Why Python Has Taken Over Finance

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What is the Financial Singularity?
“Vast increases in biological and machine intelligences will create what’s being called the Singularity—a threshold of time at which AIs that are at least as smart as humans, and/or augmented human intelligence, radically remake civilization.”

“Financial singularity is the point at which all investment decisions are made by intelligent machines rather than human agents. … When all human fallibility is eliminated from markets, efficient markets, which have only existed so far in theory, could become a reality.”

Read more: Financial Singularity Definition | Investopedia
What are Driving Forces in Algorithmic Trading?
algorithmic trading

machine & deep learning

- data
- algorithms
- hardware

- optimization, training & learning
- testing
- validation

prediction
("self-driving car")

automation

trading
("money making machine")
Financial Markets

\[ x \rightarrow y \]

Finance History

\[ f(\cdot) \]

\[ f(x) \neq y \]

AI in Finance

\[ m(\cdot, a, b) \]

\[ m(x, a^*, b^*) \approx y \]
Today’s algorithmic trading programs are relatively simple and make only limited use of AI. However, this is sure to change. Artificial intelligence is beneficial in any domain where patterns have to be found in large quantities of data and effective decisions have to be taken on the basis of those patterns, especially when the decisions have to be taken rapidly.

Murray Shanahan (2015)
Is a Financial Singularity Possible?
Dutch Speed-Trader Turns to Currencies After Conquering ETFs

Flow Traders wants to colonize markets with its approach to trading, but its core business is coming under attack

by Will Hadfield
14 June 2017, 6:41 CEST
From Bloomberg Markets

The bottom shelf of the fridge is laden with Heineken and Corona. The Corona is on rotation, but the Heineken is a permanent fixture: This is Amsterdam. A few strides away there's a dark, well-stocked in-house pub.

Up one flight of stairs, the atmosphere is very different. Behind a door that can only be opened with a security pass is by far the largest trading floor for exchange-traded funds in Europe. The 110 traders here, along with 30 colleagues in offices elsewhere, traded €640 billion ($719 billion) in ETFs last year and at least that much in futures, commodities, bonds, stocks, and foreign exchange.

The trading volumes are those of a major Wall Street bank, but the refrigerator—and especially the pub, with its arcade games, pool table, and giant television—is pure startup. This isn’t an investment bank; this is Flow Traders NV, one of the world’s most successful algorithmic trading firms.

This year the firm will undergo its biggest transformation since it opened for business in 2004. Flow, which handles about a third of all ETF trades in Europe, is seeking to do to currency markets what it’s already done to its core business. The firm’s strategic calculation is that high-speed foreign exchange traders should be able to offer better prices than banks, which typically adjust their bids and offers based on their customers’ creditworthiness and the amount of business they do with the lender.

Rietberg and Dijkstra say the move into currency trading is a natural evolution of the business. That may be, but Flow also badly needs to find a new way to grow: Its shares languish below €32—the price when it went public almost two years ago. In the first three months of 2017, its profit dropped 41 percent as quiet markets reduced its ability to earn money from trading. What’s more, Flow needs to adjust to a changing landscape. In some markets, the pool of income available to algo trading firms is shrinking; as competition increases from established trading companies looking to expand into new asset classes.
Flow is at a crossroads. Its distinctive approach to algorithmic trading could enable it to colonize other financial markets—or it could shrivel as rivals attack its core ETF business. “Flow could be multiple times the size it currently is in 20 years,” says Joost de Rijk, an analyst who covers the company for Amsterdam-based merchant bank Kempen & Co. “But it could also be gone. I think they will reevaluate every year whether this is working. That’s the DNA of the company.”

When you make only 0.028 percent on a trade, you need to make a lot of them.

Announcing its first-quarter results in May, Flow reported that it hadn’t lost money on a single trading day in the preceding 34 months. It attributes the stellar run to its use of deterministic modeling, which produces definite outcomes, not probable ones. Most of its rivals calculate prices by means of statistical, or stochastic, modeling, producing hedges that probably (but not definitely) protect them from any downside.
Cloud TPUs

Google's second-generation Tensor Processing Unit is coming to Cloud

Teaching state-of-the-art machine learning models requires an enormous amount of computation, and researchers, engineers, and data scientists often wait weeks for results. To solve this problem, we've designed an all-new ML accelerator from scratch—a second-generation TPU, or Tensor Processing Unit—that can accelerate both training and running ML models.

Each device delivers up to 180 teraflops of floating-point performance, and these new TPUs are designed to be connectable into ever larger systems. A 4x-TPU pod can apply up to 11.2 teraflops of computation to a single ML training task.

We're extremely excited about these new TPUs, and we want to share this technology with the world so that everyone can access their benefits. That's why we're bringing our second-generation TPUs to Google Cloud for the first time as Cloud TPUs on GCP, the Google Compute Platform. You'll be able to relish and match Cloud TPUs with StyleGAN-2, NVIDA CPU, and all of the rest of our infrastructure and services to build and optimize the perfect machine learning system for your needs. Rest of all Cloud TPUs are easy to program via TensorFlow, the most popular open-source machine learning framework.
What are the Benefits of Python for Finance?
PYTHON’S BENEFITS … … COMPARED TO

1. open source software
2. general purpose language
3. multi-paradigm language
4. powerful ecosystem of packages
5. leading in data science
6. first class citizen in AI
7. core technology in finance
8. supported by many players
9. strong and open communities
10. books, resources, trainings

vendor developed & maintained
domain specific language
single-paradigm languages
weak ecosystems
just good in finance or single area
no access to AI world
just a “somehow used” technology
emphasized by selected players
vendor driven and/or small communities
vendor and/or few specialized resources
Live Demo

https://goo.gl/gyni7T
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