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)

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Department of Information Management
Tamkang University

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

2019-09-10
Course Syllabus

Tamkang University
Academic Year 108, 1\textsuperscript{st} Semester (Fall, 2019)

• Course Title: \textit{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
<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Subject/Topics</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>2019/09/10</td>
<td>Course Orientation on AI in Finance Big Data Analytics</td>
</tr>
<tr>
<td>2</td>
<td>2019/09/17</td>
<td>AI in FinTech: Financial Services Innovation and Application</td>
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<tr>
<td>3</td>
<td>2019/09/24</td>
<td>ABC: AI, Big Data, Cloud Computing</td>
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<td>4</td>
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<td>Business Models of Fintech</td>
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<tr>
<td>5</td>
<td>2019/10/08</td>
<td>Event Studies in Finance</td>
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<td>6</td>
<td>2019/10/15</td>
<td>Case Study on AI in Finance Big Data Analytics I</td>
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<td>7</td>
<td>2019/10/22</td>
<td>Foundations of AI in Finance Big Data Analytics with Python</td>
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<td>8</td>
<td>2019/10/29</td>
<td>Case Study on Financial Industry Practice I</td>
</tr>
<tr>
<td>9</td>
<td>2019/11/05</td>
<td>Quantitative Investing with Pandas in Python</td>
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<tr>
<td>10</td>
<td>2019/11/12</td>
<td>Midterm Project Report</td>
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<td>11</td>
<td>2019/11/19</td>
<td>Machine Learning in Finance Application with Scikit-Learn In Python</td>
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<tr>
<td>13</td>
<td>2019/12/03</td>
<td>Case Study on AI in Finance Big Data Analytics II</td>
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<td>14</td>
<td>2019/12/10</td>
<td>Deep Learning for Financial Time Series Forecasting with TensorFlow II</td>
</tr>
<tr>
<td>15</td>
<td>2019/12/17</td>
<td>Case Study on Financial Industry Practice II</td>
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<td>17</td>
<td>2019/12/31</td>
<td>Final Project Presentation I</td>
</tr>
<tr>
<td>18</td>
<td>2020/01/07</td>
<td>Final Project Presentation II</td>
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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#1081AlFBDA
  – Cases and Papers related to AI in Finance Big Data Analytics.

• References
  – Francois Chollet (2017), Deep Learning with Python, Manning Publications
Yves Hilpisch (2018),
Python for Finance: Mastering Data-Driven Finance, O'Reilly

Source: https://www.amazon.com/Python-Finance-Mastering-Data-Driven/dp/1492024333
Paolo Sironi (2016)

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


Yves Hilpisch (2015), Derivatives Analytics with Python: Data Analysis, Models, Simulation, Calibration and Hedging, Wiley


Source: https://www.amazon.com/Python-Finance-powerful-quantitative-analysis/dp/1787125696
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

Source: https://www.amazon.com/Learning-Data-Mining-Python-Second/dp/1787126781

Aurélien Géron (2017),

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.

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

https://colab.research.google.com/notebooks/welcome.ipynb
FinTech
Financial Technology
FinTech
Financial Technology

FinTech

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

Source: https://www.fintechweekly.com/fintech-definition
Financial Services
Financial Services

Source: http://www.crackitt.com/7-reasons-why-your-fintech-startup-needs-visual-marketing/
Financial Revolution with Fintech

A financial services revolution
Consumer Trends

1. Simplification
2. Transparency
3. Analytics
4. Reduced Friction

Source: http://www.hedgethink.com/fintech/european-fintech-top-100/
FinTech: Financial Services Innovation

Source: http://www3.weforum.org/docs/WEF_The_future__of_financial_services.pdf
FinTech: Financial Services Innovation

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

Source: http://www3.weforum.org/docs/WEF_The_future__of_financial_services.pdf
Artificial Intelligence and Deep Learning for Fintech
From Algorithmic Trading to Personal Finance Bots: 41 Startups Bringing AI to Fintech

Source: https://www.cbinsights.com/blog/artificial-intelligence-fintech-market-map-company-list/
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
AYASDI
Kensho
DataRobot

Quantitative Trading
sentient technologies
clone algo
alpaca

AI Assistants/Bots
KASIST@
TRIM
Penny

Credit Scoring
TypeScore
aire

Market Research & Sentiment Analysis
Digital Reasoning
context relevant
Numenta
turi

Blockchain
Skry

WALNUT ALGORITHMS

SURE.
Wecash

Personal Banking
personetics

Search Engine
alphasense

Debt Collection
feedzai

Fraud Detection
trueaccord

SBDA group

Source: https://www.cbinsights.com/blog/artificial-intelligence-fintech-market-map-company-list/
Artificial Intelligence (AI) in Fintech

General Purpose/Predictive Analytics

- AYASDI
- Digital Reasoning
- Context Relevant
- H₂O
- Kensho
- Cortical.io
- Numenta
- DataRobot
- Nervana Systems

Market Research & Sentiment Analysis

- Indico
- Acuity Trading
- Lucena Quantitative Analytics
- Numerai
- Dataminr

Search Engine

- Alphasense

Source: https://www.cbinsights.com/blog/artificial-intelligence-fintech-market-map-company-list/
Artificial Intelligence (AI) in Fintech

- **Quantitative Trading**
  - Sentient Technologies
  - Clone Alg
  - Alpaca
  - Walnut Algorithms

- **AI Assistants/Bots**
  - KASIST
  - TRIM
  - Penny
  - INSURIFY
  - SURE.
  - Cleo
  - FinGenius

- **Credit Scoring**
  - TypeScore
  - aire
  - creditvidya
  - zest finance
  - ADF
  - Applied Data Finance
  - Wecash
  - CREAM FINANCE

- **Blockchain**
  - Skry
  - EUKLID

- **Debt Collection**
  - TrueAccord

- **Personal Banking**
  - Personetics

- **Fraud Detection**
  - feedzai
  - Biocatch

Source: https://www.cbinsights.com/blog/artificial-intelligence-fintech-market-map-company-list/
Wealthfront Robo Advisor

Source: https://www.wealthfront.com/
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
Contact

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