CptS 591 Elements of Network Science

Jinyang Ruan, Yize Hu

4/6/2021

Project Proposal

# **Intention**

With the rising importance of graph data applications in real life such as page rank algorithms, sequence DNA data and social networks, graph dataset comparison metrics got popular when we are trying to figure out the similarity between different graphs. In our group project, we are proposing different graph comparing methods to calculate the similarity value we get from comparing the data via the methods we put forward and make analysis on which method performs well in terms of similarity scores.

# **Methods**

Considering the methods in terms of comparing graph similarity. We have a couple of ideas before the detailed lecture on similarity, we have a couple of ideas to implement the comparison methods including the comparing the distance between the Laplacian matrices of the networks and Euclidean distance between adjacency matrices of the networks.

# **Data Obtain**

For the dataset that we are trying to employ for similarity comparison, we are planning to use Erdos-Renyi model and Barabasi model to generate random graphs. Then we use different methods to calculate the similarity between two graphs.

In addition, we are planning to find two real-world networks such as DNA sequences and analyze the similarity between those two real-world networks.

# **Background work**

Deeply understanding of the current common methods to analyze the similarity between graphs is required.

# **Tentative plan**

Based on the understanding of the different similarity calculation methods, generate two random graphs, apply several common-used methods, and analyze the similarity scores we get. Theoretically discuss the difference among those methods, get rough solutions to which methods perform better when we focus on different characters.

Put our solutions we got previously into practice, apply same methods to real-world networks then make analysis on the results.