Industry Classification Using Graphs

a talk by

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The Hong Kong University of Science and Technology

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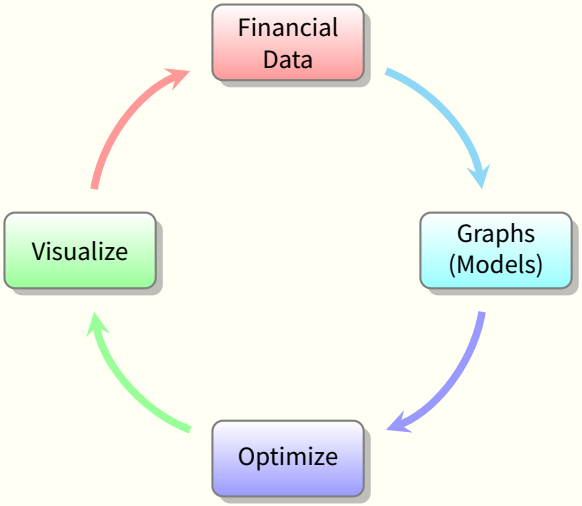
May, 2023

Team

Gist



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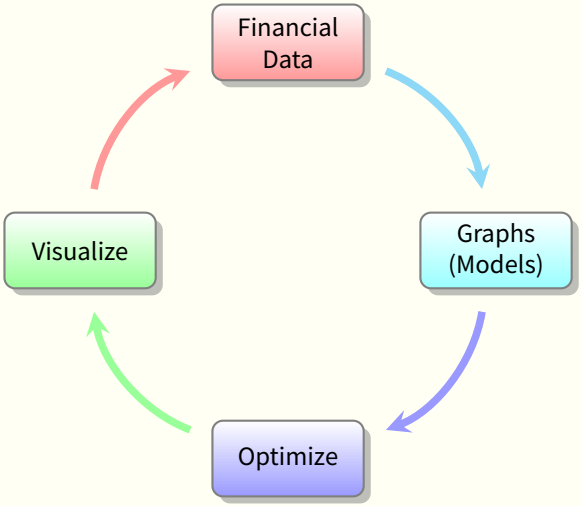

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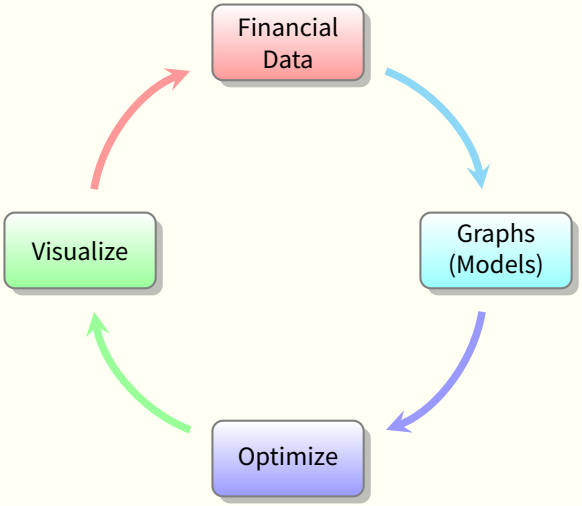

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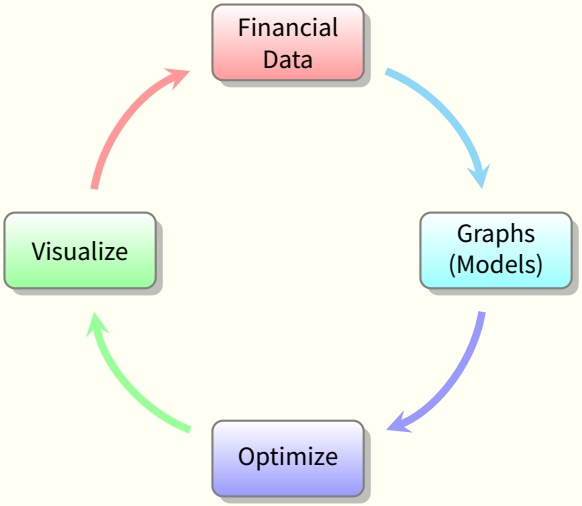

- Key ideas:
  - **model** a financial networks as undirected graph
  - **use** such graphs as a **tool** for industry **classification** of stocks or **clustering** cryptocurrencies

Motivation and Goals

[1] https://www.msci.com/our-solutions/indexes/gics

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- result of our research efforts:
  - **NeurIPS'22** Cardoso, J. V. M., Ying, J., and Palomar, D. P. "Learning Bipartite Graphs: Heavy Tails and Multiple Components", *Advances in Neural Information Processing Systems*, 14044–14057 (35), 2022
  - **NeurIPS'21** Cardoso, J. V. M., Ying, J., and Palomar, D. P. "Graphical Models in Heavy-Tailed Markets", *Advances in Neural Information Processing Systems*, 19989–20001 (34), 2021

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Light Primer on Graphs

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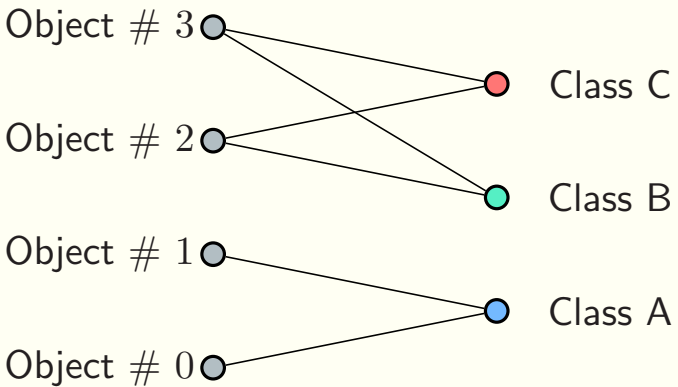

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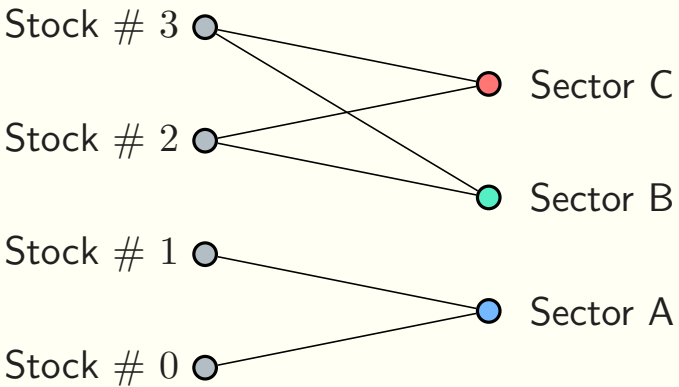

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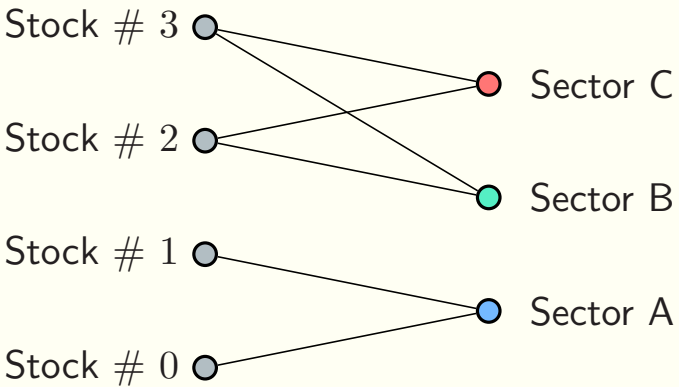

- hierarchical classification

goal: estimate the edges that connect stocks to sectors

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- **R packages**

  `https://github.com/convexfi/fingraph`

  `https://github.com/convexfi/bipartite`

Stock Industry Classification

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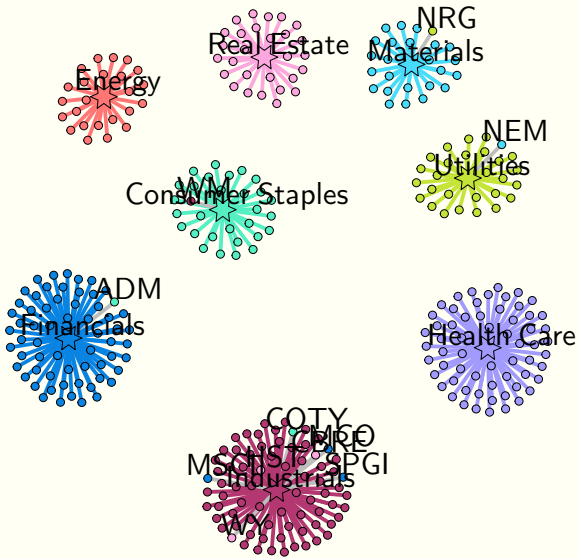

Clustering Cryptocurrencies

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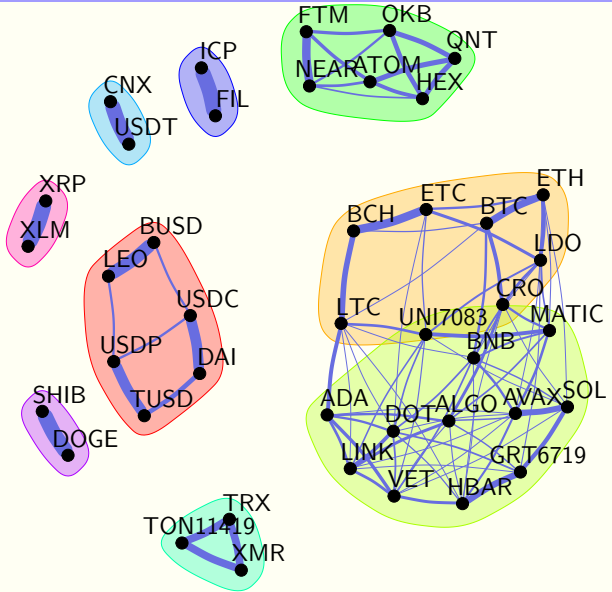

R Pseudocode

```
library(xts)
library(quantmod)
library(igraph)
library(fingraph)

stock_features <- query_features(...)
stock_graph <- estimate_graph(stock_features,
                              hyperparameters=...)
plot(stock_graph)
```

Thank You!!

- jvdmc@connect.ust.hk
- https://github.com/convexfi
- https://mirca.github.io
- @mircaze