Revealing information networks

Bsc Thesis

Abstract

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The purpose of this thesis is to provide a comprehensive picture of the research direction of growing network models, and to present our own results.

In the first part, we intend to give an overview of network modeling. Using the terminology of graph theory, the mathematical background of network science is established. We introduce graph features that are common in several complex information networks. Next, we review growing network models, and analyse whether the generating algorithms are capable of reproducing the common properties we examined.

Afterwards we go through the results that are strongly connected to our work. We describe two more growing network models, namely the triangle closing model, and the exponential model.

In the last part of this thesis we present our own experiments. Measurements are shown on real data sets, analysing the evolution of the degree distribution exponent, the average degree and the fraction of triangle edges. We also investigate the original triangle closing model in order to understand the effects of triangle edge addition during the growing process. Finally a new model is proposed based on the exponential and triangle closing models, that is able to reproduce properties captured in both of the original models. We verify our model with simulations, and compare the generated networks to real-world systems.