

In this thesis we encounter networks in three contexts i) as the citation networks between documents in citation databases CiteSeer and DBLP, ii) as the structure of e-government websites that is navigated by users and iii) as the social network of users of a photo-sharing site Flickr and a social networking site Yahoo!360. We study the properties of networks present in real datasets, what are the effects of their structure and how this structure can be exploited. We analyze the citation networks between computer science publications and compare them to those described in Physics community. We also demonstrate the bias of citation databases collected autonomously and present mathematical models of this bias. We then analyze the link structure of three websites extracted by exhaustive crawls. We perform a user study with 134 participants on these websites in an lab. We discuss the structure of the link networks and the performance of subjects in locating information on these websites. We finally exploit the knowledge of users' social network to provide higher quality recommendations than current collaborative filtering techniques and demonstrate the performance benefit on two real datasets.