Algothon 2019 – Phase 1

The pack is aimed for participants without prior experiences in algorithmic trading. There is no requirement to follow all parts of the pack. We would like to see different models and tools developed in the competition and any projects that can address the investment themes will have equal chances of winning the prizes regardless whether they follow the following pack.

Phase 1 Objectives:

1. *Dip your feet into the world of quantitative finance by developing an investment idea and converting it into a hypothesis on which you will base your predictive model in the future. This hypothesis will enable researchers to evaluate if your idea will be able to generate alpha.*

2. *We would like to highlight the importance of data in phase 1. Before building predictive models, it is essential to have a good understanding of how you will feed data into said model and where you will acquire this data from. This can be rather challenging as a lot of reliable and accurate financial data out there is trapped behind a sizeable pay wall. Live data will not be required for Algothon 2019.*

Instructions and Requirements

1. *Identify a sound investment idea.*
2. *State the model hypothesis.*
3. *Specify your data sources and reasons for using them.*

Recommendations:

- Target a universe of assets that your model can be applied to. A more general universe of assets is better.
- You can find the full list of data references in a separate document.
- Consider how to combine different data sources to address the investment themes in the competition

Please note we have included a Glossary of terms, e.g. universe, in the Learning Resources section of this pack.

Example – Phase 1

Model Name:

Crossover Triggered Momentum Reversal

Team Names, University, Course and Contacts:

Ankur Kapila   *Oxford University*   *BSc Software Engineering*   *AKap2000@gmail.com*
Jane Smith   *Imperial*   *Financial Engineering*   *jane99@gmail.com*

Conceptual Description of Model Hypothesis:

If the price is moving in a certain direction, momentum suggests it will continue to occur. If the price begins to change direction, then a cross over will likely occur. The cross over occurs because the fast-moving average will respond quicker to the change than the slow-moving average. The cross over signals the change in regime but is also resistant to random fluctuation. Since the movement of the price has changed direction and the asset entered a new regime, momentum suggests this movement will continue to occur so is the point at which a trade is executed.
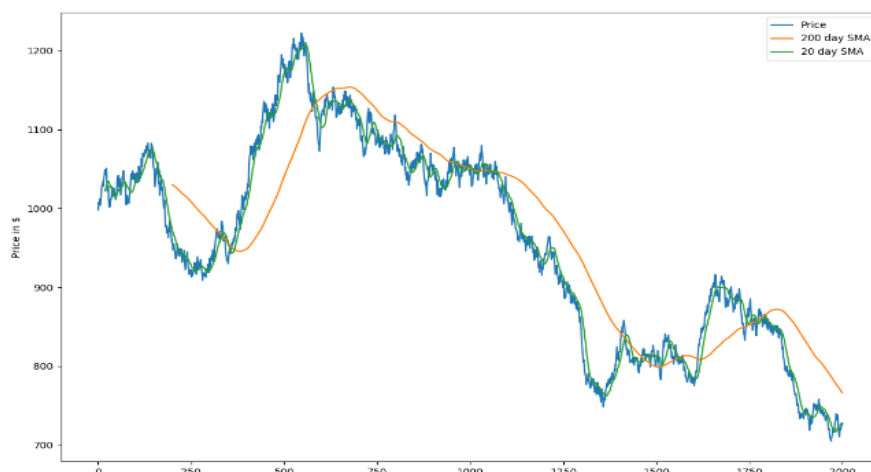
Our strategy looks for a crossover of two different moving averages with different look back periods.

Target Universe of Assets:

- G10 FX
- US Equity
- European Equity

Data Sources:

Data	Source	Explanation
Dates and times	*Quandl.com*	*Please explain why you are using this data source here.*
Tick level pricing data	*Quandl.com*	*Please explain why you are using this data source here.*
Satellite data	*Zoom.earth*	*Please explain why you are using this data source here.*

Learning Resources

Glossary of terms

- Asset: a marketable security, a resource that can be owned and converted into cash
- Target asset universe: often based on an index (e.g. FTSE 100) or some other list of assets, and need to source actual price/return data for this universe across a period of at least 500 periods (e.g. several years of daily returns or over a decade of weekly returns)

Further Reading

If you need more help to implement your idea, please start with the following guides and references:

- https://www.quantstart.com/articles/Beginners-Guide-to-Quantitative-Trading
- https://www.quantopian.com/tutorials

If you are eager to understand more and anticipate the later phases, we also recommend the following:

- Active Portfolio Management: A Quantitative Approach for Producing Superior Returns and Controlling Risk (McGraw-Hill Library of Investment & Finance) by Richard C. Grinold, Ronald N. Kahn. Book available in the Central Library of Imperial College
- Arnott, Robert D. and Harvey, Campbell R. and Markowitz, Harry, A Backtesting Protocol in the Era of Machine Learning (November 21, 2018). Available at SSRN: https://ssrn.com/abstract=3275654 or http://dx.doi.org/10.2139/ssrn.3275654
- López de Prado, Marcos, What to Look for in a Backtest (August 11, 2013). Available at SSRN: https://ssrn.com/abstract=2308682 or http://dx.doi.org/10.2139/ssrn.2308682
- Lo, Andrew. (2003). The Statistics of Sharpe Ratios. Financial Analysts Journal. 58. 10.2469/faj.v58.n4.2453. Available at: https://www.researchgate.net/publication/228139699_The_Statistics_of_Sharpe_Ratios
- Garleanu and Pedersen (2013). "Dynamic trading with predictable returns and transaction costs," Journal of Finance. Available at: http://www.lhpedersen.com/research