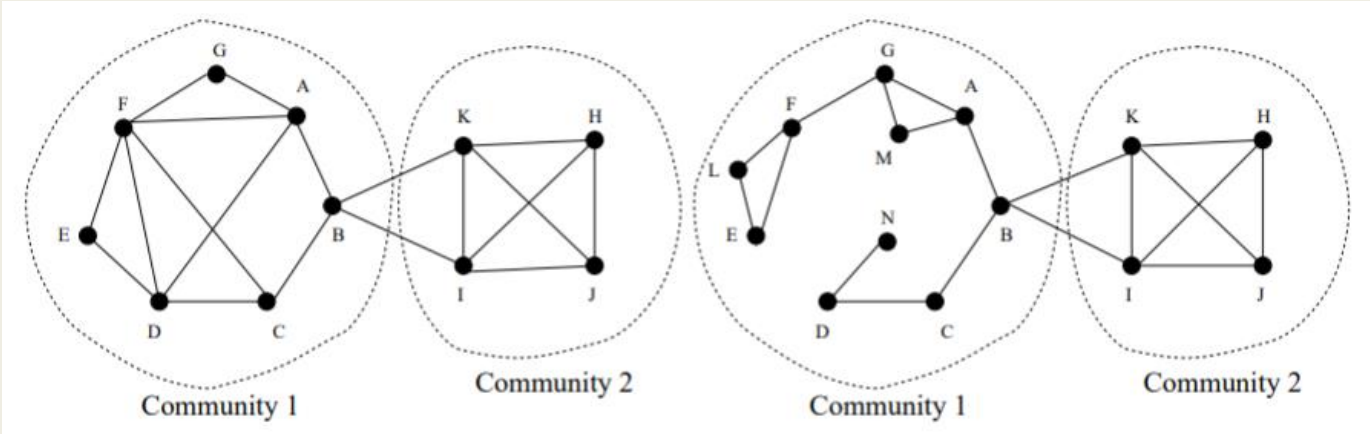
MAX-MIN MODULARITY

Cassandra Spath

Problems with Modularity

- Requires entire graph structure
- Fail on small scale communities
- Measure existing links only



Addressing Problems

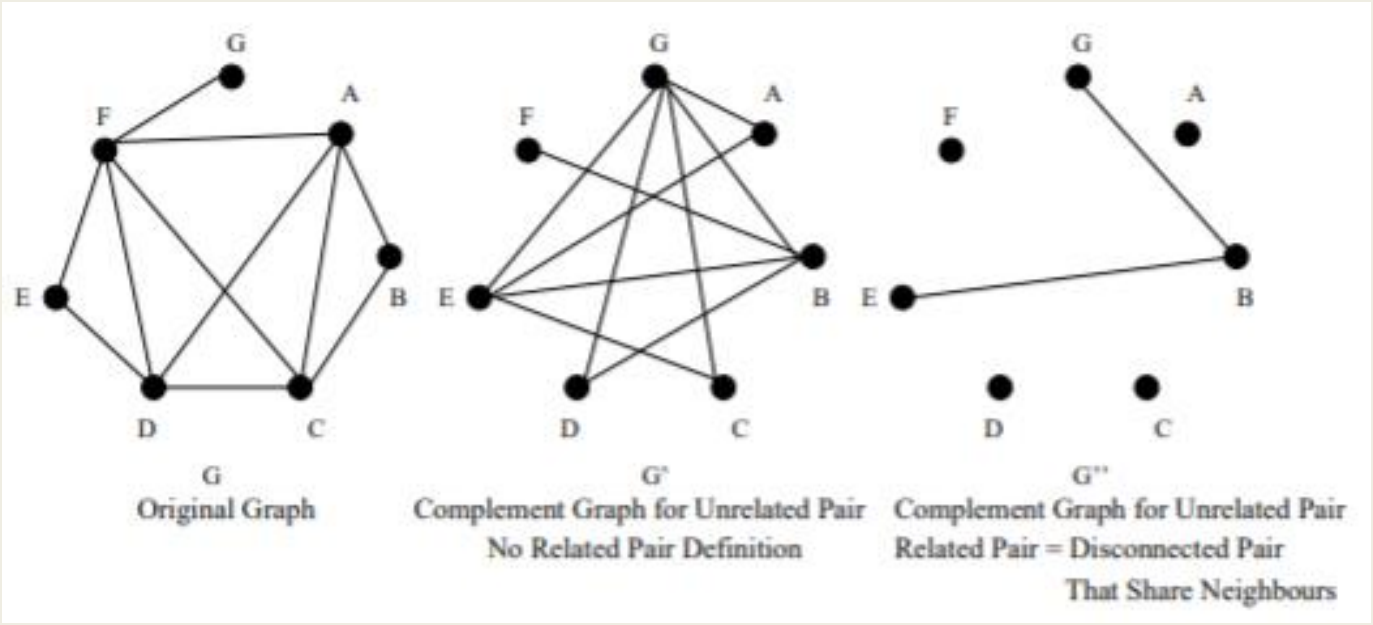
- Incorporating missing links
- Measure structure for existing links
- Measure structure for missing links

Outline

- Max-Min Modularity
- Defining related pairs
  - Structurally
  - Metadata
- Results
  - *Karate Club*
  - *Sawmill Strike*
  - *Mexican Politicians*

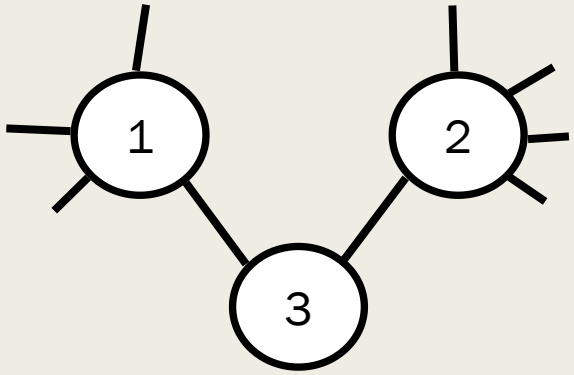
Max-Min Modularity

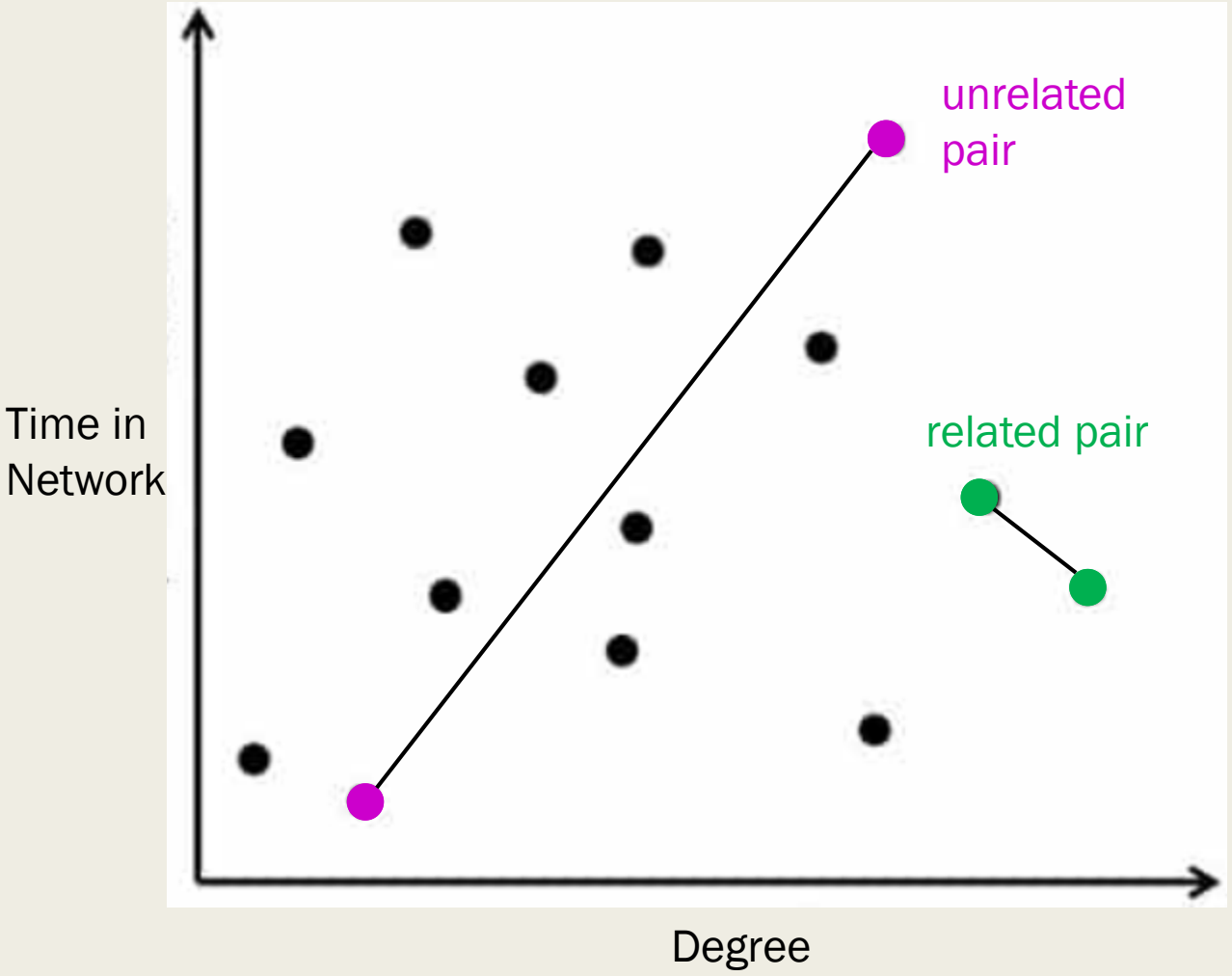
- Maximize modularity
- Minimize compliment modularity
  - *Uses compliment graph*
  - *Based on related and unrelated pairs*



Related Pairs

- How to define?
- Structurally
- Metadata

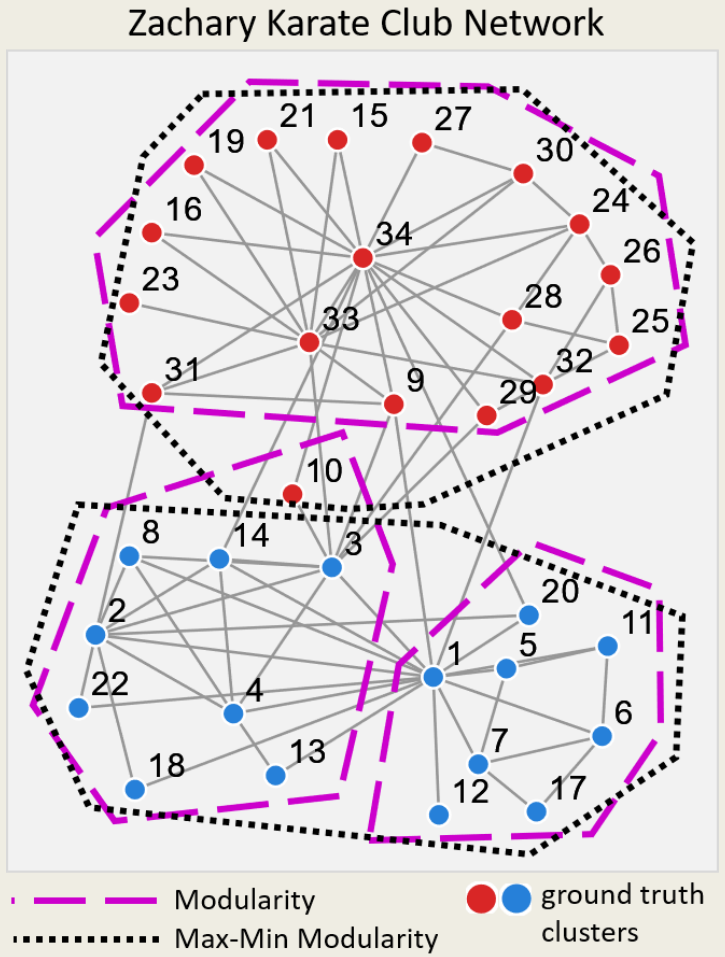




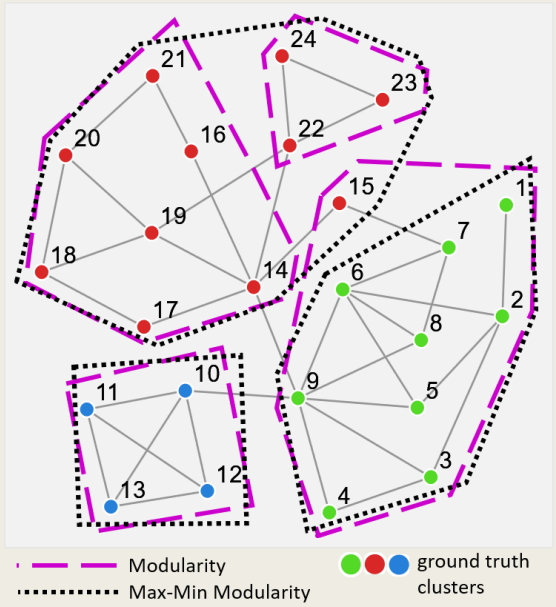
Results on a Simple Network

- Straightforward groups
- Few connections between communities

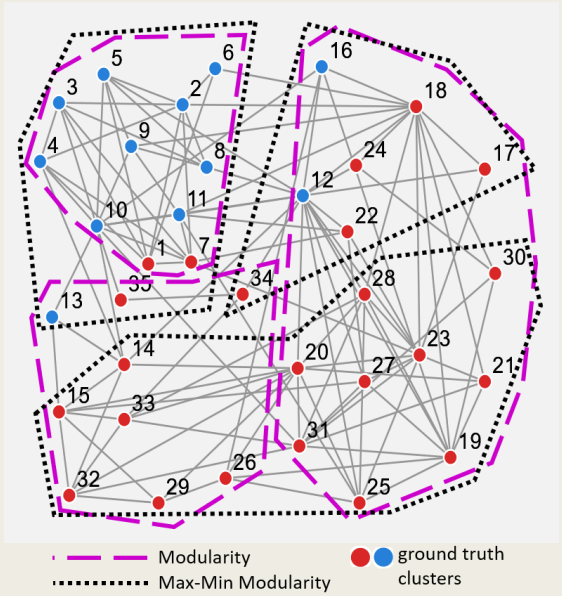
- Modularity
  - *3 communities*
  - *ARI score = 0.680*
- Max-Min Modularity
  - *2 communities*
  - *ARI score = 1.00*
- Improvement = 47.1%



Sawmill Strike Network



Mexican Politician Network



More Results

Sawmill Strikes:

- 1 less community
- ARI score = 1.00
- Improvement = 50.6%

Mexican Politics:

- ARI score = 0.359
- Improvement = 40.7%

Recap

- Max-Min Modularity
- Defining related pairs
  - Structurally
  - Metadata
- Results
  - *Karate Club*
  - *Sawmill Strike*
  - *Mexican Politicians*

Acknowledgements

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