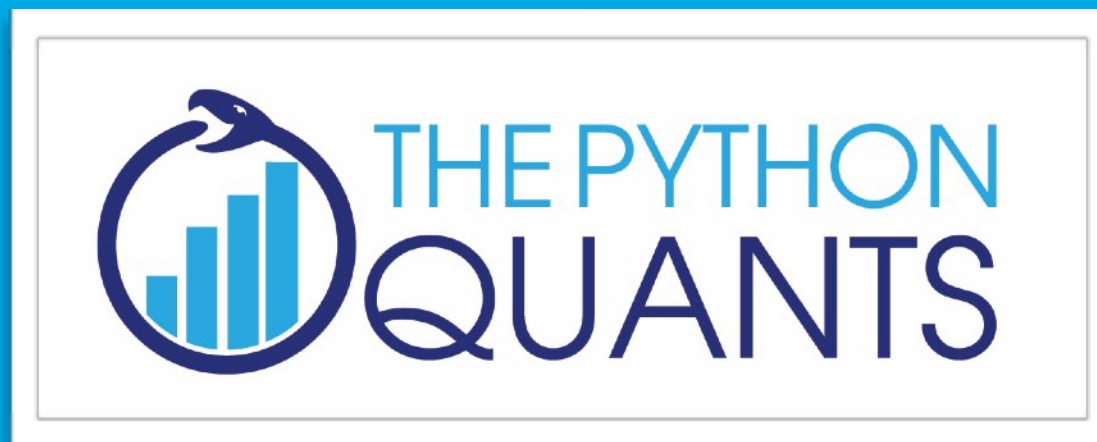


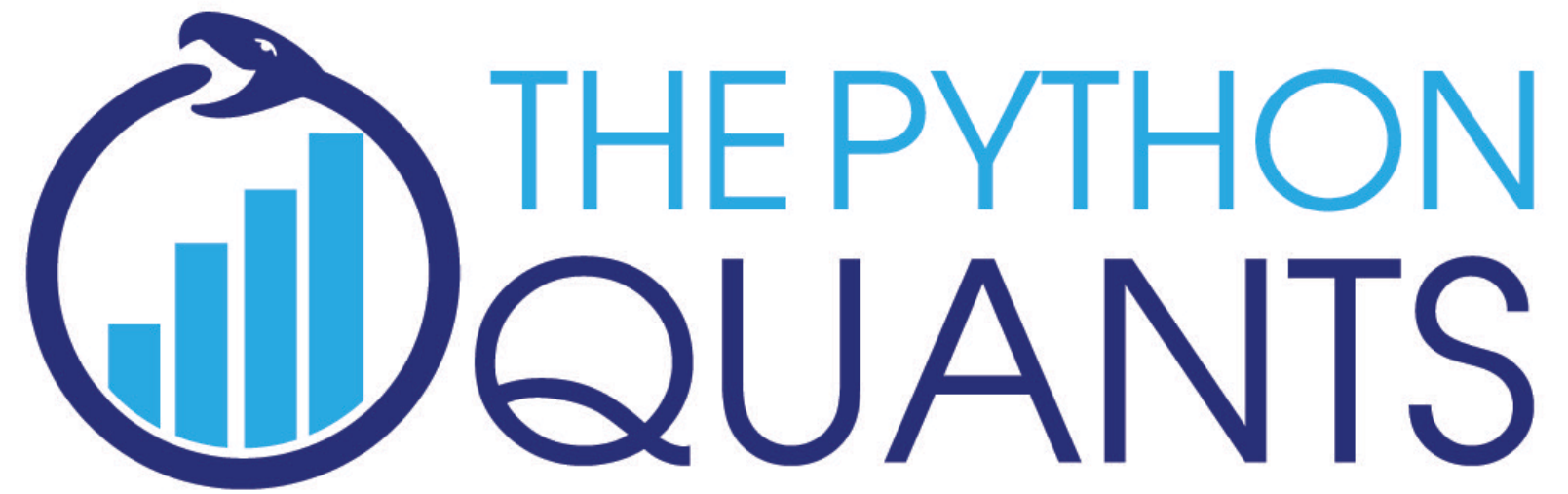
The AI Machine — Solving the Last Mile Problem in Algorithmic Trading

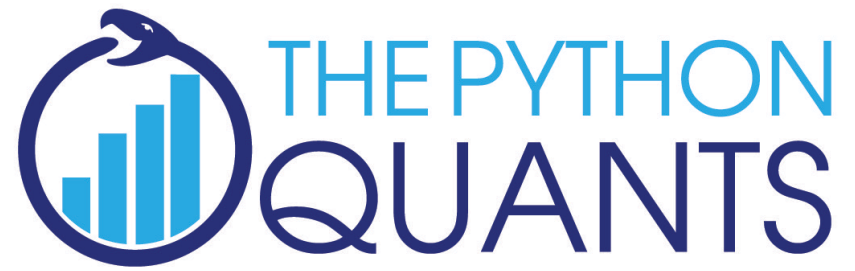
Quant Insights Conference, London, 16. November 2018

Dr. Yves J. Hilpisch



The Group





SERVICES

for financial institutions globally



EVENTS

for Python quants & algorithmic traders



TRAINING

about Python for finance
& algorithmic trading



CERTIFICATION

in cooperation with university



BOOKS

about Python and
finance



PLATFORM

for browser-based
data analytics



OPEN SOURCE

Python library
for financial analytics





Standardized deployment of AI-based algorithmic trading strategies.

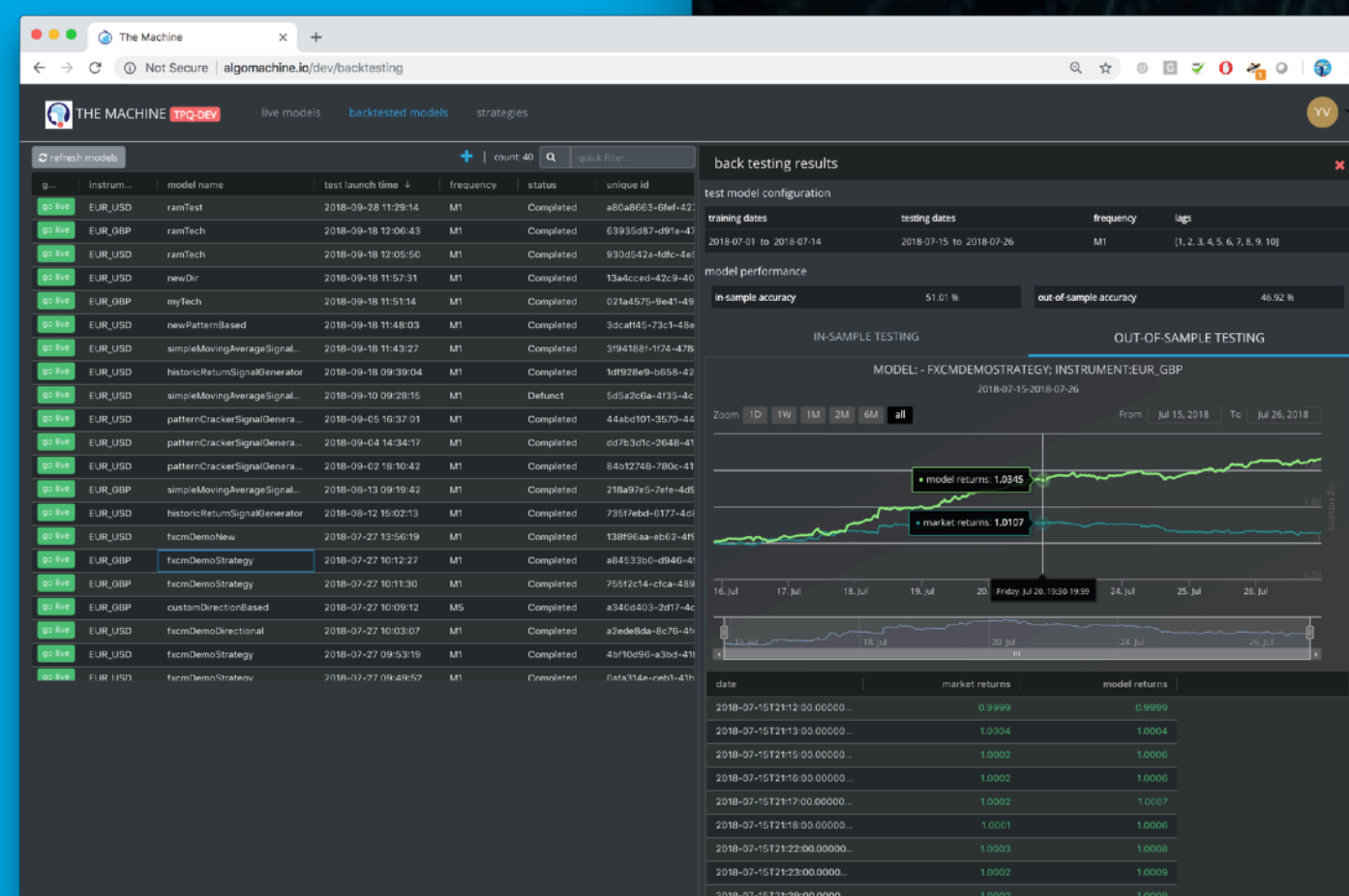
You focus on research and strategy development, The AI Machine deploys robustly and reliably.

Template-based strategy definition in Python, standardized backtesting, multiple strategies in parallel, real-time visual monitoring and audit, detailed reporting.

Stay informed about The AI Machine and all things Python for Algorithmic Trading.

Your email address

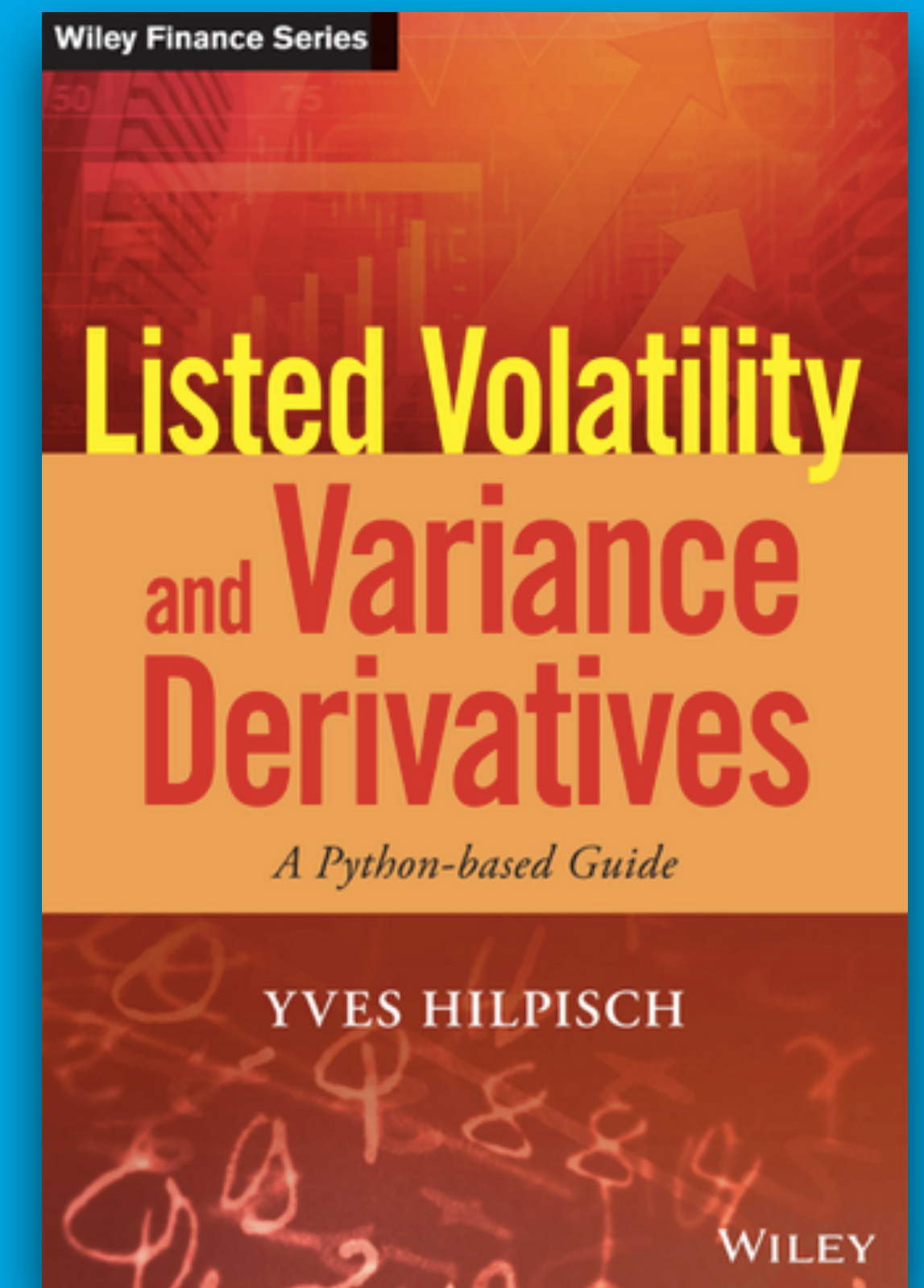
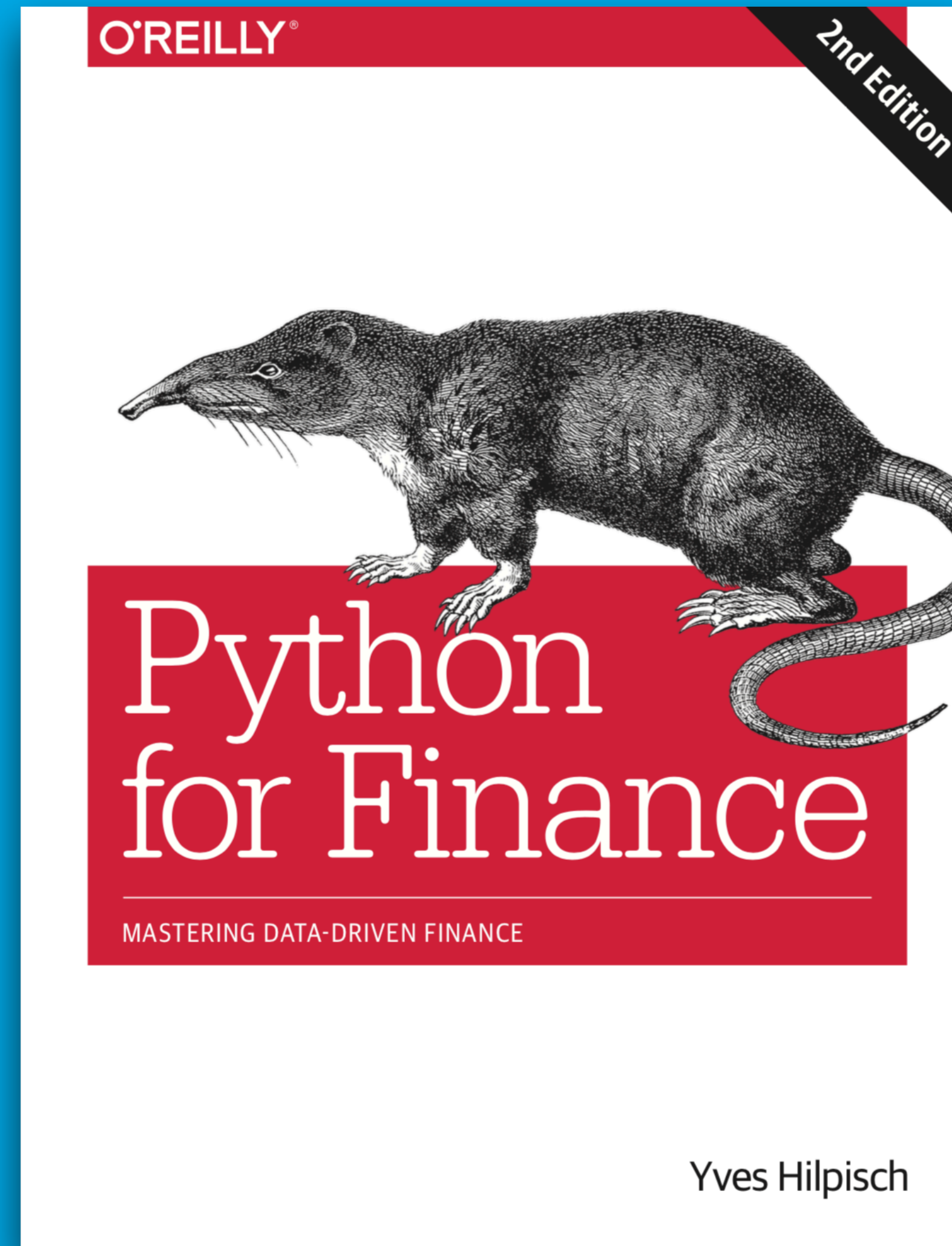
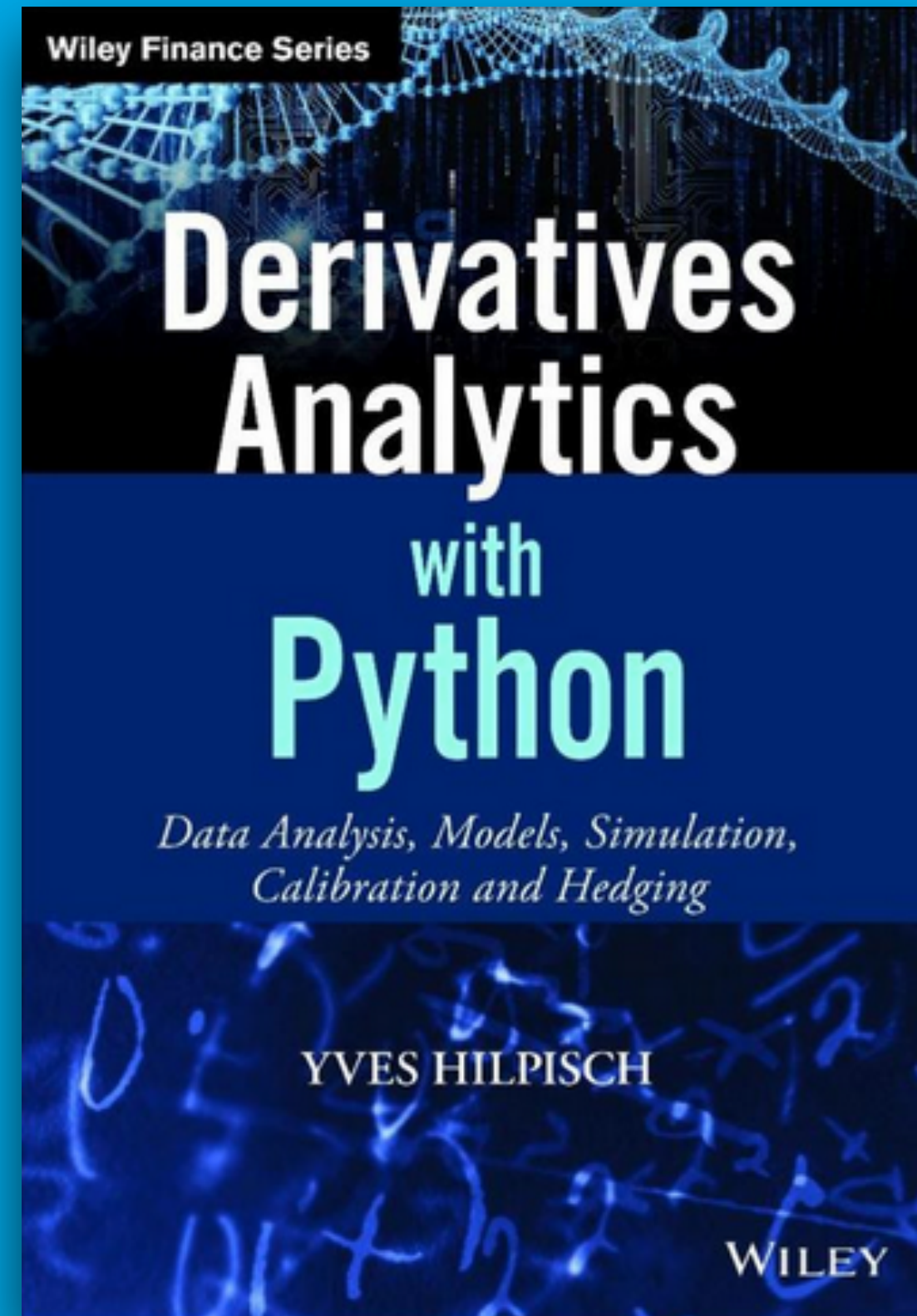
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<http://books.tpq.io>

Data-Driven Finance

FINANCIAL TIMES

TUESDAY 3 OCTOBER 2017

WORLD BUSINESS NEWSPAPER

MIDDLE EAST

Mohamed El-Erian

Reasons to worry about the Fed's 'beautiful normalisation' — PAGE 20

Torturing Theresa

Boris Johnson's bid to dictate May's Brexit strategy — JANAN GANESH, PAGE 11

Confined in a circle

The myths that hold back women in Indian society — AMY KAZMIN, PAGE 10

Las Vegas reels from worst US mass shooting

A casualty is carried from the scene after a gunman opened fire on concertgoers in Las Vegas on Sunday night. More than 58 people were killed and over 150 wounded, making it the deadliest mass shooting in US history.

Las Vegas police said the suspected gunman, 64-year-old Stephen Paddock, fired shots from his 32nd-floor room in the Mandalay Bay Hotel and Casino into the crowd of 22,000 people attending the Route 91 Harvest Festival.

In televised remarks, Donald Trump, the US president, called the shooting "an act of pure evil" but made no reference to guns. He plans to visit the city on Wednesday to meet the families of the victims and law enforcement officials.

Report page 7



David Becker/Reuters/Imago

Catalan president urges Brussels to mediate in independence clash

◆ Region seeks to avoid 'traumatic split' from Spain ◆ EU says dispute is 'internal matter'

MICHAEL TOTTHAR — BARCELONA

He added: "We don't want a traumatic split, Sunday's referendum, while it's necessary the suspension of Catalonia's

status of law, which calls for of the liberal government supports the

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☰ 👤 📁 💬 🔔 📅 📄 📶

NEW Welcome to the new faster, more powerful Company Overview. [See what's changed](#) [Revert to previous version](#) [Send feedback](#)

AAPL.O ▼ APPLE INC ▼

United States | NASDAQ Global Select Consolidated | Computer Hardware

Overview

News & Research

Price & Charts

Estimates

Financials

Events

Ownership

Debt & Credit

Peers & Valuation

Derivatives

Filings

360 Menu

📄 ⚙️

BUSINESS SUMMARY >

Apple Inc. designs, manufactures and markets mobile communication and media devices, personal computers and portable digital music players. The Company sells a range of related software, services, accessories, networking solutions, and third-party digital content and applications. The Company's segments include the Americas, Europe, Greater China, Japan and Rest of Asia Pacific. The Americas segment includes both North and South America. The Europe segment includes European countries, India, the Middle East and Africa. The Greater China segment includes China, Hong Kong and Taiwan. The Rest of Asia Pacific segment includes Australia and the Asian countries not included in the Company's other operating segments. Its products and services include iPhone, iPad, Mac, iPod, Apple Watch, Apple TV, a portfolio of consumer and professional software applications, iPhone OS (iOS), OS X and watchOS operating systems, iCloud, Apple Pay and a range of accessory, service and support offerings.

NEWS >

28-Dec-2016

10:24:36	Apple dominerade julhandeln mått i antalet aktiverade enheter	FNW
10:15:18	UPDATE 3-S.Korea fines Qualcomm \$854 mln for violating competition laws	RTRS
09:42:52	Corea del Sur multa a Qualcomm con 854 mlns dlr por violar leyes de competencia	RTRS
06:00:10	RPT-Wall Street cale une fois de plus au seuil des 20.000 points	RTRS
03:30:18	Aumento del gasto de último minuto impulsa a temporada de ventas de fin de año ...	RTRS
01:50:14	Last-minute spending surge lifts U.S. holiday shopping season	RTRS

27-Dec-2016

23:33:16	Reuters Insider - Tech stocks could take the Dow to 20k	CNBC
23:32:28	Reuters Insider - History suggests Dow could hit 20k by Friday: Technician	CNBC
22:55:29	LEAD 2-Wall Street cale une fois de plus au seuil des 20.000 points	RTRS
22:09:39	Apple, Cisco Lead DJIA Higher Tuesday	WALLST

EVENTS >

Upcoming

Past

24-Jan-2017 > 30-Jan-2017

NTS	Q1 2017 Apple Inc Earnings Release	📅
-----	------------------------------------	---

24-Feb-2017 > 28-Feb-2017

PRICE PERFORMANCE >

Open	
Prev. Close	
Bid / Ask	
VWAP	--
Turnover	
Volume	
Short Interest	0.90%
YTD	
Beta (5Y Monthly)	1.29
Mkt Cap	USD 625.27B
PE (LTM)	14.12
Div Yield	1.94%
DR	BRL 📄 AAPL34.SA (1:0.1)
DR Type	--
DR Bank	--

AAPL.O 115.190000

Price USD

117.260000

115.00

110.00

105.00

100.00

95.00

90.00

85.00

Dec-31

Mar-31

Jun-30

Sep-

14-Dec-2016

Today

5D

3M

6M

1Y

5Y

No Benchmark ▼

52Wk: 89.47 12-May 118.69 11-Oct

📅 Next Earn Report: 24-Jan-2017

Free Float	5.32B	Asset Type	Ordinary Share	📄 5 yr CDS	26.980 bps
Outstanding	5.33B	Share Class	--	Δ Today	-0.07%
IPO Date	12-Dec-1980	Lot Size		Δ 1 Week	-0.074
First Trade Da...	12-Dec-1980	Voting Rights	1		

FUNDAMENTALS >

	AAPL (Sep-2016)	Growth	Industry
Gross Margin	38.02%	(4.71%) 4Q	38.91%
Operating Margin	25.10%	(11.59%) 4Q	5.75%

Tick Data

```
In [23]: tick = ek.get_timeseries(['AAPL.O'],  
                                fields='*',  
                                start_date='2017-07-11 16:00:0000',  
                                end_date='2017-07-11 16:15:0000',  
                                interval='tick')
```

```
In [24]: tick.info()
```

```
<class 'pandas.core.frame.DataFrame'>  
DatetimeIndex: 1898 entries, 2017-07-11 16:00:00.686000 to 2017-07-11 16:14:59.708000  
Data columns (total 2 columns):  
VALUE      1892 non-null float64  
VOLUME     1898 non-null float64  
dtypes: float64(2)  
memory usage: 44.5 KB
```

```
In [25]: tick.tail()
```

```
Out[25]:
```

	AAPL.O	VALUE	VOLUME
	Date		
	2017-07-11 16:14:59.693	144.9900	100.0
	2017-07-11 16:14:59.693	144.9900	100.0
	2017-07-11 16:14:59.693	144.9900	100.0
	2017-07-11 16:14:59.707	144.9899	400.0
	2017-07-11 16:14:59.708	144.9899	1305.0

News

```
In [29]: news = ek.get_news_headlines('R:.SPX AND "Trump" AND Language:LEN', count=5)
news
```

```
Out[29]:
```

	versionCreated	text	storyId	sourceCode
2017-08-18 16:46:19	2017-08-18 16:46:19	U.S. STOCKS EXTEND GAINS AFTER NEW YORK TIMES ...	urn:newsml:reuters.com:20170818:nL4N1L44L9:1	NS:RTRS
2017-08-18 15:53:08	2017-08-18 15:53:08	CORRECTED-U.S. STOCKS PARE LOSSES, TRADERS CIT...	urn:newsml:reuters.com:20170818:nL4N1L44IK:1	NS:RTRS
2017-08-18 15:16:27	2017-08-18 15:16:27	US STOCKS-Wall St lower on growing concerns ov...	urn:newsml:reuters.com:20170818:nL4N1L44F2:5	NS:RTRS
2017-08-18 11:24:30	2017-08-18 11:24:30	US STOCKS-Futures flat amid growing concerns o...	urn:newsml:reuters.com:20170818:nL4N1L43RR:5	NS:RTRS
2017-08-17 17:09:05	2017-08-17 17:09:05	US STOCKS-Wall St extends losses on Trump poli...	urn:newsml:reuters.com:20170817:nL4N1L34N1:5	NS:RTRS

```
In [30]: storyId = news.iloc[4, 2]
storyId
```

```
Out[30]: 'urn:newsml:reuters.com:20170817:nL4N1L34N1:5'
```

```
In [31]: from IPython.display import display, HTML
```

```
In [32]: display(HTML(ek.get_news_story(storyId)))
```

- Gary Cohn resignation rumors knocked down
- Wal-Mart drops after reporting margin fall
- Indexes down: Dow 0.81 pct, S&P 1.03 pct, Nasdaq 1.39 pct

Updates to early afternoon

By Sruthi Shankar and Tanya Agrawal

Aug 17 (Reuters) - U.S stocks hit session lows in early afternoon trading on Thursday as investors worried about President Donald Trump's ability to

Data specialist Enigma reels in investment group cash

Hedge funds and venture capital firms move into analytics businesses they use themselves

Lindsay Fortado in New York YESTERDAY

4

Hedge funds, banks and venture capital firms are piling into investments in data companies in the hope of cashing in on a business they are using a lot more themselves.

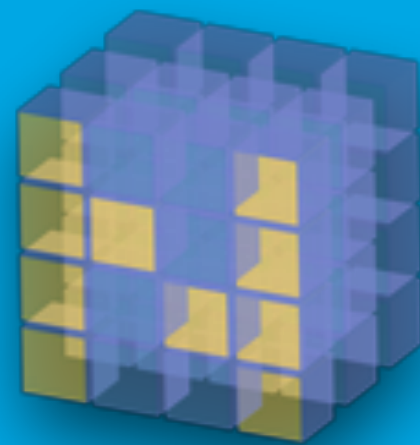
In recent years, there has been a [proliferation of start-ups](#) that trawl through reams of data and sell it to investment groups searching for an edge.

The latest to attract investor interest is Enigma, a New York-based start-up that received funding from sources including quant giant Two Sigma, activist hedge fund Third Point and venture capital firms NEA and Glynn Capital in a \$95m capital raising announced on Tuesday.

Enigma collects a huge range of data including the contents of every container ship that arrives in US ports every week, [aeroplane registrations](#), elevator inspection reports in California and data on amusement park rides in Arkansas.



IP[y]:
IPython

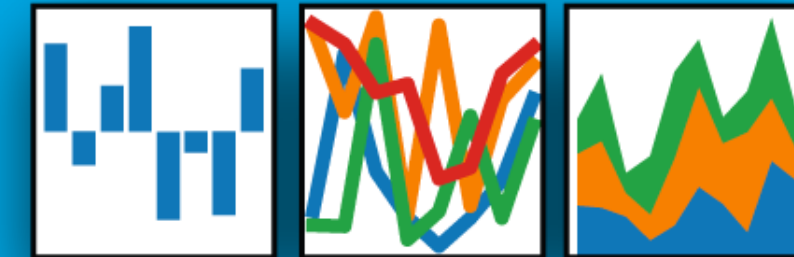


NumPy

matplotlib



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



AI-First Finance

MARCOS LOPEZ DE PRADO

ADVANCES *in* FINANCIAL MACHINE LEARNING



WILEY

“The essential tool of econometrics is multivariate linear regression, an 18th-century technology that was already mastered by Gauss before 1794 ... It is hard to believe that something as complex as 21st-century finance could be grasped by something as simple as inverting a covariance matrix.”

“... what if economists finally started to consider non-linear functions?”

“An ML algorithm can spot patterns in a 100-dimensional world as easily as in our familiar 3-dimensional one.”

“Econometrics might be good enough to succeed in financial academia (for now), but succeeding in practice requires ML.”

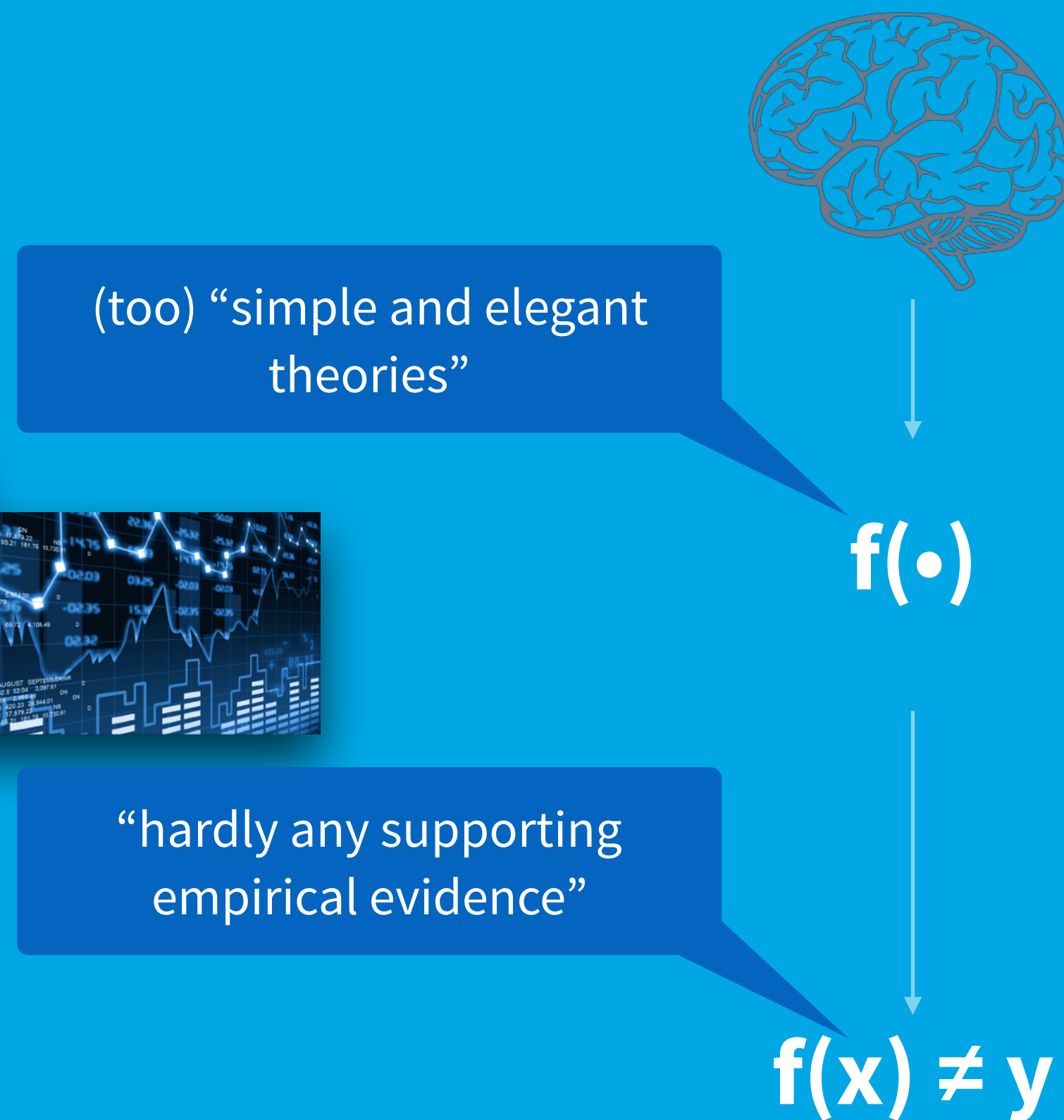
Marcos López de Prado (2018)

Financial Markets



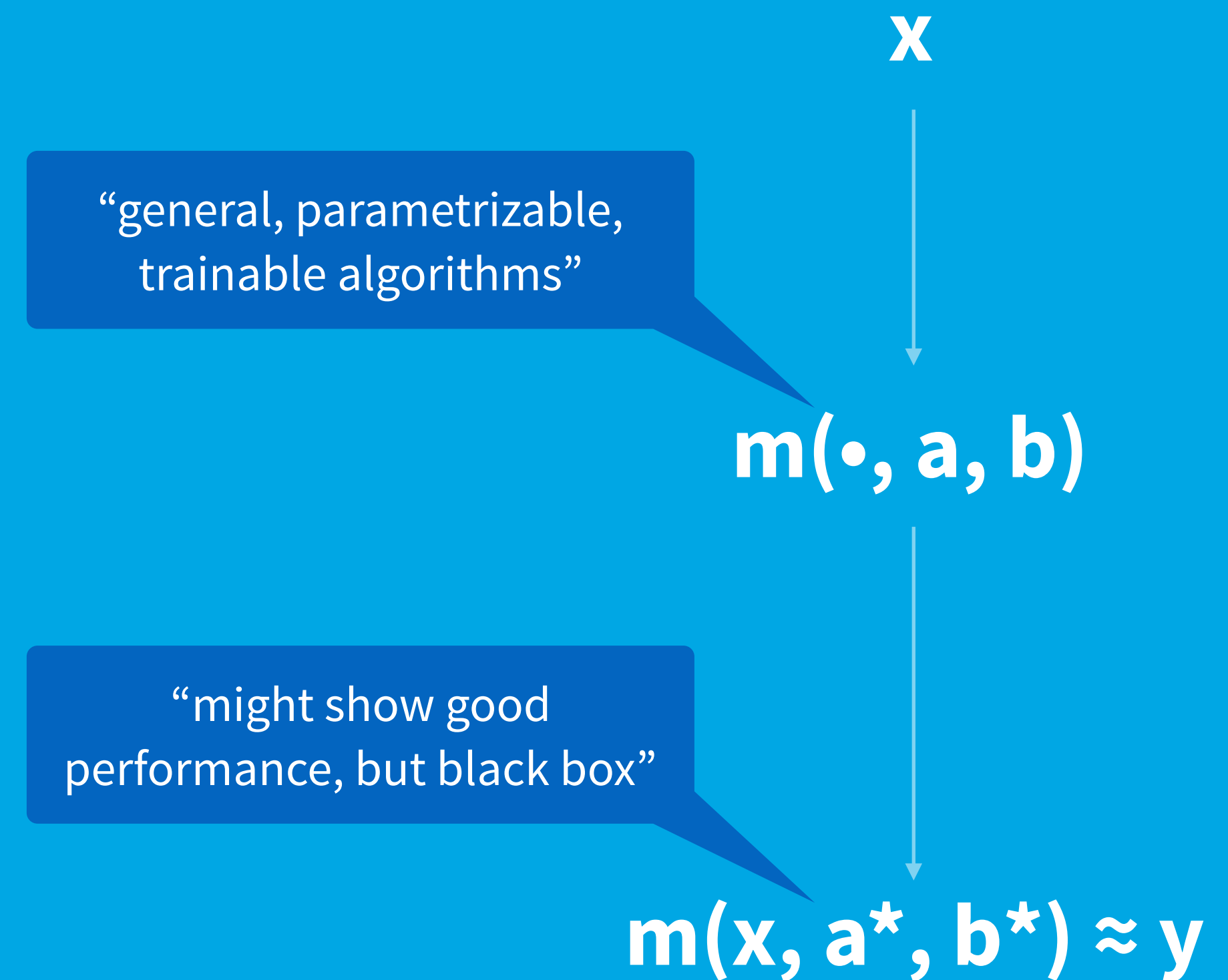
“non-linear, complex, changing”

Finance History

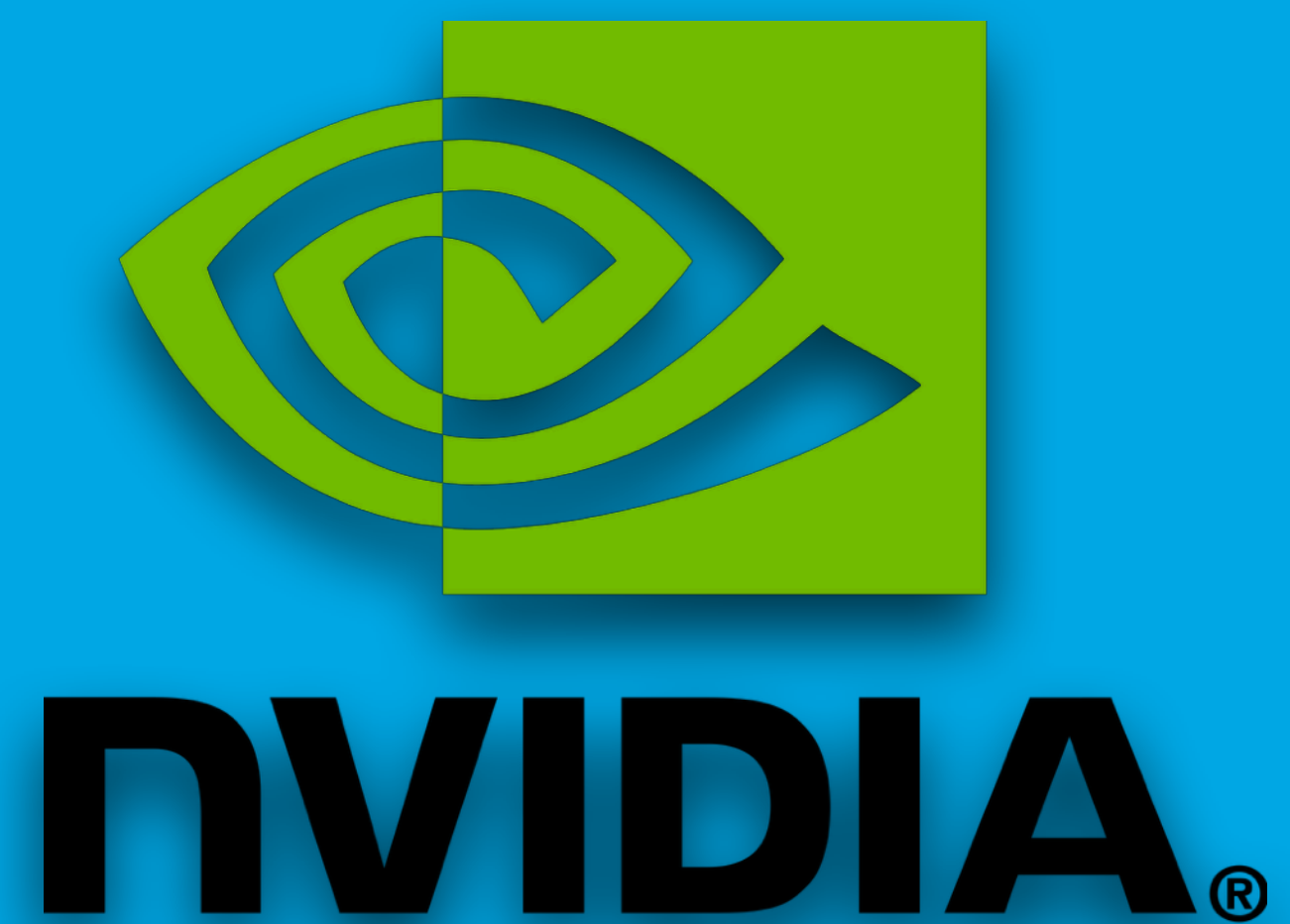


“brain-driven & beauty myth”

AI in Finance = finaince



“data-driven & AI-first”



The Research & Deployment Process

Algorithmic Trading				
Data	Features and Labels	Machine & Deep Learning	Backtesting	Deployment
EUR/USD exchange rate	time series features	support vector machine & DNN classifier	vectorized backtesting	online algorithm
1 minute bars	economic indicators	training & testing	event-based backtesting	cloud deployment
August & September 2018	directional movement	validation	visualization	monitoring & risk management

Algorithmic Trading

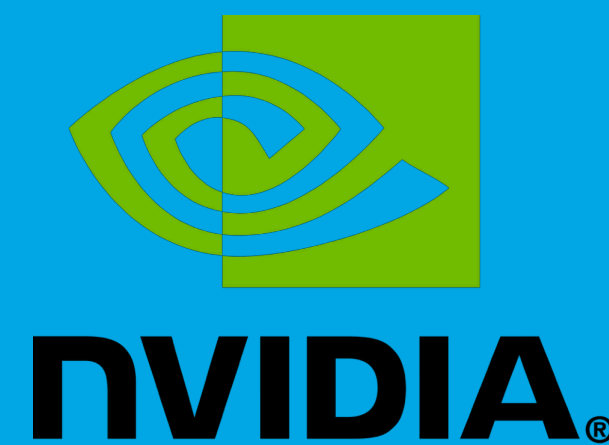
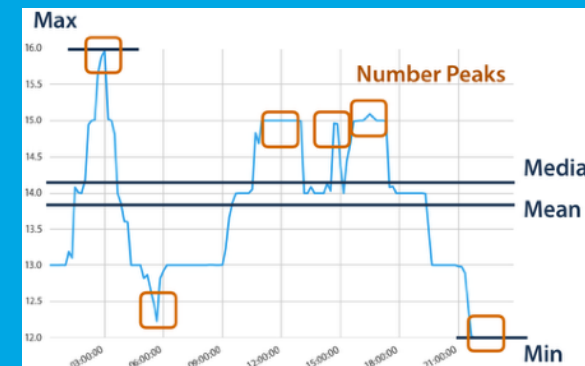
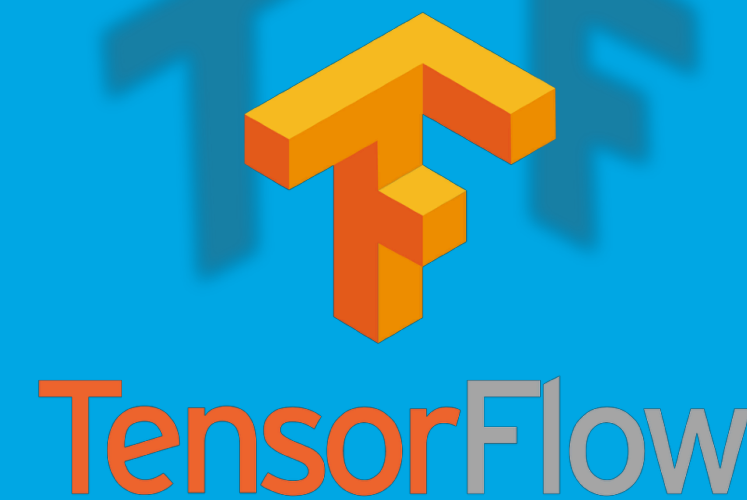
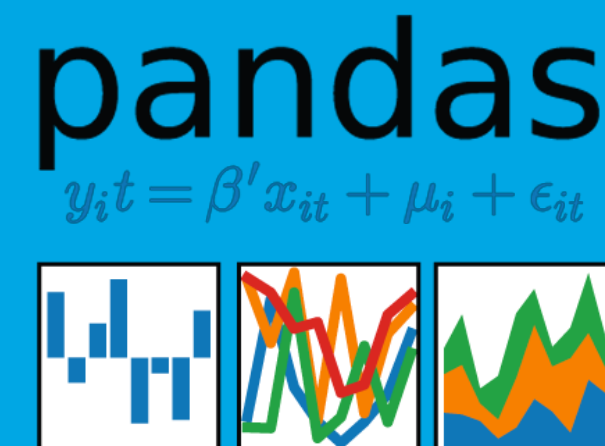
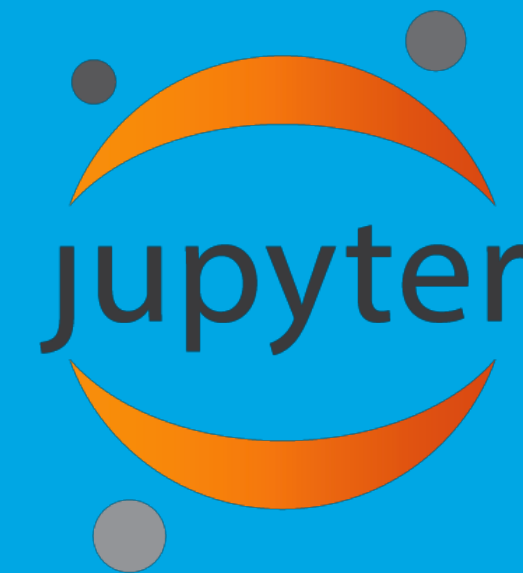
Data

Features and
Labels

Machine &
Deep Learning

Backtesting

Deployment





*Workshop Program
on 20. Sep 2018
in London
for 90 Minutes
with 100+ People.*



PLATFORM

**Python, packages &
Jupyter Notebook**

**Demo Account
with FXCM**

**Python Wrapper
fxcmpy**

**First Steps
with the API**

STRATEGIES

**Retrieving
Historical Data**

**Generating
Features Data**

**Training
Classification Models
from ML & DL**

**Vectorized
Backtesting**

DEPLOYMENT

**Streaming
Tick Data**

Data Collection

Online Algorithm

Automated Trading

Algorithmic Trading

Data

Features and
Labels

Machine &
Deep Learning

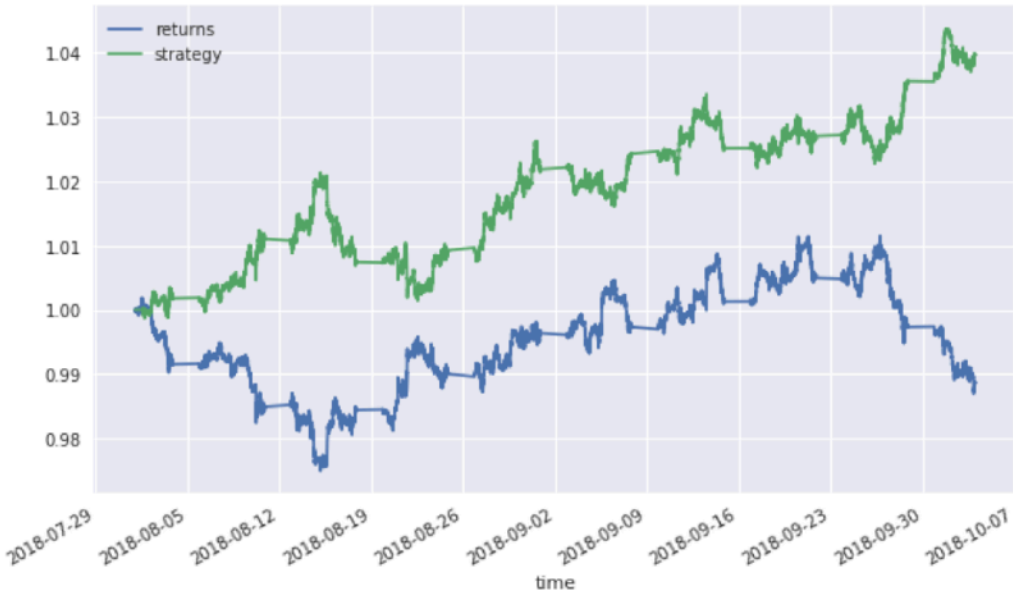
Backtesting

Deployment

Out-of-Sample Performance

```
In [79]: test['strategy'] = test['position'] * test['returns']
test['strategy'][test['position'].diff() != 0] -= ptc

In [80]: test[['returns', 'strategy']].cumsum().apply(np.exp).plot(figsize=(10, 6));
```



Date,AAPL.O,MSFT.O,INTC.O,AMZN.O,GS.N,SP
2010-01-01,,,,,,1.4323,1096.35,,
2010-01-04,30.57282657,30.95,20.88,133.9
2010-01-05,30.625683660000004,30.96,20.8
2010-01-06,30.138541290000003,30.77,20.8
2010-01-07,30.082827060000003,30.452,20.
2010-01-08,30.28282686,30.66,20.83,133.5
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2010-01-12,29.674256040000003,30.07,20.6
2010-01-13,30.092827050000004,30.35,20.9
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2010-01-18,,,,,,1.4385,1132.5,,
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2010-02-02,27.979972020000005,28.46,19.91,118.12,156.94,110.38,1103.32,21.48,1.3961,1114.8,43.0,109.13
2010-02-03,28.46140011,28.63,19.68,119.1,157.23,109.83,1097.28,21.6,1.3898,1109.25,42.57,108.7
2010-02-04,27.435686850000003,27.84,19.02,115.94,150.68,106.44,1063.11,26.08,1.3734,1063.05,40.24,104.37
2010-02-05,27.922829220000004,28.02,19.47,117.39,154.16,106.66,1066.19,26.11,1.3662,1
2010-02-08,27.731400840000003,27.72,19.35,116.83,151.1,105.89,1056.74,26.51,1.3652,10
2010-02-09,28.027114830000002,28.01,19.65,118.03,152.49,107.22,1070.52,26.0,1.3789,10
2010-02-10,27.873686412000005,27.99,19.69,117.36,153.63,107.01,1068.13,25.4,1.3726,10
2010-02-11,28.38140019,28.12,20.06,120.09,154.05,108.13,1078.47,23.96,1.3681,1094.95,
2010-02-12,28.625685660000002,27.93,20.43,119.66,153.93,108.04,1075.51,22.73,1.3615,1

```
93 class svm_pattern_trader(tpqoa):
94     def __init__(self, *args):
95         super(svm_pattern_trader, self).__init__(*args)
96         self.raw_data = pd.DataFrame()
97         self.position = 0
98         self.units = 2000
99         self.trades = 0
100        self.lags = lags
101        self.bar_length = '1min'
102        self.bar = 1
103        self.entry_price = None
104        self.current_price = 0
105        self.stops = 0
106        self.takes = 0
107        n = dt.datetime.now()
108        self.init_time = n
109        self.start_time = dt.datetime(n.year,
110        self.stop_time = dt.datetime(n.year, n
111        self.next_trade_time = self.start_time
112        logger_monitor('START TIME: {}'.format(self.start_time), False, False)
113        logger_monitor('TRADE START: {}'.format(str(self.start_time)), False, True)
114        logger_monitor('LAGS: {}'.format(strategy['lags']), False, True)
115        logger_monitor('NBINS: {}'.format(strategy['nbins']), False, False)
116        logger_monitor('BINS\n{}'.format(str(strategy['bins'])), False, True)
117        logger_monitor('MODEL\n{}'.format(str(strategy['model'])), False, True)
118
119    def on_success(self, time, bid, ask):
120        """
121        Method called when new data is retrieved. """
122        False
123        self.ticks, end=" ")
124        y_data = self.raw_data.append(pd.DataFrame(
125            {'bid': bid, 'ask': ask}, index=[pd.Timestamp(time)]))
126        y_data = self.raw_data.resample(
127            self.bar_length, label='right').last().ffill().iloc[-1]
```

diverse set of
skills required

```
1 [ 0.7 ] Tasks: 42, 55 thr; 1 running
2 [ 0.0 ] Load average: 0.00 0.00 0.10
3 [ 0.0 ] Uptime: 41 days, 22:15:37
Mem[ 411M/985M]
Swp[ 68.8M/4.00M]
```

PID	USER	PRI	NI	VIRT	RES	SHR	S	CPU%	MEM%	TIME+	Command
7895	root	20	0	32232	4808	3984	R	0.0	0.5	0:00.09	htop
1	root	20	0	77948	5868	4212	S	0.0	0.6	0:39.96	/sbin/init
415	root	19	-1	119M	33712	22492	S	0.0	3.3	0:59.83	/lib/systemd/systemd-journald
416	root	20	0	103M	2280	2140	S	0.0	0.2	0:00.02	/sbin/lvmtd -f
428	root	20	0	43648	3736	2992	S	0.0	0.4	0:08.97	/lib/systemd/systemd-udev
570	systemd-t	20	0	138M	2188	2188	S	0.0	0.2	0:00.00	/lib/systemd/systemd-timesyncd
531	systemd-t	20	0	138M	2188	2188	S	0.0	0.2	0:05.82	/lib/systemd/systemd-timesyncd
622	systemd-n	20	0	71948	2224	2140	S	0.0	0.2	0:05.35	/lib/systemd/systemd-networkd
643	systemd-r	20	0	70732	3416	3280	S	0.0	0.3	0:06.55	/lib/systemd/systemd-resolved
852	root	20	0	70588	3012	2916	S	0.0	0.3	0:05.06	/lib/systemd/systemd-logind
856	root	20	0	31748	2296	2180	S	0.0	0.2	0:06.55	/usr/sbin/cron -f
866	root	20	0	518M	2760	1400	S	0.0	0.3	0:13.22	/usr/bin/lxcfs /var/lib/lxcfs/
867	root	20	0	518M	2760	1400	S	0.0	0.3	0:13.00	/usr/bin/lxcfs /var/lib/lxcfs/
26771	root	20	0	518M	2760	1400	S	0.0	0.3	0:12.33	/usr/bin/lxcfs /var/lib/lxcfs/
26772	root	20	0	518M	2760	1400	S	0.0	0.3	0:13.04	/usr/bin/lxcfs /var/lib/lxcfs/
24403	root	20	0	518M	2760	1400	S	0.0	0.3	0:08.36	/usr/bin/lxcfs /var/lib/lxcfs/
28537	root	20	0	518M	2760	1400	S	0.0	0.3	0:08.47	/usr/bin/lxcfs /var/lib/lxcfs/
17232	root	20	0	518M	2760	1400	S	0.0	0.3	0:03.75	/usr/bin/lxcfs /var/lib/lxcfs/
858	root	20	0	518M	2760	1400	S	0.0	0.3	1:12.25	/usr/bin/lxcfs /var/lib/lxcfs/
859	messagebu	20	0	50060	2660	2292	S	0.0	0.3	0:32.61	/usr/bin/dbus-daemon --system --address=systemd: --nofork --nop
898	syslog	20	0	256M	2272	2200	S	0.0	0.2	0:05.34	/usr/sbin/rsyslogd -n
899	syslog	20	0	256M	2272	2200	S	0.0	0.2	0:00.00	/usr/sbin/rsyslogd -n
900	syslog	20	0	256M	2272	2200	S	0.0	0.2	0:05.07	/usr/sbin/rsyslogd -n
870	syslog	20	0	256M	2272	2200	S	0.0	0.2	0:10.79	/usr/sbin/rsyslogd -n
879	root	20	0	107M	1596	1568	S	0.0	0.2	0:00.00	/usr/sbin/irqbalance --foreground
872	root	20	0	107M	1596	1568	S	0.0	0.2	1:56.55	/usr/sbin/irqbalance --foreground

F1Help F2Setup F3Search F4Filter F5Tree F6SortBy F7Nice F8Nice F9Kill F10Quit

Algorithmic Trading

Data

**Features and
Labels**

**Machine &
Deep Learning**

Backtesting

Deployment

research & interactive financial analytics skills

**devops skills and
24/7 system**

few hundred lines of code

**thousands of
lines of code**

**Deployment
Gap &
Last Mile Problem**

The AI Machine

Algorithmic Trading

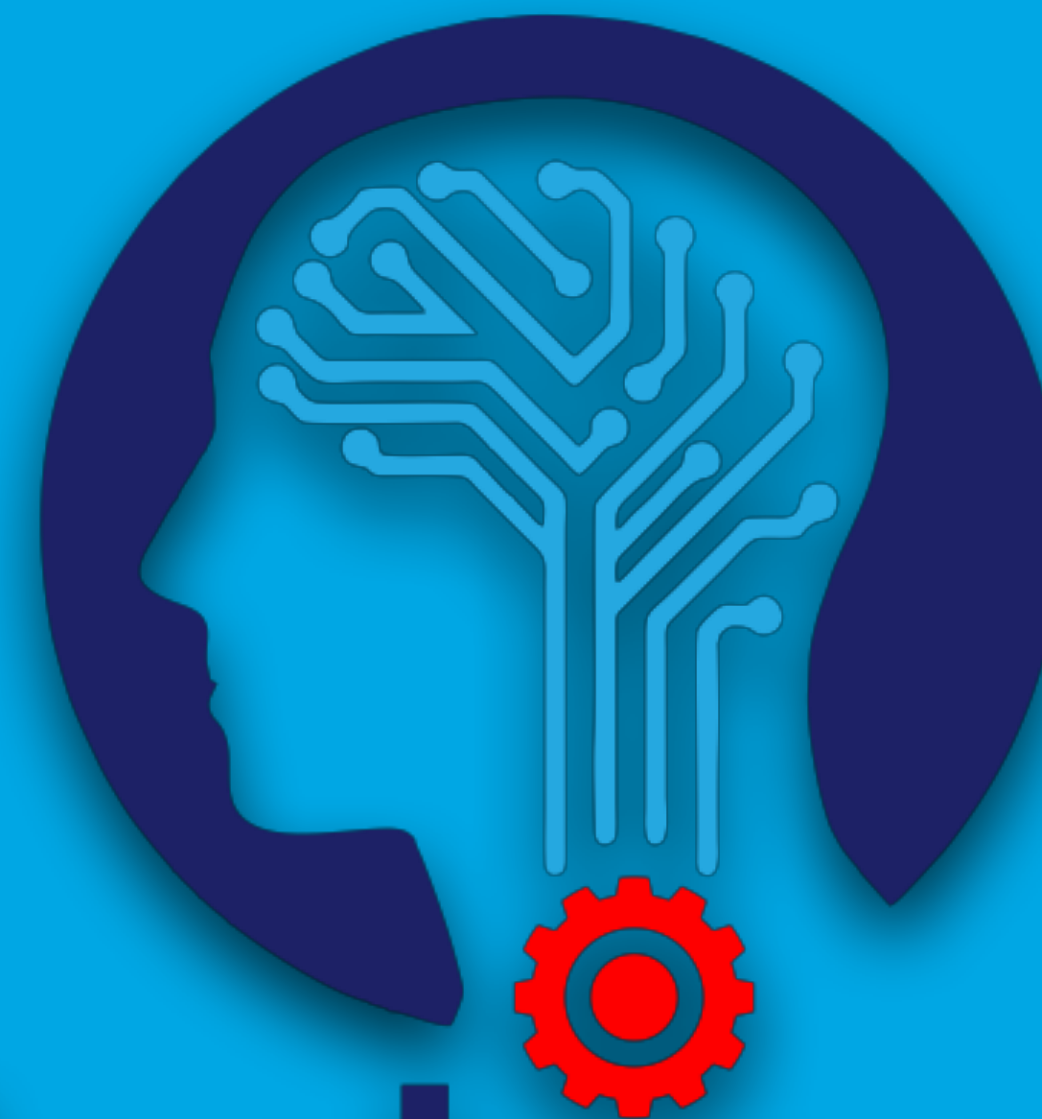
Data

Features and
Labels

Machine &
Deep Learning

Backtesting

Deployment



The AI Machine



The AI Machine

Prediction Engines

**Technical Rules
Statistical Methods
Machine Learning
Deep Learning
...**

Decision Rules

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

Python & Template-Based Strategy Definition

The Machine

Not Secure | algomachine.io/strategy

THE MACHINE prod

live models

backtested models

strategies

YV

+ new strategy

strategy name	status	last modified time	Del
mlpPattern	uploaded	2018-09-20 07:28:05	De
fxPattern	uploaded	2018-10-02 10:14:13	De
odscTest	uploaded	2018-09-20 11:37:26	De
fxTech	uploaded	2018-10-02 10:22:09	De
mlTest	uploaded	2018-09-19 13:00:06	De

strategy

File Edit View Insert Cell Kernel Widgets Help

Trusted Python 3

```
# these sre the set of default model parameters. override where applicable.
instrument = TPQParam(mandatory=True, default="EUR_USD", display_name="instrument")
frequency = TPQParam(mandatory=False, default="M1", display_name="frequency")
lags = TPQParam(mandatory=True, default=16, display_name="number of lags", sequence=2)
nbins = TPQParam(mandatory=True, default=20, display_name="nbins", sequence=3)
C = TPQParam(mandatory=True, default=1, display_name="C", sequence=4)
random = TPQParam(mandatory=True, default=False, display_name='random', sequence=5)
ml_technique = TPQParam(mandatory=True, default='svm', display_name="ML technique",
                        valid_list=['svm', 'logistic_regression', 'naive_bayes'], sequence=1)

training_start_date = TPQParam(mandatory=True, default='2018-08-01', display_name="training sta
training_end_date = TPQParam(mandatory=True, default='2018-09-15', display_name="training end d
testing_start_date = TPQParam(mandatory=True, default='2018-09-16', display_name="testing start
testing_end_date = TPQParam(mandatory=True, default='2018-10-01', display_name="testing end dat

def __init__(self):
    super().__init__()
    self.detrend_how = 'none'

def initialize(self):
    # Some additional initializations
    if (isinstance(self.lags, int)):
        self.lags = list(range(1, self.lags + 1, 1))
```


The Machine

←

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Not Secure

algomachine.io/backtesting

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📶

🔴

🔔

🌐

⋮

THE MACHINE

prod

live models

backtested models

strategies

🔄 refresh models

+

count: 5

🔍

quick filter..

g...	instrum...	model name	test launch time ↓	frequency	status	unique id
<div>go live</div>	EUR_GBP	fxTech	2018-10-02 10:25:07	M1	Completed	1993c88e-aea5-43
<div>go live</div>	EUR_USD	fxPattern	2018-10-02 10:18:10	M1	Completed	a61910fd-5e1b-481
<div>go live</div>	EUR_USD	odscTest	2018-09-20 11:38:09	M5	Completed	cce08479-5cb1-4e
<div>go live</div>	EUR_USD	mlpPattern	2018-09-20 07:35:47	M1	Completed	a4e79b06-e758-43
<div>go live</div>	EUR_USD	mlpPattern	2018-09-20 07:32:13	M1	Completed	87e56ed4-a5ff-49

Standardized
In-Sample & Out-of-Sample
Backtesting

back testing results

✕

test model configuration

training dates	testing dates	frequency	lags	nbins
2018-08-01 to 2018-09-15	2018-09-16 to 2018-10-01	M1	10	40

model performance

in-sample accuracy	47.22 %	out-of-sample accuracy	46.31 %
--------------------	---------	------------------------	---------

IN-SAMPLE TESTING

OUT-OF-SAMPLE TESTING

MODEL:FXPATTERN - SVC; INSTRUMENT:EUR_USD

2018-09-16-2018-10-01

Zoom

1D

1W

1M

2M

6M

all

From

Sep 18, 2018

To

Oct 1, 2018

log returns

1.01

1

0.99

0.98

19. Sep

20. Sep

21. Sep

24. Sep

25. Sep

26. Sep

27. Sep

28. Sep

Monday, Oct 1, 09:30-09:59

date

market returns

model returns

2018-09-18T11:46:00.00000...

1.0003

0.9997

2018-09-18T11:47:00.00000...

1.0004

0.9996

2018-09-18T11:48:00.00000...

1.0004

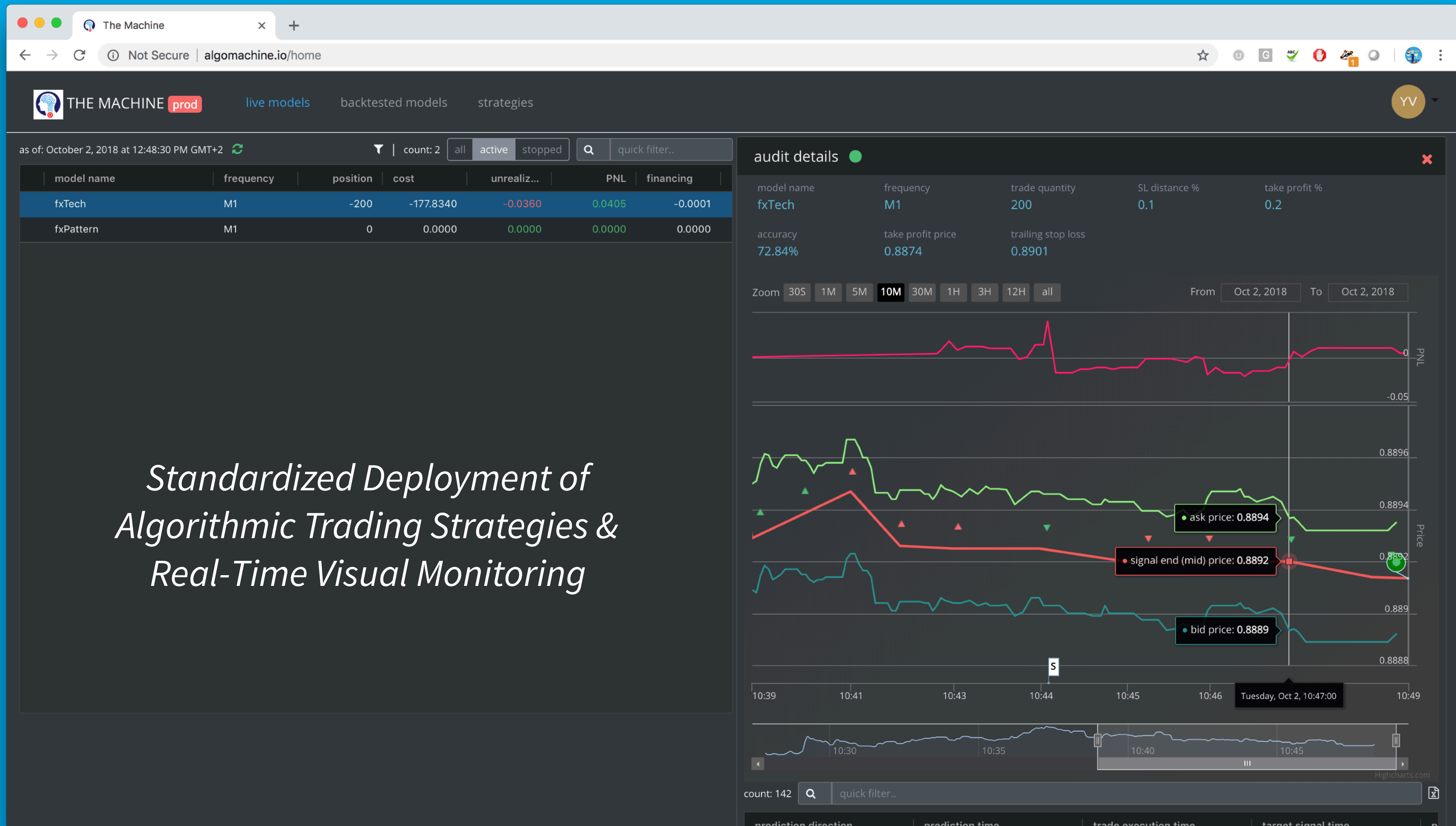
0.9996

2018-09-18T11:49:00.00000...

1.0002

0.9998

Standardized Deployment of Algorithmic Trading Strategies & Real-Time Visual Monitoring





Covering the Complete
Algorithmic Trading Strategy
Life Cycle instead of
Single Trades Only



Demo

<http://algomachine.io>

DataRobot & The AI Machine

(work in progress ...)

Algorithmic Trading

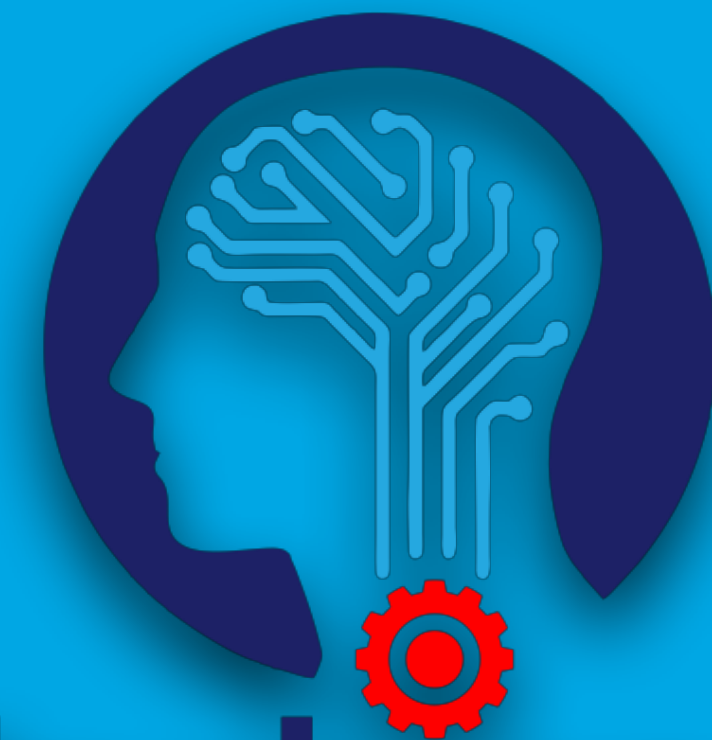
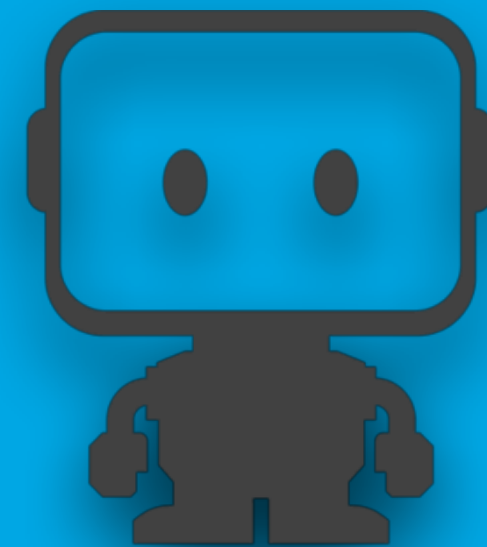
Data

Features and
Labels

Machine &
Deep Learning

Backtesting

Deployment



DataRobot

The AI Machine

*Automated features
creation and training/testing
of machine/deep
learning & time series models.*

*Standardized deployment
of AI-based algorithmic
trading strategies.*



INDUSTRIAL CHAIN — Vision

(according to López de Prado “Advances in Financial Machine Learning”)

- **data sources:** platforms (Oanda, FXCM) and data providers (TR, DJ)
- **feature analysis:** by researchers or in automatic fashion via **DataRobot**
- **strategies:** manual model selection or automated ML via **DataRobot**
- **backtesting:** sequential, randomized via **DataRobot & The AI Machine**
- **deployment:** automated deployment via **DataRobot & The AI Machine**
- **portfolio oversight:** live and post audit via **The AI Machine**

end-to-end integration with trading platform
(from historical data to tick/event streams to trading)

**template-based strategy definition
in Python**
(for backtesting as well as live trading)

**auto derivation of AI-based trading
strategies based on DataRobot**
(for backtesting as well as live trading)

live monitoring and audit for multiple strategies
(interactive visualization of all event, signals, performance, etc.)

management of the strategy life cycle
(full transparency from start to finish, post-trading analytics, etc.)

The AI Machine UG

The Python Quants GmbH

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