



# AI in Finance

## Big Data Analytics

# Course Orientation for

# AI in Finance Big Data Analytics

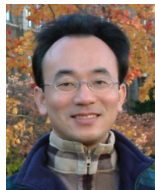
1081AIFBDA01

TLVXM2A (M2449) (8497) (Fall 2019)

(MBA, DBETKU) (3 Credits, Required) [Full English Course]

(Master's Program in Digital Business and Economics)

Tue, 2, 3, 4, (9:10-12:00) (B1012)



**Min-Yuh Day, Ph.D.**

Associate Professor

Department of Information Management

Tamkang University

<http://mail.tku.edu.tw/myday>





# Course Syllabus

Tamkang University

Academic Year 108, 1<sup>st</sup> Semester (Fall, 2019)

- Course Title: **AI in Finance Big Data Analytics**
- Instructor: Min-Yuh Day
- Course Class: TLVXM2A (MBA DBETKU, TKU)
  - Master's Program in Digital Business and Economics, 2A
- Details
  - Distance Learning Course
  - Selective
  - One Semester
  - 3 Credits
- Time & Place: Tue, 2, 3, 4, (9:10-12:00) (B1012)



# Department Teaching Objectives

- Train students not only to acquire knowledge from **economics, finance, and industrial developments** but also to apply **information technology** and **analytical** and **quantitative skills** to various situations.
- Students can enhance their competitiveness in facing rapid changes in world economy.



# Department Core Competences

- 1. Cultivating students the ability of computer programming. (30%)**
2. Training students the ability of website design for starting up a business.
- 3. Training students the ability of analyzing various situations in the financial market. (30%)**
- 4. Helping students to acquire the knowledge of financial technology. (40%)**



# Subject Schoolwide Essential Virtues

1. A global perspective. (10%)
2. Information literacy. (50%)
3. A vision for the future. (10%)
4. Moral integrity. (10%)
5. Independent thinking. (10%)
7. A spirit of teamwork and dedication. (10%)

# Course Introduction



- This course introduces the **fundamental concepts**, **research issues**, and **hands-on practices** of **AI in Finance Big Data Analytics**.
- Topics include
  - AI in FinTech: Financial Services Innovation and Application
  - ABC: AI, Big Data, Cloud Computing
  - Business Models of Fintech
  - Event Studies in Finance
  - Foundations of AI in Finance Big Data Analytics with Python
  - Quantitative Investing with Pandas in Python
  - Machine Learning in Finance Application with Scikit-Learn In Python
  - Deep Learning for Financial Time Series Forecasting with TensorFlow
  - Case Study on AI in Finance Big Data Analytics
  - Case Study on Financial Industry Practice



# Teaching Objectives

1. Understand and apply the fundamental concepts and research issues of **AI in finance big data analytics**.
2. Conduct information systems research in the context of **AI in finance big data analytics**.



# Teaching Methods

- Lecture
- Discussion
- Publication,
  - Practicum
  - Experience
  - Imitation
- Problem Solving





# Assessment

- Study Assignments
  - Discussion
  - Practicum
    - Report
- Activity Participation

# Course Schedule (1/2)



Week	Date	Subject/Topics
1	2019/09/10	Course Orientation on AI in Finance Big Data Analytics
2	2019/09/17	AI in FinTech: Financial Services Innovation and Application
3	2019/09/24	ABC: AI, Big Data, Cloud Computing
4	2019/10/01	Business Models of Fintech
5	2019/10/08	Event Studies in Finance
6	2019/10/15	Case Study on AI in Finance Big Data Analytics I
7	2019/10/22	Foundations of AI in Finance Big Data Analytics with Python
8	2019/10/29	Case Study on Financial Industry Practice I
9	2019/11/05	Quantitative Investing with Pandas in Python

# Course Schedule (2/2)



Week	Date	Subject/Topics
10	2019/11/12	Midterm Project Report
11	2019/11/19	Machine Learning in Finance Application with Scikit-Learn In Python
12	2019/11/26	Deep Learning for Financial Time Series Forecasting with TensorFlow I
13	2019/12/03	Case Study on AI in Finance Big Data Analytics II
14	2019/12/10	Deep Learning for Financial Time Series Forecasting with TensorFlow II
15	2019/12/17	Case Study on Financial Industry Practice II
16	2019/12/24	Deep Learning for Financial Time Series Forecasting with TensorFlow III
17	2019/12/31	Final Project Presentation I
18	2020/01/07	Final Project Presentation II



# Grading Policy

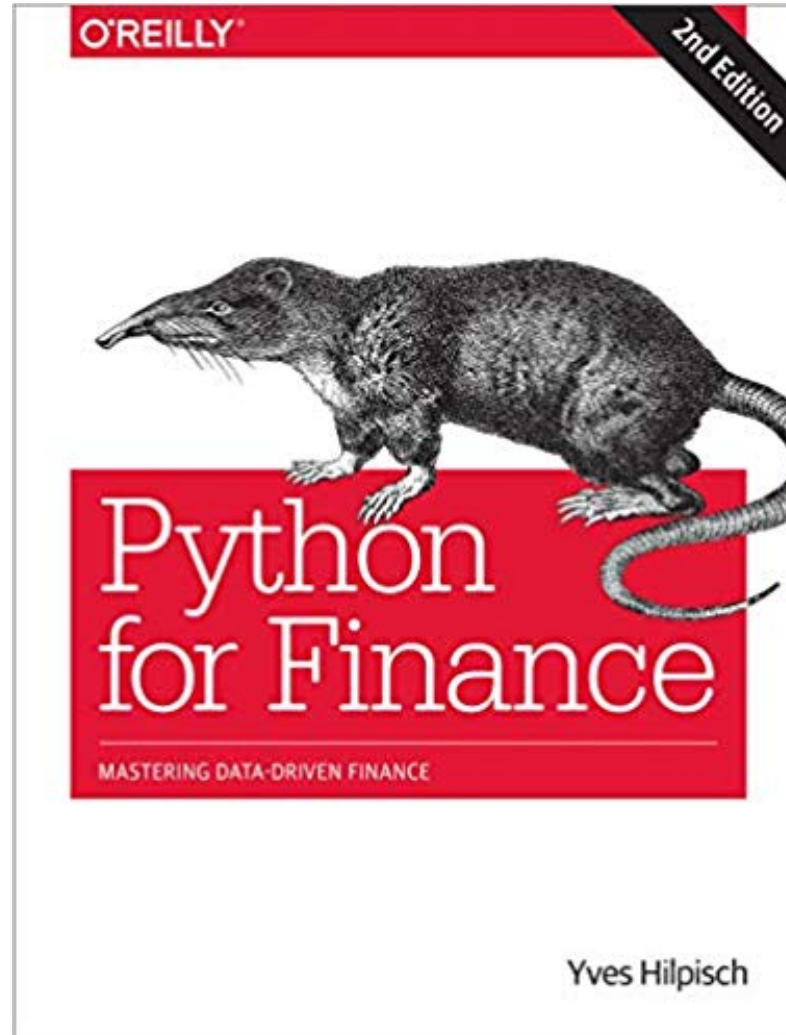
- Mark of Usual: 40%
- Final Project: 60%
  - Midterm Project Report (30%)
  - Final Project Report (30%)



# Textbooks and References

- **Textbook:**
  - **Slides**  
<http://mail.tku.edu.tw/myday/teaching.htm#1081AIFBDA>
  - Cases and Papers related to AI in Finance Big Data Analytics.
- **References**
  - Paolo Sironi (2016), FinTech Innovation: From Robo-Advisors to Goal Based Investing and Gamification, Wiley.
  - Yves Hilpisch (2018), Python for Finance: Mastering Data-Driven Finance, 2nd Edition, OReilly Media.
  - Francois Chollet (2017), Deep Learning with Python, Manning Publications
  - Yuxing Yan (2017), Python for Finance: Apply powerful finance models and quantitative analysis with Python, Second Edition, Packt Publishing.
  - Aurelien Geron (2017), Hands-On Machine Learning with Scikit-Learn and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems, O'Reilly Media.

Yves Hilpisch (2018),  
Python for Finance: Mastering Data-Driven Finance,  
O'Reilly



Paolo Sironi (2016)

# FinTech Innovation:

From Robo-Advisors to Goal Based Investing and Gamification,  
Wiley



Doron Kliger and Gregory Gurevich (2014),  
**Event Studies for Financial Research:**  
A Comprehensive Guide,  
Palgrave Macmillan

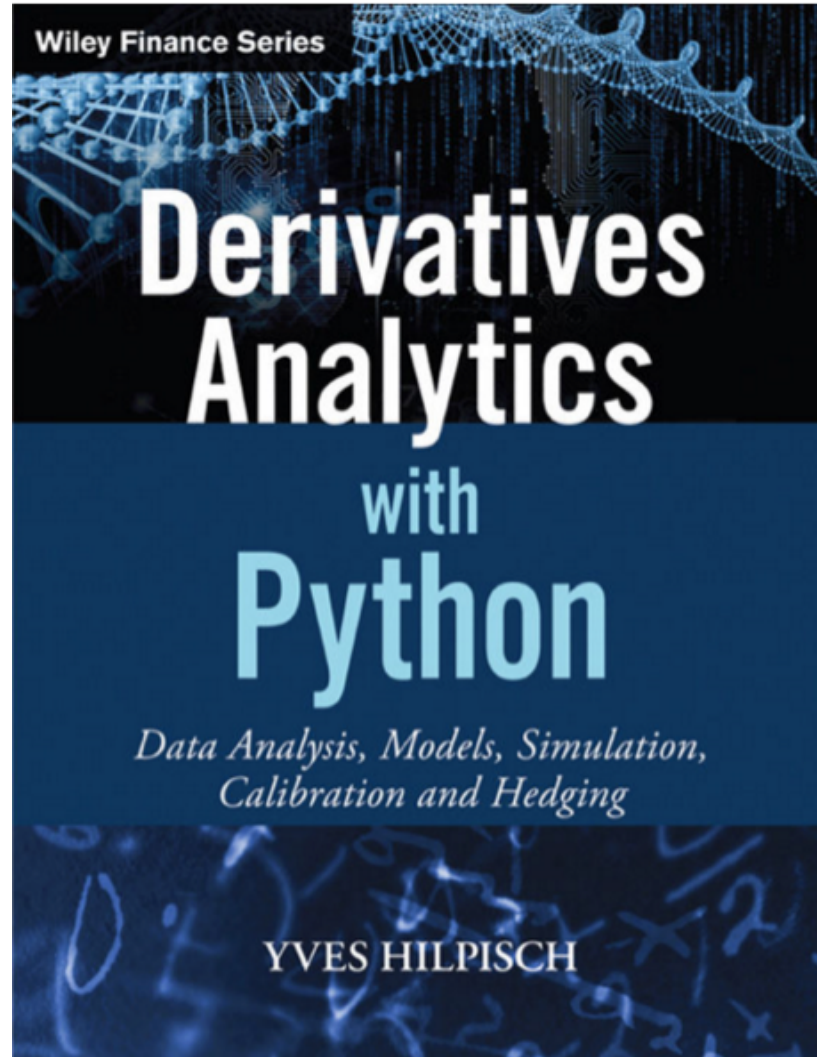




Yves Hilpisch (2015),

## Derivatives Analytics with Python:

Data Analysis, Models, Simulation, Calibration and Hedging, Wiley

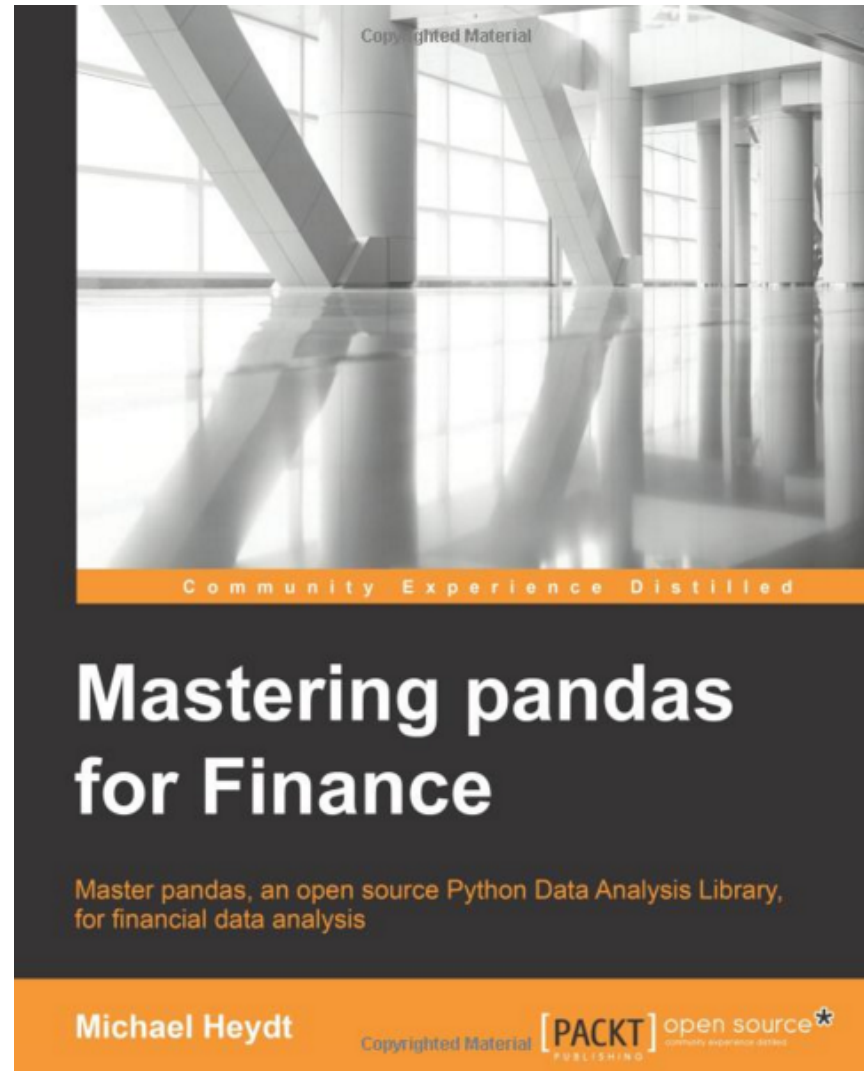


Yuxing Yan (2017),

**Python for Finance: Apply powerful finance models and quantitative analysis with Python**, Second Edition,  
Packt Publishing

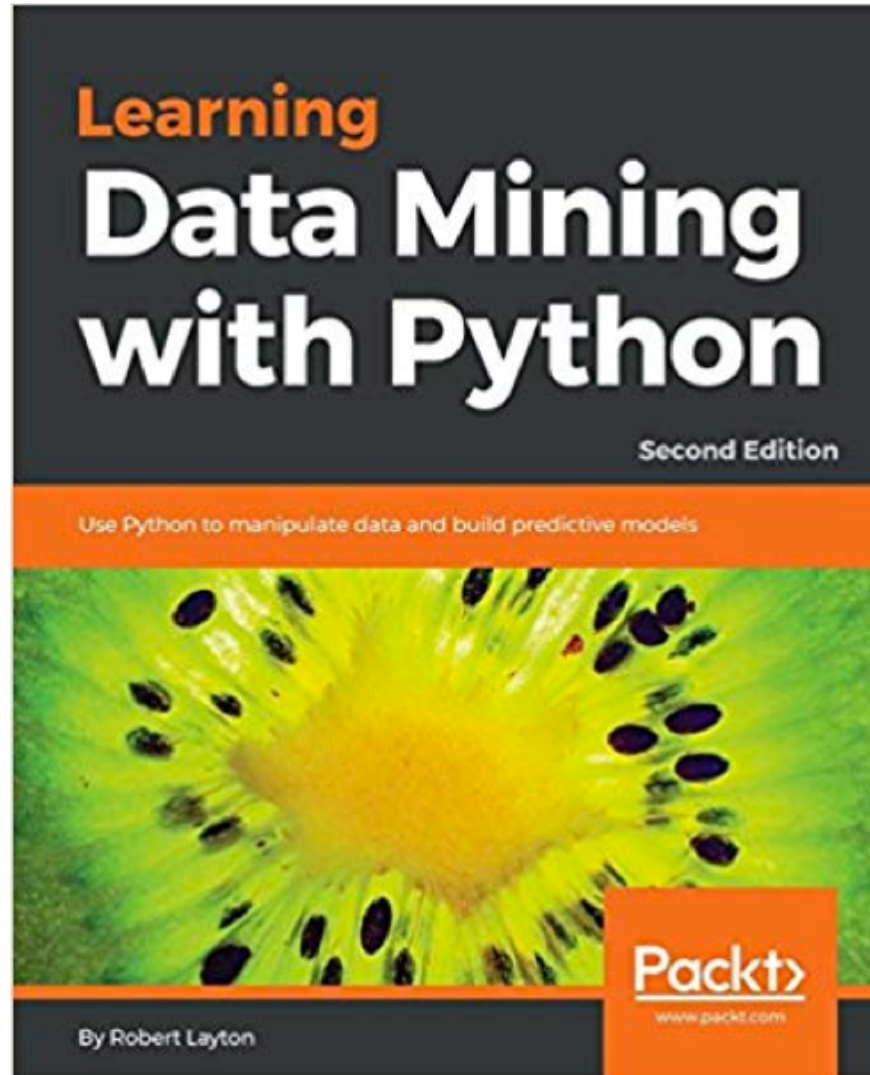


Michael Heydt (2015),  
**Mastering Pandas for Finance**,  
Packt Publishing



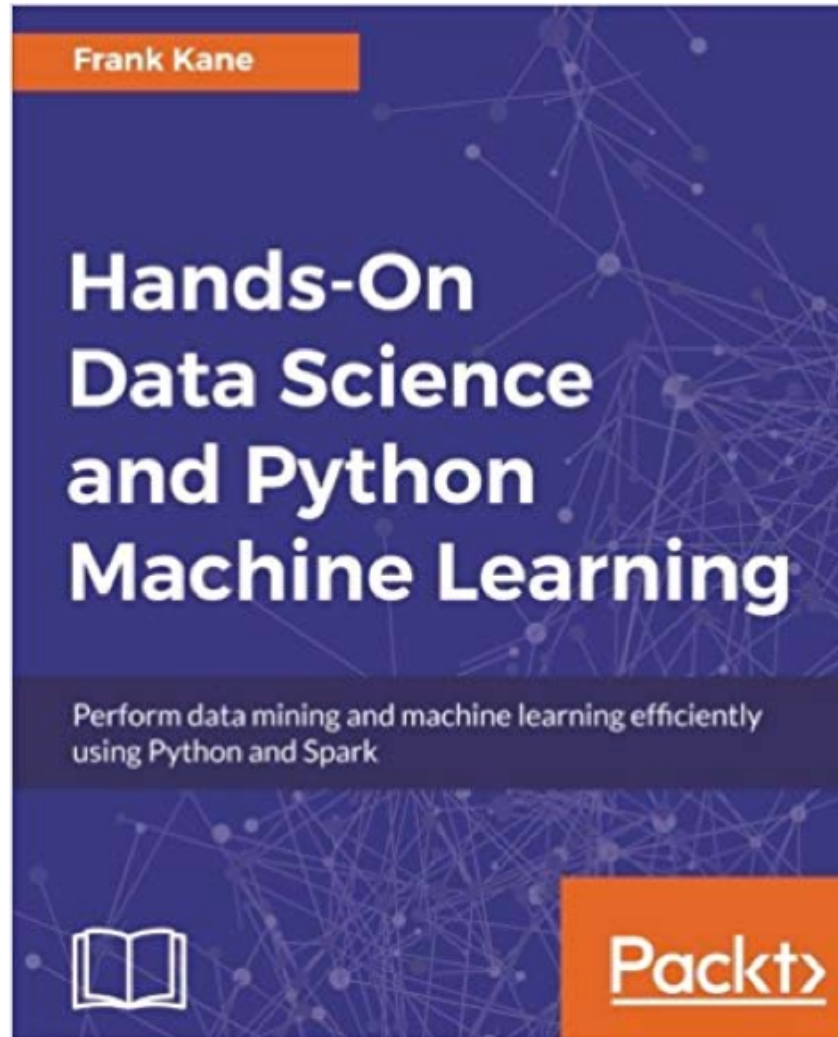
Robert Layton (2017),

# Learning Data Mining with Python - Second Edition, Packt Publishing

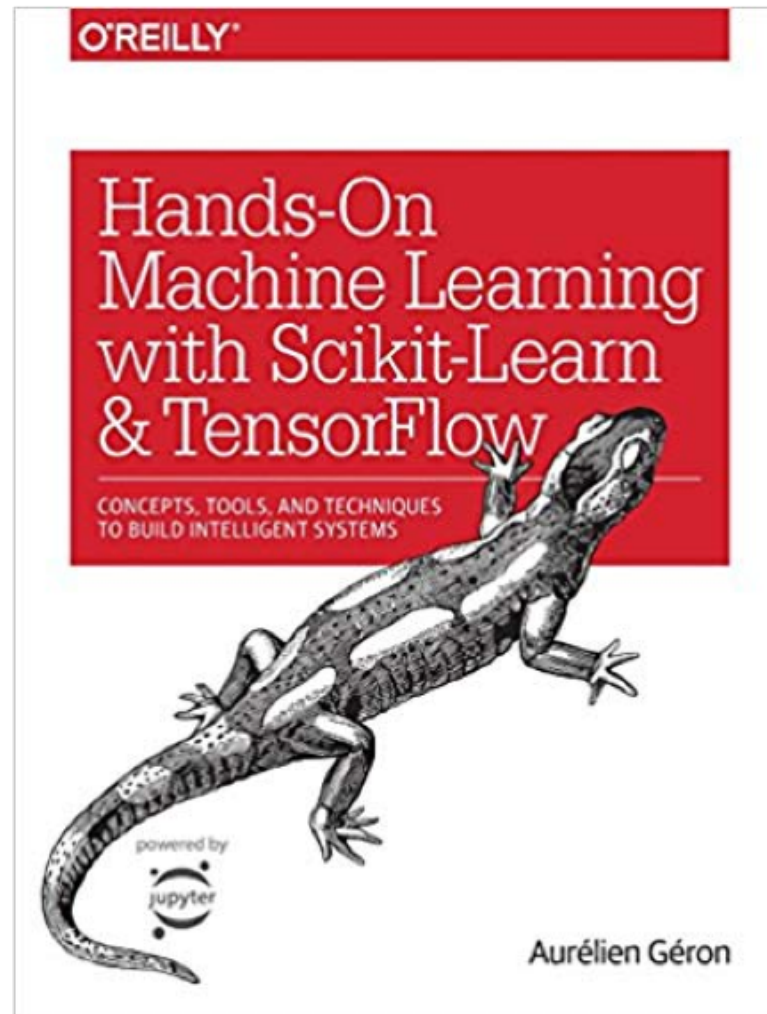


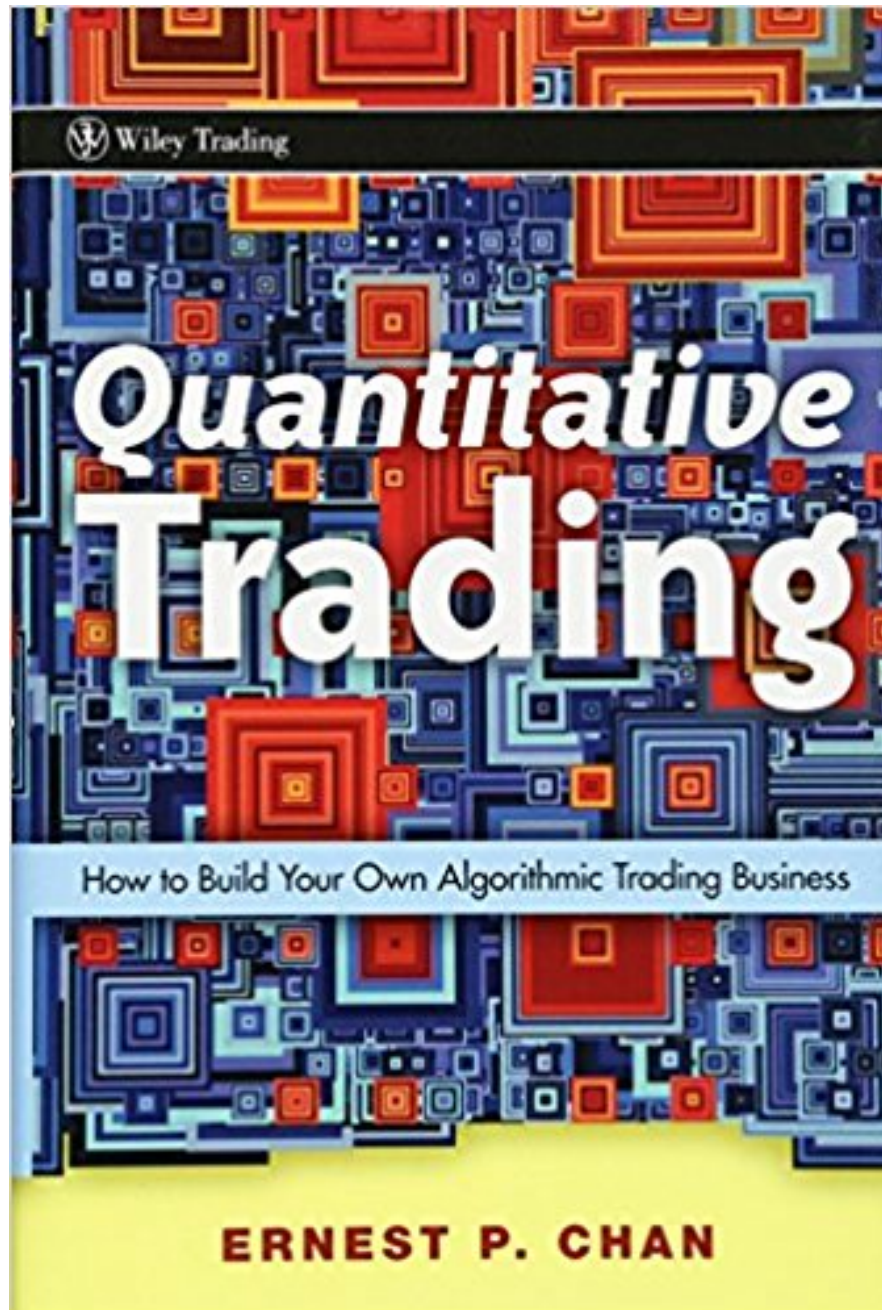
Frank Kane (2017),

**Hands-On Data Science and Python Machine Learning: Perform data mining and machine learning efficiently using Python and Spark,**  
Packt Publishing



Aurélien Géron (2017),  
**Hands-On Machine Learning with Scikit-Learn and TensorFlow:  
Concepts, Tools, and Techniques to Build Intelligent Systems,**  
O'Reilly Media, 2017





Wiley Trading Series

# *Algorithmic* **TRADING**

**WINNING STRATEGIES AND THEIR RATIONALE**

+ website

**ERNEST P. CHAN**

**WILEY**



Wiley Trading Series

# MACHINE TRADING

DEPLOYING COMPUTER ALGORITHMS  
TO CONQUER THE MARKETS

ERNEST P. CHAN

WILEY

# Google Colab

The screenshot shows the Google Colaboratory web interface. At the top, the browser address bar displays the URL <https://colab.research.google.com/notebooks/welcome.ipynb>. The main header includes the 'Hello, Colaboratory' logo and a menu with options like File, Edit, View, Insert, Runtime, Tools, and Help. Below the header, there are buttons for '+ CODE', '+ TEXT', 'CELL', and 'COPY TO DRIVE'. A sidebar on the left contains a 'Table of contents' with sections like 'Getting Started', 'Highlighted Features', 'TensorFlow execution', 'GitHub', 'Visualization', 'Forms', 'Examples', and 'Local runtime support'. The main content area features a large 'Welcome to Colaboratory!' message with a sub-header 'Getting Started' and a list of links: 'Overview of Colaboratory', 'Loading and saving data: Local files, Drive, Sheets, Google Cloud Storage', 'Importing libraries and installing dependencies', 'Using Google Cloud BigQuery', 'Forms, Charts, Markdown, & Widgets', 'TensorFlow with GPU', and 'Machine Learning Crash Course: Intro to Pandas & First Steps with TensorFlow'. Below this, there are sections for 'Highlighted Features', 'Seedbank', and 'TensorFlow execution'. The 'TensorFlow execution' section includes a text block and a mathematical equation: 
$$\begin{bmatrix} 1. & 1. & 1. \end{bmatrix} + \begin{bmatrix} 1. & 2. & 3. \end{bmatrix} = \begin{bmatrix} 2. & 3. & 4. \end{bmatrix}$$

FinTech

# Financial Technology



# Financial Technology

## FinTech

“providing  
financial services  
by making use of  
software and  
modern technology”

# Financial Services

# Financial Services





# Financial Revolution with Fintech

## A financial services revolution

### Consumer Trends



1. Simplification



2. Transparency



3. Analytics



4. Reduced Friction

# FinTech: Financial Services Innovation



# FinTech:

## Financial Services Innovation

1. Payments
2. Insurance
3. Deposits & Lending
4. Capital Raising
5. Investment Management
6. Market Provisioning

Artificial Intelligence  
and  
Deep Learning  
for  
Fintech

From Algorithmic Trading  
to Personal Finance Bots: 41  
Startups Bringing  
AI to Fintech

# From Algorithmic Trading To Personal Finance Bots: 41 Startups Bringing AI To Fintech

## AI in Fintech

41 Startups Bringing Artificial Intelligence To Fintech

General Purpose/ Predictive Analytics



Market Research & Sentiment Analysis



Search Engine



Quantitative Trading



Blockchain



Debt Collection



AI Assistants/Bots



Fraud Detection



Credit Scoring



Personal Banking



# Artificial Intelligence (AI) in Fintech

## General Purpose/ Predictive Analytics



## Market Research & Sentiment Analysis



## Search Engine



# Artificial Intelligence (AI) in Fintech

## Quantitative Trading



## Blockchain



## Debt Collection



## AI Assistants/Bots



## Fraud Detection



## Credit Scoring

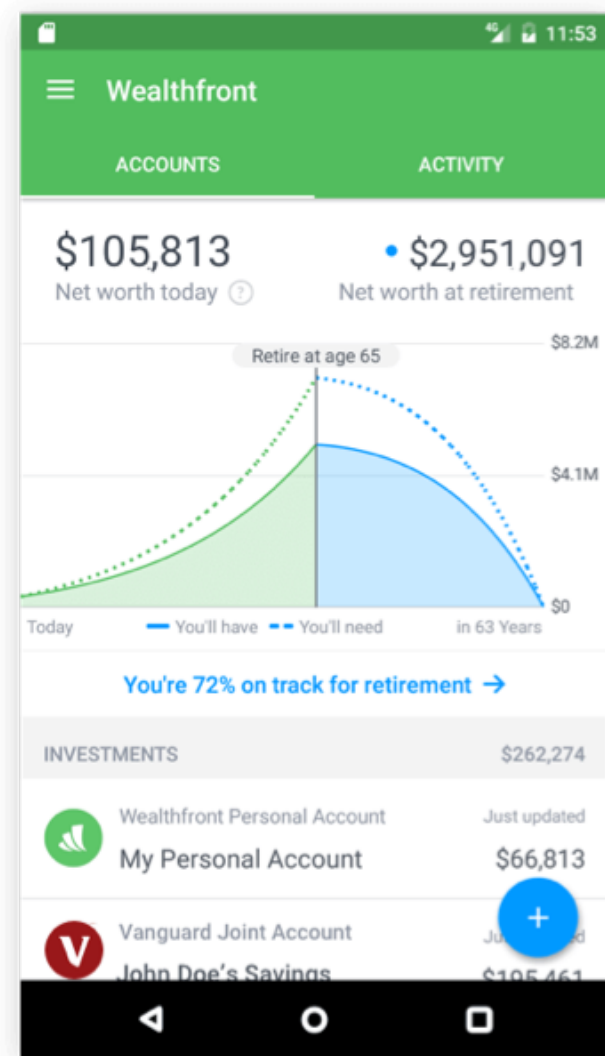
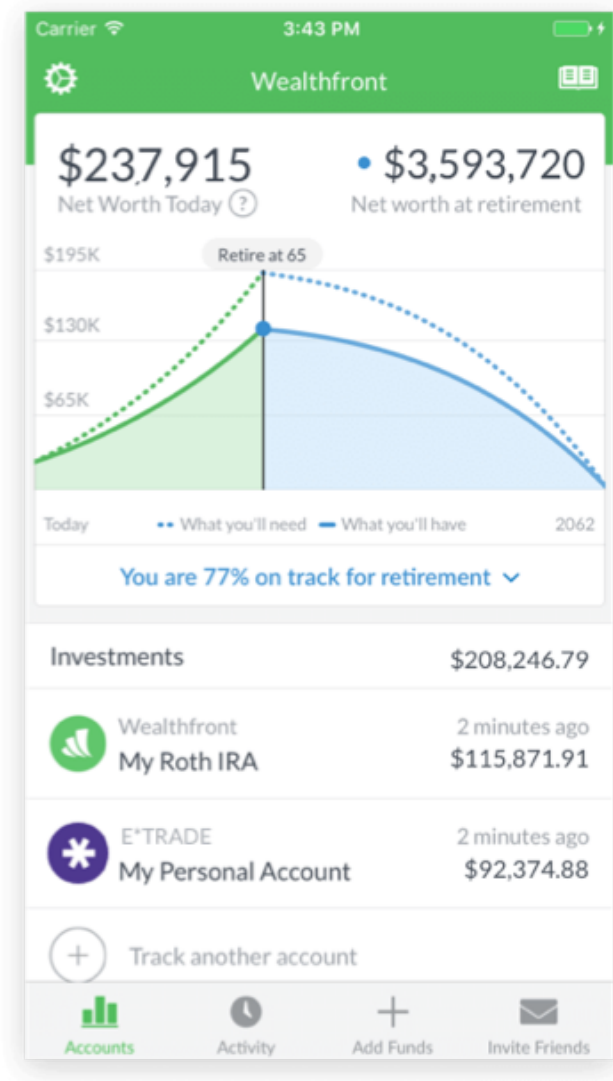


## Personal Banking





# Wealthfront Robo Advisor



# Financial Technology, FinTech

# Big Data Analytics in Finance

# Artificial Intelligence for Investment Analysis

# AI in Financial Application

# **AI in Finance**

# **Big Data Analytics**

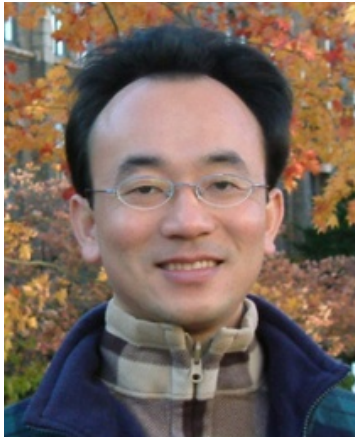
# Big Data Analytics in Investment



# AI in Finance

## Big Data Analytics

### Contact



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