Artificial Intelligence in Fintech Quiz (1) [1]

[1] Please turn in your workable codes and corresponding running results.

Quantify HFT stock trading data and option data (50 points)

- Summarize singular value decomposition (SVD) and its possible applications in fintech (10 points)
- The folder fintech_quiz_1.zip contains 2 opion datasets and 4 large-cap HFT datasets from four sectors IT, bank, retail and fashion. Each HFT dataset consists of 5850 observations across 9 variables
  - APPL.
  - BAC
  - WMT
  - AEO.

1. Visualize data with any methods you like
2. Compute the variance concentration ratios of data and visualize it. What can you find?
3. Compare the variance concentration ratios of the normalized data of the data by using different normalization methods
4. Apply 1,2,3 to *at least your own two datasets in finance*
5. What are your conclusions? why?

FinTech data retrieval (50 points)[2]

- Write software to retrieve recent 1 week HFT data for the following stocks
  - IT: GOOG, AAPL, MSFT, AMZN, FB
  - Bank: 'JPM', 'BAC', 'C' , 'GS, 'HSBC'
  - Compare their variance concentration ratios under different normalization methods, what can you find?

  1. Calculate the stock log returns in each time interval for each stock and plot it

     The i^{th} day log return $u_i = \ln(\frac{S_i}{S_{i-1}})$, where S_i is stock close price at i^{th} day.
  2. Compute the max, min, mean, median, standard deviation, skewness, kurtosis for close price and volume for each data set (need plots).

- Retrieve daily stock data for the following types of companies from 02/01/2015 to 02/01/2021and write it in csv
  - IT: GOOG, AAPL, MSFT, AMZN, FB
  - Bank: 'JPM', 'BAC', 'C' , 'GS, 'HSBC'

  1. Compare the stock price patterns of these companies during the years
  2. Calculate the days of up and down for each stock in each year.

[2]Make sure your codes are efficient and clean

What should you turn in?

- 1. A folder that contains
  - A ppt to show details of your analytics (at MOST 30 pages)
  - your data
  - source files
  - corresponding related output.
- 2. Send the zipped file (.zip instead of ,rar) of your folder to Canvas before the DUE