

The Power of Locality for Network Algorithms

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Given the massive size of many networks, conventional algorithms which scale as polynomials in the network size are woefully inadequate. In the first part of this talk, we consider how to use locality to deliver much more efficient algorithms (quasi-linear or even sub-linear in the network size) for quantities and questions like pagerank, coverage, diffusion, and determining the most influential nodes. In this second part of this talk, we consider another aspect of locality, namely the question of local data access. Many large networks are encoded locally, e.g., with adjacency lists. How does the nature of the data access impact the efficiency of algorithms? Surprisingly, we show that small differences in data access can lead to very large differences in efficiency and approximability of network algorithms. As an example, we consider a covering problem which arises naturally for recruiters on social networks, and show how small differences between the information on neighbors in LinkedIn and Facebook lead to large differences in their utility to recruiters.