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Social Network Analysis

Eigenvector Centrality

**Tools needed**

This implementation of network analysis was created with python 3.7. The packages imported were networkx, Matplotlib.pyplot, and csv are necessary for the operation of the simulation. The packages scipy, pandas, and sys are included for supplementary purposes such as debugging and improvements. IDE in which this was developed is Visual studio code. Other environments such as Jupyter, Python terminal, and any with Python 2 or 3 capabilities are sufficient.

**Abstract**

Social network analysis is a focus area of Network analysis dealing with interpersonal connections. In network analysis, the typical topography is a hypergraph structure comprised of points connected by edges. Attributes such as node degree, edge density, and edge weight are aggregated to reveal network structure both locally and overall. In social networks, nodes can be comprised of people, hashtags, discussion topics or any quantifiable point in the structure. Edges are connections between these nodes. These connections take form as data transmission, shared people between the groups, or a tangible affect the nodes have between each other. Community detection is a challenge of social network analysis. In Eigenvector centrality, a nodes centrality is determined by the amount of important edges it is a part of. Edges which are critical for the connectivity of a graph are assigned a higher precedence than edges which are on the periphery. Using this measure of importance, edges which are of low precedence are removed . this in turn leaves edges which compose intercommunity bonds, cluster structure, and cliques.

**Implementation**

This program was implemented using a Eigenvector\_removal. The purpose of this function was to assess the eigenvector centrality of the edges and associate it with that value with the edge. For a user given cutoff point, the function would iteratively remove edges leaving only the edges of most importance to reveal the local and overall structure of the graph. The main function builds the graph based on the data collected from a CSV file and displays the processed graph using Matplotlib.pyplot.