Exp - 9 CASE STUDY

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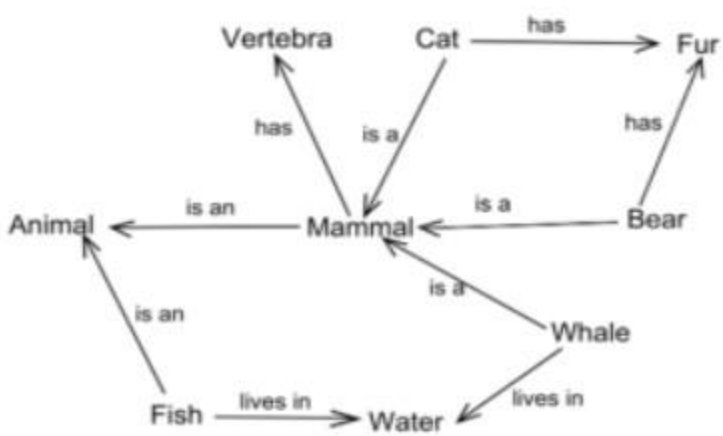
Introduction:

Semantic networks are a way of representing relationships between objects and ideas. For example, a network might tell a computer the relationship between different animals (a cat IS A mammal, a cat HAS whiskers). Below is an example image of a semantic network.



Objective:

We have used Software Network Analysis (SNA) Software which is used to analyze patterns of relationships among people in groups. They are useful for examining the social structure and interdependencies (or work patterns) of individuals or organizations.

Data Set used :

Famous data set. It is a default data set which is present in the SNA software which consists of 24 actors , 21 nodes ,190 arcs and it's a directed type graph.

Features:

Auto create:

Create a new network automatically. You may create a random network, recreate famous data-sets or use the built-in web crawler to create a network of webpages. subgraph:

Create a basic subgraph from selected nodes. Select some nodes with your mouse and then click on one of these options to create a basic subgraph with them. You can create a star, clique, line, etc subgraph .There must be some nodes selected!

Real world application:

Subgraphs can derive meaningful data from events for analytics and data visualization.

Edge mode:

In social networks and graphs, edges can be directed or undirected (and the corresponding network is called directed or undirected as well). This option lets you choose what kind of edges you want in your network. By selecting an option here, all edges of the network will change automatically. For instance, if the network is directed and and you select "undirected" then all the directed edges will become undirected Real world application:

The value mode (a) and edge mode (b) of 2D templates. The bottom row provides examples of using 2D templates for analysing air quality data, in which the white line renders special data. Abnormal datasets can be easily recognized (d) compared to the normal cases (c). The background templates are automatically adjusted according to the regions-of-interest.

Transform Network Edges:

Select a method to transform network edges. Available methods .

1. Select Symmetrize Directed Edges:

Makes all directed arcs in this relation Equivalence: Select reciprocal. That is, if there is an arc from node A to node B then a new arc from node B to node A is created with the same weight.

2. Symmetrize Edges by examining Strong Ties:

Creates a new symmetric relation by keeping strong ties only. In the new relation, a tie will exist between actor A and actor B only when both arcs A->B and B->A are present in the current or all relations.

3. Symmetrize Edges by examining Cocitation:

Creates a new symmetric relation by connecting actors that are cocitated by others. In the new relation, an edge will exist between actor i and actor j only if C(ij)> 0, where C the Cocitation Matrix

4. Dichotomize Edges:

Creates a new binary relation in a valued network using edge dichotomization according to a given threshold value. In the new dichotomized relation, an edge will exist between actor and actor j only if elij) > threshold, where threshold is a user defined value. The process is also known as compression and slicing.

Real world application:

Data transformation is a buzzword you hear frequently in the age of big data (even though data transformation's significance is not limited just to big data). And while it's easy to define data transformation at a high level, understanding what data transformation means in practice can be trickier. If you've found yourself pondering what data transformation examples look like, keep reading for some real-world situations in which data needs to be transformed, and what the transformation requires.

Matrix:

Compute and display the adjacency matrix and other matrices based on the adjacency matrix of the current network.

Available options:

1. Adjacency Matrix
2. Adjacency Matrix Plot
3. Inverse of Adjacency Matrix
4. Transpose of Adjacency Matrix
5. Cocitation Matrix
6. Degree Matrix
7. Laplacian Matrix

Example of adjacency matrix:

Real world application:

An example of the matrix-based visualization to illustrate two biclusters mined from a gene-expression matrix 2.

Analyse Cohesion:

1. Reciprocity:

Measures the likelihood that pairs of nodes in a directed network are mutually linked.

2. Symmetry:

Checks if the directed network is symmetric or not.

3. Distances:

Computes the matrix of geodesic distances between all pairs of nodes.

4. Average Distance:

Computes the average distance between all nodes.

5. Graph Diameter:

The maximum distance between any two nodes in the network.

6. Walks:

A walk is a sequence of edges and vertices (nodes), where each edge's endpoints are the two vertices adjacent to it. In a walk, vertices and edges may repeat.

7. Eccentricity:

The Eccentricity of each node is how far, at most, is from every other actor in the network.

8. Reachability:

Creates a matrix where an element (ij) = 1 only if the actors and are reachable

9. Clustering Coefficient (CLC):

The CLC score of each node is the proportion of actual links between its neighbours divided by the number of links that could possibly exist between them.

Quantities now close each actor and its neighbours are to form a complete subgraph.

Example of reciprocity:

Real world application:

Online social cohesion reflects real-world group action in Syria during the Arab Spring The Arab Spring was a series of anti-government protests, uprisings, and armed rebellions that spread across much of the Arab world in the early 2010s.

Prominence:

1. Derived centrality:

The sum of delta for all st EV where A delta is the ratio of all geodesics between nodes and f which run through node u.

2. Stress Centrality (SC):

The sum of sigma for all st EV where sigma is the number of geodesics between nodes s and t which run through

3. Eccentricity Centrality (EC):

Also known as Harary Graph Centrality. The inverse maximum geodesic distance from node u to all other nodes in the network

4. Power Centrality (PC):

The sum of the sizes of all Ne-order neighbourhoods of node u with weight 1/n

5. Information Centrality (IC):

Measures the information flow through all paths between actors weighted by strength By Prominence Index of tie and distance.

6. Eigenvector Centrality (EVC):

Rad The EVC score of each node is the element of the leading eigenvector of the adjacency matrix that is the eigenvector

7. Degree Prestige (DP):

Also known as tridegree Centrality, it is the sum of inbound edges to a node u from all adjacent nodes

8. Prommity Prestige (PP):

The ratio of the proportion of nadel tid can reach each node to the average distance these rodes are from Similar to Select a prominence Cioseness Centralit, but it counts only inbound distances to each acicutus ita measure of actor prestige Example of degree centrality:

Real world application:

At Prominence, we use data in innovative ways that bring value to healthcare organizations and the patients they serve, value like improving clinic operations, increasing quality of care, decreasing AR, and more. But this blog post isn't about those large-scale types of ROI.

Community Analysis

Community detection measures and cohesive subgroup algorithms, to identify meaningful subgraphs in the graph. Available measures

1. Clique Census:

Computes aggregate counts of all maximal by Force-Directed Moc cliques of actors by size, actor by clique None analysis, clique co-memberships

2. Triad Census:

Computes the Holland, Leinhardt and Davis triad census, which counts all different classes of triads coded according to their number of Mutual. Asymmetric and Non-existent dyads (M-A-N scheme) Example of clique:

Structural Equivalence Analysis:

Select one of the available structural equivalence measures and visualization algorithm

1. Available options

2. Pearson Coefficients

3. Tie profile similarities

4. Dissimilarities

5. Hierarchical Clustering Analysis

Example of PEARSON CORRELATION COEFFICIENTS:

Real world application:

Social media data provides a record of global human interactions at a scale that is hitherto unprecedented. These interactions are an invaluable resource for analysing social allegiances, discovering entities with shared interests, and identifying key players in communities.

Conclusion:

Hence with the chosen famous data set we have iterated over all the features offered by semantic virtualizer, during this study we have also learned about each of the feature we used and it’s one real world application.