Bruce Hao

DATA 602

Project Part 2

Data: Historical futures pricing data will be downloaded via API from Quandl and stitched together.

1. Data frames will be created to house certain static data, e.g. instrument ticker, exchange code, expiration months to be traded, etc.
2. Since futures contracts expire, multiple futures contracts for each instrument will need to be downloaded (and stitched together, explained in the analytical step below) via Quandl API

Analytical: The stitched pricing data will then be used to derive forecasts based on certain trading rules. Then, risk management and portfolio sizing will be used to determine how many contracts of each instrument to trade.

1. In order to have one continuous stream of prices for each instrument, the prices for each contract will be stitched together using the ‘Panama’ method
2. Two trading rules will then be applied to each instrument, i.e. trend and carry
   1. Trend – exponentially weighted moving averages of various speeds will be calculated and compared in order to determine in which direction an instrument is trending
   2. Carry – prices between the traded contract and the previously expiring one will be compared to determine the direction of carry
3. Trading rules are normalized to produce a forecast between -20 (full short) and +20 (full long)
4. Forecasts are combined into a single forecast for each instrument
5. Each instrument will then be sized according to a risk budget (based on total risk target and individual instrument risk)
6. Finally, suggested position sizes for each instrument within the portfolio will be computed

Visualization: Various aspects of the system will need to be plotted, e.g. pricing levels, forecasts, position sizes, back-test results, etc.

1. Here, various visualization methods still need to be explored, e.g. IPython, plotly, bokeh, spyre,
2. Visualizations of the pricing levels, forecasts, position sizes, back-test results will be displayed via a set of views and/or dashboards (depending on which visualization method is ultimately selected)

API: In addition to using the Quandl API for pricing data, I'd like to use Interactive Broker's API to partially automate trades (assuming sufficient time).

1. Functionality to programmatically retrieve portfolio data from an active IB account will be developed
2. Finally, functionality to programmatically execute daily trades will be added