returns): 0.0120205309945
Average Daily Return: 0.000787866551049
Cumulative Return: [ 1.43421311]

C:\Python27>
```

Extra challenges

To achieve a more precise result for the best portfolio, I have implemented fine grain search around the maxima obtained from previous method. In this process, the algorithm involves performing step-wise increments of 0.01 to find maximum Sharpe Ratio +/- 0.1 around the initial allocation obtained from initial search with reduced effort.

Output

```
C:\Windows\system32\cmd.exe

C:\Python27>python optimizer_improved.py 2010 6 1 2011 6 1 AAPL GLD GOOG XOM
Start Date: June 01, 2010
End Date: June 01, 2011
Symbols: ['AAPL', 'GLD', 'GOOG', 'XOM']
Optimal Allocations: [ 0.11  0.43  0.    0.46]
Sharpe Ratio: 2.3932939232
Volatility (stdev of daily returns): 0.00803557245017
Average Daily Return: 0.0012114697902
Cumulative Return: [ 1.34736592]

C:\Python27>python optimizer_improved.py 2004 1 1 2006 1 1 MMM MO MSFT INTC
Start Date: January 01, 2004
End Date: January 01, 2006
Symbols: ['MMM', 'MO', 'MSFT', 'INTC']
Optimal Allocations: [ 0.01  0.92  0.07 -0.   ]
Sharpe Ratio: 1.11262956439
Volatility (stdev of daily returns): 0.0119310520995
Average Daily Return: 0.000836236399383
Cumulative Return: [ 1.47033245]

C:\Python27>
```