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| --- | --- | --- | --- | --- |
|  | Py3plex | Pymnet | muxviz | Multinetx |
| Programming language | Python,c | Python,C | R | Python ,C |
| Basic statistics | YES | YES | YES | YES |
| Visualisation of large network | YES | YES | YES | YES |
| 3D visualization | NO | YES | NO | YES |
| Aggregation/Decompositon | YES | YES | YES | NO |
| Random graph generator | YES | YES | YES | YES |
| Adjacency Matrices Manipulation | YES | YES | YES | YES |
| NODE CLASSIFICATION | YES | NO | NO | NO |
| ISOMORPHISM | YES | YES | NO | NO |
| COMMUNITY DETECTION | YES | NO | YES | NO |
| GUI VERSION | NO | NO | YES | NO |
| TENSOR MANIPULATION | YES | YES | YES | YES |
| NODE RANKING | YES | YES | YES | YES |
| TOPOLOGY ENRICHMENT | YES | NO | NO | NO |
| TEMPORAL NETWORKS | NO | NO | YES | YES |
| NETWORK EMBEDDING | YES | NO | NO | NO |

AVAILABLE MULTILAYER NETWORK VISUALISATION PACKAGE AND CORE FEATURE AVAILABLE IN THEM:

**CORE FEATURES:-**

Programming Language:-It is basically the machine language we are using to code the visualization of the multilayer network,or the availability of the package .

Basic Statistics:-Network Science is a approach of data and the connection of data. So the preliminary Statistics like mean median mode ,are the basic Statistics operations.

Visualisation of large networks:- Basically the network scientist used to deal with real data which are often huge and the network nodes are densely connected,hence it is very important to have this feature ,such that real life network can be visualize .

3D Visualisation:-When we are dealing with real life network ,sometimes the nodes in the network are segregrated ,which a network scientist called a layers.So to visualize the networks with multiple layers like multilayer network,the 3D visualization plays an important and gives us a 3 dimensional view of the network.

Aggregation:- Aggregation is basically means a formation of clustering,Multilayer aggregation procedure can be used standalone in cases when the underlying **networks** are either directly observable of the input is a network. In that case, no data bootstrapping is necessary. ... However, the algorithm is intended to integrate gene networks inferred using different methods and genomics data sets

Random Graph Genarator:-Any Graph formed randomly .

Adjacency Matrices Manipulation:- Every network can be expressed mathematically in the form of an adjacency matrix .In these matrices the rows and columns are assigned to the nodes in the network and the presence of an edge is symbolised by a numerical value. By using the matrix representation of the network we can calculate network properties such as degree, and other centralities by applying basic concepts from linear algebra. A network with undirected, unweighted edges will be represented by a symmetric matrix containing only the values 1 and 0 to represent the presence and absence of connections, respectively.Directed and weighted networks can make use of different numerical values in the matrix to express these more complex relationships. The sign of the values, for example, is sometimes used to indicate stimulation or inhibition.

Node Classification:- When dealing with large graphs, such as those that arise in the context of online social networks, a subset of nodes may be labeled. These labels can indicate demographic values, interest, beliefs or other characteristics of the nodes.

Isomorphism:- A graph can exist in different forms having the same number of vertices, edges, and also the same edge connectivity. Such graphs are called isomorphic graphs

Community Detection:-Community detection is an important research area in social networks analysis where we are concerned with discovering the structure of the social network. Detecting communities is of great importance in sociology, biology and computer science, disciplines where systems are often represented as graph

GUI VERSION:-Graphical User Interface.

Tensor manipulation:- A **tensor on the vector space** *V* is then defined to be an element of (i.e., a vector in) a vector space of the form:

{\displaystyle V\otimes \cdots \otimes V\otimes V^{\*}\otimes \cdots \otimes V^{\*}}V X V X V X V V\* X V\* X V\*

where V\* is the dual space of V.

Node Ranking:- Ranking objects in a network may refer to sorting the objects according to importance, popularity, influence, authority, relevance, similarity, and proximity, by utilizing link information in the network. The spreading ability of node v is defined as the number of nodes that are finally infected at the end of spreading process which originates from node v. Then, we can obtain a ranked list by sorting the spreading ability of nodes in the network.

Topological enrichment:- Topology is the way in which the nodes and edges are arranged within a network. Topological properties can apply to the network as a whole or to individual nodes and edges.

Temporal Networks:- Temporal networks fill the border area between network science and time-series analysis and are relevant for the modeling of epidemics, optimization of transportation and logistics, as well as understanding biological phenomena.

Network Embeddings :-Network embedding refers to the approach of learning latent low-dimensional feature represen- tations for the nodes or links in a network. The basic principle is to learn encodings for the nodes in the network such that the similarity in the embedding space reflects the similarity in the network.

REFFERENCE:-

<https://reposhub.com/python/data-validation/SkBlaz-Py3plex.html> (PY3PLEX)

<https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2341334> (PYMNET)

<https://doi.org/10.1093/comnet/cnu038https://doi.org/10.1093/comnet/cnu038> (MUXVIZ)

<https://iopscience.iop.org/article/10.1088/1367-2630/aa936a/metahttps://iopscience.iop.org/article/10.1088/1367-2630/aa936a/meta> (MULTINETX)