FXCM Webinar Series on Algorithmic Trading

Python & Historical Tick Data

24. October 2017

Dr. Yves J. Hilpisch

RISK DISCLAIMER

Trading forex/CFDs on margin carries a high level of risk and may not be suitable for all investors as you could sustain losses in excess of deposits. Leverage can work against you. Due to the certain restrictions imposed by the local law and regulation, German resident retail client(s) could sustain a total loss of deposited funds but are not subject to subsequent payment obligations beyond the deposited funds. Be aware and fully understand all risks associated with the market and trading. Prior to trading any products, carefully consider your financial situation and experience level. Any opinions, news, research, analyses, prices, or other information is provided as general market commentary, and does not constitute investment advice. FXCM & TPQ will not accept liability for any loss or damage, including without limitation to, any loss of profit, which may arise directly or indirectly from use of or reliance on such information.

AGENDA

1. The Python Quants Group
2. Driving Forces in Algorithmic Trading
3. Why Python for Algorithmic Trading?
4. Live Demo
    - Using Python & pandas for Backtesting
    - Working with FXCM Historical Tick Data
    - Adding Indicators to Data Sets
    - Visualization of OHLC Data & Studies

The Python Quants Group

SERVICES
for financial institutions globally

EVENTS
for Python quants &
algorithmic traders

THE PYTHON QUANTS

CERTIFICATION
in cooperation with university

TRAINING
about Python for finance
& algorithmic trading

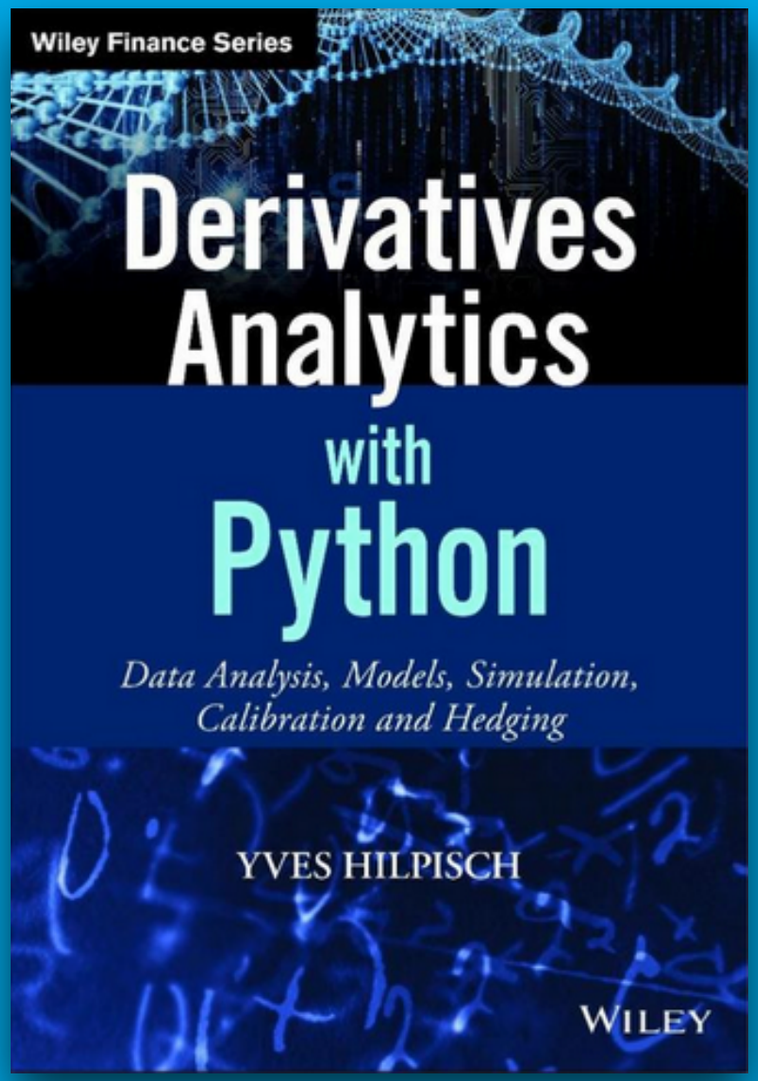
BOOKS
about Python and
finance

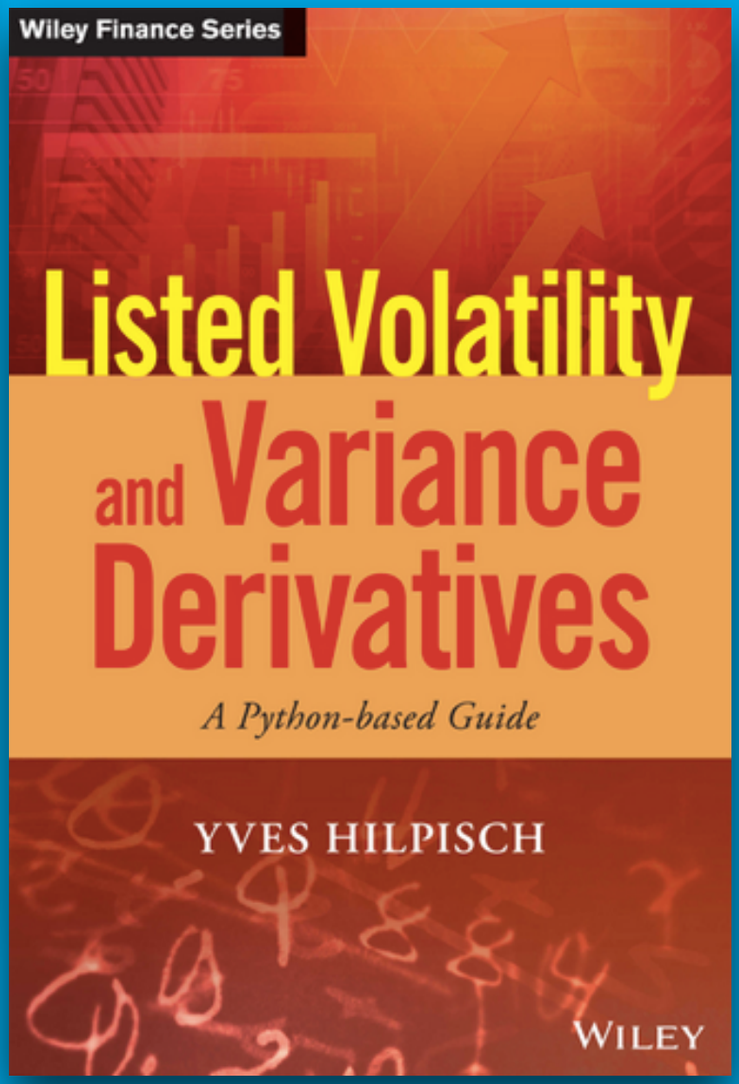
PLATFORM
for browser-based
data analytics

OPEN SOURCE
Python library
for financial analytics

http://tpq.io

http://hilpisch.com





http://books.tpq.io

PROGRAM DIRECTOR

Dr. Yves J. Hilpisch is founder and managing partner of The Python Quants (http://tpq.io), a group focusing on the use of open source technologies for financial data science, algorithmic trading and computational finance. He is the author of the books

He is the author of the books:

- Python for Finance (O'Reilly)
- Derivatives Analytics with Python (Wiley)
- Listed Volatility and Variance Derivatives (Wiley)

He has written the financial analytics library DX Analytics (http://dx-analytics.com) and organizes conferences and Meetup events about Python for finance and algorithmic trading in Frankfurt, London and New York. He has given keynote speeches at technology conferences in the United States, Europe and Asia.

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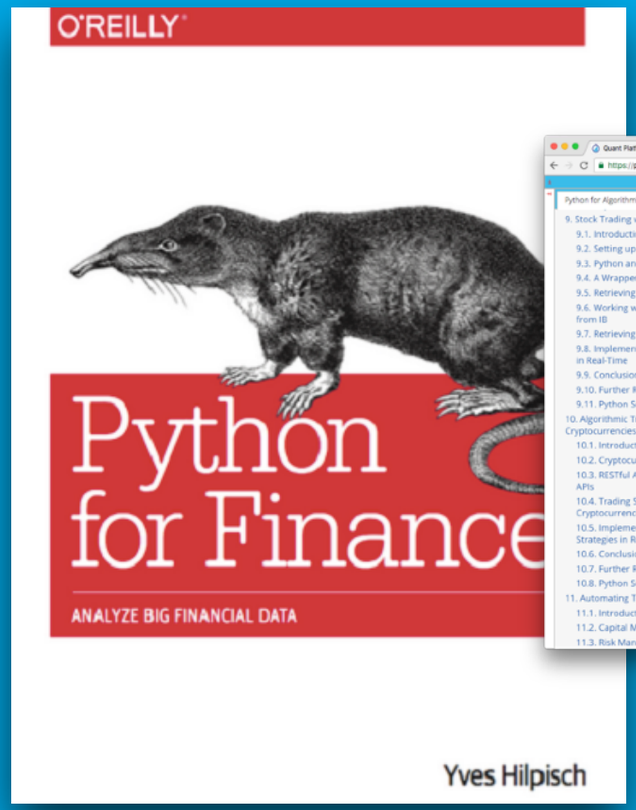
April 2017

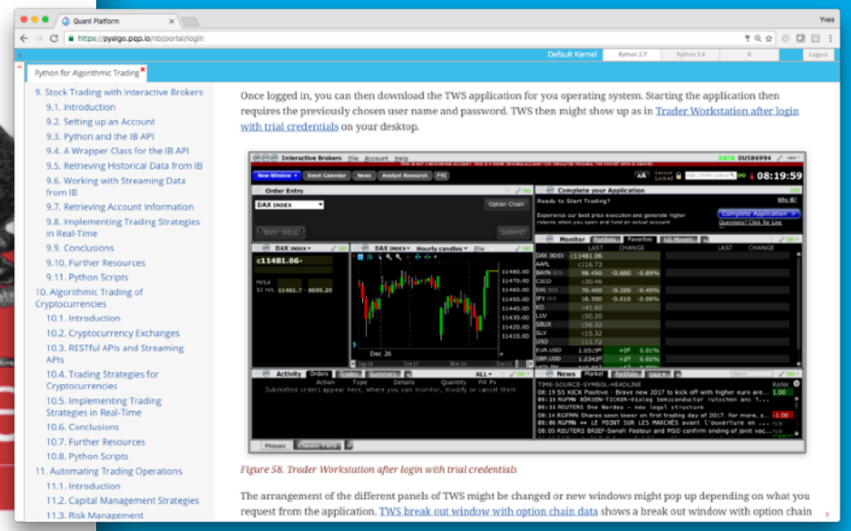
UNIVERSITY CERTIFICATE IN PYTHON FOR ALGORITHMIC TRADING

THE PYTHON QUANTS

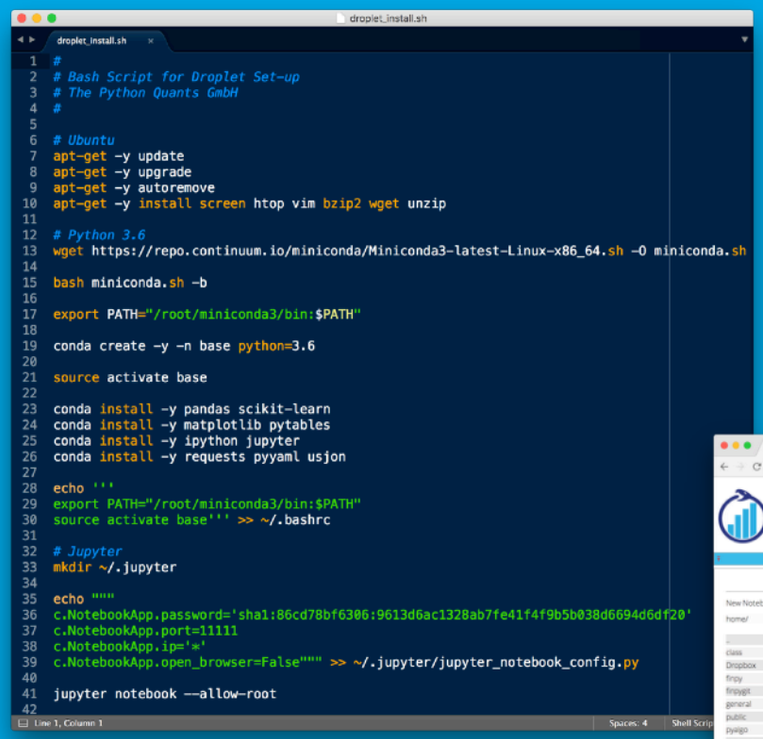
http://training.tpq.io

1,200+ pages of
Python for Finance &
Algorithmic Training

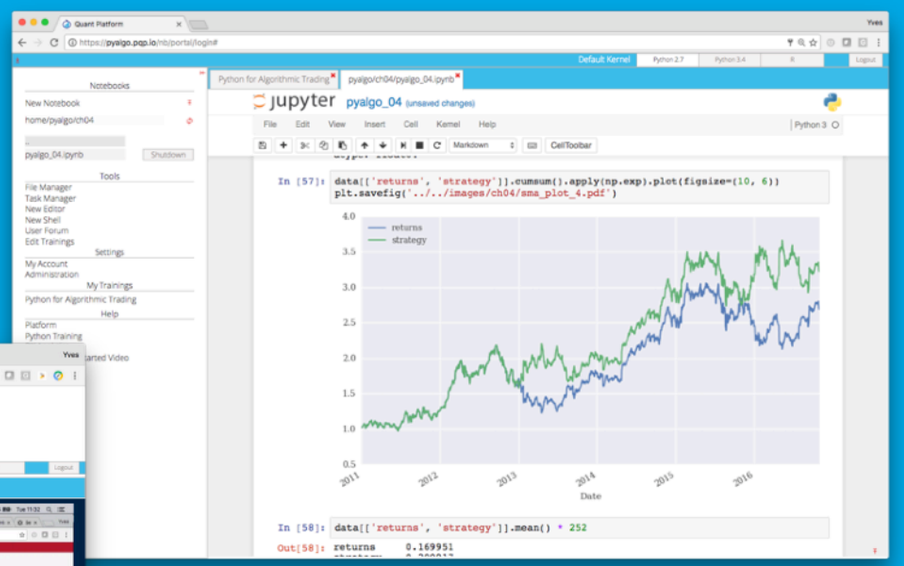




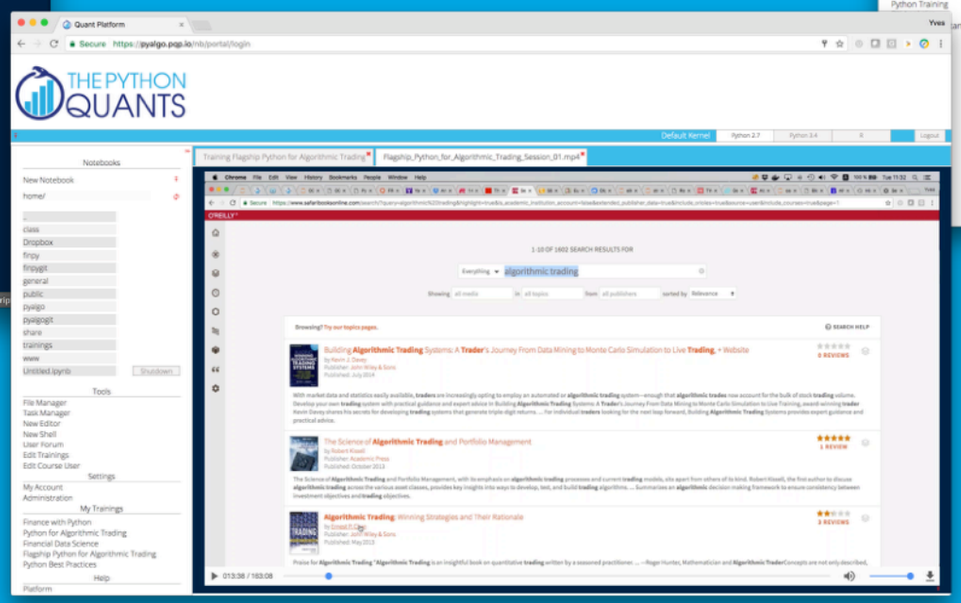
5,000+ lines of code



50+ Jupyter Notebooks



125+ hours
of pre-recorded
video instruction



Driving Forces in Algorithmic Trading

mega trends

software	**hardware**	**data**	**social**
open source	open infrastructure	open data	open networks
cutting edge	specialized hardware	programmatic APIs	specialized events

machine & deep learning

data

algorithms

hardware

optimization, training & learning

testing

validation

prediction (“self-driving car”)

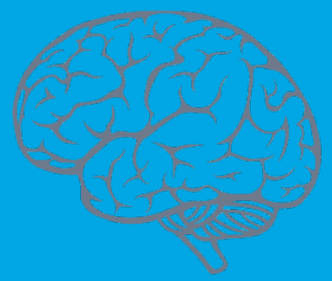
automation

trading (“money making machine”)

algorithmic trading

Humans

x



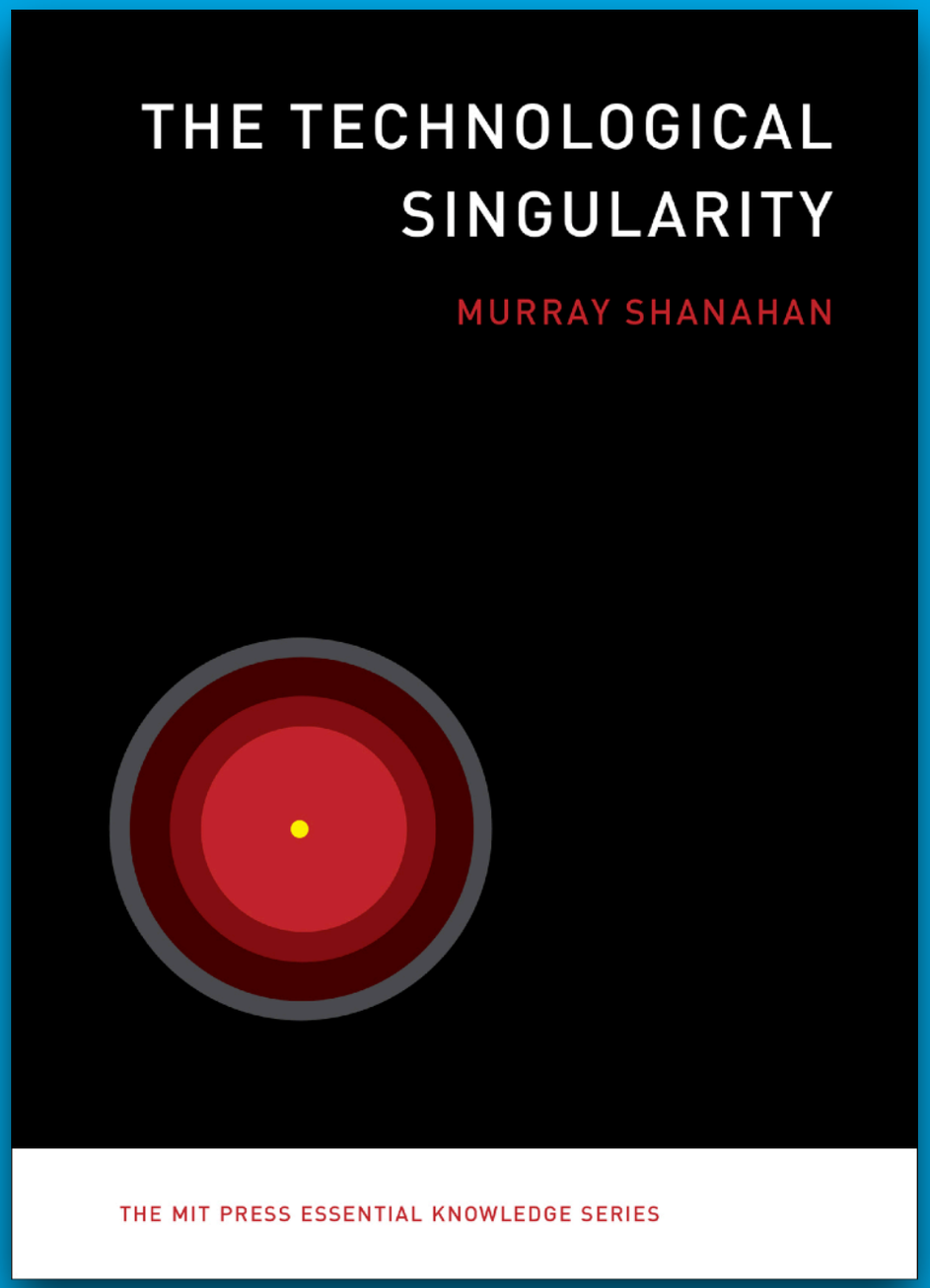
y

Algorithms

x

f(x)

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)

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, 06:01 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.

source: https://www.bloomberg.com/

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 ETFs 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.

source: https://www.bloomberg.com/

Why Python for Algorithmic Trading?

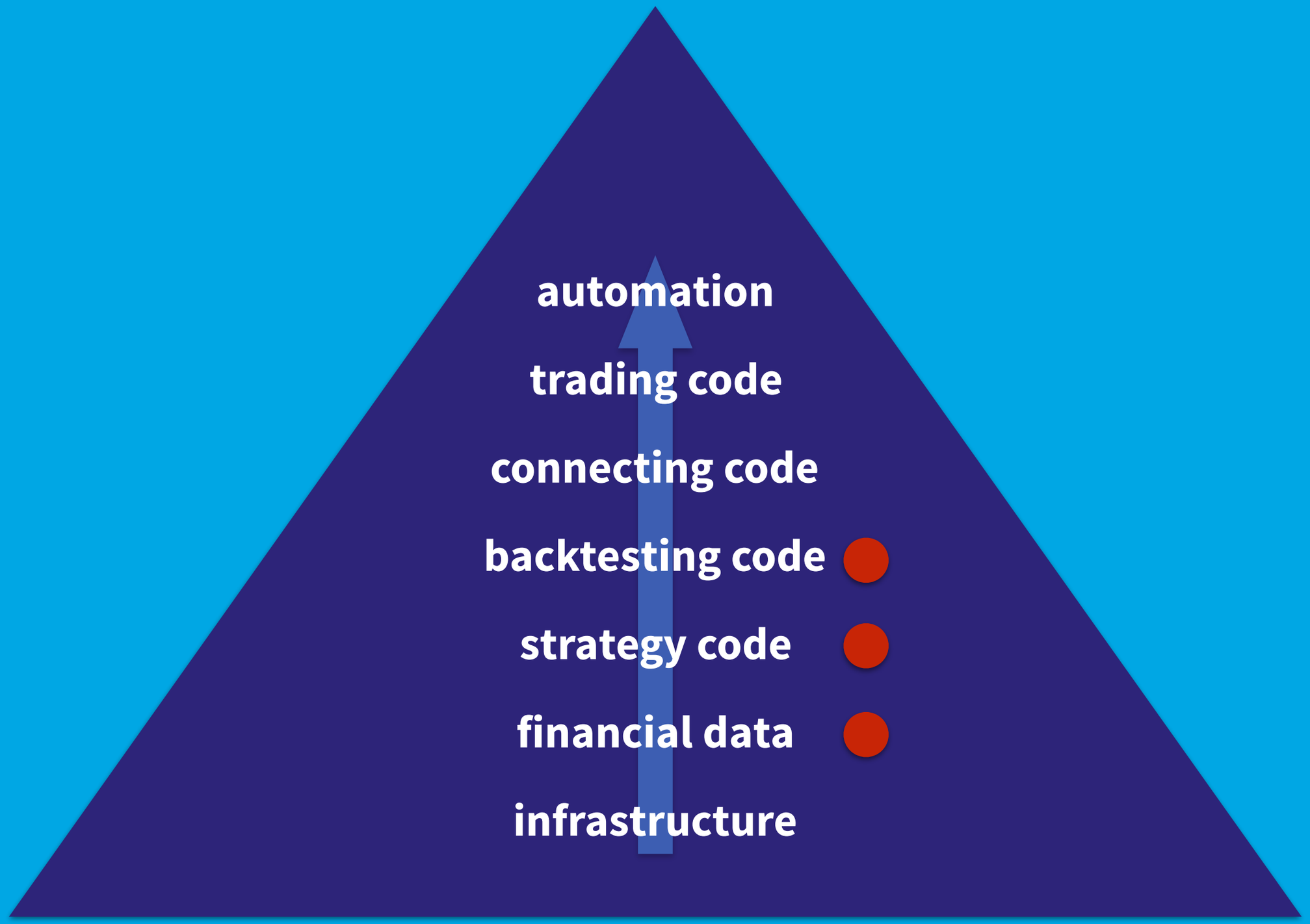
PYTHON'S BENEFITS ...	... COMPARED TO
1. open source software	vendor developed & maintained
2. general purpose language	domain specific language
3. multi-paradigm language	single-paradigm languages
4. powerful ecosystem of packages	weak ecosystems
5. leading in data science	just good in finance or single area
6. first class citizen in AI	no access to AI world
7. core technology in finance	just a "somehow used" technology
8. supported by many players	emphasized by selected players
9. strong and open communities	vendor driven and/or small communities
10. books, resources, trainings	vendor and/or few specialized resources

MACHINE LEARNING & ALGORITHMIC TRADING NEED …

… access to lots of historical, granular data sets

… access to real-time (“streaming”) data

… powerful soft- and hardware to work with the data


automation
trading code
connecting code
backtesting code
strategy code
financial data
infrastructure

Live Demo

LIVE DEMO

1. Using Python & pandas for Backtesting
    - data handling
    - static visualization
    - calculation of indicators
    - calculation of performance
2. Working with FXCM Historical Tick Data
3. Adding Indicators to Data Sets
4. Visualization of OHLC Data & Studies

LINK TO THE GIST

https://goo.gl/C1WD8r

http://gist.github.com/yhilpisch

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