**Program Manual for NMVis Website - An Interactive Visualization Tool for Network Motifs**

Website: https://nmvis.azurewebsites.net

For information about hosting the application using Java, Maven, and Azure Web App Service using Intellij IDEA see the following link:

https://docs.microsoft.com/en-us/java/azure/intellij/azure-toolkit-for-intellij-create-hello-world-web-app?view=azure-java-stable

**Format for input graphs:**

- All files and pasted data for graphs should have one line for each edge present in the graph. Nodes can be separated with any number of commas, spaces or tabs. For example, the following are all valid input formats:

```
1,2
2,3
3,4
4,1
5,1
6,1
7,2
8,2
```

```
1       2
2       3
3       4
4       1
5       1
6       1
7       2
8       2
```

```
1 2
2 3
3 4
4 1
5 1
6 1
7 2
8 2
```

```
1         2
2,3
3     4
4,,,, 1
5 , , 1
6         ,1
7,        ,2
8 2
```

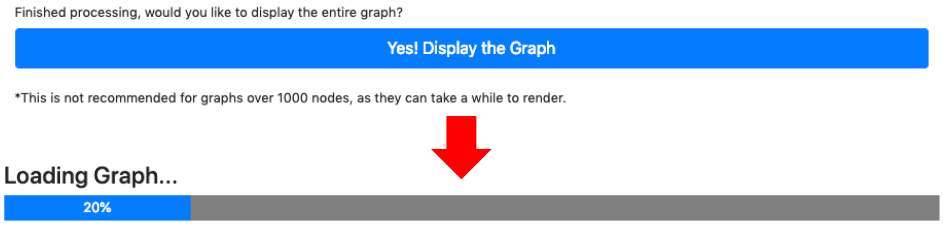
- Nemo Collect files contain all of the network motifs found in the graph. This program will hopefully soon be able to find the network motifs for you but for now, the "nemoCollect" file should be provided in the following format for visualization. The nodes can again be separated by any number of commas, spaces or tabs. An id for the motif must precede it on the line above with a tag that says "ID:" followed by the motif id which can be made up of any number of letters or numbers. A space can exist between "ID:" and the id, though this is not necessary. Some examples are as follows:

```
ID: 111
8, 9, 14, 15, 13

ID: 111
22, 16, 14, 15, 13

ID: 111
22, 16, 14, 9, 13

ID: 111
22, 16, 14, 15, 9

ID: 333
24, 25, 26, 27, 28

ID: 1019
24, 25, 28, 26, 29

ID: 8989
25, 29, 28, 27, 26
```

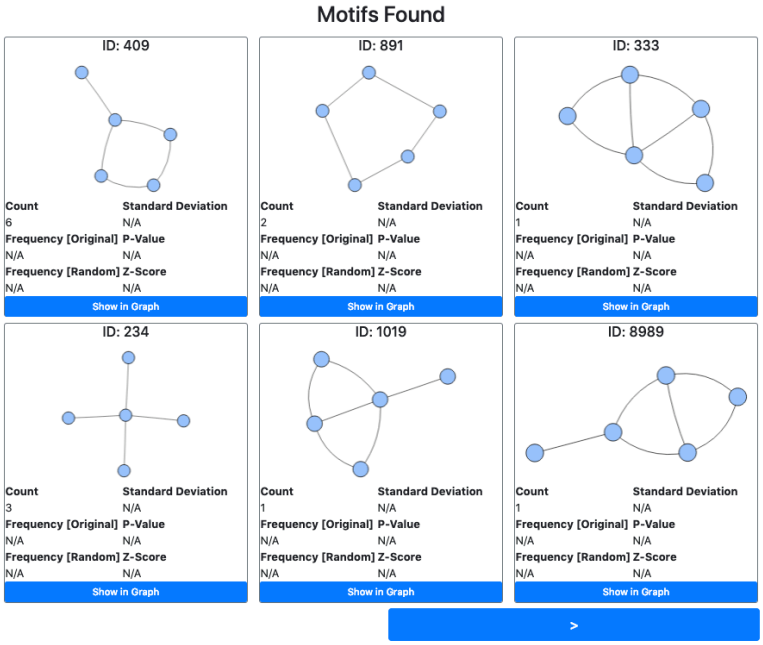
```
ID: 234
9 8 14 7 11

ID: 234
9, 14, 15, 13, 16

ID: 9999
10, 12, 11, 8, 9

ID: 9999
8, 9, 6 7 23

ID: 409
6       7       8       9       5

ID: 409
8, 9, 10, 11, 14
```

**Website Functionality**:

- Simply displaying a graph (no motif data): simple input the graph file or paste in the graph data and click the “Show Network Motifs” button, then click the “Yes! Display the Graph” button. For large graphs (over 1000 nodes), the rendering can be slow, depending on the browser used and your system capabilities. For best results use Google Chrome. The “Yes! Display the Graph” button will be replaced by a loading bar if the graph will not immediately load.

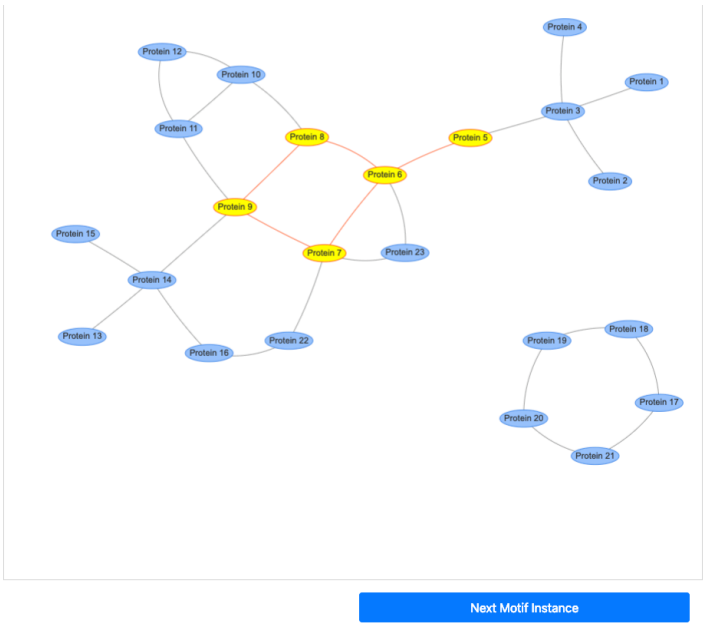


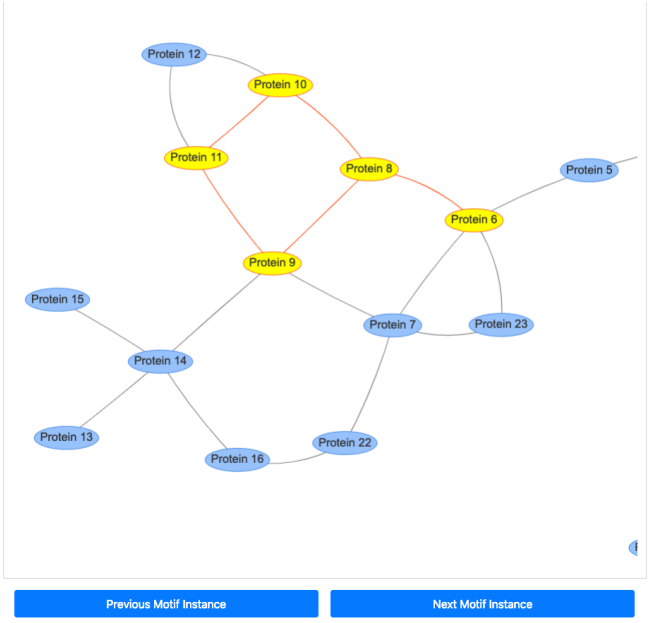

- Displaying a visual representation of all the motifs present in “nemoCollect” file: attach the graph data file and “nemoCollect” file in the format explained above and select the size of the motif from the dropdown. Note, this must be the same as the number used for the nemo collect data or no motifs will be displayed. Select “the Show Network Motifs” button. The following is a possible example, move through the pages of motifs (if there are more than 6) with the arrow buttons bellow the motif cards.




*Note: the “N/A”s shown in the image are will soon be replaced with actual network motif results that will be computed from the input graph. Come back soon to see this functionality.

- To display a specific motif instance in the graph: click the “Show in Graph” button on a motif card (will load the full graph if it hasn’t been loaded yet). The first instance of the motif will be highlighted in the graph like so (left image):




To see the next instance of the motif in the graph (if one exists), click the “Next Motif Instance” button (will not be shown if only one exists). This will highlight the next instance in the graph and move/zoom to a position in the graph where all the nodes fit on the screen (right image).

**General graph Functionality (for overall graph or individual motif graphs):**

- To zoom in and out of any graph: use the scrolling functionality on your mouse or trackpad. It has been recognized that zooming on a graph can cause unwanted scrolling in Firefox. Using Google Chrome is a good solution to this problem.
- To move the entire graph: click on any white space in the graph box and drag.
- To move the nodes and edges of the graph around: click and drag any node to a desired position. This can be helpful when trying to visualize complicated motifs from different views.