

人工智慧財務金融應用



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淡江大學

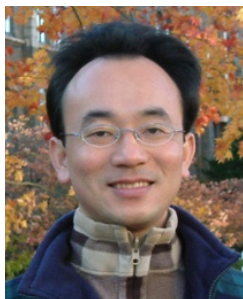
AI in Financial Application

人工智慧財務金融應用課程介紹 (Course Orientation on AI in Financial Application)

1081AIFA01

EMBA, IMTKU (M2457) (8413) (Fall 2019)

Fri 12,13,14 (19:20-22:10) (D301)



Min-Yuh Day

戴敏育

Associate Professor

副教授

Dept. of Information Management, Tamkang University

淡江大學 資訊管理學系

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

2019-09-20



人工智慧 財務金融應用

AI in Financial Application

淡江大學108學年度第1學期

課程教學計畫表

Fall 2019 (2019.09 - 2020.01)

- 課程名稱：**人工智慧財務金融應用**
(AI in Financial Application)
- 授課教師：戴敏育 (Min-Yuh Day)
- 開課系級：資管所碩專班 (TLMXJ1A)
- 開課資料：選修 單學期 3 學分 (3 Credits, Elective)
- 上課時間：週五 12,13,14 (Fri 19:20-22:10)
- 上課教室：D301 (淡江大學台北校園)



淡江大學



資訊管理學系

資訊創新

管理思維

淡江大學資訊管理 系(所)教育目標



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- 培育能整合
資訊技術、
管理技能
及具有解決問題能力的
高等資訊管理實務人才。

淡江大學資訊管理 系(所)核心能力



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- A. 現代管理知識應用 ◦ (10%)
- B. 邏輯思考 ◦ (10%)
- C. 關鍵分析 ◦ (10%)
- D. 結合資訊技術與管理 ◦ (30%)
- E. 研究與創新 ◦ (10%)
- F. 資料分析與應用 ◦ (20%)
- G. 資通安全管理 ◦
- H. 言辭與文字表達 ◦ (10%)

課程簡介

- 本課程介紹人工智慧財務金融應用
基本概念與研究議題
- 課程內容包括
 - 人工智慧投資分析與機器人理財顧問、
 - 金融科技對話式商務與智慧型交談機器人、
 - 財務金融事件研究法、
 - Python AI智慧金融分析基礎、
 - Python Pandas 量化投資分析、
 - Python Scikit-Learn 機器學習財務金融應用、
 - TensorFlow 深度學習財務金融應用、
 - 社會網絡分析財務金融應用、
 - 人工智慧財務金融應用個案研究。

Course Introduction

- This course introduces the fundamental concepts, research issues, and hands-on practices of AI in Financial Application.
- Topics include
 - Artificial Intelligence for Investment Analysis and Robo-Advisors,
 - Conversational Commerce and Intelligent Chatbots for Fintech,
 - Event Studies in Finance,
 - Quantitative Investing with Pandas in Python,
 - Machine Learning in Finance Application with Scikit-Learn In Python,
 - Deep Learning for Financial Application with TensorFlow,
 - Social Network Analysis for Financial Application,
 - and Case Study on AI in Financial Application.

課程目標 (Objective)

- 瞭解及應用 人工智慧財務金融應用
基本概念與研究議題。
(Understand and apply the fundamental concepts and research issues of AI in Financial Application.)
- 進行人工智慧財務金融應用相關之
資訊管理研究。
(Conduct information systems research in the context of AI in Financial Application.)

課程大綱 (Syllabus)

週次 (Week)	日期 (Date)	內容 (Subject/Topics)
1	2019/09/13	中秋節 (Mid-Autumn Festival) 放假一天 (Day off)
2	2019/09/20	人工智慧財務金融應用課程介紹 (Course Orientation for AI in Financial Application)
3	2019/09/27	人工智慧投資分析與機器人理財顧問 (Artificial Intelligence for Investment Analysis and Robo-Advisors)
4	2019/10/04	金融科技對話式商務與智慧型交談機器人 (Conversational Commerce and Intelligent Chatbots for Fintech)
5	2019/10/11	國慶日補假 (Bridge Holiday for National Day, Extra Day Off)
6	2019/10/18	財務金融事件研究法 (Event Studies in Finance)

課程大綱 (Syllabus)

週次 (Week)	日期 (Date)	內容 (Subject/Topics)
7	2019/10/25	人工智慧財務金融應用個案研究 I (Case Study on AI in Financial Application I)
8	2019/11/01	Python AI智慧金融分析基礎 (Foundations of AI in Finance Big Data Analytics with Python)
9	2019/11/08	Python Pandas 量化投資分析 (Quantitative Investing with Pandas in Python)
10	2019/11/15	期中報告 (Midterm Project Report)
11	2019/11/22	Python Scikit-Learn 機器學習財務金融應用 (Machine Learning in Finance Application with Scikit-Learn In Python)
12	2019/11/29	TensorFlow 深度學習財務金融應用 I (Deep Learning for Finance Application with TensorFlow I)

課程大綱 (Syllabus)

週次 (Week)	日期 (Date)	內容 (Subject/Topics)
13	2019/12/06	人工智慧財務金融應用個案研究 II (Case Study on AI in Financial Application II)
14	2019/12/13	TensorFlow 深度學習財務金融應用 II (Deep Learning for Finance Application with TensorFlow II)
15	2019/12/20	TensorFlow 深度學習財務金融應用 III (Deep Learning for Finance Application with TensorFlow III)
16	2019/12/27	社會網絡分析財務金融應用 (Social Network Analysis for Finance Application)
17	2020/01/03	期末報告 I (Final Project Presentation I)
18	2020/01/10	期末報告 II (Final Project Presentation II)

教學方法與評量方法

- 教學方法

- 講述、討論、
發表、實作

- 評量方法

- 討論、實作、報告

教材課本

- 教材課本
 - 講義 (Slides)
 - 人工智慧財務金融應用相關個案與論文
(Cases and Papers related to
AI in Financial Application)

參考書籍 (References)

1. Yves Hilpisch (2018), Python for Finance: Mastering Data-Driven Finance, 2nd Edition, O'Reilly Media
2. Paolo Sironi (2016), FinTech Innovation: From Robo-Advisors to Goal Based Investing and Gamification, Wiley.
3. Yuxing Yan (2017), Python for Finance: Apply powerful finance models and quantitative analysis with Python, Second Edition, Packt Publishing.
4. Aurélien Géron (2017), Hands-On Machine Learning with Scikit-Learn and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems, O'Reilly Media.
5. Francois Chollet (2017), Deep Learning with Python, Manning Publications.

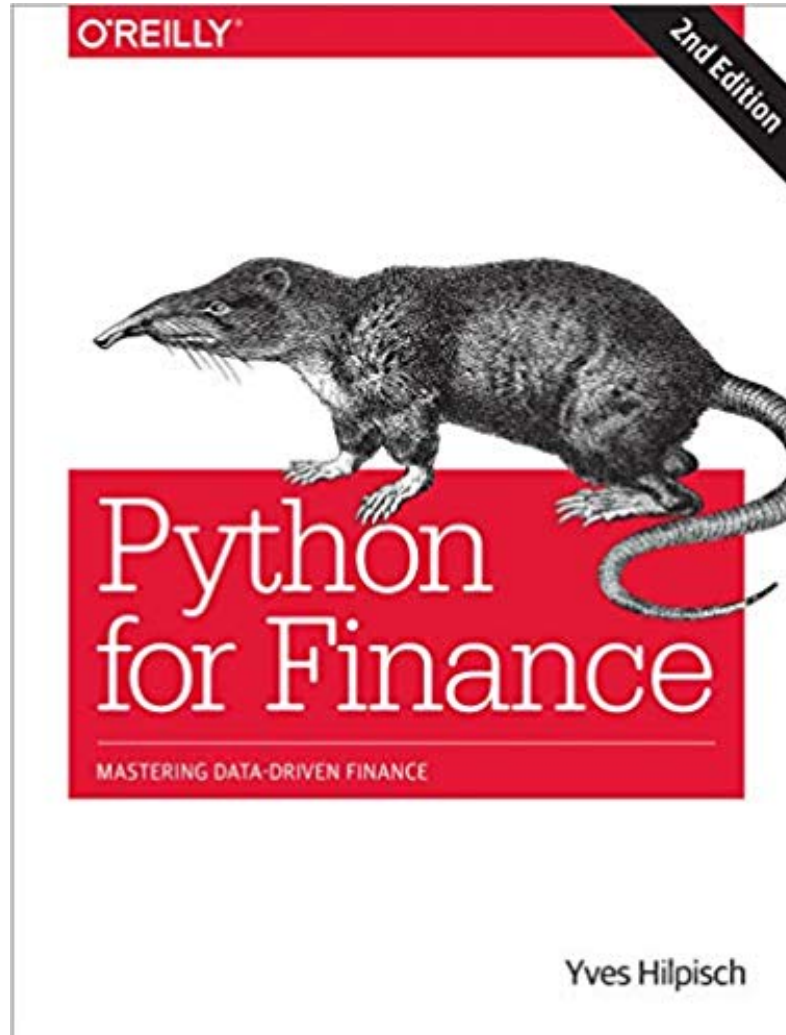
作業與學期成績計算方式

- 作業篇數
 - 3篇
- 學期成績計算方式
 - ☒ 期中評量：30 %
 - ☒ 期末評量：30 %
 - ☒ 其他（ 課堂參與及報告討論表現 ）：40 %

AI and Big Data Analytics in Finance

- **金融科技** (Spring 2017) (EMBA IMTKU)
 - Financial Technology, FinTech
- **財務金融大數據分析** (Fall 2017) (EMBA IMTKU)
 - Big Data Analytics in Finance
- **人工智慧投資分析** (Fall 2018) (EMBA IMTKU)
 - Artificial Intelligence for Investment Analysis
- **人工智慧財務金融應用** (Fall 2019) (EMBA IMTKU)
 - AI in Financial Application
- **智慧金融大數據分析** (Fall 2019) (MBA, DBETKU)
 - AI in Finance Big Data Analytics

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

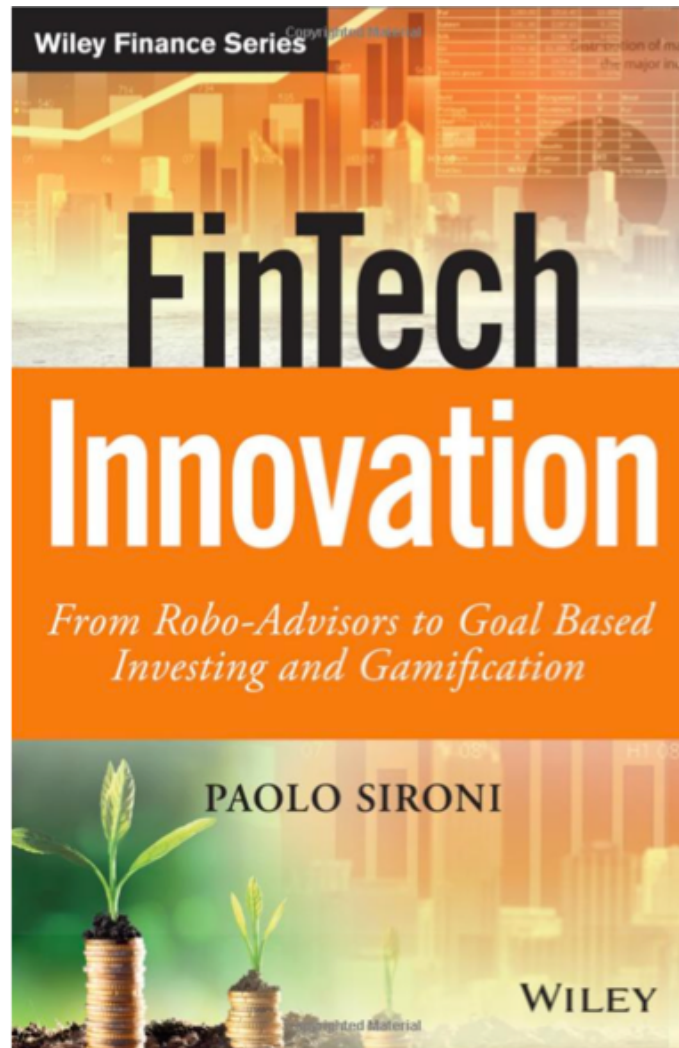


Paolo Sironi (2016)

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

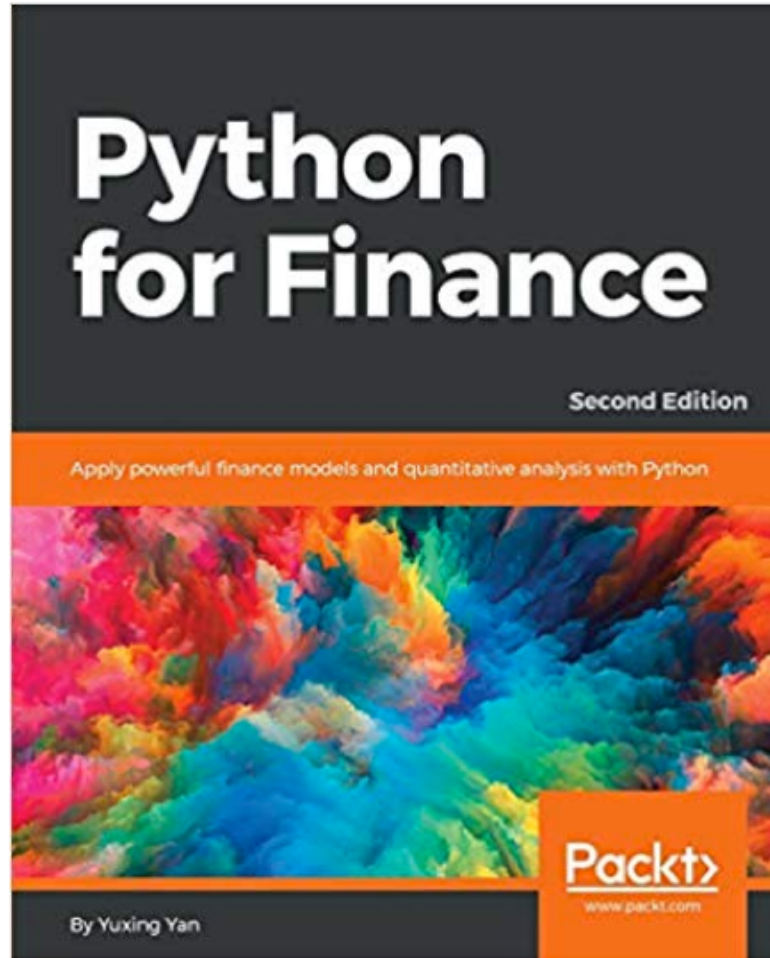


沈中華、李建然 (2000),
事件研究法：
財務與會計實證研究必備

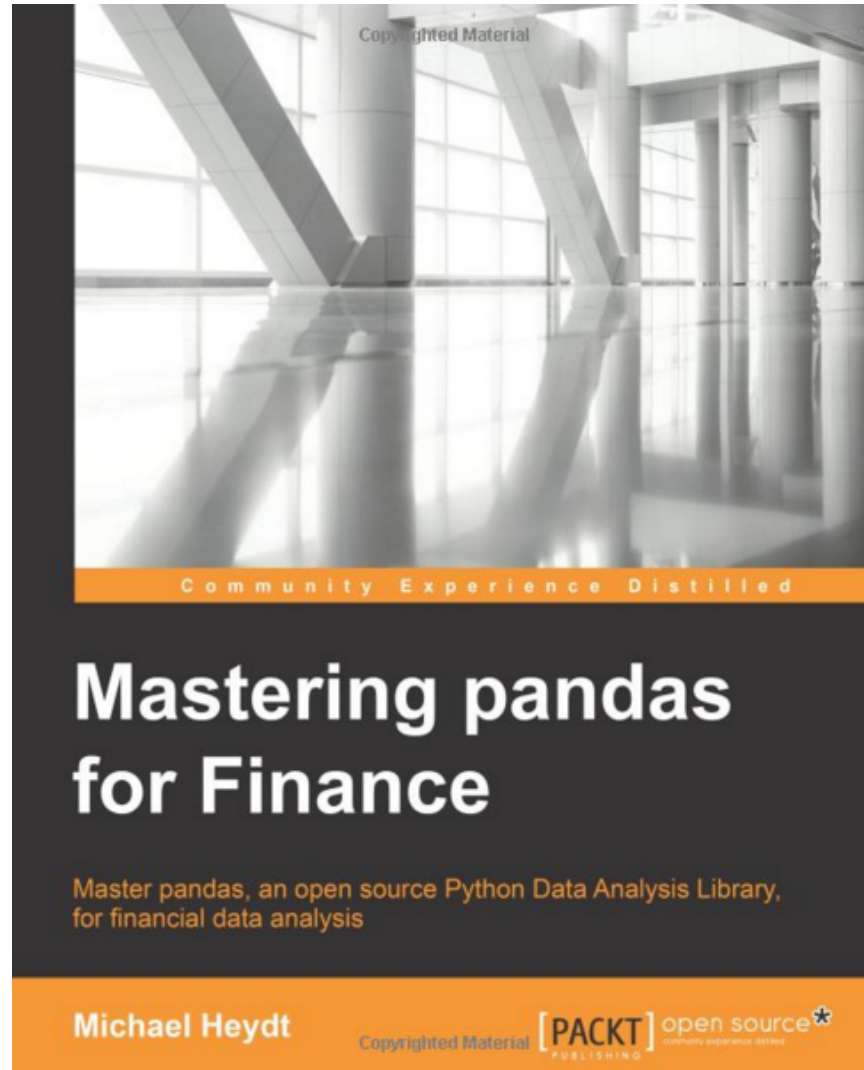


Yuxing Yan (2017),

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

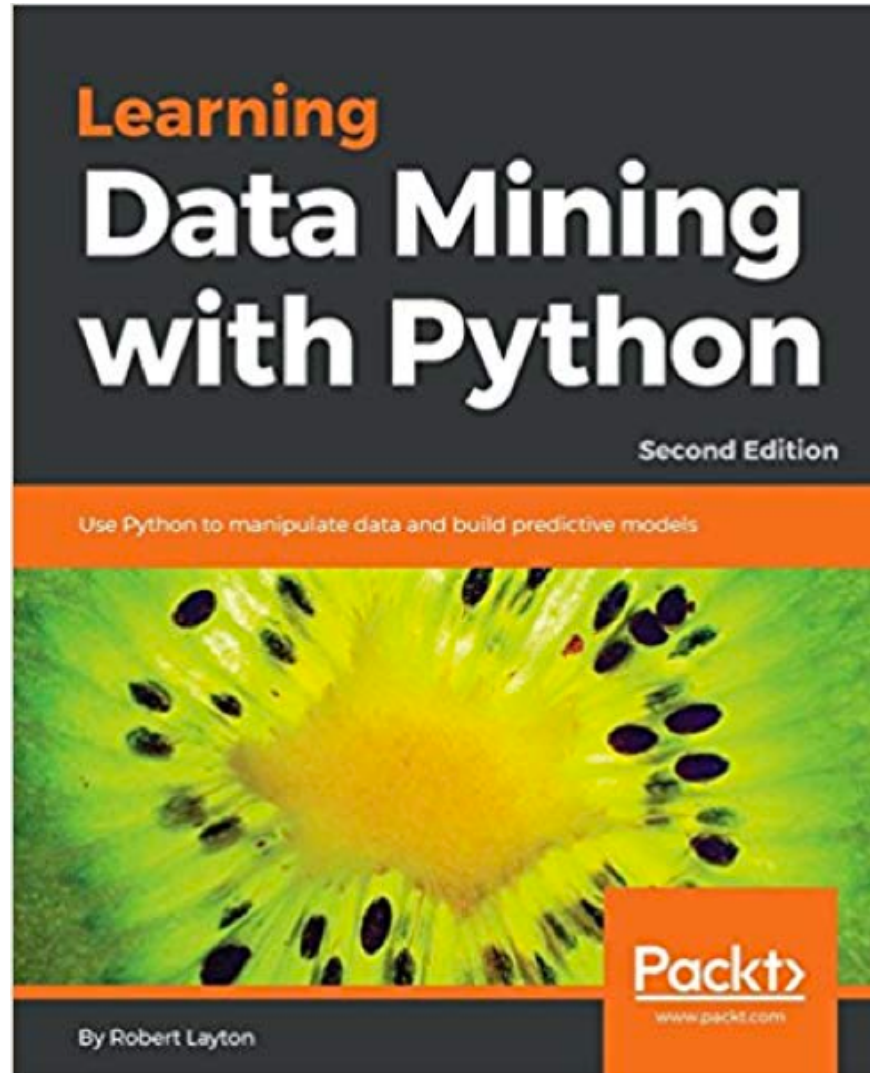


Michael Heydt (2015), Mastering Pandas for Finance, Packt Publishing



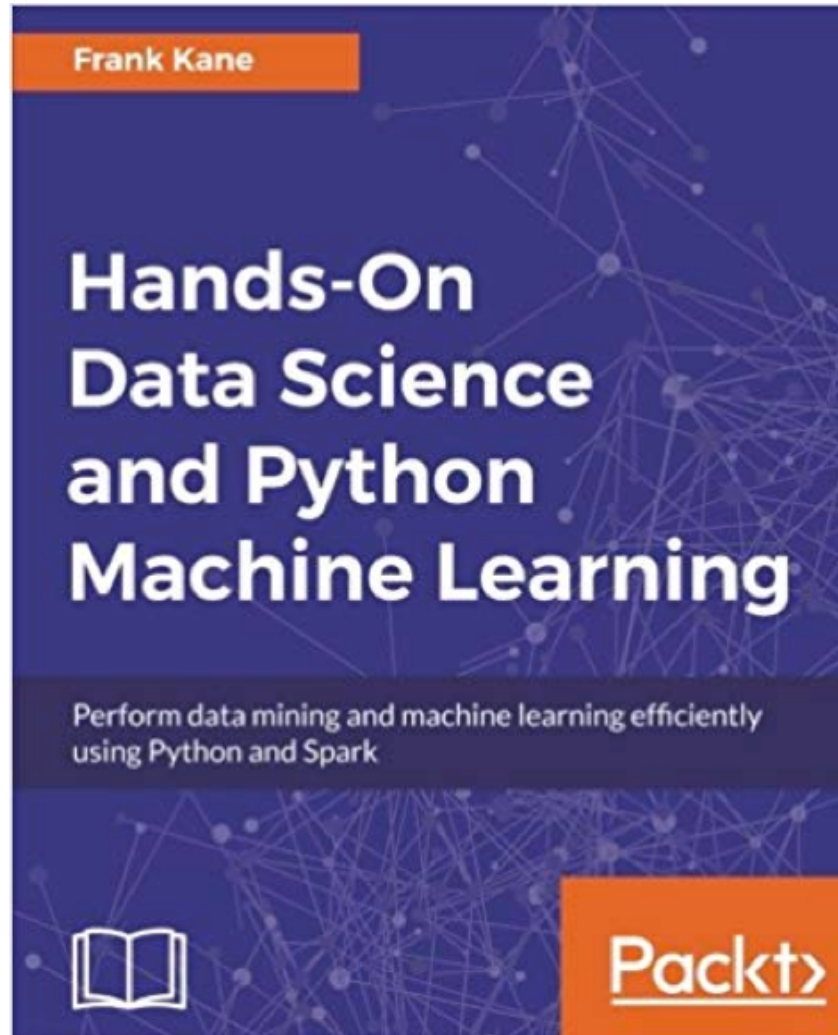
Source: <http://www.amazon.com/Mastering-Pandas-Finance-Michael-Heydt/dp/1783985100>

Robert Layton (2017),
Learning Data Mining with Python - Second Edition,
Packt Publishing

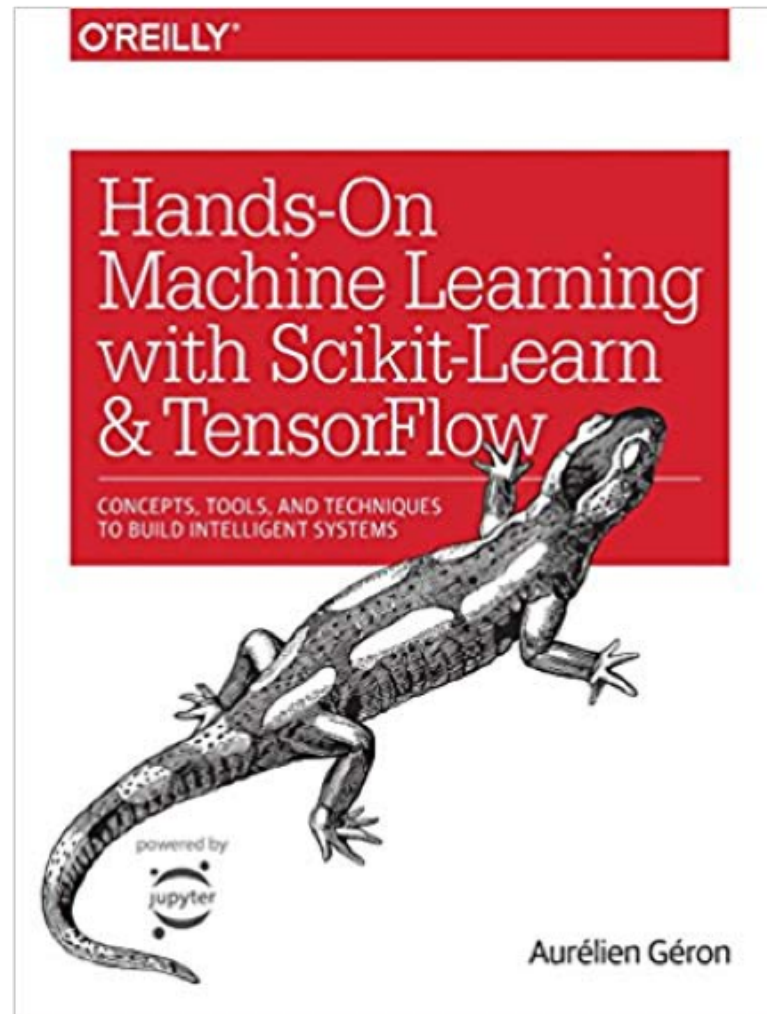


Frank Kane (2017),

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



Google Colab

CO

Hello, Colaboratory

File Edit View Insert Runtime Tools Help

CODE TEXT CELL CELL COPY TO DRIVE

CONNECT EDITING

Table of contents

Code snippets

Files

Getting Started

Highlighted Features

TensorFlow execution

GitHub

Visualization

Forms

Examples

Local runtime support

SECTION

CO

Welcome to Colaboratory!

Colaboratory is a free Jupyter notebook environment that requires no setup and runs entirely in the cloud. See our [FAQ](#) for more info.

Getting Started

- [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](#)
- [Machine Learning Crash Course: Intro to Pandas & First Steps with TensorFlow](#)

Highlighted Features

Seedbank

Looking for Colab notebooks to learn from? Check out [Seedbank](#), a place to discover interactive machine learning examples.

TensorFlow execution

Colaboratory allows you to execute TensorFlow code in your browser with a single click. The example below adds two matrices.

$$\begin{bmatrix} 1. & 1. & 1. \end{bmatrix} + \begin{bmatrix} 1. & 2. & 3. \end{bmatrix} = \begin{bmatrix} 2. & 3. & 4. \end{bmatrix}$$

FinTech

Financial Technology

FinTech



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

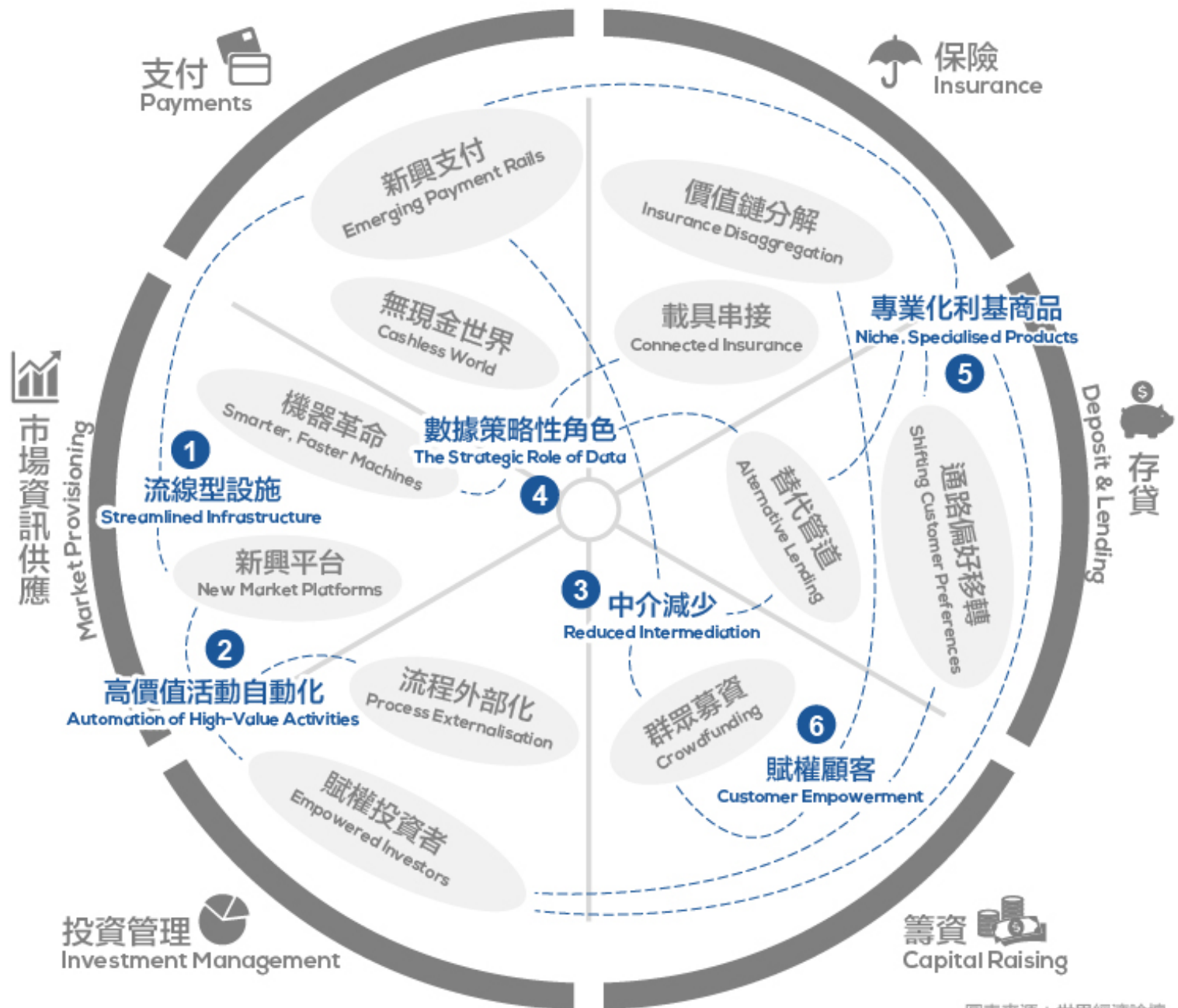
FinTech: Financial Services Innovation



FinTech:

Financial Services Innovation

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



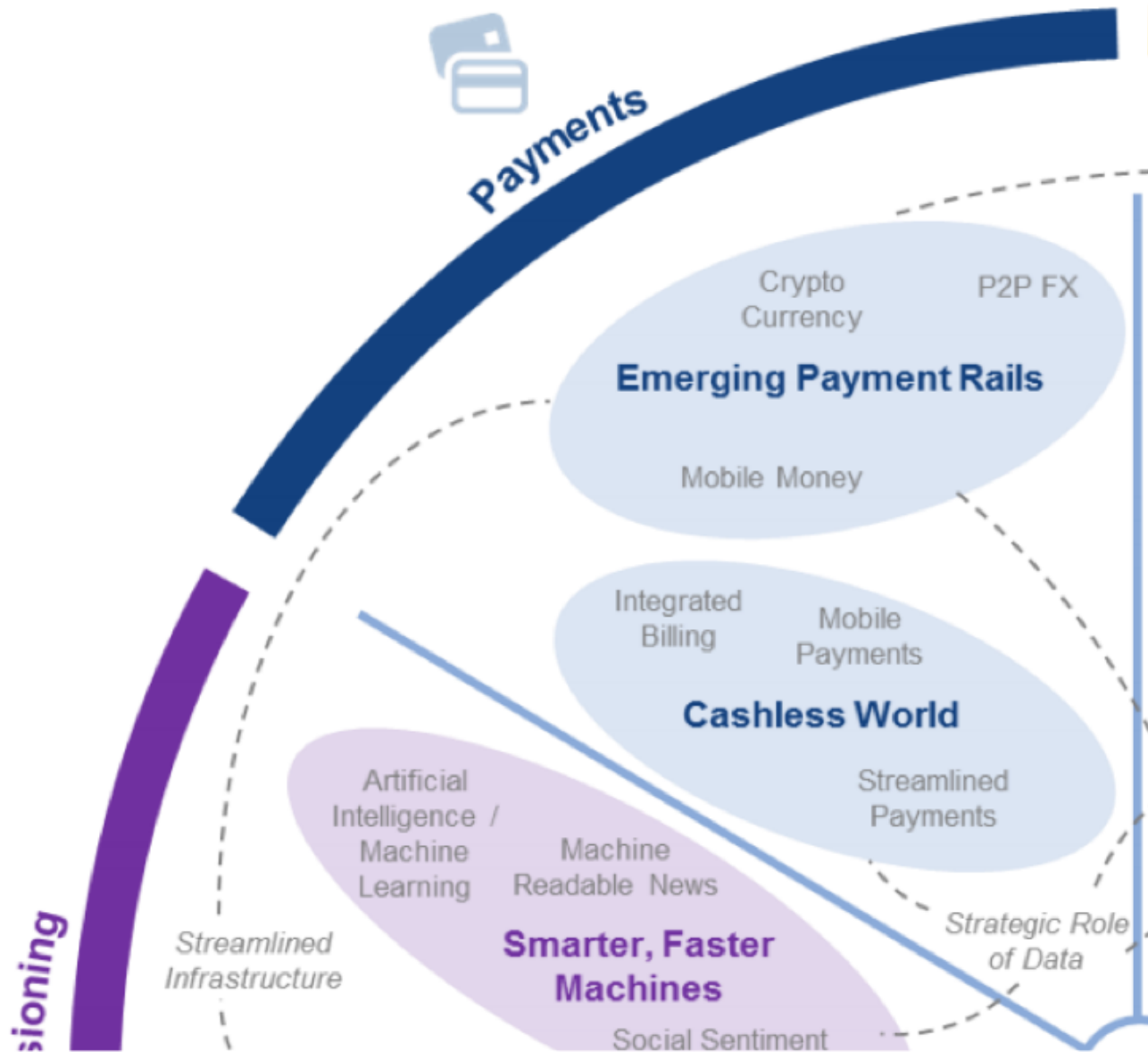
圖表來源：世界經濟論壇

FinTech: Financial Services Innovation

功能	創新項目
 支付 Payments	無現金世界 (Cashless World) 新興支付 (Emerging Payment Rails)
 保險 Insurance	價值鏈裂解 (Insurance Disaggregation) 保險串接裝置 (Connected Insurance)
 存貸 Deposit & Lending	替代管道 (Alternative Lending) 通路偏好移轉 (Shifting Customer Preferences)
 籌資 Capital Raising	群眾募資 (Crowdfunding)
 投資管理 Investment Management	賦權投資者 (Empowered Investors) 流程外部化 (Process Externalisation)
 市場資訊供應 Market Provisioning	機器革命 (Smarter, Faster Machines) 新興平台 (New Market Platforms)

圖表來源：Fugle團隊整理

FinTech: Payment

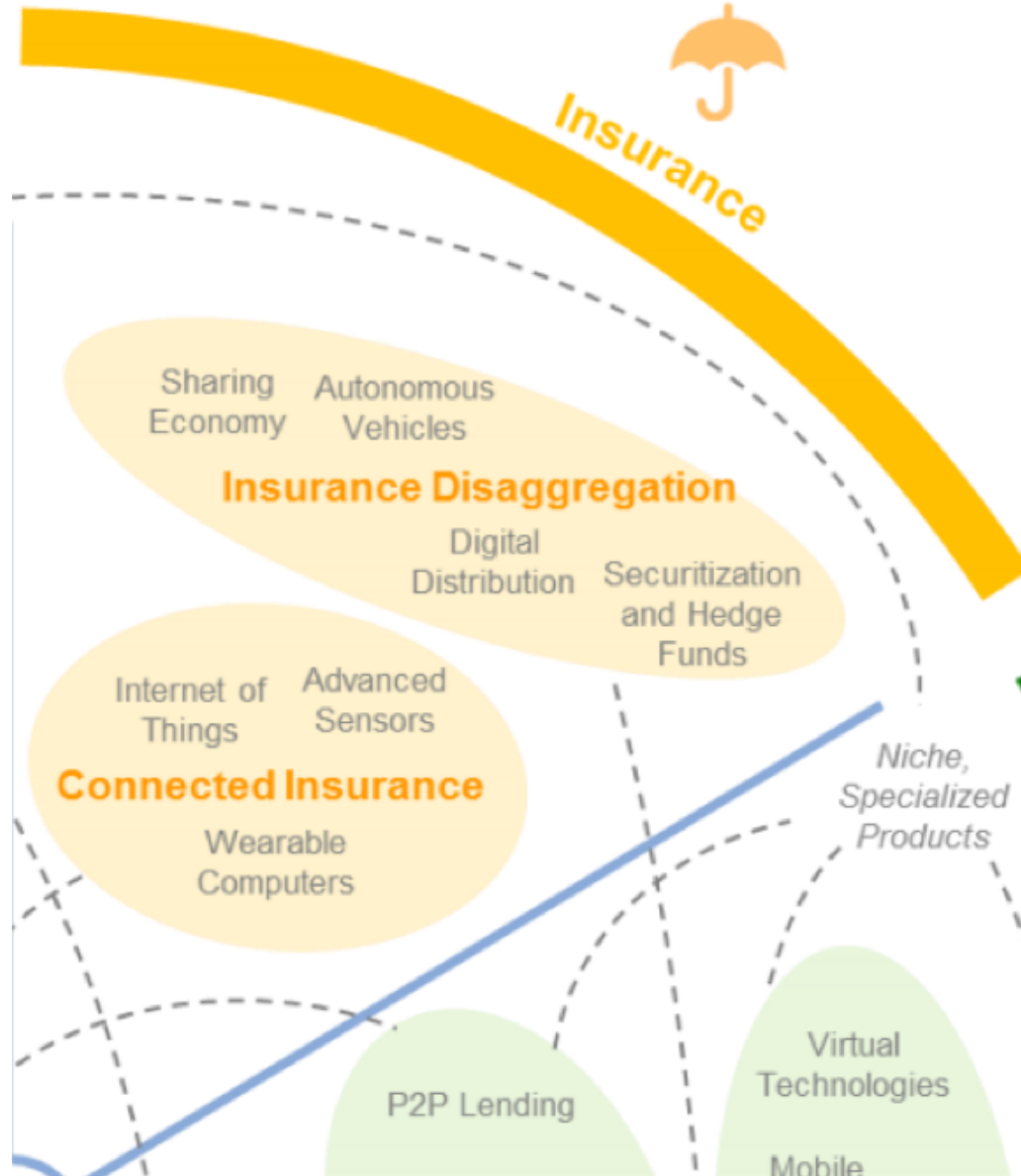


FinTech: Payment Cashless World Emerging Payment Rails



圖表來源：Fugle團隊整理

FinTech: Insurance



FinTech: Insurance

Insurance Disaggregation

Connected Insurance

保險



創新

關鍵趨勢

價值鏈裂解
Insurance
Disaggregation

裂解分佈 (Disaggregated Distribution)、共享
經濟、第三方資本、自動駕駛車

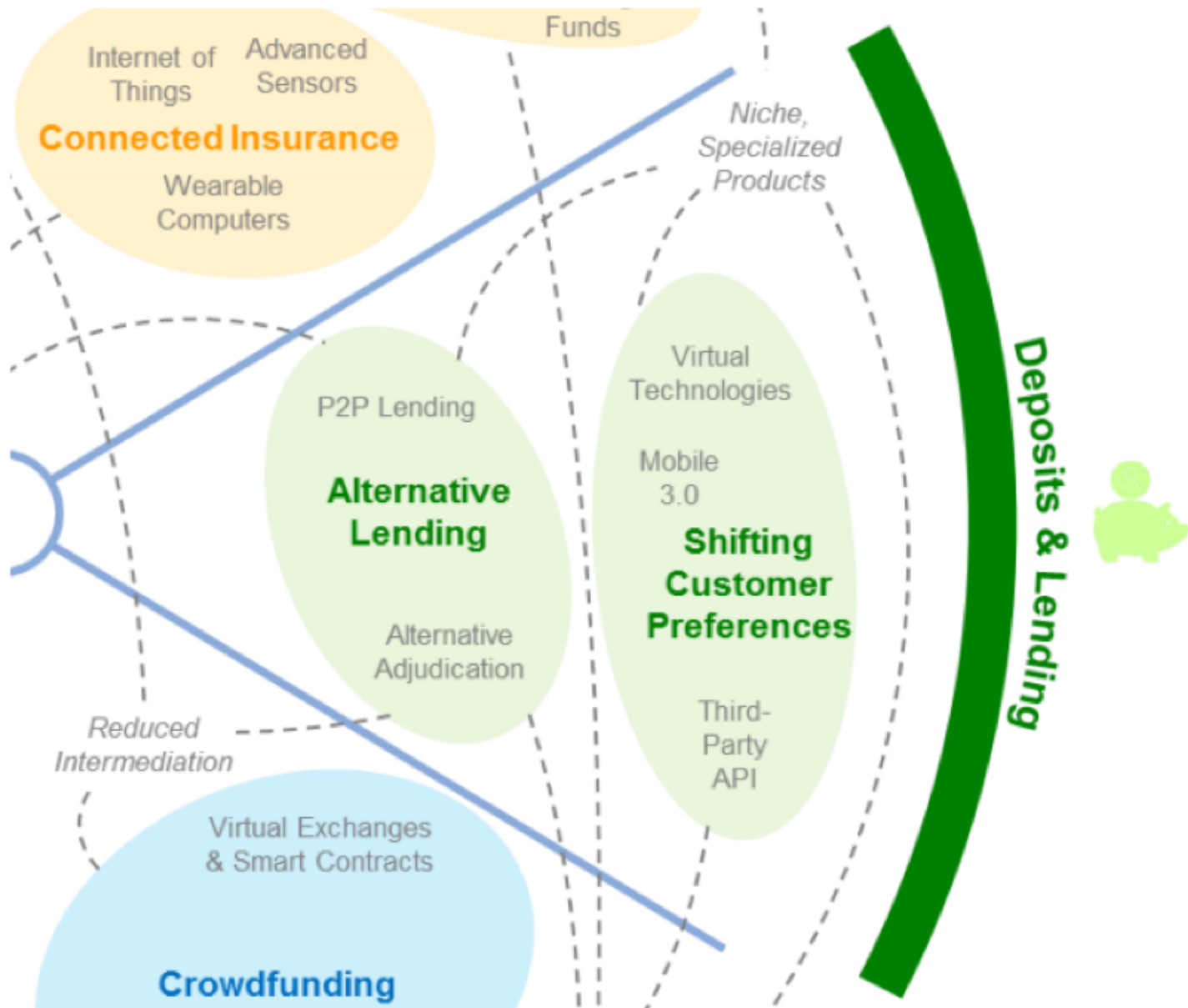
保險串接裝置
Connected
Insurance

高性價比感測器、穿戴式裝置、物聯網、標
準化平台

圖表來源：Fugle團隊整理

3

FinTech: Deposits & Lending



3

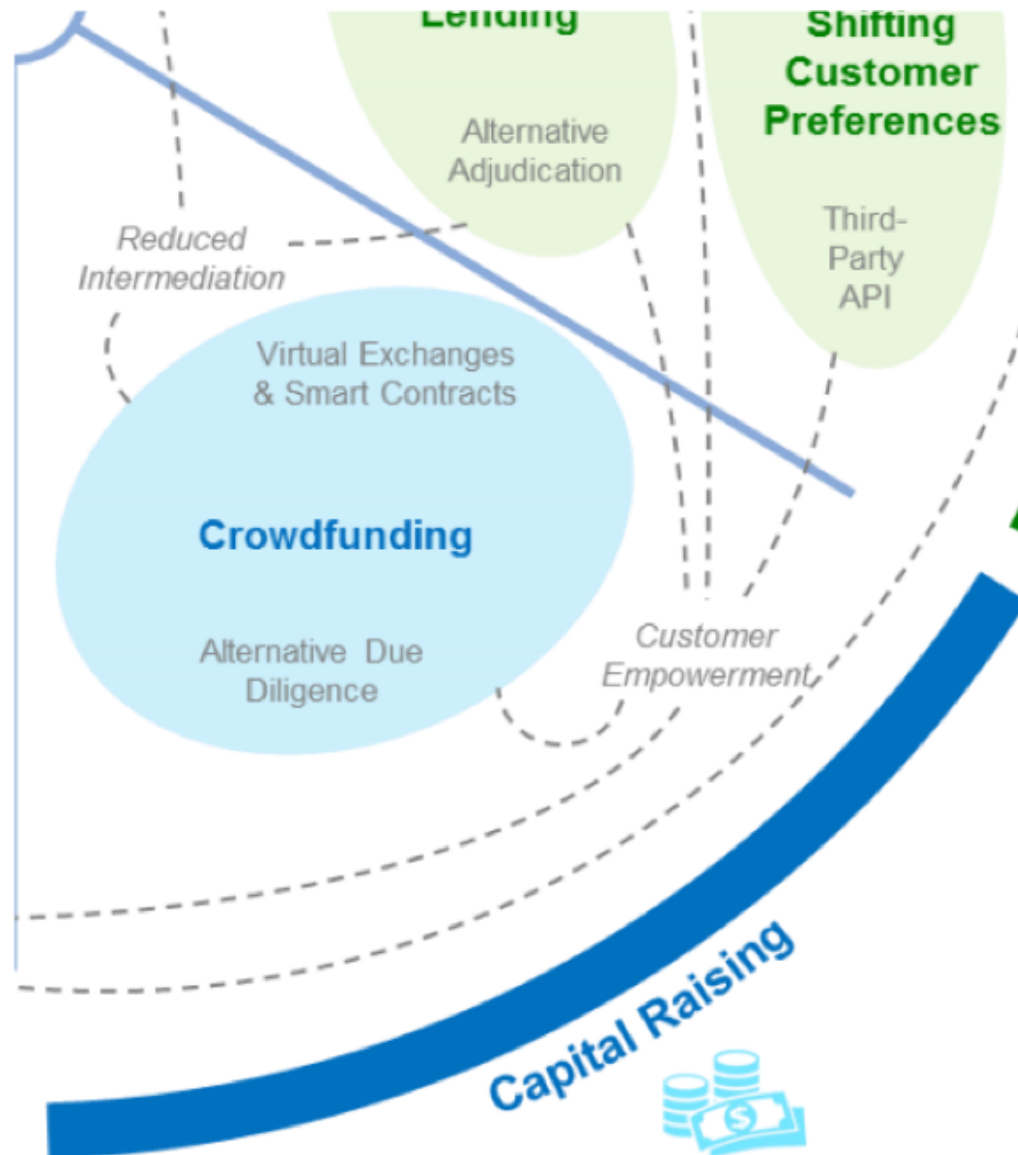
FinTech: Deposits & Lending Alternative Lending Shifting Customer Preferences



圖表來源：Fugle團隊整理

4

FinTech: Capital Raising



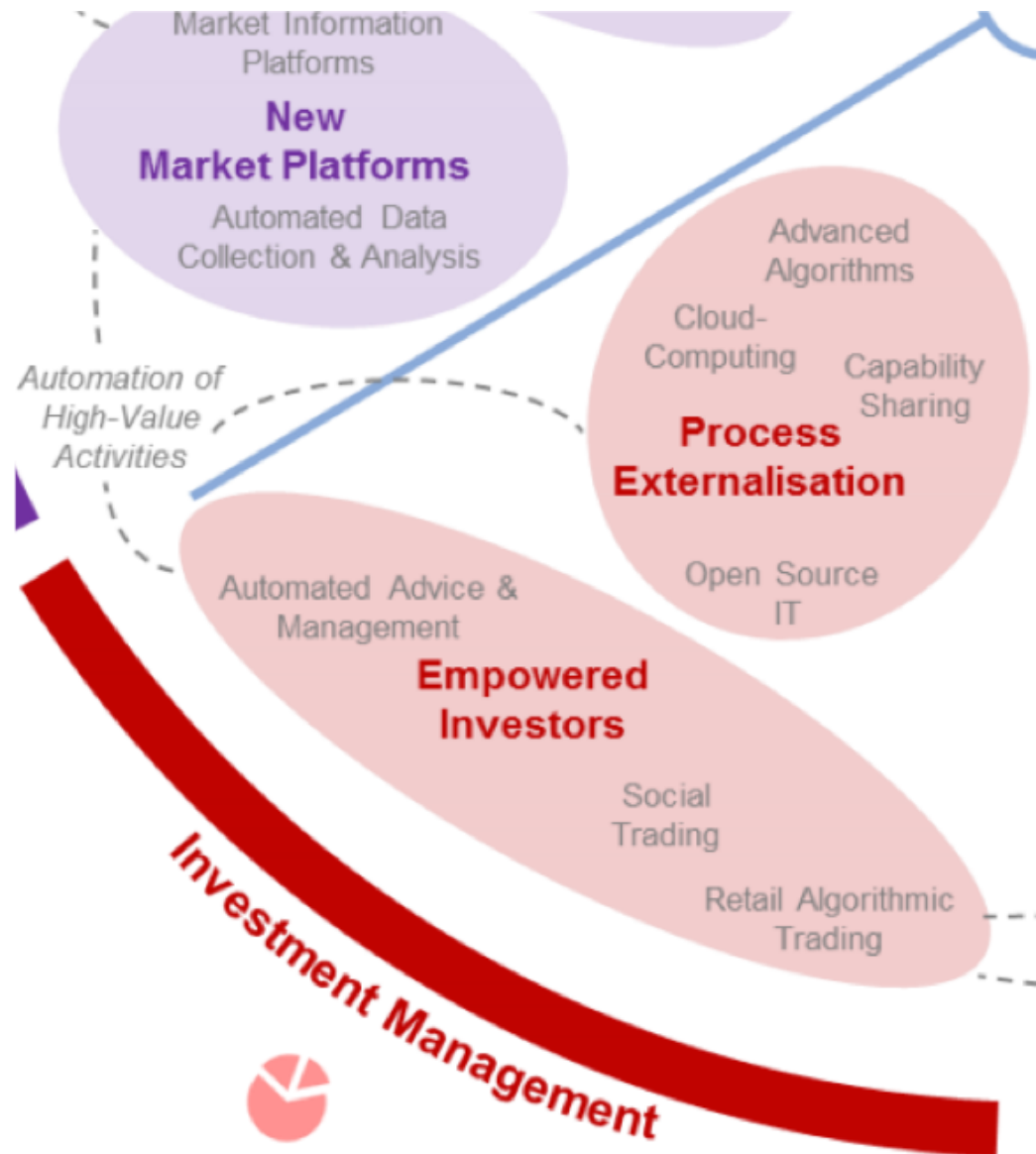
4

FinTech: Capital Raising Crowdfunding



圖表來源：Fugle團隊整理

5 FinTech: Investment Management



5 FinTech: Investment Management Empowered Investors Process Externalization

投資管理



創新

關鍵趨勢

賦權投資者
Empowered
Investors

社群交易、機器推薦與財富管理、零售演算法交易 (Retail Algorithmic Trading)

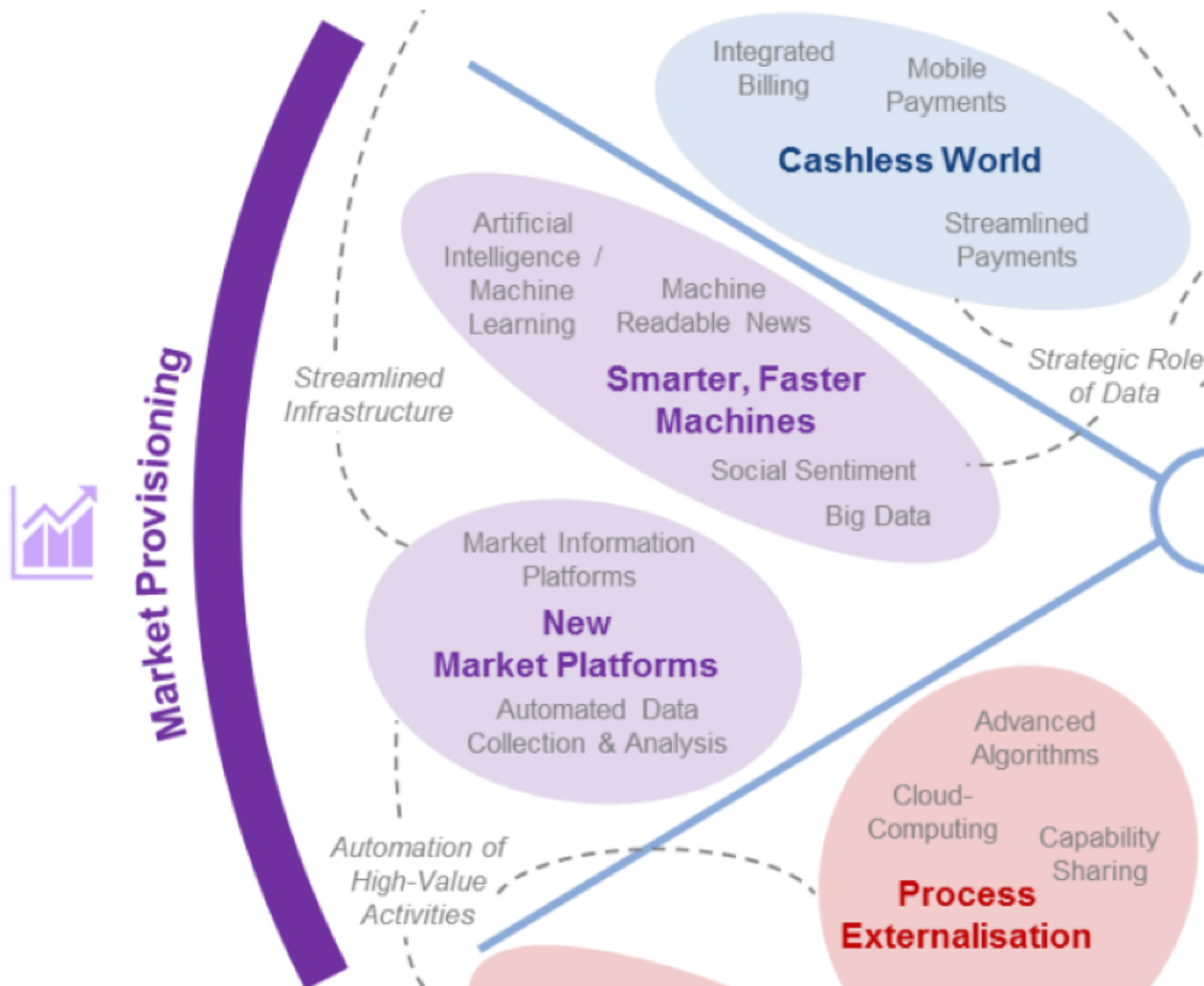
流程外部化
Process
Externalisation

流程即服務 (Process-as-a-Service, PaaS)、能力共享 (Capability Sharing)、進階分析、自然語言

圖表來源：Fugle團隊整理

6

FinTech: Market Provisioning



6

FinTech: Market Provisioning Smarter, Faster Machines New Market Platforms

市場資訊供應



創新

關鍵趨勢

機器革命

Smarter, Faster
Machines

機器易用數據 (Machine Accessible Data)、人工智慧 / 機器學習、大數據

新興平台

New Market
Platforms

固定收益商品平台 ALGOMI、基金 / 組合型基金平台 NOVUS、私募 / 創投平台 BISON、未公發股權平台 LIQUITY、原物料商品與衍生性合約平台 ClauseMatch

圖表來源：Fugle團隊整理

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



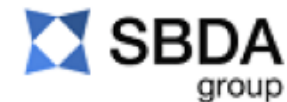
Fraud Detection



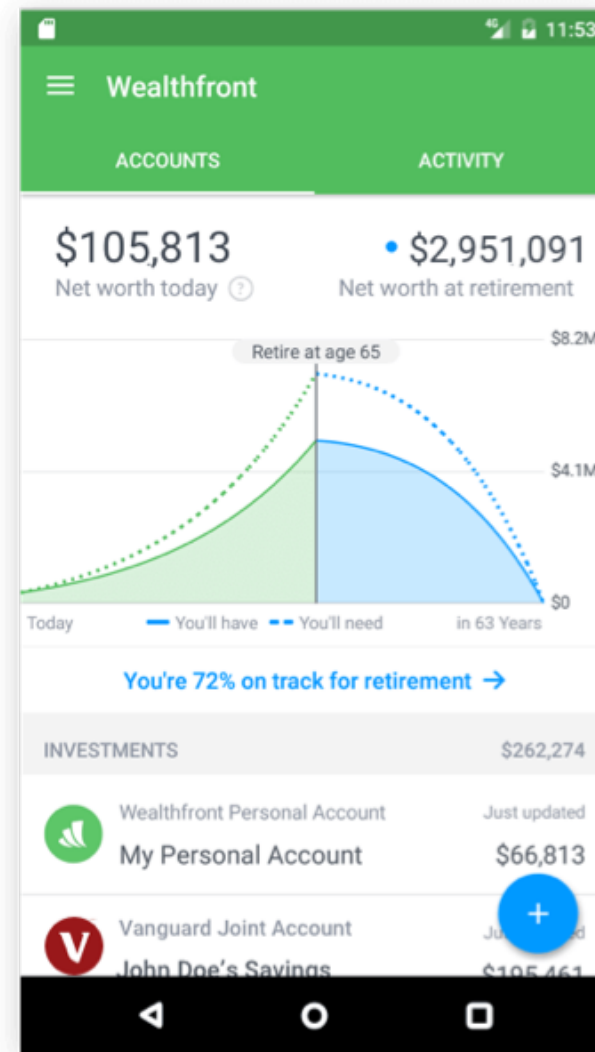
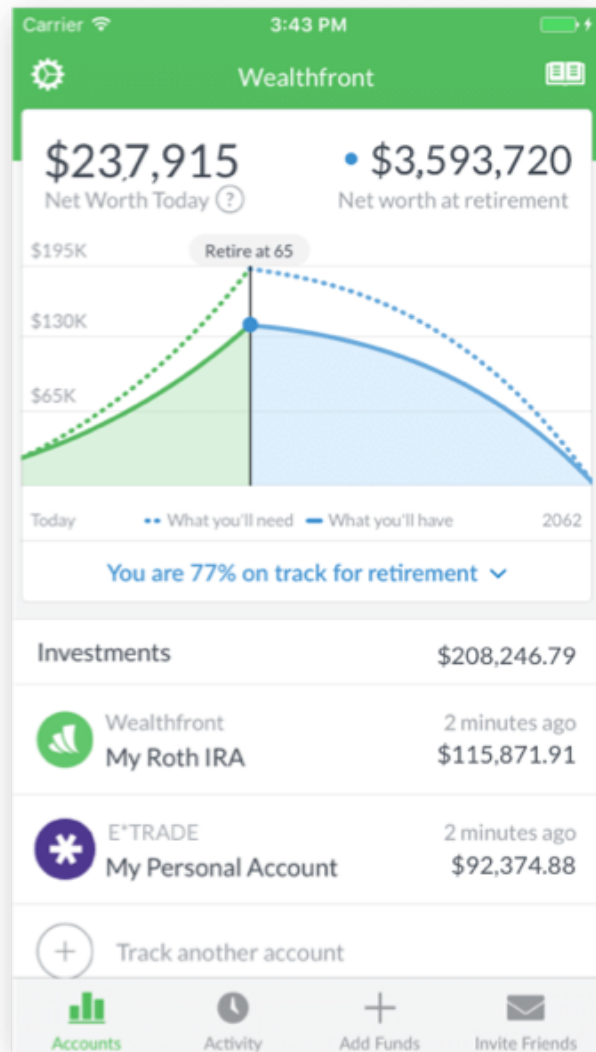
Credit Scoring



Personal Banking



Wealthfront Robo Advisor



1

金融科技

**Financial Technology,
FinTech**

2

財務金融大數據分析

Big Data Analytics in Finance

3

人工智慧投資分析

**Artificial Intelligence for
Investment Analysis**

4

人工智慧 財務金融應用

AI in Financial Application

5

智慧金融大數據分析

AI in Finance Big Data Analytics

Summary

- This course introduces the fundamental concepts, research issues, and hands-on practices of AI in Financial Application.
- Topics include
 - Artificial Intelligence for Investment Analysis and Robo-Advisors,
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 - Social Network Analysis for Financial Application,
 - and Case Study on AI in Financial Application.

AI in Financial Application

Contact Information



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