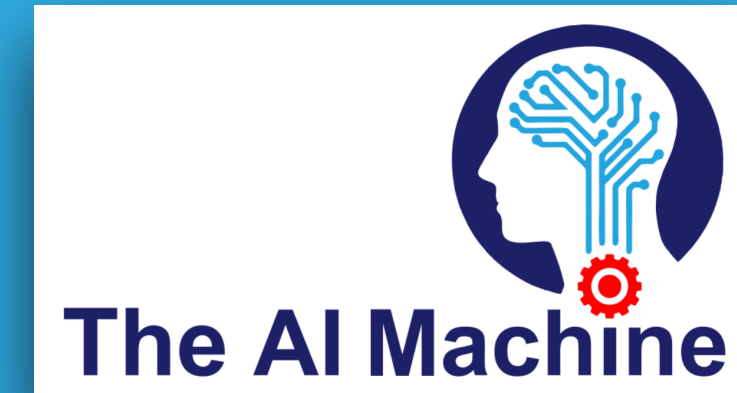


# AI-Powered Algorithmic Trading with Python

Half-Day Training at ODSC London 2023

Dr. Yves J. Hilpisch



You find the Gist with the resources under

**[https://bit.ly/odsc\\_ldn\\_2023](https://bit.ly/odsc_ldn_2023)**

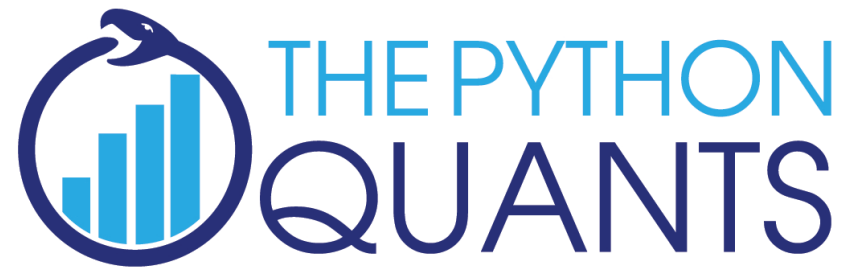
(will be updated during the session)



## Agenda

- Introduction
- Data-Driven Finance
- The Medium Article
- Trading Platform
- Case Study: Momentum
- Case Study: AI Strategy
- Case Study: Deployment
- The AI Machine

# Introduction



**SERVICES**  
for financial institutions globally

The illustration shows a globe with a circular arrow around it, indicating global reach. Below the globe, there are several call center agents wearing headsets and working at computers.

**EVENTS**  
for Python quants & algorithmic traders

The illustration shows a group of seven people in business suits, representing a professional community or event attendees.

**TRAINING**  
about Python for finance  
& algorithmic trading

The illustration shows a man in a suit pointing at a presentation board that displays the Python Quants logo and some charts. The board is on a stand.

**CERTIFICATION**  
in cooperation with university

The illustration shows a certificate with a red ribbon seal, symbolizing a formal certification or award.

**PLATFORM**  
for browser-based  
data analytics

The illustration shows a white paper airplane with a yellow tail, symbolizing a platform or a forward-looking technology.

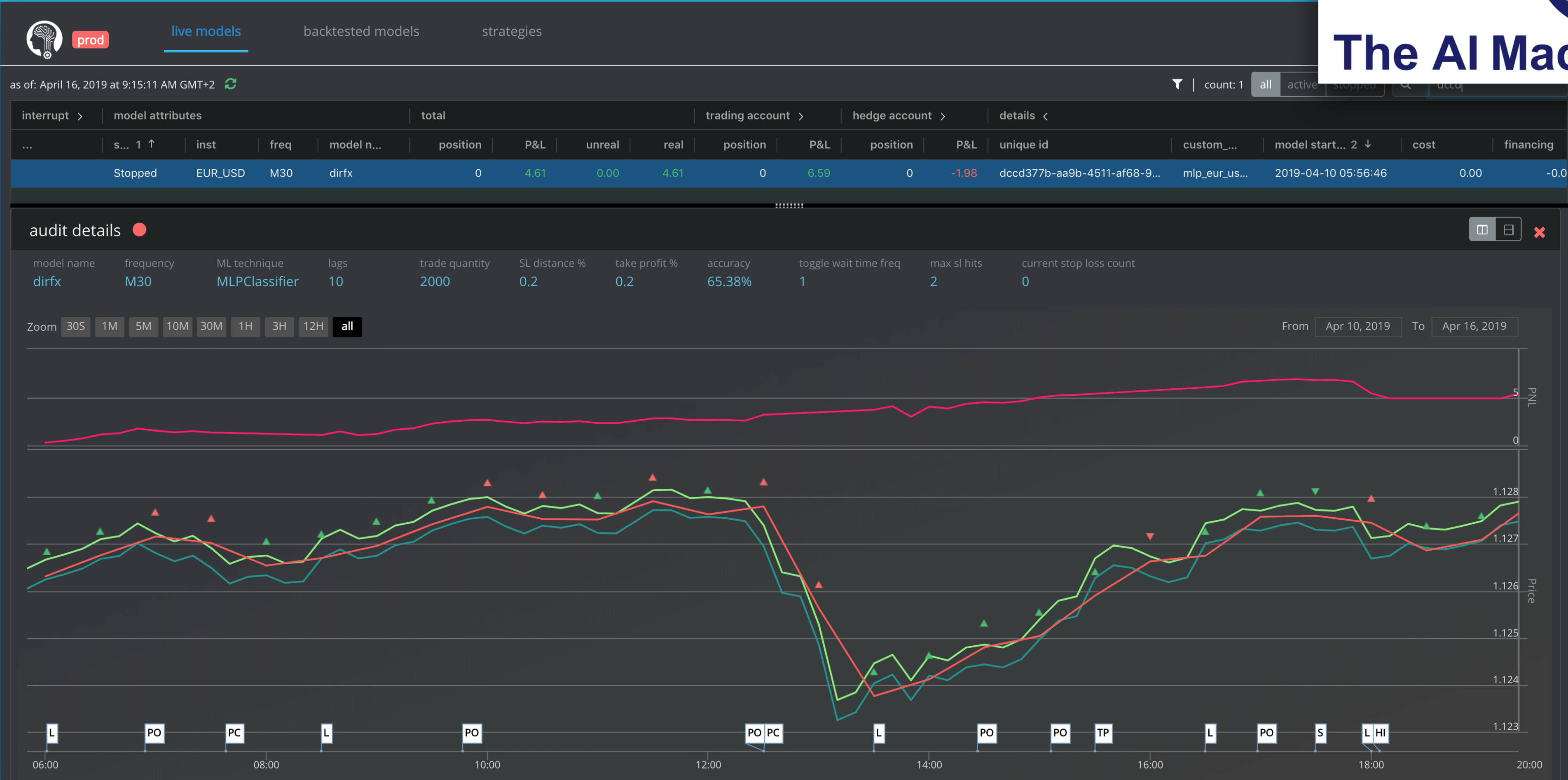
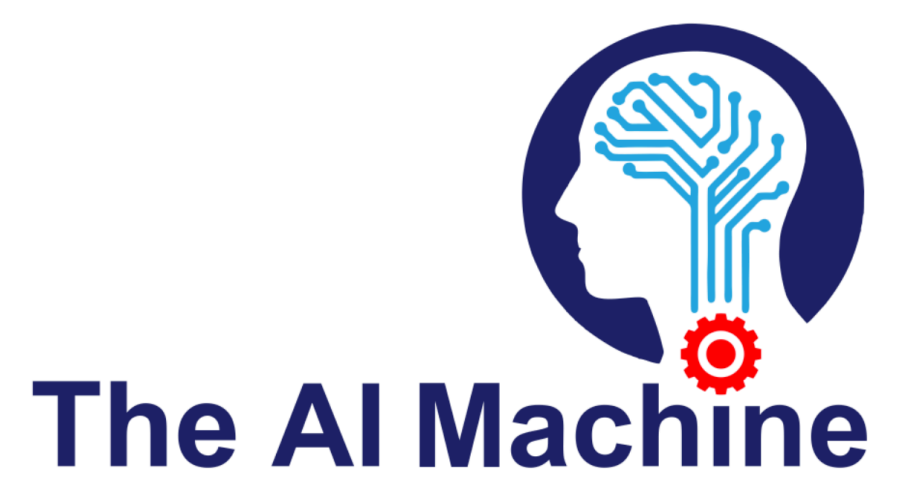
**OPEN SOURCE**  
Python library  
for financial analytics

The illustration shows a white paper airplane with a yellow tail, symbolizing an open-source project or a forward-looking technology.

**BOOKS**  
about Python and  
finance

The illustration shows an open book, a target with an arrow, and a glowing lightbulb, representing knowledge, goals, and ideas.

The illustration shows a person in a white shirt working at a laptop. The laptop screen displays the Python logo. There are also books, a calculator, and a globe nearby.



<http://aimachine.io>



Dr. Yves J. Hilpisch is founder and CEO of **The Python Quants** (<http://tpq.io>), a group focusing on the use of open source technologies for financial data science, artificial intelligence, algorithmic trading, and computational finance. He is also the founder and CEO of **The AI Machine** (<http://aimachine.io>), a company focused on AI-powered algorithmic trading based on a proprietary strategy execution platform.

Yves has a Diploma in Business Administration, a Ph.D. in Mathematical Finance and is Adjunct Professor for Computational Finance.

Yves is the author of six books (<https://home.tpq.io/books>):

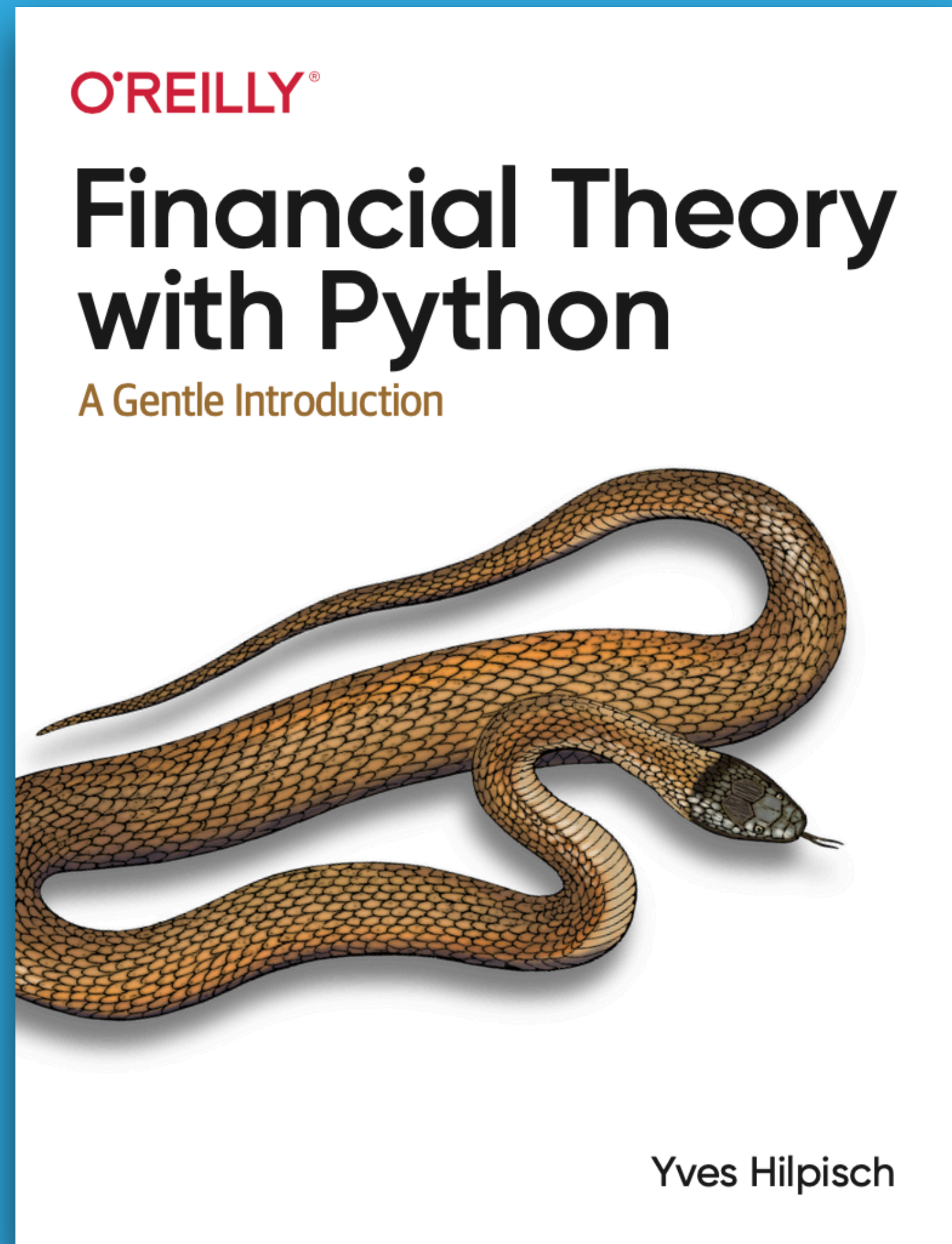
- \* Financial Theory with Python (2021, O'Reilly)
- \* Artificial Intelligence in Finance (2020, O'Reilly)
- \* Python for Algorithmic Trading (2020, O'Reilly)
- \* Python for Finance (2018, 2nd ed., O'Reilly)
- \* Listed Volatility and Variance Derivatives (2017, Wiley Finance)
- \* Derivatives Analytics with Python (2015, Wiley Finance)



Yves is the director of the first online training program leading to **University Certificates in Python for Algorithmic Trading** (<https://home.tpq.io/certificates/pyalgo>) and **Computational Finance** (<https://home.tpq.io/certificates/compfin>). He also lectures on computational finance, machine learning, and algorithmic trading at the **CQF Program** (<http://cqf.com>).

Yves is the originator of the financial analytics library **DX Analytics** (<http://dx-analytics.com>) and organizes Meetup group **events, conferences, and bootcamps** about Python, artificial intelligence and algorithmic trading in London (<http://pqf.tpq.io>), New York (<http://aifat.tpq.io>), Frankfurt, Berlin, and Paris. He has given **keynote speeches** at technology conferences in the United States, Europe, and Asia.

# *Financial Theory with Python – A Gentle Introduction*



Finance with Python and Python environments

Basic Finance Concepts and Models:

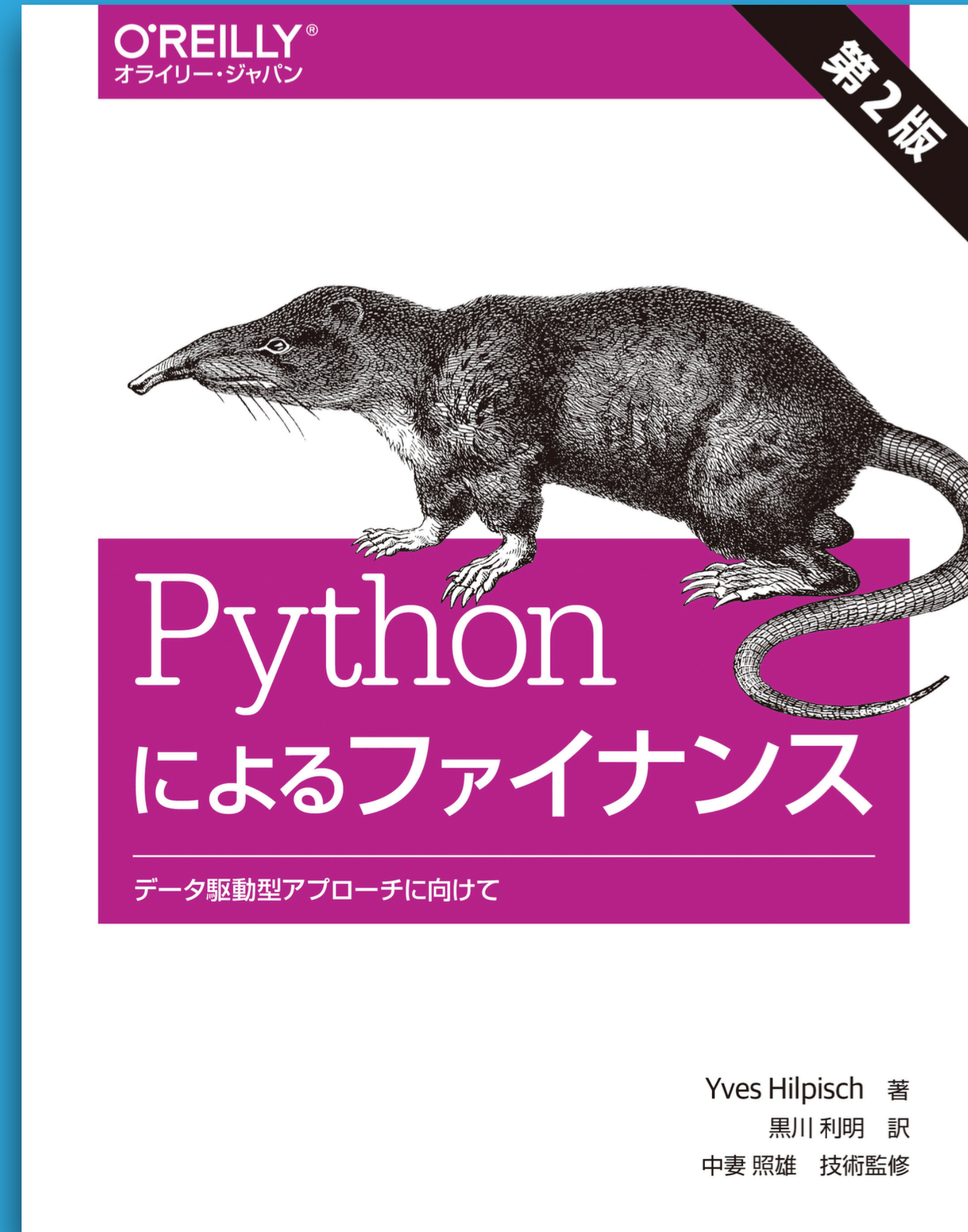
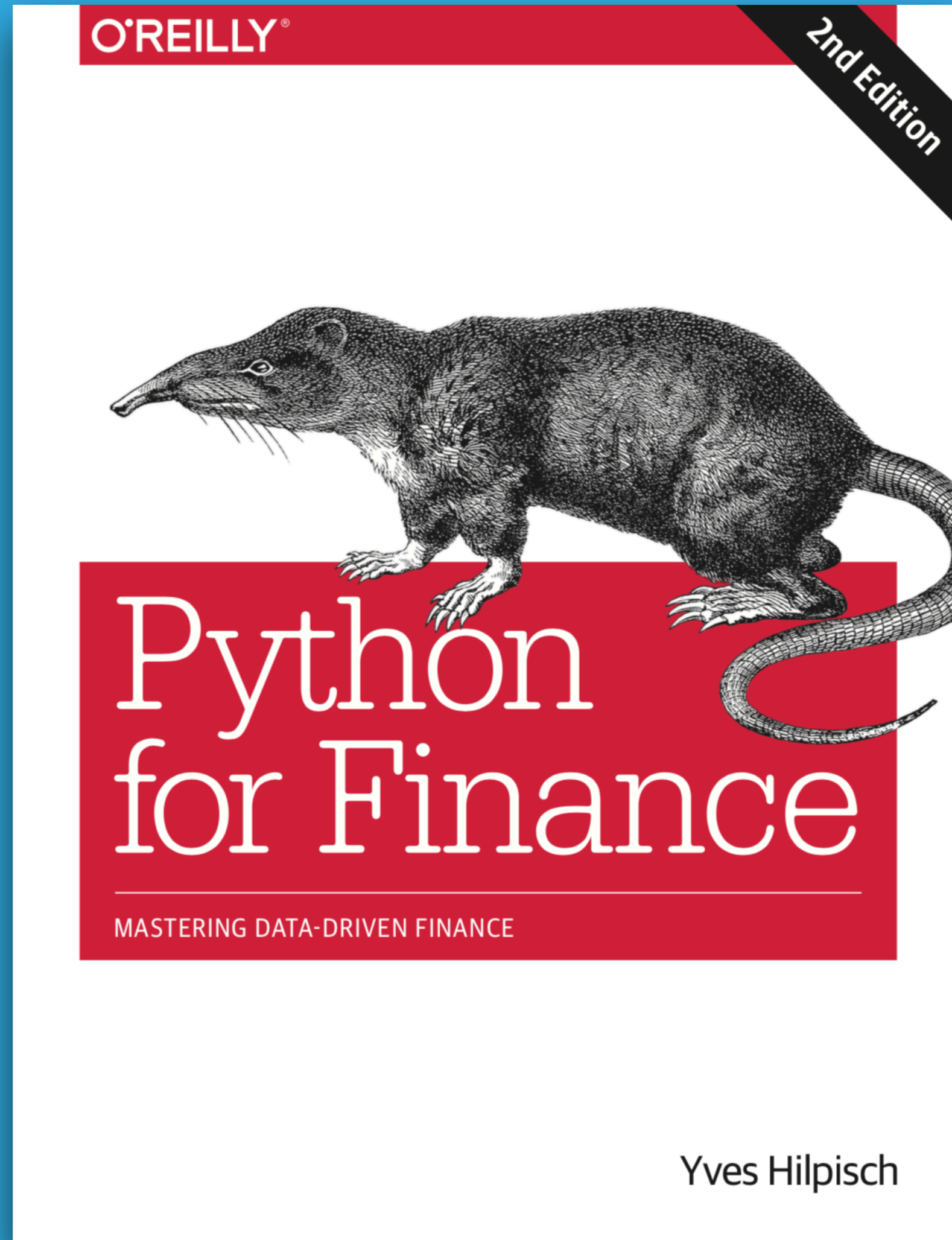
- Risk–Return
- Pricing of Instruments
- Expected Utility Theory
- Mean–Variance Portfolio Theory
- Capital Asset Pricing Model
- Portfolio Optimization

Basic Python Concepts and Packages:

- Major Python Idioms
- NumPy Package
- SciPy & SymPy Packages

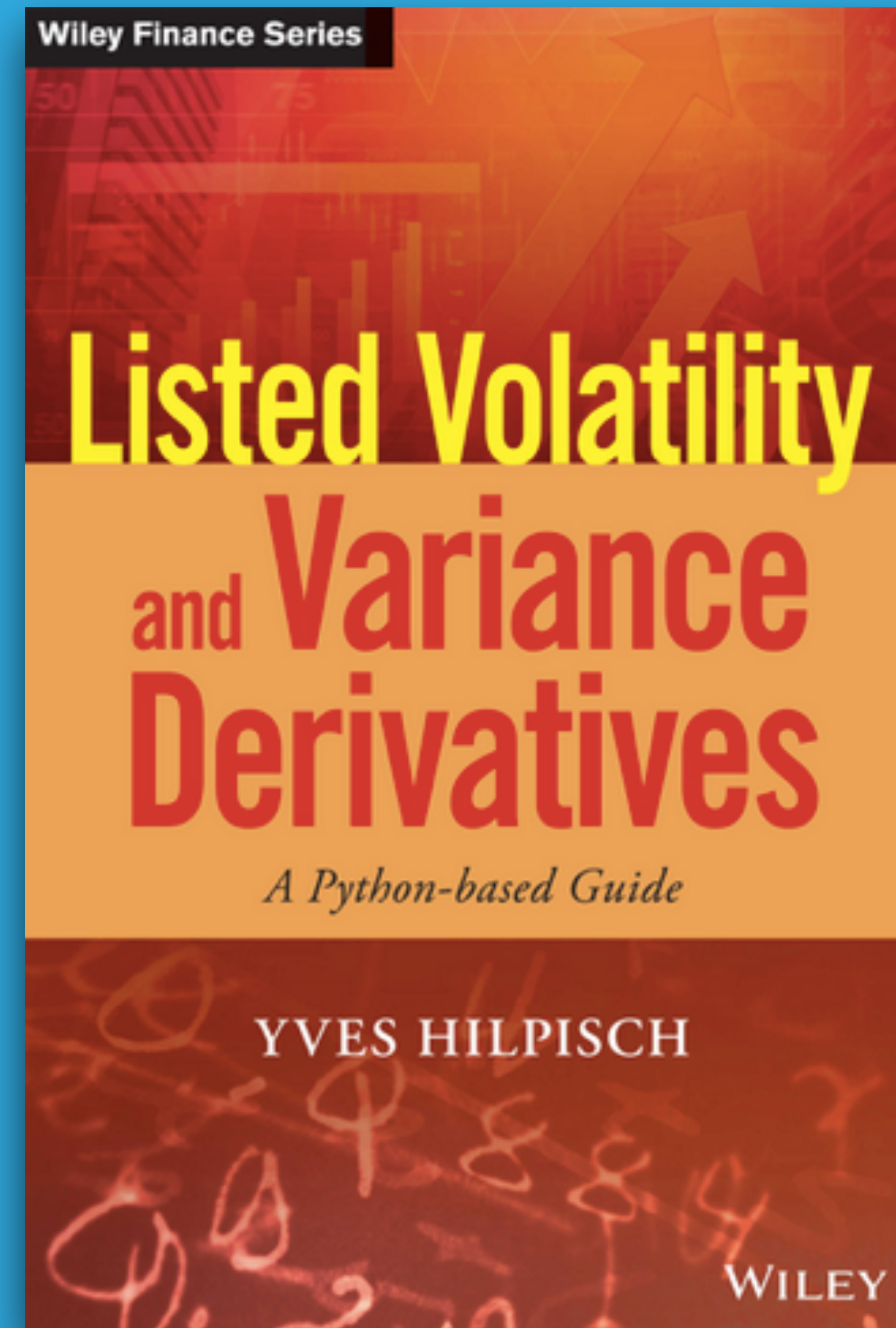
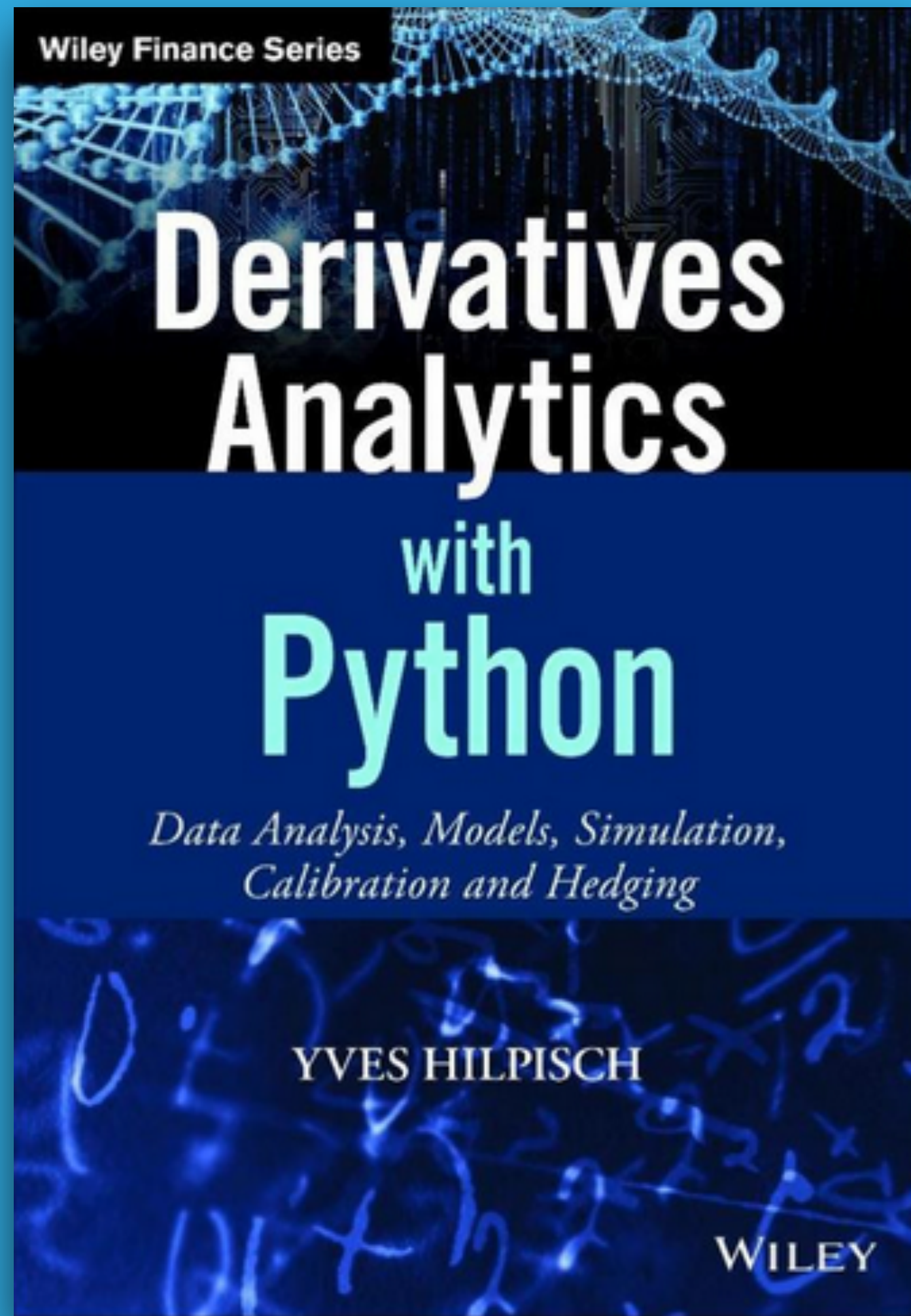


# Python for Finance





# Quant Finance with Python



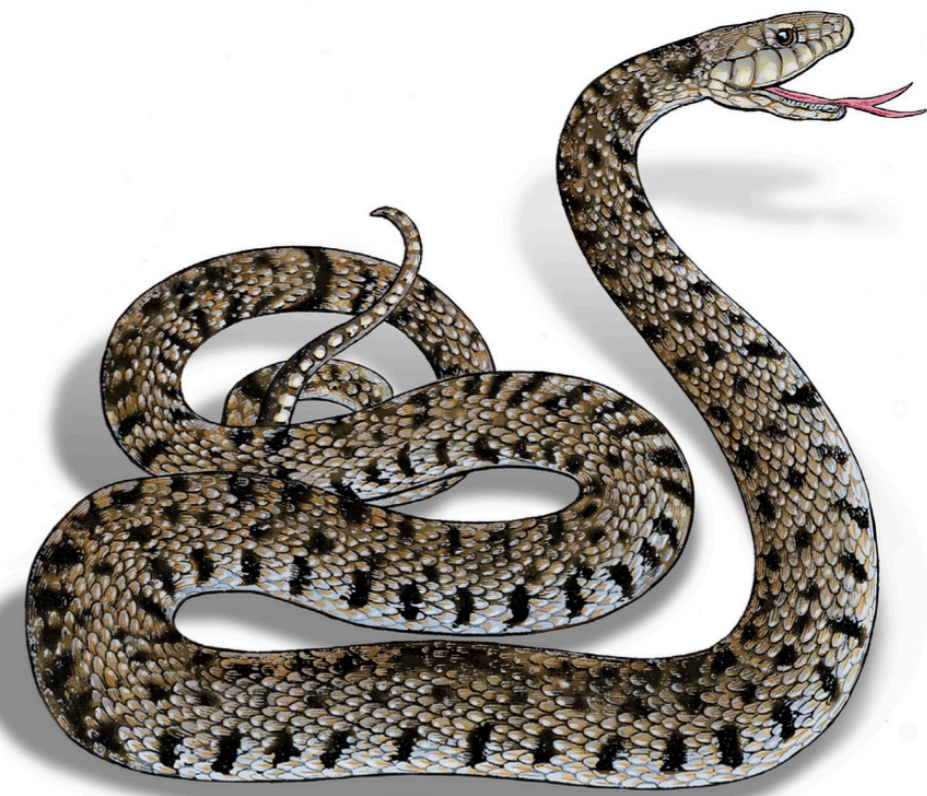


# Python & AI for Finance & Trading

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## Python for Algorithmic Trading

From Idea to Cloud Deployment

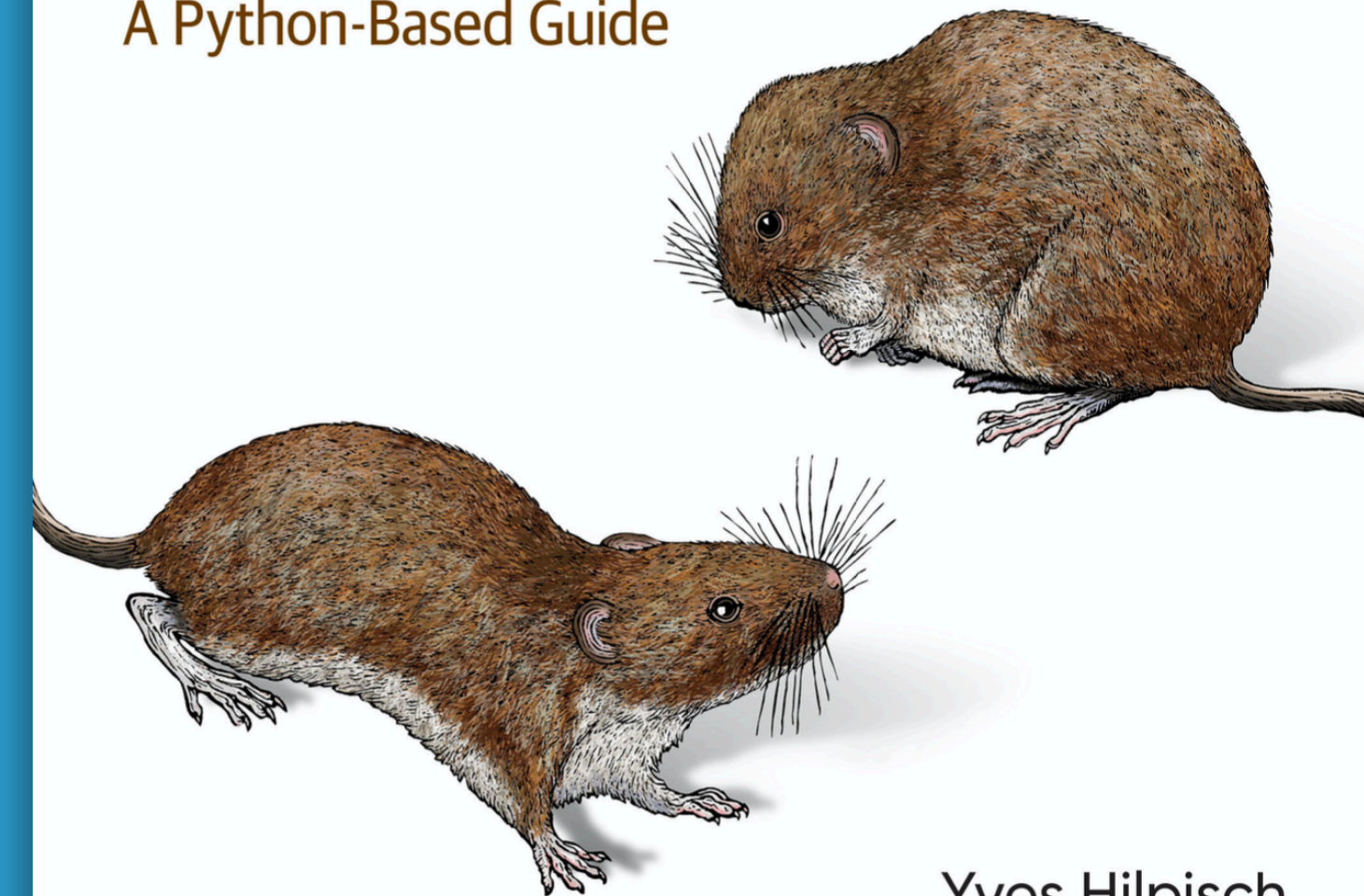


Yves Hilpisch

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## Artificial Intelligence in Finance

A Python-Based Guide



Yves Hilpisch



O'REILLY®  
オライリー・ジャパン

# Pythonからはじめる アルゴリズムトレード

自動売買の基礎と機械学習の本格導入に向けた  
Pythonプログラミング



Yves Hilpisch 著  
村上 振一郎 訳

YVES HILPISCH

# Trading con Python



Creare algoritmi  
per la compravendita  
e l'analisi di mercato

APQ&EO

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# Python 演算法交易

從創意發想到雲端部署



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藍子軒 譯

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# 金融AI 人工智慧的金融應用

運用 Python 的學習指南

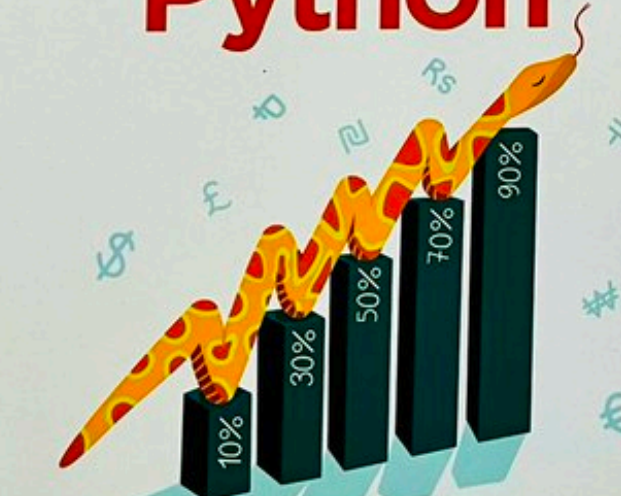


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陳仁和 譯

YVES HILPISCH

# Trading con Python



Creare algoritmi  
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e l'analisi di mercato

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# 파이썬을 이용한 알고리즘 트레이딩

Python for Algorithmic Trading  
From Idea to Cloud Deployment

아이디어 도출부터  
클라우드 배포까지



이브스 힐피쉬 지음  
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# Data-Driven Finance



# FINANCIAL TIMES

FRIDAY 12 NOVEMBER 2021 NEWS PROVIDER OF THE YEAR UK £3.90 Channel Islands €3.20 Republic of Ireland €3.20

## COP clock runs down



Summit's 'blah blah blah' is welcomed — GILLIAN TRITT, PAGE 25  
Business climate pledges' credibility gap — BIG READ, PAGE 25  
The struggle to write the carbon market rule book — PAGE 4

## Protest legacy

Huge Hong Kong police population keeps itself busy — NOTEBOOK, PAGE 24

## Iran impasse

Long wait for liberty goes on

Richard Ratcliffe holds up a picture of his wife, Nazanin Zaghari-Ratcliffe, the British human rights lawyer who has been imprisoned by Tehran since 2016. Ratcliffe has been on hunger strike outside the Foreign, Commonwealth and Development Office for 19 days, trying to get pressure on the government to do more to secure her release. Talks between British officials and Iran's foreign minister yesterday — principally to discuss reviving the nuclear deal with the Islamic republic — had raised hopes of a possible breakthrough. However, Ratcliffe said he had been hit "violently" after speaking to General Clerfy, the foreign minister involved in the negotiations. (UK news page)



## Briefing

NHS waiting list soars to almost 6m

New data have shown 5.6m people were waiting for hospital care in England in September, up by more than 1m in a year. Medical bodies said the figures were "unacceptable" and "shocking". — PAGE 1

Wall St cools in on GE's decline and fall

General Electric has paid more than 37% in losses to banks since 2009 as lenders sought to avoid the financial de-risking that culminated in a falling share price and the break-up of the group. — PAGE 4

Johnson's battery chemicals

The 204-year-old company has done a U-turn in its ambition to develop a national champion in the new-to-power electric cars with a division to stop making chemicals for batteries. — PAGE 16

Uber chief flies in to its London crisis

Uber's chief executive has held the FT that revealing a shortlist of 20,000 drivers in the UK was a priority. The taxi company has raised fares and paid out several lawsuits. — PAGE 10

Rivian priced its highly anticipated IPO at \$78 a share

All eyes have been on the new electric vehicle maker as it went public. The IPO was a success, with the company's shares rising in the first days of trading. — PAGE 11

Lukashenko threatens EU gas supplies

The Belarusian president has threatened to cut the transit of gas and goods to Europe if the EU imposes further sanctions on his regime over the migrant crisis on his country's border with Poland. — PAGE 4

Foreign buyers triple home ownership

The number of homes in England and Wales owned by overseas buyers has tripled in the past decade, with cities outside London also their target. Foreign ownership in Europe has been on the rise. — PAGE 1

Semiconductor makers

have earned less than 17% of the roughly \$146 billion the industry will devote to capital spending this year to legacy chips, Gartner estimates. — PAGE 11

Hertz, which emerged from bankruptcy this summer

is on the Nasdaq, with shares closing down nearly 10% in the first day of trading. — PAGE 11

DoorDash said it agreed to acquire European food-delivery company Wolt in a deal valued at over \$5 billion

— PAGE 11

Presto is close to a deal to combine with a SPAC and go public in a merger that would value the restaurant-technology firm at about \$1 billion

— PAGE 11

Video game company Unity agreed to pay \$1.3 billion for major parts of its rival-effects studio Weta

— PAGE 11

## Xi cements grip on China after vote puts him on par with Mao

Party says nation 'rejuvenated' • Third five-year term likely • New emphasis on socialism

BY REPORTERS

China's Communist party has passed its first "historical resolution" in 40 years, paving the way for President Xi Jinping to stay in office until at least 2032. The resolution, formally adopted by the party's central committee at the end of its annual meeting, on Monday, yesterday declared that Xi's leadership was "the key to the great rejuvenation of the Chinese nation." According to the official Xinhua news agency, "This week's annual plenum is particularly significant as it comes just a year before a party congress is expected to elect a new leadership team to serve until 2027. Communist China has almost reached the end of its 100th anniversary, and similar milestones to secure

its grip on power in 1949 and 1982, respectively. By declaring "the great rejuvenation of the Chinese nation has entered an irreversible historical process" under Xi's leadership, the party has in effect elevated him as an equal of Mao and Deng, replacing his predecessor as the party's central committee secretary in 2013. Xi, the plenum said, had "resolved many problems that [the party] failed to address for a long time despite setbacks and setbacks." He and Jiang presided over peaceful and orderly transitions of power, with their successors identified five years in advance. Xi is expected to disagree with that tradition and secure a third five-year term as the party's general secretary late next year. Xi did not directly announce at the start of his second term

in 2017, this third term as president would begin in March 2022. "The central purpose of the plenum is to ensure Xi Jinping's leadership," said Wang Kang, a China expert at Singapore Management University. "Xi Jinping's leadership was declared to have resolved many problems that [the party] failed to address for a long time despite setbacks and setbacks." Xi and Jiang presided over peaceful and orderly transitions of power, with their successors identified five years in advance. Xi is expected to disagree with that tradition and secure a third five-year term as the party's general secretary late next year. Xi did not directly announce at the start of his second term



Xi Jinping

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## Datawatch

Coffee hit



Walt's



## De Klerk, last president of apartheid era, dies at 85

De Klerk, who shared the Nobel Peace Prize with Nelson Mandela for dismantling apartheid, had died at the age of 85. As South African president he had the courage to initiate the country's engagement in social engineering had not worked and that South Africa's role was inevitable. But he remained neutral more practical than moral and having left politics, he often attracted outrage for his defence of a separate but equal society. (Obituary page 4)

## Johnson's £4m outside earnings open him to charges of hypocrisy from MPs

Baron Johnson, who this week ordered his MPs to donate themselves "wherever all to your constituents" instead of working on second jobs, has himself earned more than £4m from his own outside interests in the past 14 years. Since he was elected parliament in 2010 he made £3.6m, mostly in his last year as a backbencher in 2019 and 2020 when he took on foreign secretary and prime minister, according to Freedom of Information calculations based on the register of MPs' financial interests. These earnings include £4.5 million from speeches, £400,000 from columns and £100,000 from book advances and royalties. He was mayor of London between 2016 and 2021. Tax returns released when he was mayor showed earnings of £2.5m from 2017 to 2019. He

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World Markets	
INDEXES	CURRENCIES
DAX 30,000.00 (+1.2%)	EUR/USD 1.1850 (+0.0001)
NASDAQ 14,500.00 (+0.8%)	GBP/USD 1.3750 (+0.0002)
S&P 500 4,500.00 (+0.5%)	USD/JPY 109.50 (+0.01)
HANG SENG 26,000.00 (+0.3%)	AUD/USD 0.7800 (+0.0001)
NIKKEI 26,000.00 (+0.2%)	USD/CAD 1.3700 (+0.0001)
FTSE 100 7,500.00 (+0.1%)	CHF/USD 0.9200 (+0.0001)
SHANGHAI 3,500.00 (+0.1%)	HKD/USD 7.8000 (+0.0001)
ASX 7,500.00 (+0.1%)	SGD/USD 1.3800 (+0.0001)
IBOV 12,000.00 (+0.1%)	BRL/USD 5.5000 (+0.0001)
SENSEX 55,000.00 (+0.1%)	INR/USD 75.0000 (+0.0001)
SET 4,500.00 (+0.1%)	THB/USD 35.0000 (+0.0001)
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QUALCOMM 1,200.00 (+0.1%)	CORN 3.50 (+0.05)
INTEL 1,200.00 (+0.1%)	WHEAT 5.50 (+0.05)
AMD 1,200.00 (+0.1%)	CORN 3.50 (+0.05)
ARM 1,200.00 (+0.1%)	WHEAT 5.50 (+0.05)
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Financial Times | ft.com

FTSE 100 -0.01% | S&P 500 -0.00% | Euro/Dollar +0.04% | Pound/Dollar +0.25% | Brent Crude Oil +0.96% | 10 Year US Gov +2.50%

# FINANCIAL TIMES

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HOME WORLD US COMPANIES TECH MARKETS CLIMATE OPINION WORK & CAREERS LIFE & ARTS HOW TO SPEND IT

US-China relations

## Biden urges Xi not to allow competition to 'veer into conflict'

Leaders hold first virtual meeting as ties between US and China fray over Taiwan

UPDATED 43 MINUTES AGO

- Biden and Xi to tackle Taiwan and nuclear build-up in virtual meeting
- Australia vows to help US defend Taiwan from Chinese attacks
- Joe Biden and Xi Jinping to hold virtual summit on Monday



The Big Read

## Investors pivot to India after China's tech crackdown

4 HOURS AGO






THE WALL STREET JOURNAL.

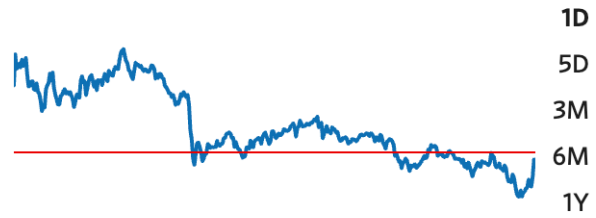
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U.S. Politics Economy Business Tech Markets Opinion Books & Arts Real Estate Life & Work WSJ Magazine Sports

U.S. S&P 500 29808.12 0.11% ▲ | U.S. 10 Yr 1/32 Yield 1.616% ▲ | Crude Oil 81.53 0.80% ▲ | Euro 1.1373 0.05% ▲ | DJIA 36087.45 0.04% ▼

# THE WALL STREET JOURNAL.

US EUROPE ASIA FX RATES FUTURES



DJIA	36087.45	-12.86	-0.04%
S&P 500	4682.80	-0.05	-0.00%
Nasdaq	15853.85	-7.11	-0.04%
Russell 2000	2400.93	-10.84	-0.45%
DJ Total Mkt	48582.45	-17.28	-0.04%

View Watchlist | View All Market Data →


OPINION

### America Will Be Number One—in Taxes

By The Editorial Board | Review & Outlook

Beto O'Rourke Announces Bid for Texas Governor

4 min read




### America's Infrastructure Struggles With New Weather Forecast

Historically anomalous heat and rain have overwhelmed systems designed to withstand old meteorological patterns, and climatologists expect still worse with climate change.


"We've never seen destruction like this before."

523 | Long read

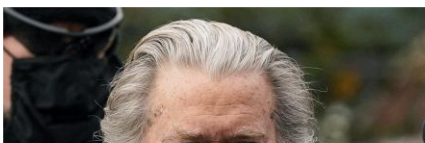


Kyle Rittenhouse Homicide Trial Wraps Up

5 min read



Shell to Move Headquarters to London Amid



... to the Web ...

### Virtual Meeting

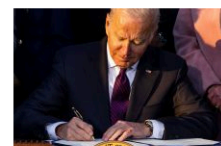
The White House said the U.S. and Chinese presidents discussed a variety of topics including Afghanistan, North Korea and Iran, as well as human rights, climate change and concerns over Taiwan. 492 | 7 min read

► How U.S. Plays Catch-Up on China's Push for Influence

### President Signs Infrastructure Bill Into Law

The passage of the \$1 trillion bill to repair roads and bridges, upgrade the electrical grid and expand access to broadband internet marks a rare bipartisan policy win for the White House. 6 min read

• What's in the Bill? From Amtrak to Roads to Water Systems





The image displays a financial terminal interface for Apple Inc. (AAPL). The main window shows the stock price at 123.08 USD, with a daily change of +150 cents. The interface is divided into several sections:

- Overview:** Includes a price chart for AAPL.O showing a price of 123.13. The chart shows a general upward trend with some volatility.
- Price Performance:** Lists key metrics such as Open (123.08), Prev. Close (123.08), Bid / Ask (123.24 / 123.35), Vwap, Turnover, Volume (13,358), Short Interest (0.500%), and YTD performance (+67.66%).
- News & Research:** A list of recent news items, including "Refinitiv Newscasts - Evidence of Belarus providing migrants tourist visas" and "S. Korea's new law on in-app payment is 'monumental': CAF chief".
- STARLINE MODELS:** A table of valuation models with scores: Price Momentum (97), Analyst Revisions (79), Smart Holdings (77), Short Interest (95), Earnings Quality (95), Credit Risk - Combined (96), Credit Risk - Smart Ratios (92), Credit Risk - Structural (88), Credit Risk - Text Mining (85), and Combined Alpha Model (72).
- RECOMMENDATIONS:** A table showing analyst recommendations: Strong Buy (11), Buy (19), Hold (8), Sell (1), and Strong Sell (1). The mean price target is USD 125.92, with a 2% upside.
- ESTIMATES:** A table of financial estimates for QTR Dec-2020 and FY Sep-2021, including EPS and Revenue.
- NEWS & RESEARCH:** A detailed list of news items with timestamps and sources, such as "Apple sued over old iPhones in Europe Tech giant i..." and "《A股动向》苹果因旧款手机电池问题在欧洲多国面临诉讼".
- RESEARCH:** A table of research reports from various contributors, including Equiti and Trefis.
- EVENTS:** A list of upcoming events, including "AAPL34.SA Final Cash Dividend of gross BRL 0.123473 paid on Nov 18, 2021" and "Q1 2021 Apple Inc Earnings Release".
- PEERS:** A table comparing Apple Inc. with its peers (HP Inc.) across various metrics like Mkt Cap, % Change, Revenue, EBITD, and EV/...

... to the Terminal ...

## Tick Data

```
[4]: %%time
data = ek.get_timeseries('AAPL.O',
                        start_date='2021-11-15 15:00:00',
                        end_date='2021-11-15 15:30:00',
                        interval='tick',
                        fields=['*'])
```

```
CPU times: user 120 ms, sys: 14.5 ms, total: 135 ms
Wall time: 2.7 s
```

```
[5]: data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
DatetimeIndex: 41213 entries, 2021-11-15 15:00:00.004000 to 2021-11-15 15:29:59.936000
Data columns (total 2 columns):
#   Column  Non-Null Count  Dtype
---  -
0   VALUE   41145 non-null    Float64
1   VOLUME  41213 non-null    Int64
dtypes: Float64(1), Int64(1)
memory usage: 1.0 MB
```

```
[14]: data.tail()
```

```
[14]:
```

	AAPL.O	VALUE	VOLUME
	Date		
	2021-11-15 15:29:59.134	150.4456	10
	2021-11-15 15:29:59.313	150.445	1
	2021-11-15 15:29:59.588	150.4409	150
	2021-11-15 15:29:59.745	150.445	1
	2021-11-15 15:29:59.936	150.4488	5

... to powerful APIs.



Apple Event on 18. October 2021 (<https://www.apple.com/de/apple-events/october-2021/>).

```
[9]: headlines = ek.get_news_headlines(query='R:AAPL.0 macbook',  
                                     count=5,  
                                     date_from='2021-10-18',  
                                     date_to='2021-10-19')
```

```
[10]: headlines
```

```
[10]:
```

	<b>versionCreated</b>	<b>text</b>	<b>storyId</b>	<b>sourceCode</b>
<b>2021-10-18 23:30:18.401</b>	2021-10-18 23:30:18.401000+00:00	Apple is finally fixing the things people hate...	urn:newsml:reuters.com:20211018:nNRAh2psl1:1	NS:WASHPO
<b>2021-10-18 23:10:18.012</b>	2021-10-18 23:10:18.012000+00:00	Apple event – live: Macbook Pro and other new ...	urn:newsml:reuters.com:20211018:nNRAh2kj3a:1	NS:INDEPE
<b>2021-10-18 21:41:19.927</b>	2021-10-18 21:41:19.927000+00:00	New MacBook Pro features ultra-fast chips, ret...	urn:newsml:reuters.com:20211018:nNRAh2u38b:1	NS:EFEING
<b>2021-10-18 21:33:50.860</b>	2021-10-18 21:33:50.860000+00:00	Apple Event: MacBook Pro 2021 alleged pictures...	urn:newsml:reuters.com:20211018:nNRAh2u1wj:1	NS:TIMIND
<b>2021-10-18 21:33:50.623</b>	2021-10-18 21:33:50.623000+00:00	Apple launches new MacBook Pro: Price, specs a...	urn:newsml:reuters.com:20211018:nNRAh2u1vv:1	NS:TIMIND

... to powerful APIs.

```
[11]: story = headlines.iloc[0]
```

```
[12]: story
```

```
[12]: versionCreated      2021-10-18 23:30:18.401000+00:00  
text      Apple is finally fixing the things people hate...  
storyId      urn:newsml:reuters.com:20211018:nNRAh2psl1:1  
sourceCode      NS:WASHPO  
Name: 2021-10-18 23:30:18.401000, dtype: object
```

```
[13]: news_text = ek.get_news_story(story['storyId'])
```

```
[14]: from IPython.display import HTML
```

```
[15]: HTML(news_text)
```

```
[15]: The demise of MagSafe charging. An inelegant Touch Bar. Limited selection of ports. The laundry list of complaints about Apple's laptops has steadily grown over the past five years. Now, Apple is finally walking back those changes.
```

On Monday, the Cupertino, Calif., company unveiled a pair of new MacBook Pro laptops, powered by its latest homegrown processors and free of the many limitations that plagued earlier models. It also showed off a set of updated AirPods and colorful HomePod mini smart speakers. Riding high from record Mac sales last year, Apple made sure to make its new MacBooks the star of its virtual event Monday.

Still, computers that run Apple's MacOS software account for only a fraction of the overall PC landscape — just over 7 percent as of the end of the second quarter, according to market research firm IDC. Its market share has slipped from 8 percent in the first quarter and 7.6 percent a year earlier, IDC data showed. The changes on display Monday seem to be geared more toward

... to powerful APIs.

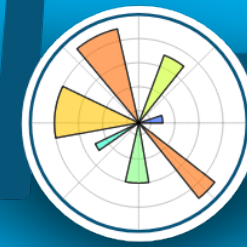


```
IP[y]:  
IPython
```

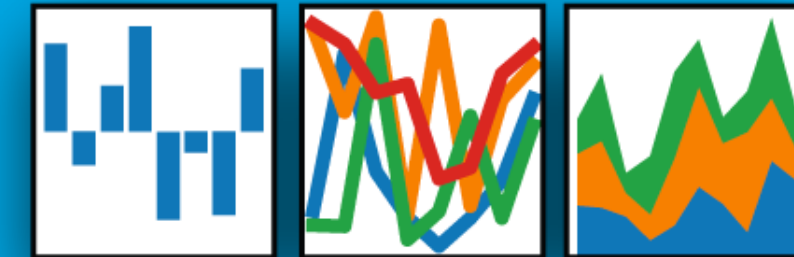


NumPy

matplotlib



pandas  
 $y_{it} = \beta' x_{it} + \mu_i + \epsilon_{it}$



Keras

# The Medium Article



Algorithmic Trading in Less than 100 Lines of Python Code

medium.com/oreillymedia/algorithmic-trading-in-less-than-100-lines-of-python-code-b4a4b159a485

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# Algorithmic Trading in Less than 100 Lines of Python Code

O'Reilly Media Follow  
Dec 17, 2020 · 9 min read

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If You Know Trading and Python, this Is Easy

**Editor's Note:** *The barriers to entry for algorithmic trading have never been lower. Not too long ago, only institutional investors with IT budgets in the millions of dollars could take part, but today even individuals equipped only with a notebook and an Internet connection can get started within minutes. In this piece from [Python for Algorithmic Trading](#), author Yves Hilpisch shows you how to implement a complete algorithmic trading project, from backtesting the strategy to performing automated, real-time trading.*

Algorithmic trading refers to the computerized, automated trading of financial instruments (based on some algorithm or rule) with little or no human intervention during trading hours. Almost any kind of financial instrument — be it stocks, currencies, commodities, credit products or volatility — can be traded in such a fashion. Not only that, in certain market segments, algorithms are responsible for the lion's share of the trading volume. The books [The Quants](#) by Scott Patterson, [More Money Than God](#) by Sebastian Mallaby, and, more recently, [The Man Who Solved the Market](#) by Gregory Zuckerman paint a vivid picture of the beginnings of algorithmic trading and the personalities behind its rise.



NEW YORK TIMES BESTSELLING AUTHOR

EDWARD O. THORP

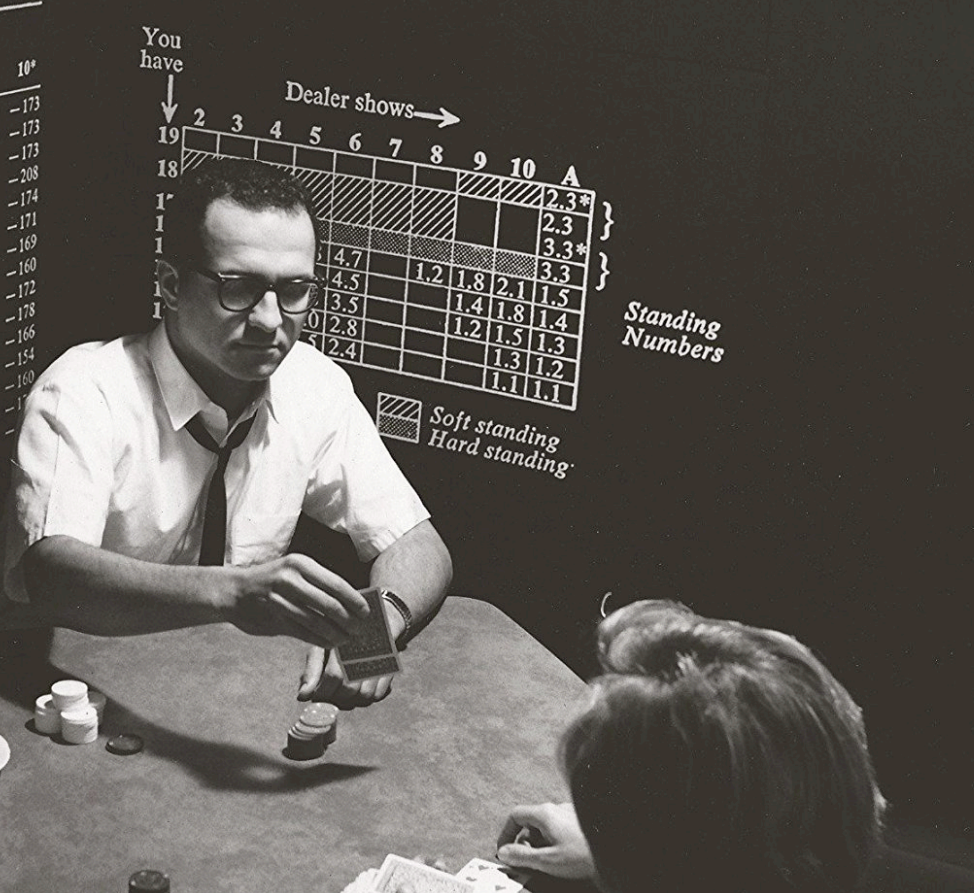
# A MAN FOR ALL MARKETS

From LAS VEGAS to WALL STREET,  
HOW I BEAT THE DEALER  
and THE MARKET

FOREWORD BY NASSIM NICHOLAS TALEB

TABLE 5. Player's Advantage Against Various Up Cards.

Player's overall advantage*	Player's advantage when the dealer's up card is									
	1*	2	3	4	5	6	7	8	9	10*
-0021	-364	094	130	176	229	236	145	056	-040	-173
-0034	-393	095	130	177	230	239	145	056	-040	-173
-0038	-351	031	065	112	157	203	061	-021	-104	-208
-0272	-373	...	...	...	...	...	...	...	...	...
0142	-371	120	195	...	...	...	...	...	...	...
0189	-374	126	240	313	370	232	141	031	-046	-169
0236	-369	184	240	289	196	176	142	038	-030	-168
0329	-385	179	236	148	181	154	117	073	-030	-168
0187	-364	159	206	124	137	317	...	...	...	...
0125	-356	131	067	089	310	317	...	...	...	...
0005	-343	024	050	259	391	391	...	...	...	...
-0091	-346	176	212	212	337	...	...	...	...	...
-0215	-385	249	284	337	...	...	...	...	...	...
0189	-404	...	...	...	...	...	...	...	...	...
0394	...	186	219	264	307	...	...	...	...	...
0070	...	...	...	...	...	...	...	...	...	...



**NEW YORK TIMES BESTSELLER**

# THE MAN WHO SOLVED THE MARKET

HOW JIM SIMONS LAUNCHED THE QUANT REVOLUTION

**Gregory Zuckerman**  
Author of *THE GREATEST TRADE EVER*

Author of *THE GREATEST TRADE EVER*

*(Handwritten mathematical notes and diagrams are visible in the background, including equations like E = 1/2 MgL, d^2x/dt^2 = -kx, and various trigonometric and calculus formulas.)*



# Trading Platform

CFDs are complex instruments and come with a high risk of losing money rapidly due to leverage. **76.6% of retail investor accounts lose money when trading CFDs with this provider.** You should consider whether you understand how CFDs work and whether you can afford to take the high risk of losing your money.



CFDs and spread betting

Sign in Help

- Products Platforms Tools Learn Social Responsibility

Try demo

Start trading

TRADING OVERVIEW

# Global forex broker for 25 years

Trade the UK 100 and Germany 30 from 1 point and EUR/USD and EUR/GBP from 0.8 pips. We offer depth of market on all our forex pairs.

You can use our powerful API technology to integrate your strategy with trading applications, build your own custom user interfaces. You can even create and test your own automated trading strategies using our APIs.

Create account

[Demo account](#)





# Create your demo trading account in minutes


Where do you live?

Select your country/region

 United Kingdom X

## Account details

Email address

Create password 

## Your password must contain:

- Between 10-15 characters
- At least 3 of the following:
  - Lower case letters (a-z)
  - Upper case letters (A-Z)
  - Numbers (0-9)
  - Special characters (ex. !@#)

## Personal details

First name



# Oanda Trading Platform

```
pip install git+https://github.com/yhilpisch/tpqoa.git
```

oanda.cfg (configuration file)

```
[oanda]  
access_token = c71f59_YOURACCESSTOKEN_13da5b8f60fac1397232  
account_id = 101-004-YOURID-001  
account_type = practice
```

## DISCLAIMER

All the content, Python code, Jupyter Notebooks and other materials (the “Material”) come without warranties or representations, to the extent permitted by applicable law.

None of the Material represents any kind of recommendation or investment advice.

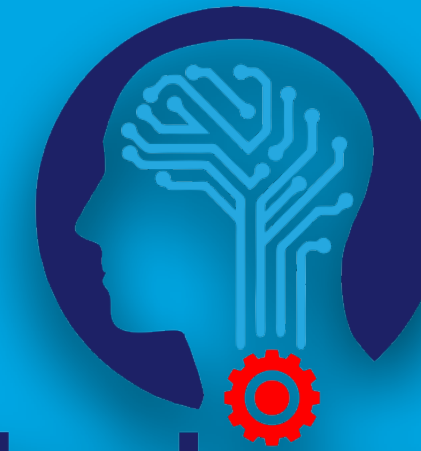
The Material is only meant as a technical illustration.

Leveraged and unleveraged trading of financial instruments, and of contracts for difference (CFDs) in particular, involves a number of risks (for example, losses in excess of deposits). Make sure to understand and manage these risks.

## Case Studies

- Momentum Strategy
- AI-Powered Strategy
- Deployment of SMA Strategy

# The AI Machine



# The AI Machine

## Prediction Engines

Technical Rules  
 Statistical Methods  
 Machine Learning  
 Deep Learning  
 Automated ML  
 ...

## Deployment & Execution

Data Streaming  
 Transaction Streaming  
 Position Management  
 Profit & Loss Calculation  
 Visualization  
 Logging & Reporting  
 ...

## Decision Rules

Entry Rules  
 Stop Loss  
 Trailing Stop Loss  
 Dynamic Stop Loss  
 Take Profit  
 Position Sizing  
 Capital Allocation  
 ...

# The AI Machine

# The Python Quants GmbH

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<http://tpq.io> | [team@tpq.io](mailto:team@tpq.io)  
@dyjh

