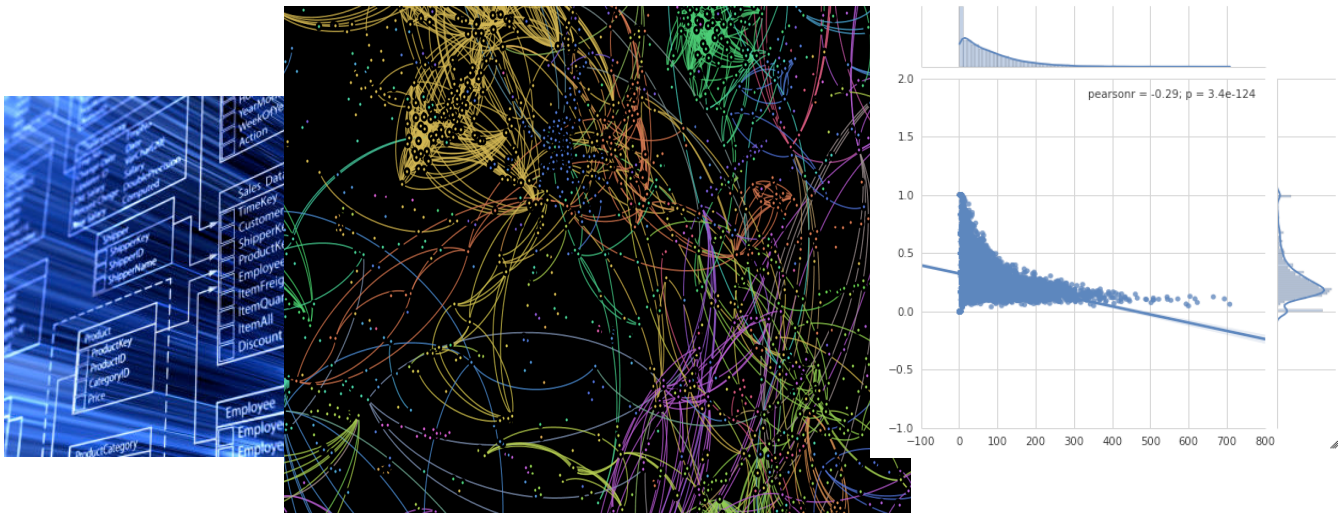
Institute of Theoretical Computer Science
Parallel Computing Group
Juniorprof. Dr. Henning Meyerhenke

Bachelor's/Master's Thesis
Automated Network Analysis



Description. Networks are everywhere - online and offline social networks, the internet, the WWW, but also biological systems like the human metabolism or brain can be modelled as complex networks. The new field of network science attempts to understand a complex system by the structure of its relationships and interdependencies. For computer scientists, these networks are large graphs and provide interesting applications for graph algorithms. This is why we are building the **NetworKit open-source tool suite for high-performance network analysis. (http://networkit.iti.kit.edu)**

Tasks. In the course of your thesis you are going to combine NetworKit's fast graph algorithms to build a network analysis pipeline. This pipeline will analyze the structure of a complex network, search for interesting patterns in the data, and produce a report including visualizations of the results. Literature research on network analysis case studies provides examples.

Requirements. Required is basic knowledge on graph theory and algorithms, as taught in computer science courses on the Bachelor level. In order to implement data processing workflows, you should also have solid programming skills in a high-level programming language, ideally Python and/or C++. Basic knowledge on statistics and data analysis is very useful. This topic can be worked on as a Bachelor's or Master's thesis.

Benefits. You get insight into network science, an exciting emerging field at the interface of graph algorithms, data mining, and applied mathematics. You learn how to develop open-source software in a larger team.

Contact. *Please do not hesitate to contact us via e-mail or face-to-face if you are interested.*

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