

Ego-Splitting Framework

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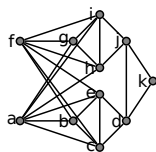
March 17, 2019

Idea

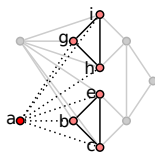
- Problem: Overlapping community detection
- Reduce problem to non-overlapping communities (partition)
 - ▶ Many established algorithms
- Two partition algorithms: local and global
- *Ego-net* of node u : Subgraph induced by the neighbors of u

The Framework

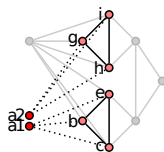
- For each node:
 - ▶ Create the ego-net graph (triangle search)
 - ▶ Use the local clustering algorithm to partition the ego-net
- Create persona graph:
 - ▶ Create a persona for each partition
 - ▶ Add edges between personas



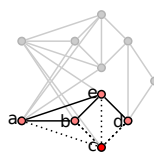
(a) original graph G



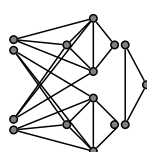
(b) ego-net of a



(c) splitting a in two personas



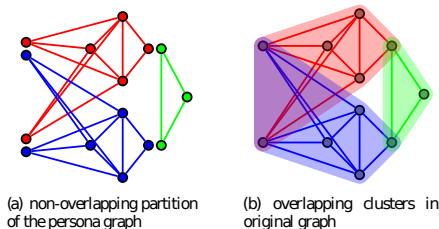
(d) ego-net of c (one persona)



(e) persona graph

The Framework

- Use the global clustering algorithm on the persona graph
 - ▶ Each partition is one community
- For each node: Collect communities from all personas

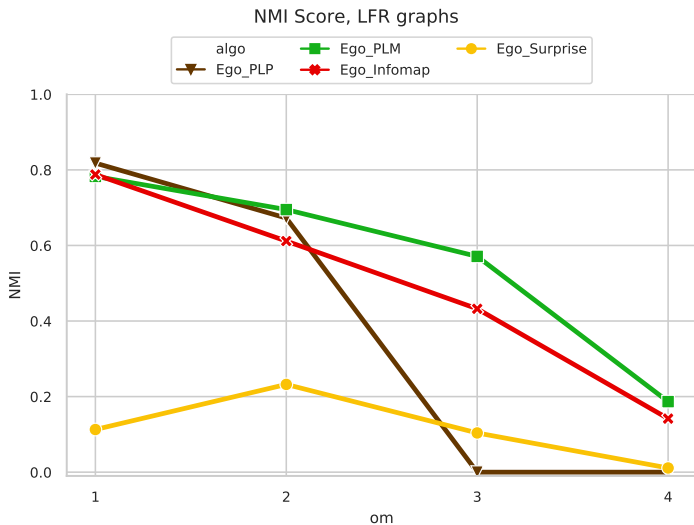


Problems

- Local partitioning is critical
 - ▶ number of Communities \leq number of Personas
 - ▶ Detecting communities in ego-net can be difficult/impossible
 - ▶ Repairing possible?

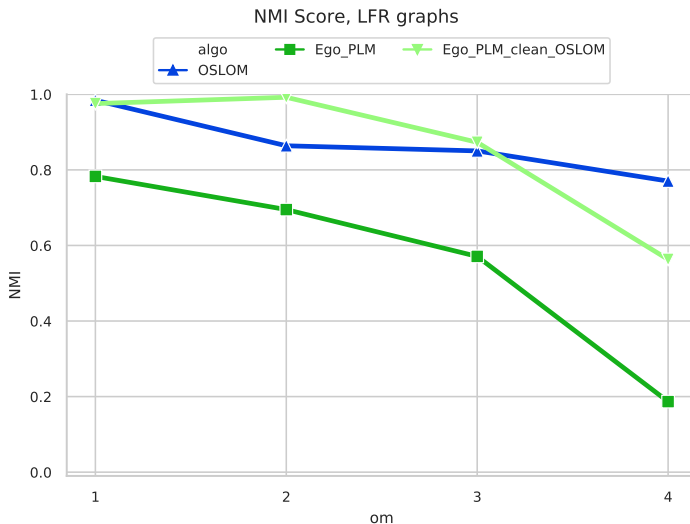
Problems

- Which partition algorithm(s)?



Possible Improvements

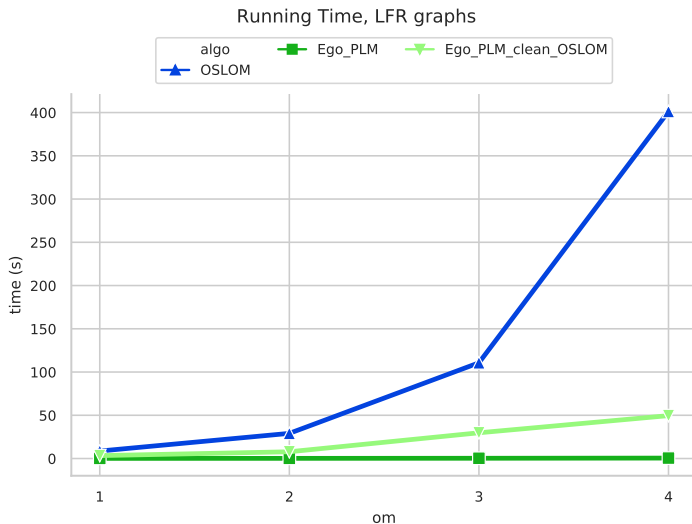
- Clean-up at the end (OSLOM)



Possible Improvements

- Connect personas of one node with additional edges
- Combinations of local/global algorithms
- Increase size of ego-net
 - ▶ neighbors of neighbors
 - ▶ squares

Plots



Plots

