Stock Price Prediction:

This function predicts the price of the chosen stock at the chosen date using a simple LSTM model, and plot its graph.

If the date input is earlier than the current date, the actual prices will also be plotted as a comparison to the predicted prices.

To use it, just enter the stock and date, and click the predict button

Warning:
Please make sure that:
For the ticker input:

1. The ticker name is correct;
2. The ticker input is in the format of "APPL, TSLA, ...";
3. The stock was in the market during the specified period of time;
4. WARNING. Due to the problem of the yfinance library, scraping APPL data may fail sometimes, so please avoid using APPL.

For the date input

1. The date input is in the format of yyyy-mm-dd;
2. The market is open on that day;
3. The date input must be a date in the past;
4. The start date must be before the end date;
5. Both dates must exist at the same time.

Portfolio Analysis:

The correlation and covariance analysis tool help you to better decide your portfolio composition (through improving diversification).

To use this, just enter the ticker of stocks and time period (start + end time) you are interested in, and this function would generate the heatmaps for the input stocks on their corr and cov.

As for the portfolio optimization function, it conducts portfolio optimization through GMV(min Risk) method and MSR(max Sharpe Ratio) method, relying on Markowitz model and Modern Portfolio Theory.

To use this, just enter the ticker of stocks in your chosen portfolio and time period (start + end time) you are interested in, and this function would generate the optimal weight for each stock under both GMV and MSR optimal portfolios, marking these two portfolios on mean-variance graph, and then creating a plot to compare the behaviors of both GMV and MSR portfolios during this time period.

Warning:

Please make sure that:

For the ticker input:

1. The ticker name is correct;
2. The ticker input is in the format of "APPL, TSLA, ...";
3. The stock was in the market during the specified period of time;
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4. The start date must be before the end date;
5. Both dates must exist at the same time.

For the risk free rate input:

It must be decimals.

Multi-Factor Model Simulation:

This function uses Fama-Macbeth model to extract common factors significant for stock picking in order to generate the highest return. The theory is to invest 1 unit of dollar into the selected portfolio with equal weight at the beginning of a month, sell the portfolio at then end of the month, and then repurchase another portfolio at the beginning of the next month, similarly until the end of the selected time.

The final outcome is a graph with the expected return trend line and the Dow Jones Industrial Average as the benchmark line over selected timeline. The overall investment return, annualized return, annualized volatility, sharp ratio, as well as maximum drawdown will be displayed.

The training model uses data from 2013-01-01 to 2019-12-31.

To use this function, enter:

1. The number of stocks (n): the n highest-return stocks each month to be put in the portfolio;
2. The risk-free rate: the market risk-free rate that you want to use as a constant;
3. Start Year: the starting time of your investment (must select the beginning of a random month between 2013-01-01 to 2019-12-31);
4. End Year: the ending time of your investment (must select the end of a random month between 2013-01-01 to 2019-12-31).

<u>Warning:</u>

Please make sure that:

1. The number of stocks is a non-zero integer;
2. The risk free rate should be a decimal number;
3. The start time should be the first day of a month between 2013-01-01 to 2019-12- 31)
4. The end time should be the last day of a month between 2013-01-01 to 2019-12-31;
5. The start time should be earlier than the end time.')