



Projects on (Social) Network Analysis

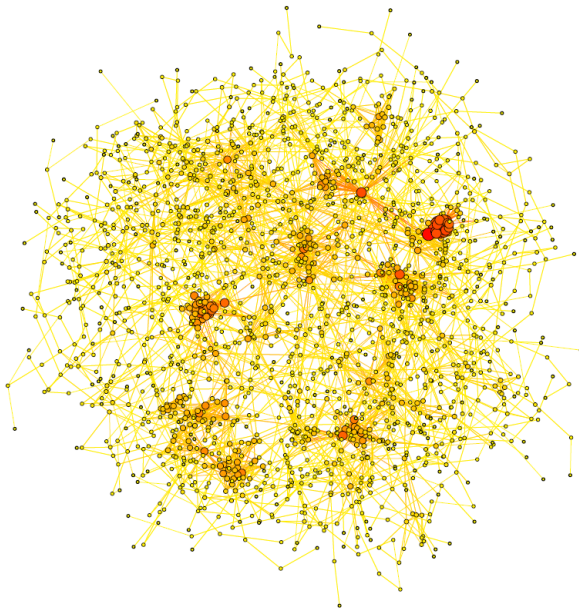
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Bachelor and master projects

- Topics: **social network analysis** and **network science**
(context: graph search, graph mining, graph theory, data mining, data science, algorithms, datastructures)
- Quantitative studies with concrete algorithms, (large) real-world datasets and experiments
- Project work in C++ and/or Python
- Thesis in \LaTeX
- Relevant BSc courses: algorithms, data structures and data mining
- Interested? Contact me at f.w.takes@liacs.leidenuniv.nl or walk by Snellius room 157b



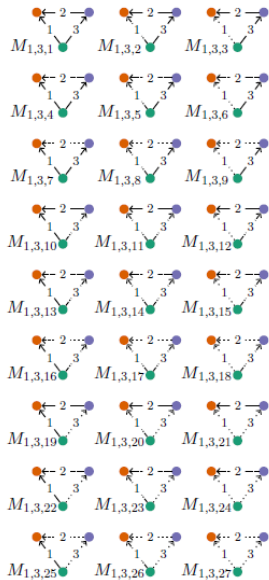
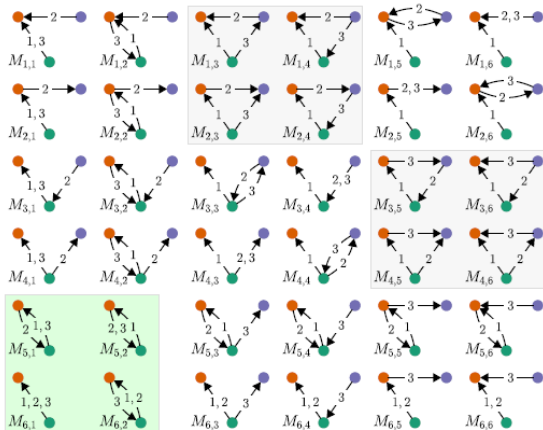
Project 1: Software package comparison

- Many packages for (social) network analysis exist
- Mostly in C++ and Python
- Examples: NetworKit, NetworkX, Graph-tool, teexGraph
- Used, among other things, for computing what the central players in social networks are
- **Question:** what is the best package in terms of performance?
- Type of work: programming, running experiments as part of a comparative analysis, working with large datasets

Project 2: Motif counting visualization

- Motifs: higher order patterns in networks / handful of nodes and edges in a particular configuration
- Building blocks of social networks
- Problem: hard to interpret motif analysis results for domain scientists
- **Question:** how can we build a graphical interface to interpret motif detection results?
- Type of work: implementing a cross-platform GUI that calls C++ code to count the frequency of each motif, and display this interactively

Motifs



Project 3: BFS parallelization comparison

- Compare a number of Breadth First Search (BFS) algorithms for traversing real-world graphs
- Starting point: several existing C++ algorithms and obtained results
- Use large-scale social network data
- **Question:** which algorithm has the best performance on various types of network datasets?
- Type of work: Running C++ code on multi-CPU machines

Breadth First Search

