

Visualization of Small World Networks Using Similarity Matrices

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Visualization of small world networks is challenging owing to the large size of the data and its property of being “locally dense but globally sparse.” Generally networks are represented using graph layouts and images of adjacency matrices, which have shortcomings of occlusion and spatial complexity in its direct form. These shortcomings are usually alleviated using pixel displays, hierarchical representations in the graph layout, and sampling and aggregation in the matrix representation. We propose techniques to enable effective and efficient visualization of small world networks in the similarity space, as opposed to attribute space, using similarity matrix representation. Using the VAT (Visual Assessment of cluster Tendency) algorithm as a seriation algorithm is pivotal to our techniques. We propose the following novel ideas to enable efficient hierarchical graphical representation of large networks: (a) parallelizing VAT on the GPUs, (b) performing multilevel clustering on the matrix form, and (c) visualizing a series of similarity matrices, from the same data set, using parallel sets-like representation. We have shown the effectiveness of proposed techniques using performance measurements of parallel implementation of VAT, results of multilevel clustering, and analyses made in case studies.

Our work has been published at BDA 2013 [1].

References

- [1] S. Parveen, and J. Sreevalsan-Nair, “Visualization of Small World Networks Using Similarity Matrices,” (to appear) in Proceedings of the second International Conference on Big Data Analytics (BDA 2013), Mysore, India.