EXPERIMENT NO : 08

Aim : Social network analysis (Girvan Newman Algorithm)

System software requirements : Python, Windows

Theory :

* Social Network analysis :
- Networks hold a significance in every domain of life. With the increase in social networks. Community structures are an essential part of such complex networks and therefore, the extraction of communities for studying the behaviour and trends of individuals forming communities as it great use today in the field of data sciences.
- The extraction requires smart and efficient techniques due to immensely growing networks. Community detection algorithms have played a vital role in detecting clusters by different implementation techniques.

* Girvan Newman Algorithm :
- The Girvan Newman technique for the detection and analysis of community structure depends upon the iterative elimination of edges of edges with the highest number of shortest paths that pass through them.
By getting rid of the edges, the network breaks down into smaller network, i.e, communities.

- The algorithm, as the name suggest, is introduced by Girvan and Newman. The idea was to find which edge in a network occur most frequently between other pairs of nodes by finding edges betweenness. The edges joining communities are then expected to have high edge betweenles.

- The underlying community structure of the network will be

much fine grained once we eliminate edges with high edge betweeness

* Algorithm:

1. Calculate edge betweeness for every edge in the graph.
2. Remove the edge with highest edge betweenness.
3. Calculate edge betweenness for remaining edges.
4. Repeat steps 2-4 until all edges are removed.

In order to calculate edge betweenness it is necessary to find all shortest paths going through that vertex.
The algorithm starts with one vertex, calculates edge weights for paths going through that vertex, and then repeats it for each vertex in the graph and sums up the weights for every edge.

Conclusion:
Thus, we have successfully implemented social network analysis using Girvan Newman algorithm