Recommendation Systems (RSs), made popular by Amazon’s “customers who bought this item also bought” feature, are now ubiquitous in every large e-commerce websites. The goal of RSs is to display something that could arouse a users interest and lead to a purchase. In this talk, I will describe the application of Heterogeneous Information Networks in modeling application semantics, and how the semantics can be used to compute user-item proximity scores for selecting the best items for recommendation. We will also describe the exploitation of high-order relations in social network and their application to RSs. In the social recommendation scenario, high-order relations reveal closely connected users that have high influence on other users. Thus, they can be exploited in RSs. Finally, we outline a work done with Alibaba to make recommendations in a billion-scale e-commerce system. I will describe how to mine the users behavior sequences and how to tackle the huge amount of data and show some experimental results.