PolInc : Political Inclination in Social Networks

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1. Problem Statement

In large social networks, indicators of centrality can be used to assign rankings to people within a graph corresponding to their network position. Top influencers preaching for a particular political party directly influence their followers/first level connections. Each person can directly preach their inclination to their contacts as well. Thus, we see that there is a large scale diffusion of information from each influencer to all the other nodes at a network level. We can score each person in the network based on the information they receive on each political party and use it to determine the overall sentiment of the population.

2. Project Scope

To identify the political inclination of all the individuals in a social network, we will first identify the most influential people in the network using betweenness/closeness centrality as a metric. Once we have a fixed number of such individuals, and we know their political inclication, we will simulate the spread of their influence (information) in the network using an information diffusion function. This function would be used to determine the effective influence of that information over a given person in the network. Once all the information has propagated, we determine the effective political inclination of each person by summing up the effective scores from each influencer.

The scope of the project is to parallelize both the centrality computation as well as the diffusion. We will be using one of the social networks from the SNAP[1] dataset to run our simulations with various parameters.

3. Implementation Plan

The algorithm is divided into two steps:
- The first step is ranking the nodes based on betweenness/closeness centrality which can be computed parallely. Once we get the rankings, the top N influences are picked and assigned a label (red or blue party).
- The second step parallelly spreads influence from all influencers over the network using an information diffusion function which exponentially reduces based on the distance from the influencer. The aggregated influence for each node is used to determine the inclination of the person.

A sample diffusion function can be:
$$influence \ = \ strength * e^{-\alpha*distance/diameter}$$
where, strength of an influencer can be determined as a function of their degree.

Once the inclinations of all the population is determined, the overall sentiment of the people can be determined based on the preference to a particular par

4. References

[1] Stanford Network Analysis Project - https://snap.stanford.edu/