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Triangle Counting and Vertex Similarity

In this talk we will discuss two significant problems of social network analysis: triangle counting and vertex similarity. In the first part of the talk we will present two randomized algorithmic schemes for triangle counting in large-scale graphs, *Triangle Sparsifiers* [1,2] and *Colorful Triangle Counting* [3] and analyze them using the Kim-Vu concentration theorem and the second moment method respectively. In the second part of the talk, we will present a new way of looking at vertex similarity compared to the existing work. Specifically, we will introduce the concept of *Social Network Archetypes* [4] which in combination with appropriate data structures provides us with the ability to answer popular types of queries such as “which are the k most similar vertices to vertex v ?”. For both parts of the talk we will provide an experimental evaluation of our methods.

- [1] Tsourakakis, C.E., Kolountzakis, M.N., Miller, G.L.: *Triangle Sparsifiers* Journal of Graph Theory and Applications (2011)
- [2] Kolountzakis, M.N., Miller, G.L., Peng, R., Tsourakakis, C.E.: *Efficient Triangle Counting in Large Graphs via Degree-based Vertex Partitioning*. Internet Mathematics (to appear)
- [3] Pagh, R., Tsourakakis, C.: *Colorful Triangle Counting and a MapReduce Implementation*. Information Processing Letters (2011)
- [4] Tsourakakis, C.E.: *Social Network Archetypes and Vertex Similarity, Graph Matching and the Generalized Eigenvalue Problem*. Arxiv 1110.2813