

Developing Trading Algorithms on Quantopian

Materials: github.com/wulucy/WUFTworkshop
Make an account: quantopian.com

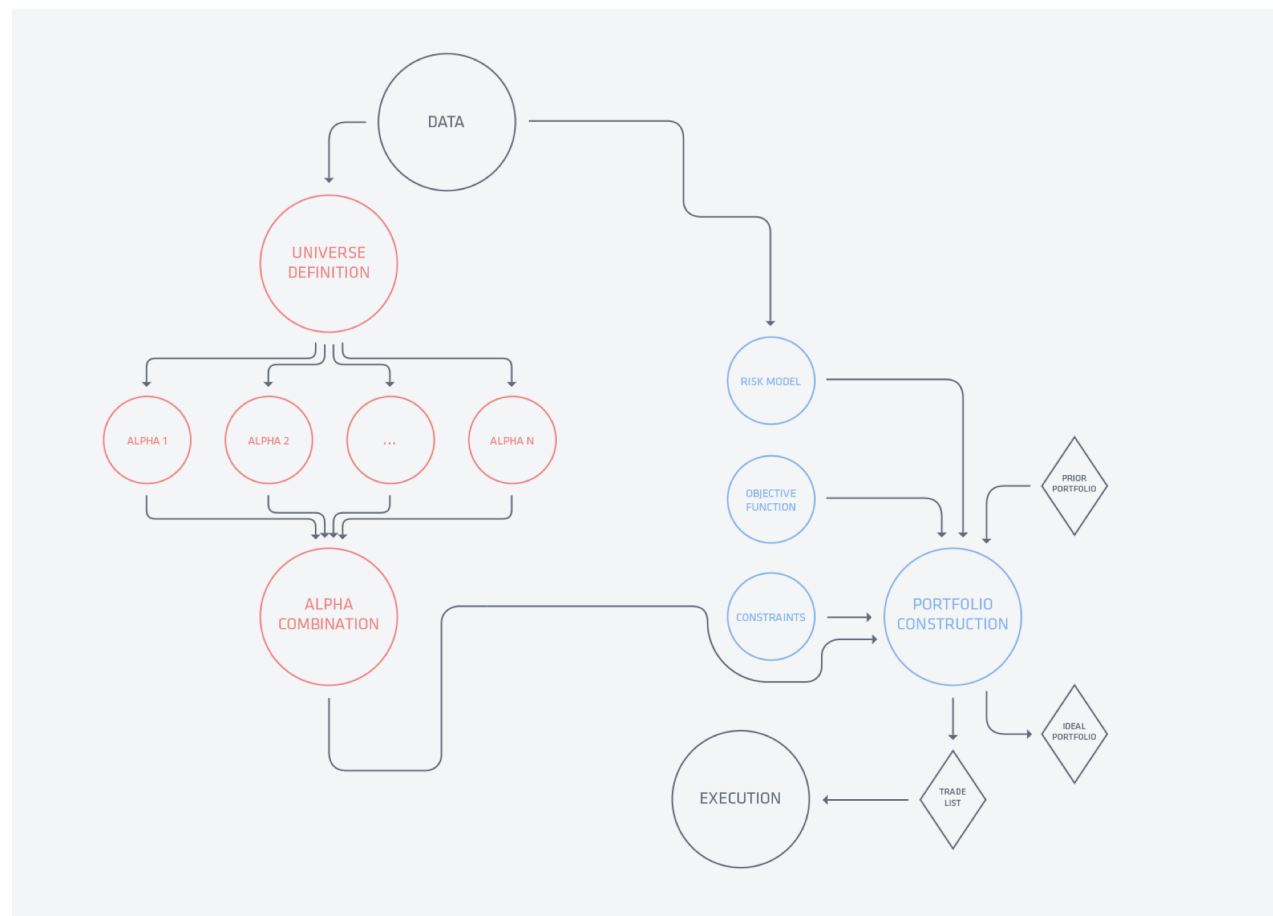
11/23/2018

Overview

- What is a trading algorithm?
- Research: Creating a “thesis”
- Building: Writing algorithms on Quantopian
 - Mean reversion example
- Backtesting: Interpreting backtests on Quantopian

What is a trading algorithm?

Data → Executing Trades



What is a trading algorithm?

Very basically...

1. Develop “thesis”
2. Collect data needed by thesis
3. Create algorithm that executes trades based on this data
4. Backtest and analyze results
5. Iterate *without overfitting*

*For daily/minutely long-short equity algorithms – *not high-frequency trading*

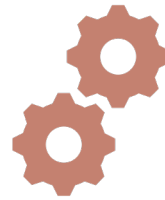
Why Quantopian?



Free, well-maintained data

Fundamentals, pricing, alternative datasets

Adjusted for stock splits/mergers/dividends



Pre-built tools

Backtesting engine

Risk analysis

Signal analysis



Community

Forums

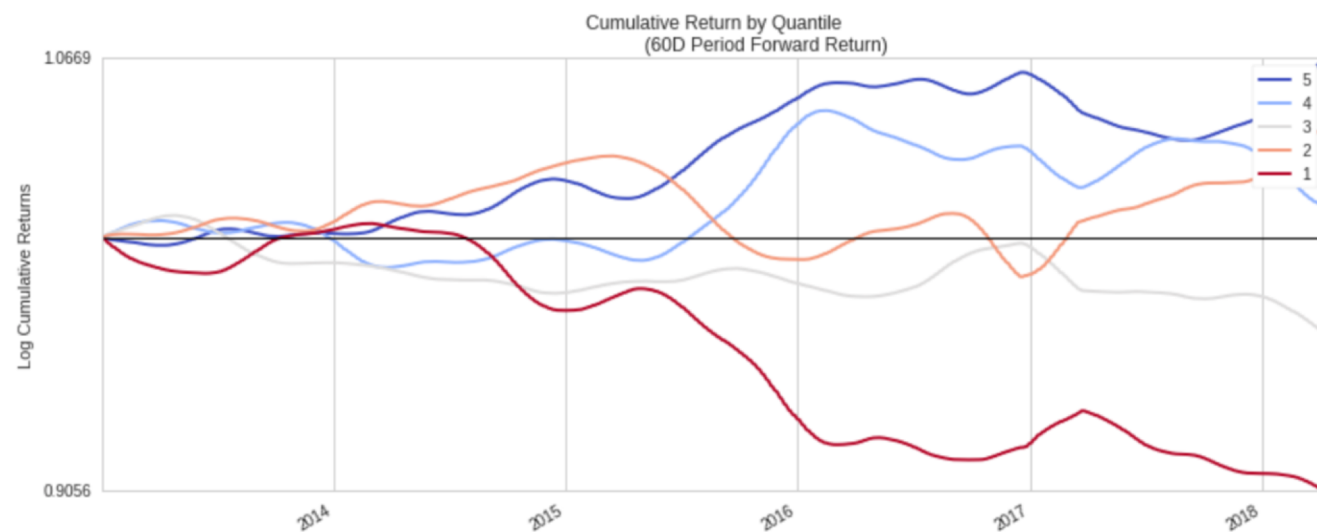
Contests!

Choosing a Thesis

Examples

- Mean reversion
- The “weekend effect”
- Companies that substantially change their 10-Ks and 10-Qs will generate lower returns than companies that do not change their 10-Ks or 10-Qs.

- Investigate using Alphasens:



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Importing Data

- Via Pipeline objects
 - Define universe
 - Choose dataset and fields from dataset

Algorithm Structure

- `initialize()`
 - Initializing global parameters
 - Scheduling functions like `rebalance()`
 - Attaching a Pipeline
- `before_trading_start()`
 - Daily data retrieval and computations
- `rebalance()`
 - Executing trades

Simple “Momentum” Example

- If price is above m times the 5-day simple moving average: **Buy**
- If price is below m times the 5-day simple moving average: **Sell**
- Try:
 - $m = 1.0, 1.05 \dots$
 - `long_leverage = 0.6, 1.0, ...`
 - `short_leverage = -0.6, -1.0, ...`
 - Changing the number of days for the simple moving average

Backtest Analysis

- Things to look at:
 - Returns and variability of returns
 - Correlation with the market (beta)
 - Sector exposure
 - “Style” risk
 - Position concentration
 - Turnover

Other things to consider...

- Using Optimize API
- Recording variables
- Using non-pricing data
- Importing your own data (Self-Serve Data)