ASSIGNMENT 3

Introduction

This report presents an analysis of two Facebook-related datasets using the NetworkX library in Python. The datasets include social network data of Facebook pages and ego networks representing user friendships. The analysis focuses on the structural properties of the combined graph, including metrics such as the number of edges, nodes, triangles, diameter, connectivity, and centrality measures.

Analysis

The analysis of the Facebook social network graph reveals significant insights into its structure and connectivity. The number of edges and nodes indicates the scale of the network, while the number of triangles provides insight into the clustering of connections. The diameter of the graph, if defined, gives an idea of the longest shortest path between any two nodes, reflecting the overall connectivity. The visualizations of degree distribution, centrality measures, and clustering coefficients further illustrate the characteristics of the network, highlighting key nodes and their roles within the social structure.

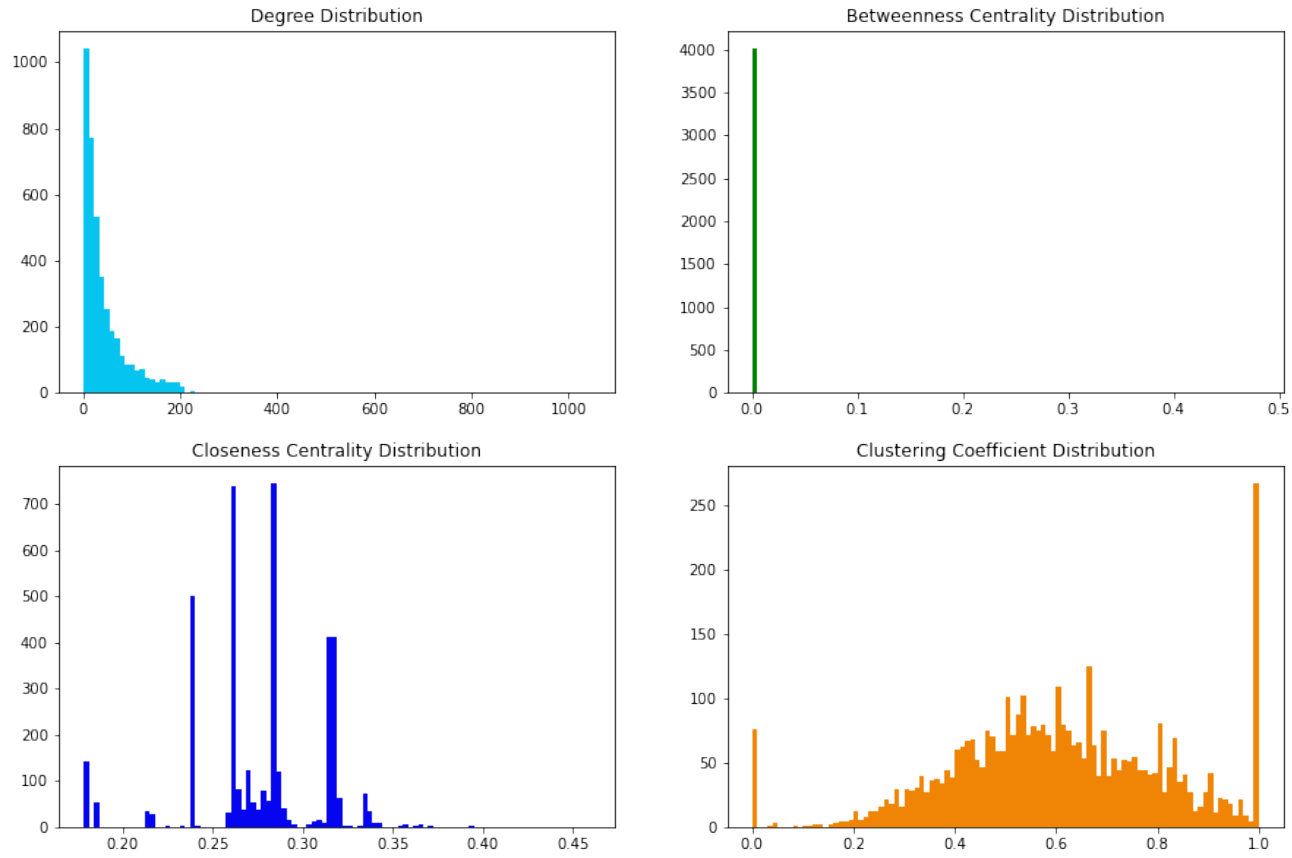

Fig1. At bins = 100 (a) Degree distribution Graph, (b) Betweenness centrality graph, (c) Closness Centrality graph, (d) clustering coefficient distribution graph

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Future work

Future work could involve deeper analysis of community structures within the graph, as well as exploring temporal dynamics if time-stamped data is available. ## Recommendations for Further Analysis

Community Detection: Implement algorithms such as the Louvain method or Girvan-Newman to identify communities within the graph. This can provide insights into how users cluster based on their connections.

Temporal Analysis: If the datasets include timestamps, analyze how the network evolves over time. This could reveal trends in user interactions and the growth of the network.

Influence Propagation: Study how information spreads through the network by simulating diffusion processes. This can help identify influential nodes that play a critical role in information dissemination.

Comparative Analysis: Compare the Facebook dataset with other social networks to identify unique characteristics and behaviors. This could involve analyzing metrics like average path length, clustering coefficients, and centrality measures across different platforms.

User Behavior Analysis: Investigate user behavior patterns by analyzing the interactions between nodes. This could include studying the frequency of interactions, types of connections (e.g., friend vs. follower), and engagement levels.

Visualization Enhancements: Utilize advanced visualization tools such as Gephi or Plotly for interactive visualizations that allow for deeper exploration of the network's structure.

Machine Learning Applications: Explore machine learning techniques to predict user behavior or classify nodes based on their attributes and connections. This could involve supervised or unsupervised learning approaches.

By pursuing these recommendations, a more comprehensive understanding of the Facebook social network can be achieved, leading to valuable insights for both academic research and practical applications in social media analysis.