Social Network Analysis

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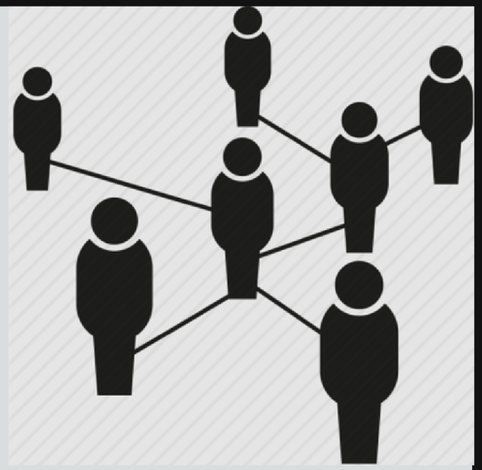
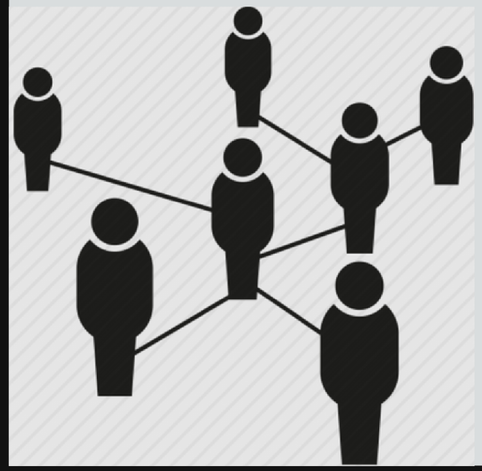


Introduction

Social networks is a platform for studying human interactions. This provides an introduction about the Network, particularly in relation . In this project, we conduct a comprehensive analysis of a educational system, focusing on the structure of friendships in our class . We construct a graph representation where nodes represent users and edges represent friendships. The Social Network Analysis , can gain a deeper understanding of how relationships shape behaviours , decisions, and the overall dynamics of social systems



Objective

This provides a concise exploration of social network analysis concerning an individual's connections with others. Networks comprise graphical representations of the relationships (edges) between variables (nodes). Network analysis provides the capacity to estimate complex patterns of relationships and the network structure can be analysed to reveal core features of the network. This paper provides an overview of networks, how they can be visualized and analyzed.

Used Algorithms

Prim’s Algorithm

Prim's algorithm is a widely used method in computer science for finding the minimum spanning tree (MST) of a connected, undirected graph. The MST of a graph is a subgraph that includes all the vertices of the original graph while minimizing the total weight of the edges. Prim's algorithm starts with an arbitrary vertex and then grows the MST by adding the shortest edge that connects a vertex in the MST to a vertex outside the MST, ensuring that no cycles are formed

Kruskal’s Algorithm

Kruskal's algorithm is another popular method in computer science used to find the minimum spanning tree (MST) of a connected, undirected graph. Similar to Prim's algorithm, the MST is a subgraph that includes all the vertices of the original graph while minimizing the total weight of the edges. However, Kruskal's algorithm approaches the problem differently by iteratively selecting the shortest edge from the graph's edges without forming any cycles.

Dijkstra’s Algorithm

Dijkstra's algorithm is a fundamental method in computer science for finding the shortest paths from a single source vertex to all other vertices in a weighted graph. It's particularly useful in solving the single-source shortest path problem when all edge weights are non-negative. The algorithm iteratively explores the graph's vertices, updating the shortest known distance to each vertex from the source as it progresses.

Bellman-Ford Algorithm

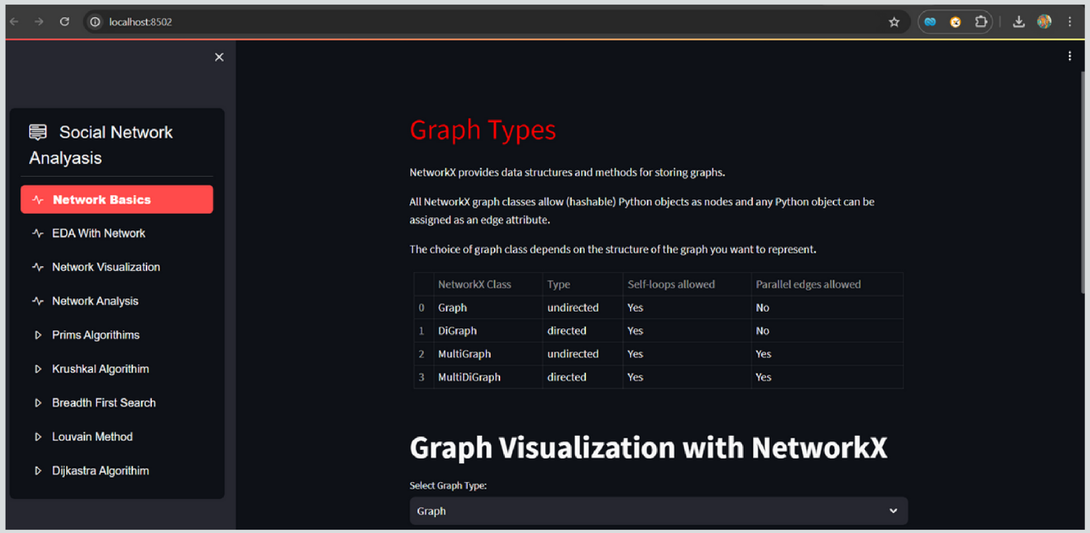
The Bellman-Ford algorithm, which is another important method in computer science used for finding the shortest paths from a single source vertex to all other vertices in a weighted graph. Unlike Dijkstra's algorithm, Bellman-Ford can handle graphs with negative edge weights, but it can also detect negative weight cycles.

Used Libraries

Networkx, Panda, NumPy, Matplotlib, Seaborn, Plotly

Output

The network structure reveals the variation in relationships between the items



Thank you very much!