ETH

Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Distributed
Computing

Prof. R. Wattenhofer

Improving Investment Strategies with GNNs

Description: Companies are interlinked through many networks, such as the global supply chain network and the co-ownership network. When one company has a negative shock, this can impact companies around it. Using these networks, we can predict such effects and adjust investment strategies accordingly.

Unfortunately, we generally have an incomplete picture of these dependency networks. Can we infer the missing edges and relationships? Conversely, can we identify erroneous or suspicious edges and remove these? And perhaps most importantly, does this knowledge improve the investment strategies built on these networks?

Problem Definition: Build models to identify missing edges in a graph, and assess how financially relevant they are.

Datasets:

- One or more examples of real financial graphs: supply chain, analyst, etc.

- Investment universe, asset returns

- The following would be nice to have: Asset metadata (node features): financial ratios, capitalization, country, sector, Asset-level signals

Plan:

- Retrieve the data needed

- Decide how to assess the quality of a graph completion: e.g., some classification loss (but the problem is severely imbalanced), the performance of a GNN on the resulting graph, or, better, an objective function with a financial interpretation (the performance of some investment strategy)

- Build a baseline model

- Use algorithms designed for recommendation systems

- Compare the approaches

Requirements: Ability to work independently and determined to obtain results, creative thinking, knowledge of Machine Learning and Python. Ideally has worked with graph learning frameworks such as pyG before.

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