

Industry Classification Using Graphs

a talk by

Vinícius Cardoso

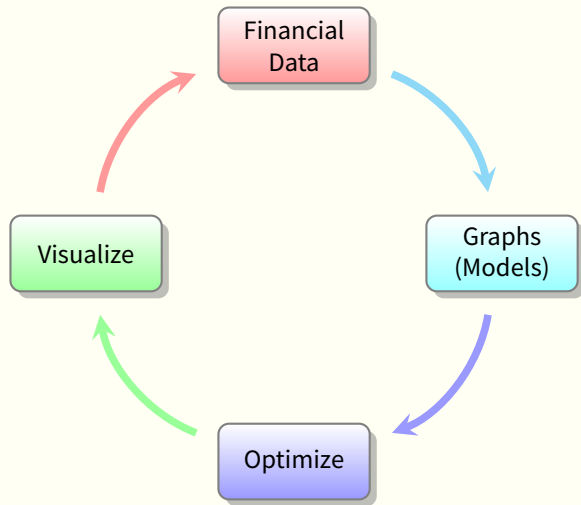
The Hong Kong University of Science and Technology

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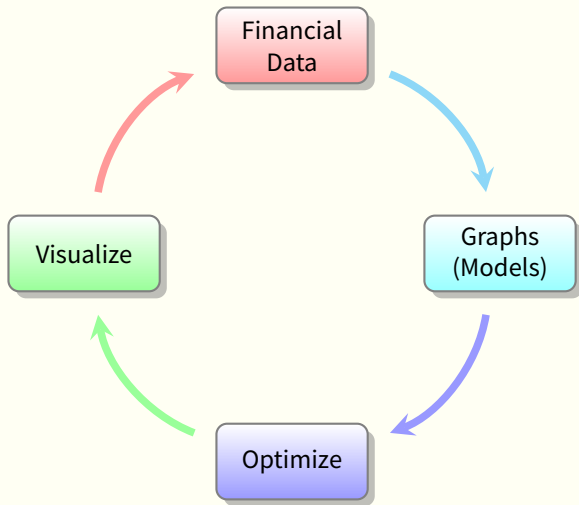
Team



Gist

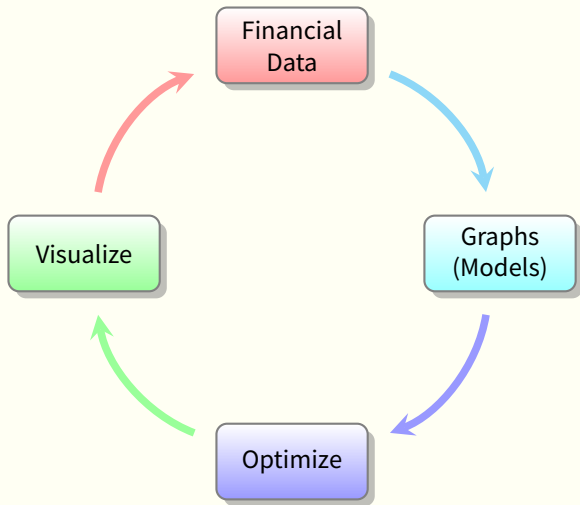


Gist



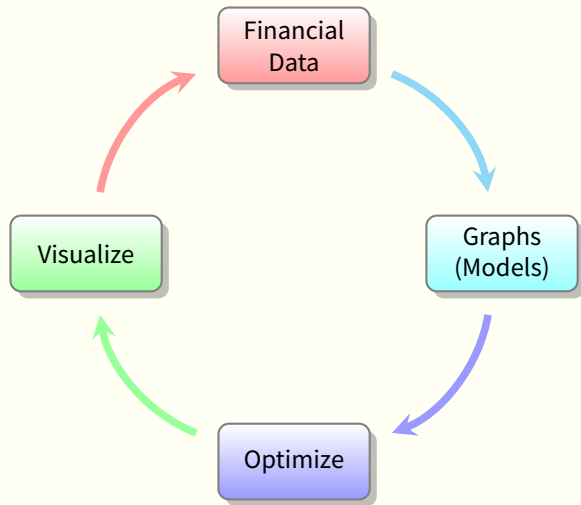
Key ideas:

Gist



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✚ Key ideas:

- ✚ **model** financial networks as undirected graphs
- ✚ **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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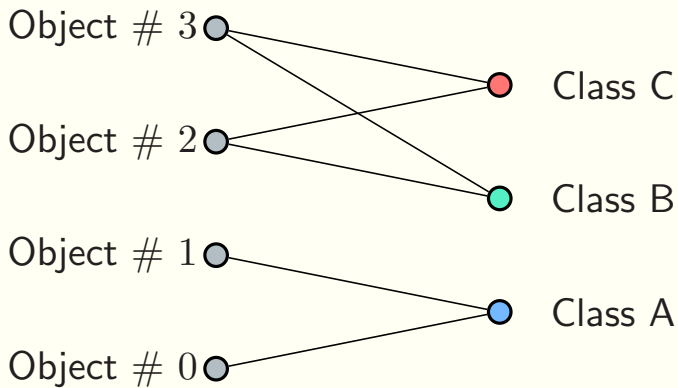
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- ❖ result of our research efforts:
 - ❖ **NeurIPS'22** Cardoso, J. V. M., Ying, J., and Palomar, D. P. “Learning Bipartite Graphs: Heavy Tails and Multiple Components”, *Advances in Neural Information Processing Systems*, 14044–14057 (35), 2022
 - ❖ **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

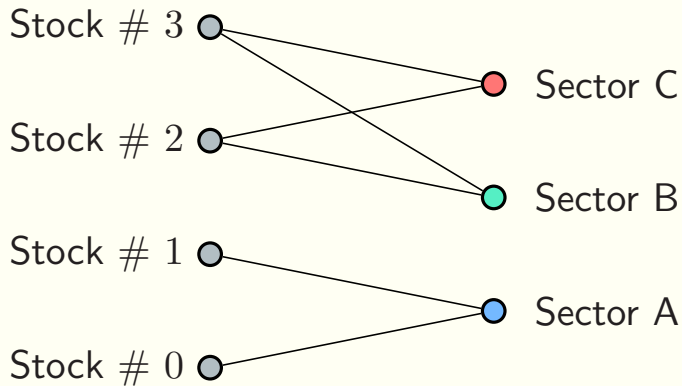
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Light Primer on Graphs

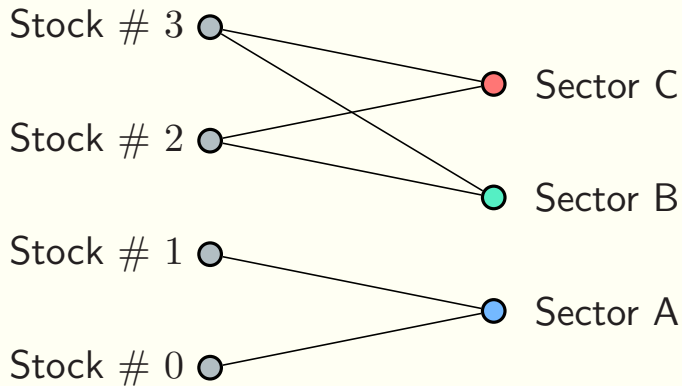
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❏ hierarchical classification

**goal: estimate the edges that
connect stocks to sectors**

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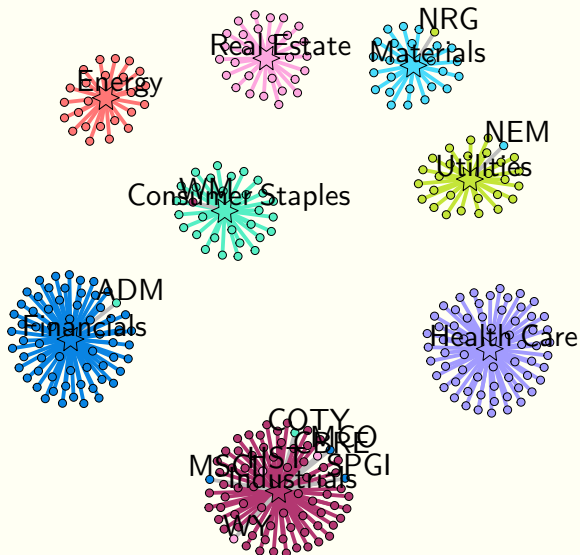
R packages

 <https://github.com/convexfi/fingraph>

 <https://github.com/convexfi/bipartite>

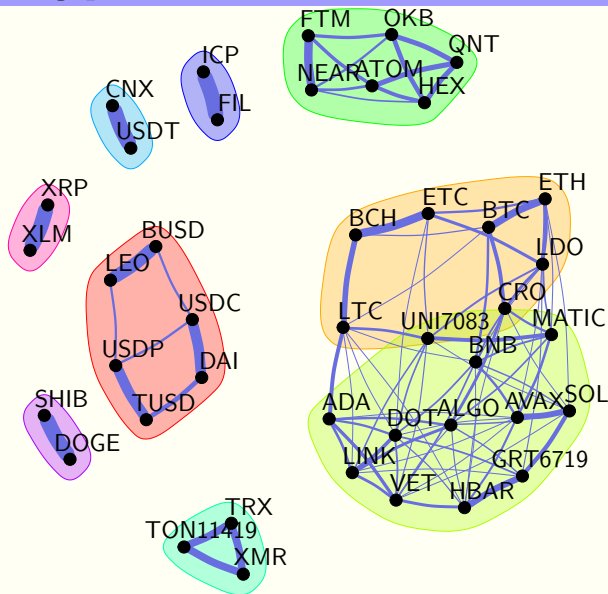
Stock Industry Classification

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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