

Lab 1 Getting to Know SNoMaN

Tool Link: <https://snoman.herokuapp.com/>

Objectives: You will learn how to use SNoMaN for basic spatial social network analysis in this lab. We use a flight network to walk you through the basic functionalities of SNoMaN.

List of Sections:

- Import Dataset
- Compute Network Statistics
- Identify Important Nodes
- Select Subnetworks
- Configure Network Appearance

Import Dataset

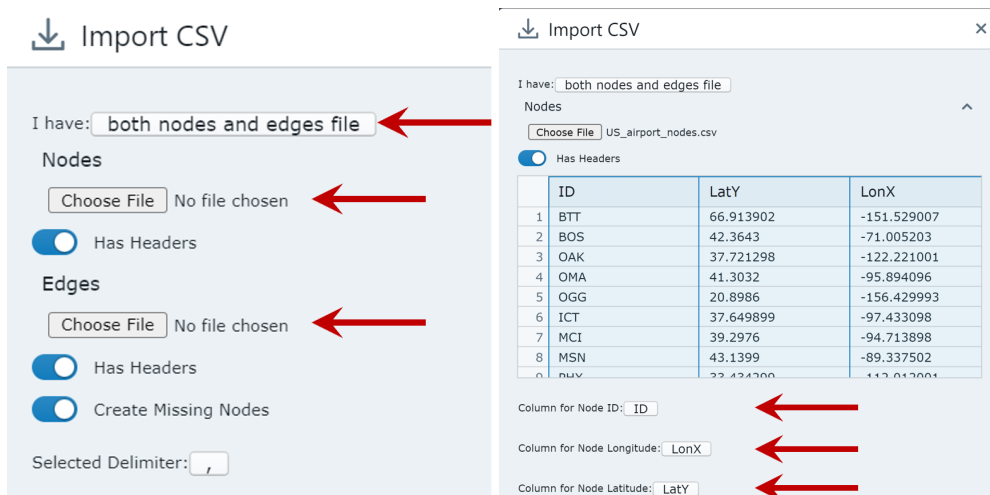
Get your dataset ready. Download the example dataset below and keep it in a folder you can easily find. The dataset includes a US flight network below, where nodes represent airports and nodes represent direct flights between airports. The data is maintained by the OurAirports website (<https://ourairports.com/data/>). It was collected by assembling government datasets and individual contributions. [US_airport_nodes.csv](#), [US_flight_edgelist.csv](#)

Import dataset to SNoMaN

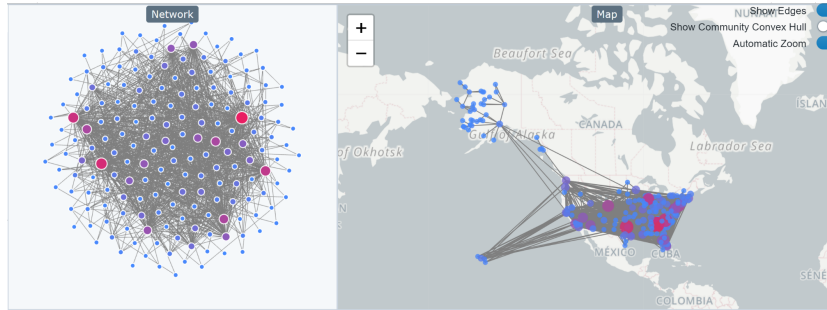
- Open [SNoMaN](#) in your browser (we recommend using Chrome regarding compatibility)
 - In the menu bar, go to **File**, choose **Import from CSV...**



- In the opened window, use the **Choose File** button to choose your node and edge list files.
- After the dataset is loaded as tables in the window, use the single selection button to specify attribute columns for ID, Longitude, and Latitude. Then scroll down and click the **Import** button.



- You should now see the network displayed in both the Network View and the Map View.



Compute Network Statistics

Statistic summaries

Navigate to the Statistic Panel at the left side of the interface, and answer the following questions:

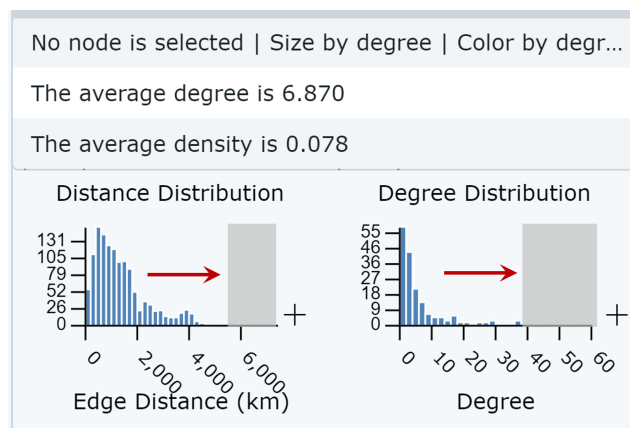
Q1: This network includes _____ nodes and _____ edges.

Q2: The network density is _____.

Q3: If the number of connected components is larger than one, there may be isolates. Are there any isolated airports (i.e., airports that are not connected by any flight routes)? _____.

Explore distance and degree distribution

- Click on the blank area of the Network view or Map View to clear any of your selections.
- The bottom left view shows the distance distribution and degree distribution of the network, you can brush the histogram to highlight edges or nodes within certain value ranges. Based on the information, answer the following questions:



Q4: Take a look at the distance distribution. How would you explain the shape of the distribution? _____.

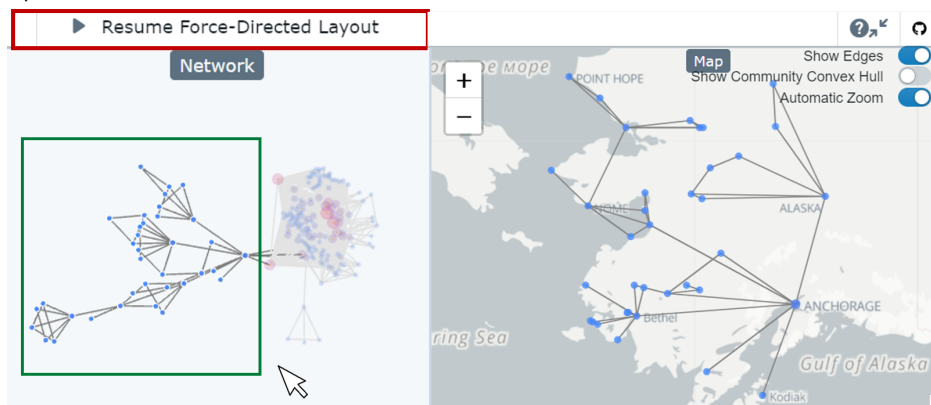
Where does the longest edge connect? _____ and how long is it approximately? _____.

Q5: What does the degree distribution of the network look like: how would you explain the shape of the distribution? _____. Where are the airports with a degree higher than 40 located? _____.

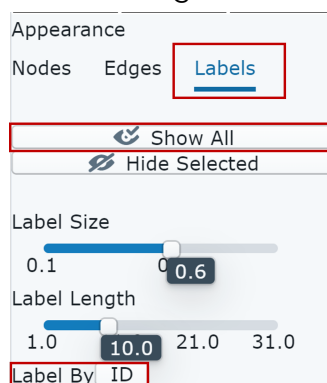
Identify Important Nodes

After the network is imported, the node size and color are by node degree by default. The degree centrality measures the number of connections a node has. In the flight network, nodes with many connections (i.e., high degree) are known as connection hubs. This section shows how to identify and locate these important nodes in the network with SNoMaN.

- Some layout interactions in the Network View:
 - Click and drag a node to move and pin it in the Network View.
 - To pan the network: drag with the right mouse button down OR move the mouse with the space key pressed in the Network view; drag the map in the Map view.
 - Drag to select a bunch of nodes in the network view to highlight or move them.
 - Adjust the view size by dragging the division border.
 - Click any blank area of the Network view or Map View to clear selections.
 - Run and pause the force-directed layout on the network under the menubar.

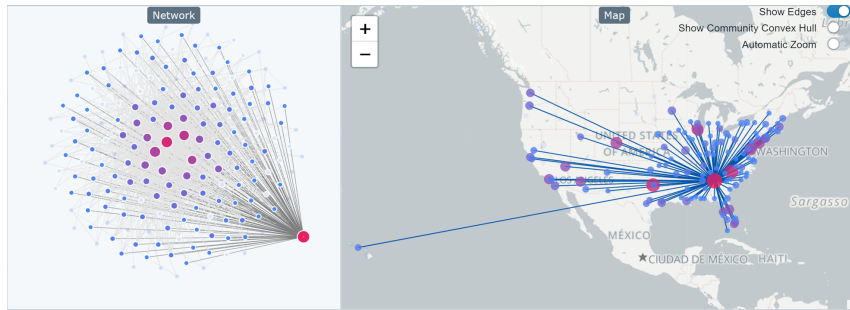


- Under the Appearance Panel click on the Labels panel, click on Show All, and choose Label by the "Id" or "Airportname" attribute. Adjust label size and length till clearly shown.



Q6: Which airport has the most direct flights? _____.

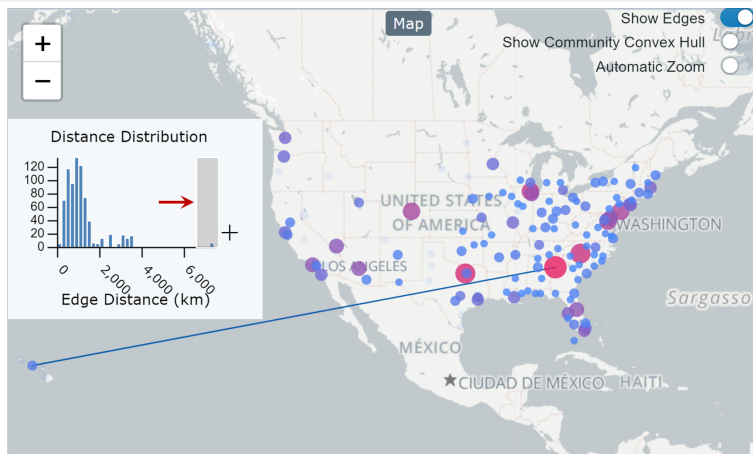
- Click on ATL airport in the Map View to freeze its ego-centric network.



Q7: Check the updated information in the bottom left view, it shows the number of airports selected and highlighted. How many airports is ATL connected to with direct flights in the US? _____.

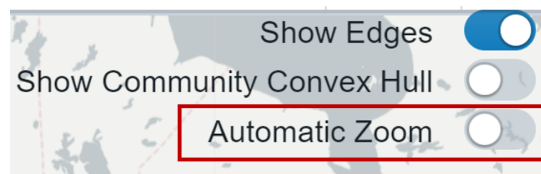
- Brush on the edge distance distribution to select the longest direct flight connected to ATL.

Q8: How far is the longest direct flight connected to ATL? Where does it connect with ATL? _____.



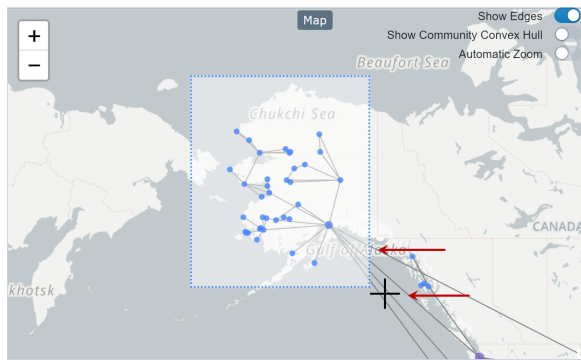
Select Subnetworks

- Turn off the Automatic Zoom feature in the Map View to avoid the map zoom with your selections and clear selections.



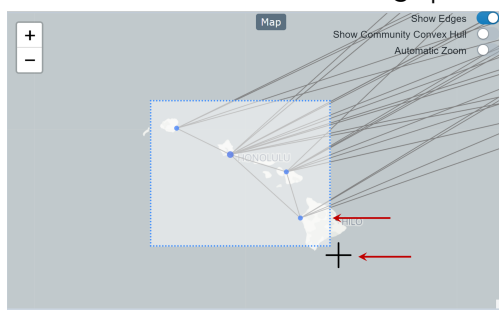
- Zoom into the Alaska area in the Map View. Press the CTRL key (Windows)/ CTRL key (Mac) to make the cursor in the Map View a cross shape, then drag to select all airports in Alaska (It takes several seconds for the selecting to respond). Check the information of the subnetwork in the bottom left view and answer the

following question.



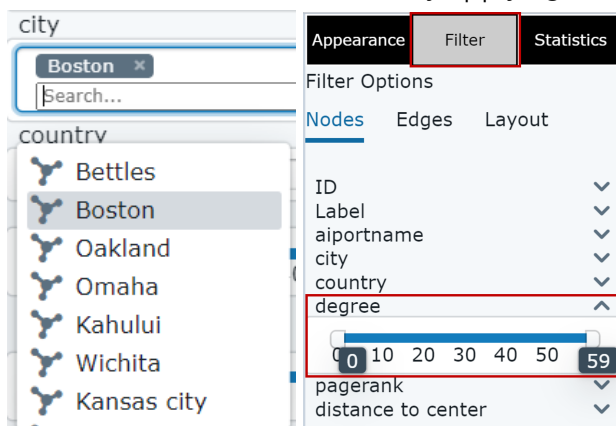
Q9: How many airports are in Alaska? _____. What is the network density of airports in Alaska?_____.

- Zoom into the Hawaii area in the Map View. Press the CTRL key (Windows)/ CTRL key (Mac), when the cursor in the Map View became cross shape, then drag to select all airports in Hawaii. Check the information of the subnetwork in the bottom left view and answer the following question.

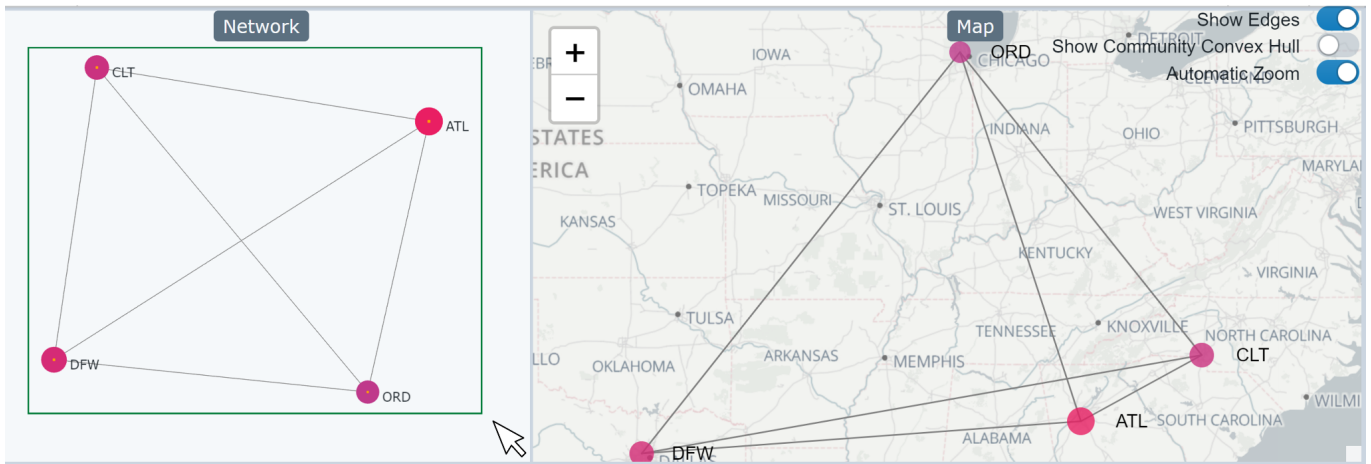


Q10: How many airports are in Hawaii? _____. What is the network density of airports in Hawaii? _____.

- Under the Filter Panel, you can take a subset of the network by applying different attribute filters.



- To see the detailed information of the subnetwork after applying filters, drag to select nodes in the Network View and check the updated information in the bottom left view.

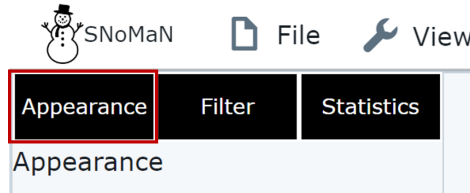


Q11: How many nodes have a degree higher than 40? _____. Are they all connected with each other?

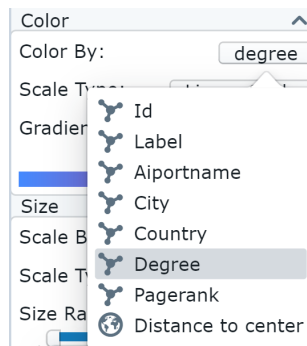
Configure Network Appearance

After the network is imported, the node size and color are by node degree by default. You can customize the network's visual properties under the Appearance Panel. When no node is selected, the configuration change will be applied to the whole network. When a set of nodes is selected, the configuration change only affects the selected nodes.

- Click on the Appearance Panel on the left side.

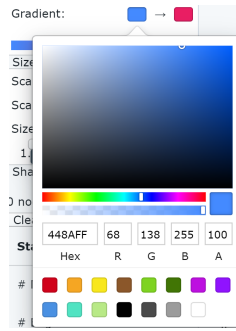


- Click on Color to open the dropdown menu to use node color to encode different attributes.



- Choose Linear Scale for the numeric attributes (e.g., degree) or Norminal Scale for categorical attributes (e.g., city).

- Click on the color bar to open up the palette for more color options



- Drag the handles of the scale bar to configure the node size range



- Customize node shape under the Shape dropdown menu.

