Introduction to Network Analysis
Session 1 Handout

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Activity 1: Drawing a family network

Go to the IntroNetworkAnalysis repository on github. There are seven files, download the Excel spreadsheet according to your group (Group 1: Robert Ho Tung's family.xlsx; Group 2: Ho Fook's family.xlsx; Group 3: Ho Kom-Tong's family.xlsx).

Sir Robert Ho Tung (何東, 1862-1956) and Ho Fook (何福, 1863-1926) are brothers, and Ho Kom-Tong (何甘棠, 1866-1950) is their half-brother. Robert and Ho Fook are Eurasian (their father is Dutch and their mother is Chinese), while Ho Kom-Tong is Chinese. The Ho brothers were prominent figures in pre-WWII Hong Kong. Their families were known as the Ho Tung family (何東家族). In the late 19th century, as British companies expanded their businesses in Hong Kong, they needed someone who could speak both Chinese and English to act as their intermediary with the locals; this person was known as a compradore (*maiban*, 買辦). After graduating from Queen's College, the Ho brothers became compradores for British companies such as Jardine Matheson and the Hong Kong and Kowloon Wharf and Godown Company. They were later appointed by the colonial government as legislative councillors. They also established maternal links with other Eurasian families in Hong Kong, such as the Lo's, the Zimmern's, and the Wong Kam-fuk's.[1]

[1] If you are interested in the history of Eurasians and their communities in pre-WWII Hong Kong, see John M Carroll's *Edge of Empires: Chinese Elites and British Colonials in Hong Kong* (Harvard University Press, 2005) and Emma Teng's *Eurasian Mixed identities in the United States, China, and Hong Kong, 1842-1943* (University of California Press, 2013).

Your task is to draw the family network (Robert Ho, Ho Fook, or Ho Kom-Tong) by hand on a piece of paper. Each group has 8 minutes to discuss and draw the network, and 2 minutes to share their network with the class.

Activity 2: Merging the networks

Go to the IntroNetworkAnalysis repository on github. Download the other two Excel spreadsheets (Group 1: Ho Fook's family.xlsx & Ho Kom-Tong's family.xlsx, and so on). Discuss with your group and try to draw a network that includes the families of Robert Ho, Ho Fook, and Ho Kom-Tong. Apart from drawing the network, try to identify the central figure(s), connectors, bridges, or gatekeepers in the networks. Each group has 10 minutes to do this and 2 minutes to share their network with the class.

Activity 3: Measuring the networks

3.1. Importing a dataset into Gephi:

1. Go to the IntroNetworkAnalysis repository on github.
2. Download Ho Tung family_Gephi.xlsx and open Gephi. Do not open the spreadsheets in Excel, if you have opened them, close them before opening Gephi.
3. Click on ‘New Project’ and then go to ‘Data Laboratory’.
4. Click on ‘Import Spreadsheet’, then select the Ho Tung family_Gephi.xlsx and press ‘open’.
5. Import the ‘Nodes table’, then go to ‘Import spreadsheet’ and import the ‘Edges table’.
6. Select ‘BigDecimal’ for the ‘Weight’ column.
7. Select ‘Undirected’ for the ‘Chart type’ and then select ‘Append to existing workplace’.
8. Go to ‘Overview’ and select ‘Yifan Hu’ for the layout.

3.2. Measuring the networks

1. Go to ‘Statistics’.
2. Run ‘Average degree’, ‘Avg. Weighted Degree’, ‘Network Diameter’, ‘Modularity’, and ‘Eigenvector Centrality’.
3. Go to ‘Data Laboratory’, and you will find statistics for several types of centrality measures, including degree (centrality), weighted degree, betweenness centrality, and eigenvector centrality.
4. Go back to ‘Overview’ then go to ‘Appearance’.
5. Select ‘Node’, click the ‘Colour’ button, then select ‘Modularity Class’ under ‘Partition’.
6. Click on ‘Apply’.

3.3. Interpreting the networks

1. Degree centrality: number of edges linked to each node (popularity, well connected)
2. Weighted degree centrality: Number of edges connected to each node, taking into account the weight of the edges (popularity, well connected)
3. Betweenness centrality: the number of times a node is on the shortest path between other nodes (bridges, gatekeepers)
4. Eigenvector centrality: similar to degree centrality, but takes into account the centrality of the nodes it‘s connected to
5. Modularity Class: Community detection

Take 8 minutes to discuss with your group about the meaning or how we can interpret the results above. Think about why some nodes (figures in the networks) will have such a high degree of centrality measures in the networks? Based on the results, what were their roles in the networks of the Ho Tung family? Each group has 3 minutes to share their findings with the class.

Activity 4: Composing datasets for Gephi

Use the break to think about how to convert the Excel spreadsheets of Robert Ho, Ho Fook and Ho Kom-Tong's families into the spreadsheets that we have just imported into Gephi?

Here are some hints:

1. What are the differences between the Ho family's spreadsheets and the ones we used for Gephi?
2. What do we need to include in the spreadsheets for Gephi?
3. What kind of functions can we use in Excel to create the spreadsheet for Gephi in a more efficient way?

Before the next class:

Think about your own Gephi project and try to collect data for it. Everyone will have some time to talk about your project in the next class.