

## References

- Gabor Csardi and Tamas Nepusz. The igraph software package for complex network research. *InterJournal, Complex Systems*:1695, 2006. URL <https://igraph.org>.
- Mahdi Jalili. *centiserve: Find Graph Centrality Indices*, 2017. URL <https://CRAN.R-project.org/package=centiserve>. R package version 1.0.0.
- Carter T. Butts. *sna: Tools for Social Network Analysis*, 2020. URL <https://CRAN.R-project.org/package=sna>. R package version 2.6.

## Supplementary

Network statistics implemented in NBFvis. These functions could be found in the igraph, centiserve and snr packages.

Name	Description
Number of Nodes	The number of nodes in the neighborhoods
Degree	The number of edges the node has
Betweenness	The number of shortest paths that pass through the node
Closeness	The reciprocal of the sum of the length of the shortest paths between the node and all other nodes
Eigencentrality	It measures the influence of a node has in the network. If a node is linked by many nodes with high eigenvector centrality, then that node itself will have high eigenvector centrality.
The reciprocal of eccentricity	The reciprocal of the longest shortest paths from the node to other ones.
Subgraph centrality	It measures the number of subgraphs a node participates in, weighting them according to their size.
Load centrality	The fraction of all shortest paths that pass through that node.
Gil-Schmidt power centrality index	It takes a value of 1 when the node is adjacent to all reachable nodes, and approaches 0 as the distance from the node to each node approaches infinity.
Information centrality scores	It measures the harmonic mean length of paths ending at the node, which is smaller if the node has many short paths connecting it to other nodes.
Stress centrality	If the node has a high stress centrality, it is traversed by a high number of shortest paths.
The reciprocal of average distance	The reciprocal of the average of the shortest paths.

Barycenter centrality	The reciprocal of the total distance from the node to all other nodes
Variant closeness centrality	The sum of inversed distances to all other nodes
Residual closeness centrality	The minimum of the closeness centrality of the node when one node is deleted.
Communicability betweenness centrality	If a node $v$ has a low communicability betweenness centrality, there are few shortest paths pass through $v$ among the pairs of nodes.
Cross-clique connectivity	The number of cliques to which belongs.
Decay centrality	The sum of distances between a chosen node and every other node weighted by the decay
Diffusion Degree	The cumulative contribution score of the node itself and its neighbors in a diffusion process.
Geodesic 3-path centrality	The number of neighbors on a geodesic path less than 3 away.
Laplacian centrality	The drop in the sum of squares of the eigenvalues in the Laplacian matrix when the node is removed.
Leverage centrality	It measures the relationship between the degree of a given node and the degree of each of its neighbors, averaged over all neighbors.
Lin centrality	It is a weighting closeness for graphs with infinite distances using the square of the number of coreachable nodes.
Lobby centrality	The largest integer $k$ such that $x$ has at least $k$ neighbors with a degree of at least $k$ .
Markov centrality	It uses the mean first-passage time from every node to every other node to produce a centrality score for each node.
Maximum neighborhood component	The size of the maximum connected component of the neighborhood. The neighborhood here is the set of nodes adjacent to the node and does not contain this node.
Radiality centrality	High radiality indicates that the node is generally closer to the other nodes with respect to the diameter. Low radiality means that the node is peripheral.
Semi local centrality	The sum of the number of the nearest and the next nearest neighbors of the nodes who are the nearest neighbors of the given node.
The reciprocal of the topological coefficient	The topological coefficient measures the extent to which a node shares neighbors with other nodes in an undirected graph.

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Table 1: Centrality Table. We use implementations of these centrality measures from the R packages **igraph** [Csardi and Nepusz, 2006], **centiserve** [Jalili, 2017] and **sna** [Butts, 2020].