

Modelling, mining, and searching networks

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Abstract

Abstract: "Complex networks arise in many diverse contexts, ranging from web pages and their links, protein-protein interaction networks, and on-line social networks such as Facebook and Twitter. The modelling and mining of these large-scale, self-organizing systems is a broad effort spanning many disciplines. A number of common properties have been observed in complex networks, such as power law degree distributions and the small world property. Stochastic graph models simulate these properties, while expanding our theoretical understanding of random graph models. Models for complex networks also give insight into their underlying properties.

We will give a brief overview of the properties observed in complex networks. We will then discuss a new geometric model that suggests a reverse engineering approach: given only the graph structure, use the model to help uncover the hidden reality of the network.

We finish by discussing network searching, which are certain two player games played on graphs. In network searching games, an intruder is loose on a network and agents try to capture him while minimizing resources. We discuss a famous example of such game, Cops and Robbers, and discuss how it leads to some deep problems on networks."