Diameter

Description

The Diameter algorithm calculates the length of the longest shortest path between pairs of nodes of a network (diameter). The shortest path lengths are calculated via breadth-first search.

Pros & Cons

The network to analyze must be undirected, otherwise there are no special constraints.

Applications

Basic analysis tool, not particular for special disciplines or problems.

Implementation Details

The algorithm needs only one input, the file where the edges of the network are listed. A first read-in of the inputfile will set the values of the number of nodes and edges of the network. In the second read-in the edges are stored in an array. Then the breadth-first search process is performed and the histogram of the shortest path length is evaluated. From the latter the diameter is determined and displayed in the NWB console. The algorithm runs in a time *O(nm)*, where *n* is the number of nodes, *m* the number of edges of the network. This algorithm is particularly suitable for sparse networks, i.e. if $m \sim n$; in that case, the computational complexity is *O(n^2)*. Because of the quadratic dependence on the number of nodes, the algorithm should not be applied to networks with more than *10^5* nodes.

Usage Hints

A simple application of this algorithm could be to calculate the diameter for networks created by the modeling algorithms of the NWB. For instance, the inputfile can be created through the Barabasi-Albert model.

Links

- Source Code

Acknowledgements

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References

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See Also