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- * VISUALIZATION
- * LAYOUT
- * RANKING (COLOR)
- * METRICS
- * RANKING (SIZE)
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- * SHOW LABELS
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- * PARTITION
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- * SAVE
- * CONCLUSION

Gephi Tutorial

Quick Start for V0.9.2

Welcome to this introduction tutorial. It will guide you to the basic steps of network visualization and manipulation in Gephi. Gephi version 0.9.2 was used to do this tutorial.

Author: Ron Hu

Inspired by [Gephi Quick Start](#)

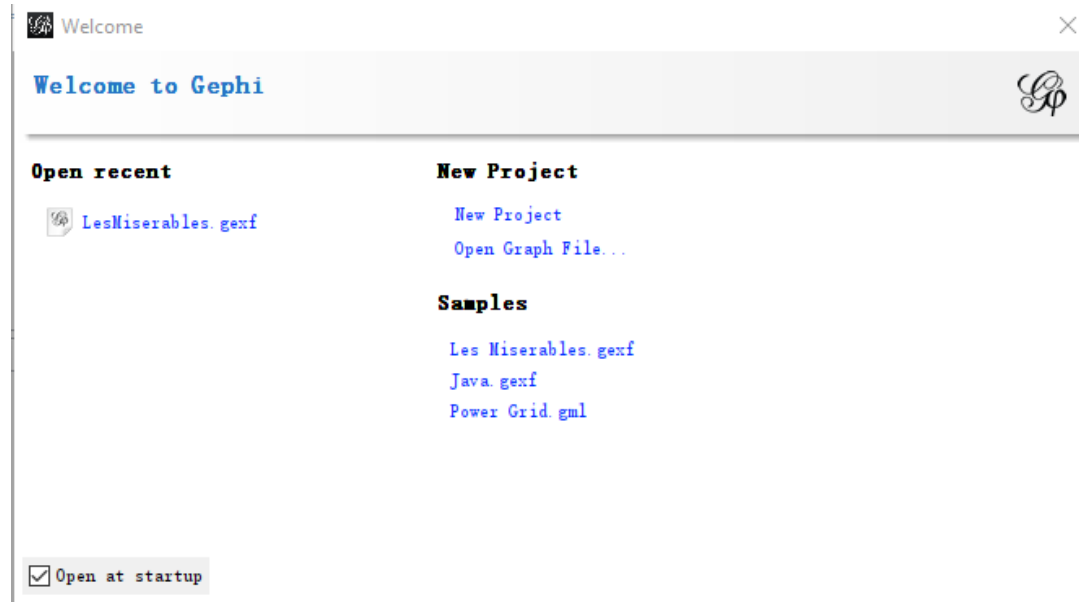
Edited on March 05th, 2021

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Open Gephi

- Download the file:
[LesMiserables.gexf](#)
- Open Gephi then create a new project

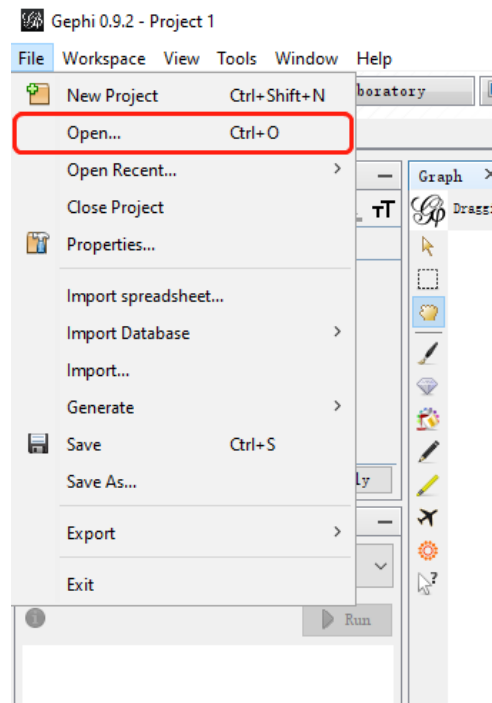


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Open Graph File

In the menubar, go to File Menu and Open...



Graph Format

- GEXF
- GraphML
- Pajek NET
- GDF
- GML
- Tulip TLP
- CSV
- Compressed ZIP

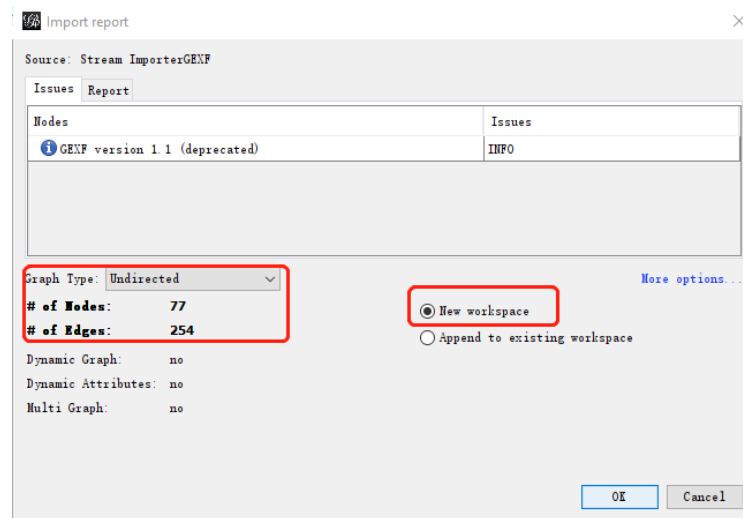
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Import Report

When your file is opened, the report sum up data found and issues.

- Number of nodes
- Number of edges
- Type of graph



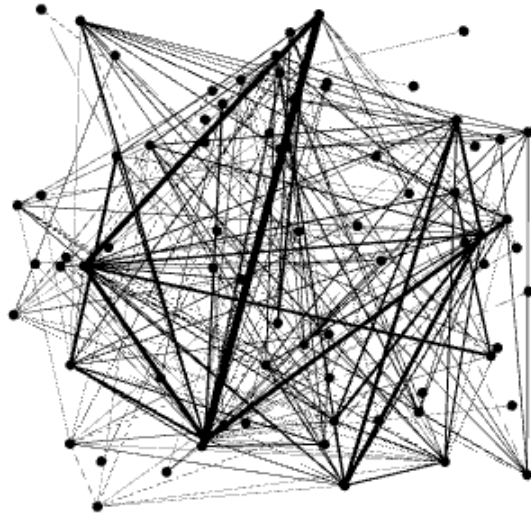
- Choose to open it in a new workspace, then Click on OK to validate and see the graph

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You should now see a graph

We imported "Les Miserables" dataset. Coappearance weighted network of characters in the novel "Les Miserables" from Victor Hugo.



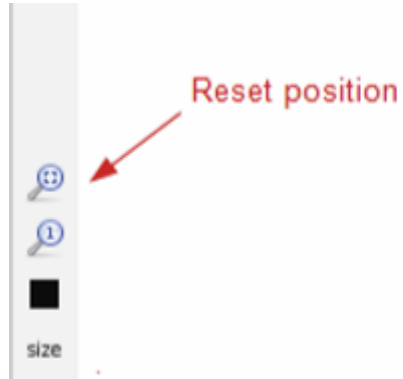
Nodes position is random at first, so you may see a slightly different representation.

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Graph Visualization

- Use your mouse to move and scale the visualization
 - Zoom: Mouse Wheel
 - Pan: Right Mouse Drag
- Locate the "Edge Thickness" slider on the bottom
- If you loose your graph, reset the position



Zoom



Drag

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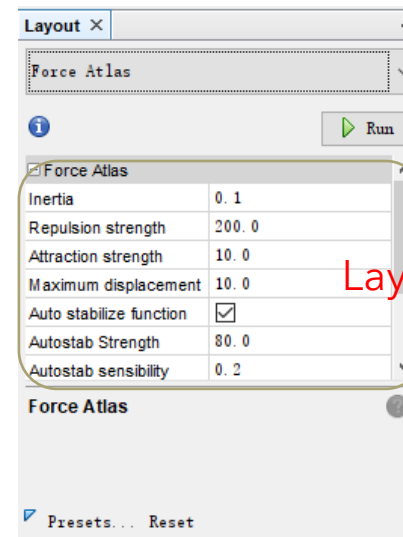
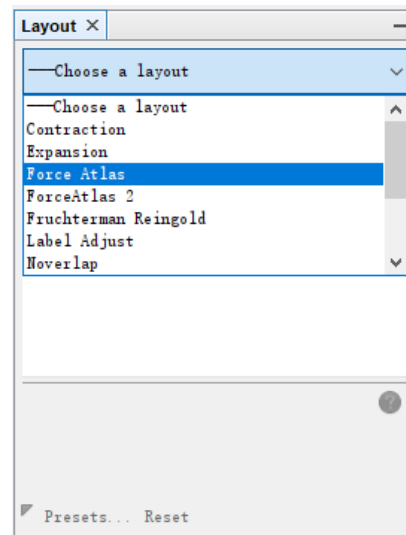
Layout the graph

Layout algorithms sets the graph shape, it is the most essential action.

- Locate the Layout module, on the left panel.
- Choose "Force Atlas"

You can see the layout properties below, leave default values.

- Click on  to launch the algorithm



Layout Properties

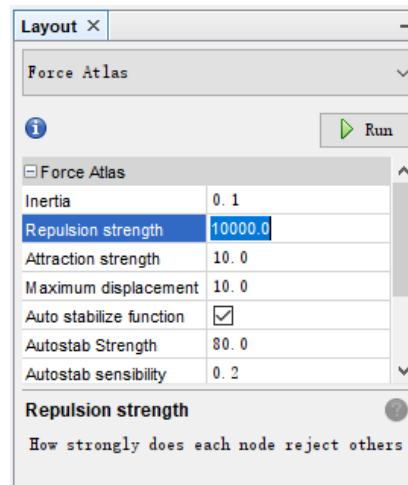
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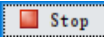
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Control the layout

The purpose of Layout Properties is to let you control the algorithm in order to make a aesthetically pleasing representation.

- Set the “Repulsion strength” at 10000 to expand the graph.
- Type “Enter” to validate the changed value.

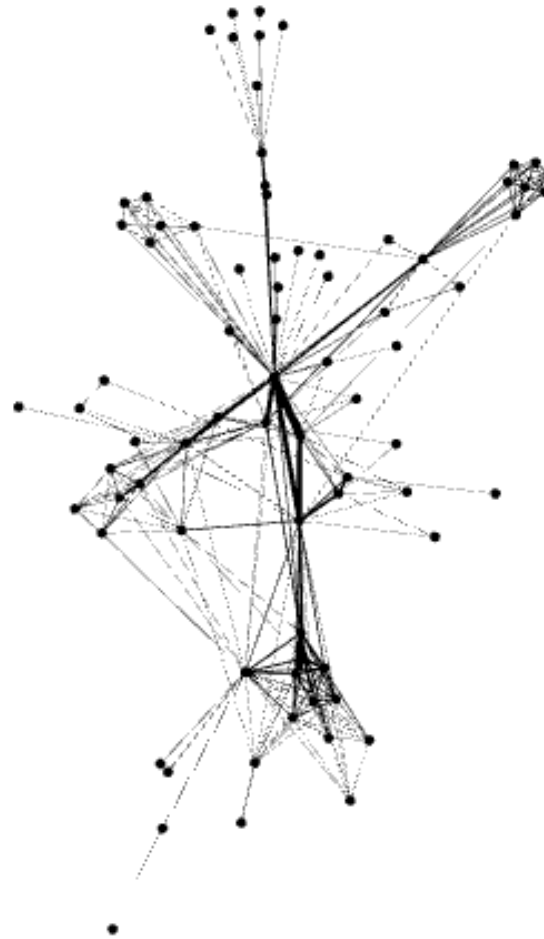


- And now  the algorithm.

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You should now see a layouted graph



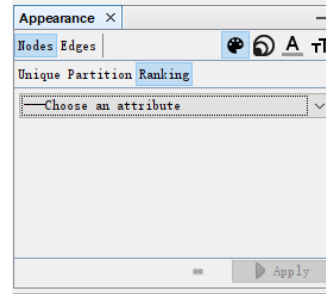
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Ranking (color)

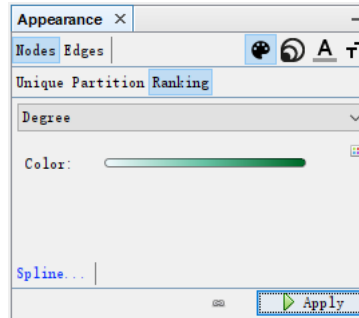
Ranking module lets you configure node's color and size.


- Locate Ranking module, in the top left.



- Choose "Degree" as a rank parameter.

You should obtain the configuration panel below:



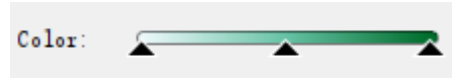
- Click on  to see the result.

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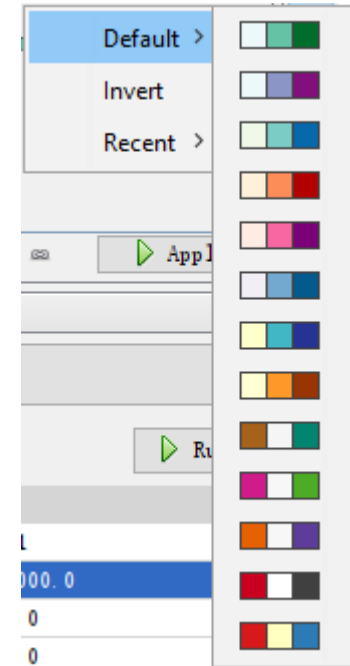
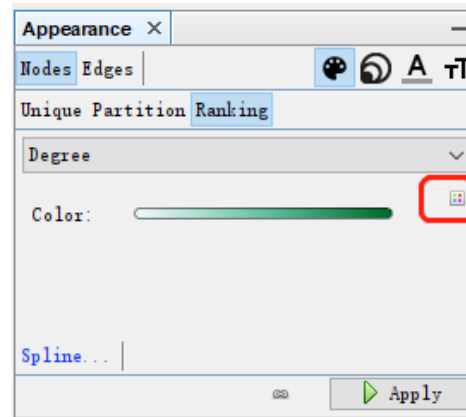
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Let's configure colors

- Move your mouse over the gradient component.



- Use palette to change colors by clicking the four-color square




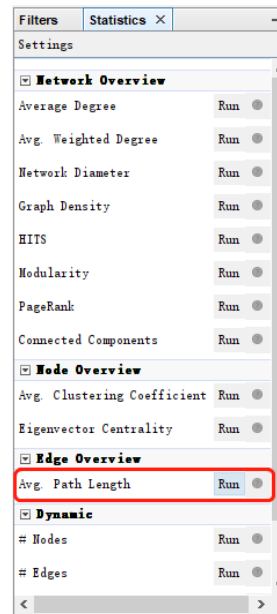
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Metrics

We will calculate the average path length for the network. It computes the path length for all possible pairs of nodes and give information about how nodes are close from each other.

- Locate the Statistics module on the right panel.
- Click on  near "Avg. Path Length".



 **Metrics available**

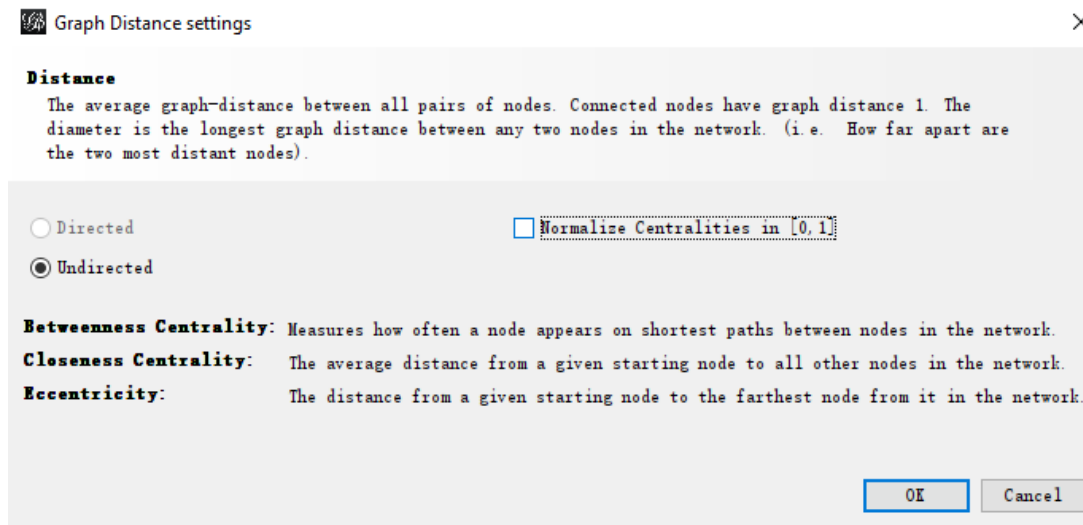
- Diameter	- Betweenness Centrality
- Average Path Length	- Closeness Centrality
- Clustering Coefficient	- Eccentricity
- PageRank	- Community Detection (Modularity)
- HITS	

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Metric settings

The settings panel immediately appears



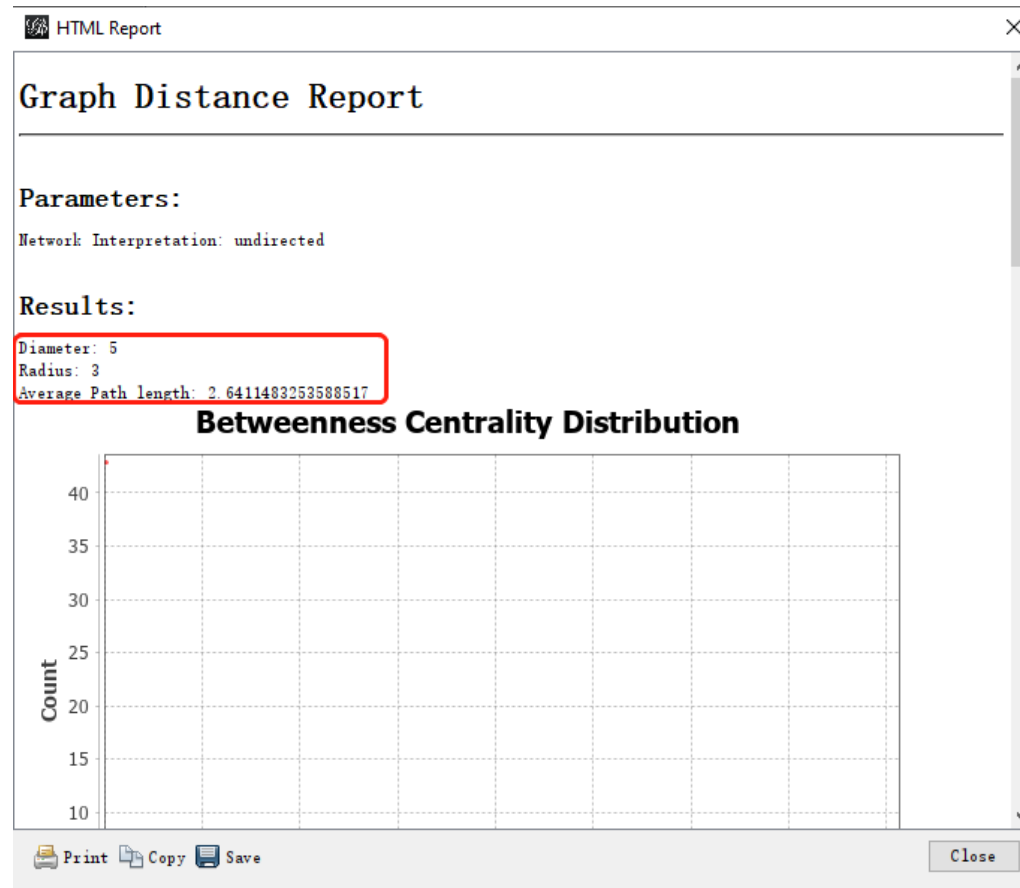
- Select "Directed" and click on OK to compute the metric

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Metric result

When finished, the metric displays its result in a report.



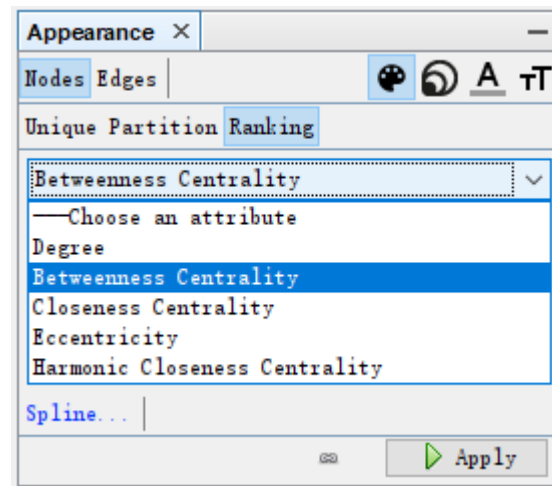
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Ranking (size)

Metrics generates general reports but also results for each node. Thus three new values have been created by the “Average Path Length” algorithm we ran.

- Betweenness Centrality
- Closeness Centrality
- Eccentricity



- Go back to Ranking
- Select “Betweenness Centrality” in the list.

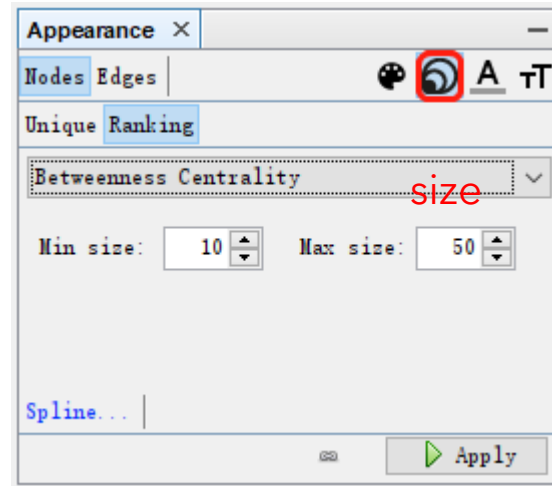
This metrics indicates influential nodes for highest value.

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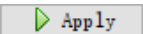
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Ranking (size)

The node's size will be set now.



- Select the diamond icon in the toolbar for size.
- Set a min size at 10 and a max size at 50.

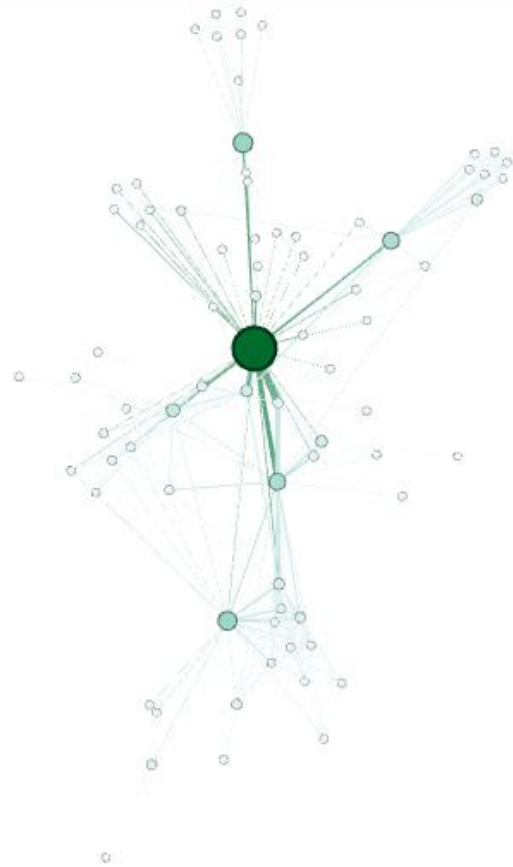
- And click on  to see the result.

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You should see a colored and sized



Color: Degree

Size: Betweenness Centrality metric

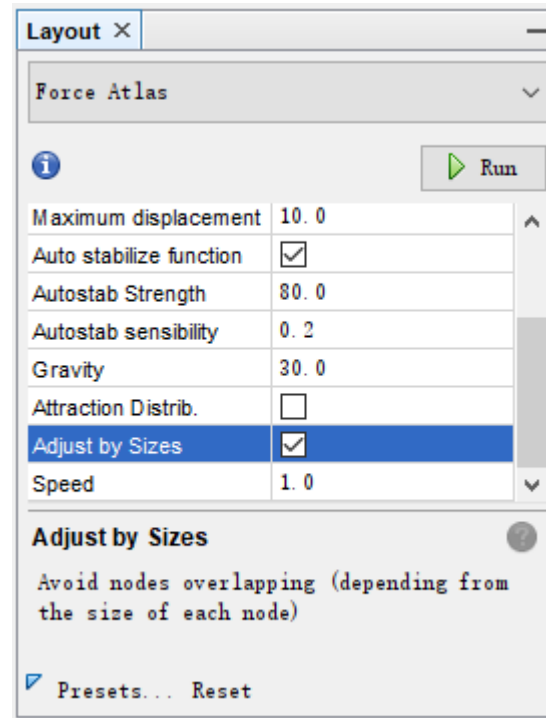
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Layout again

The layout is not completely satisfying, as big nodes can overlap smaller.

The “Force Atlas” algorithm has an option to take node size in account when layouting.



- Go Back to the Layout panel.
- Check the “Adjust by Sizes” option and run again the algorithm for short moment.
- You can see nodes are not overlapping anymore

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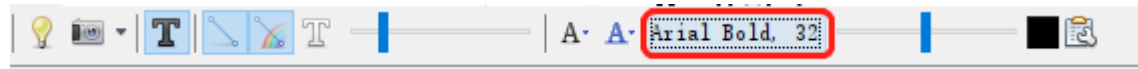
Show labels

Let's explore the network more in details now that colors and size indicates central nodes.

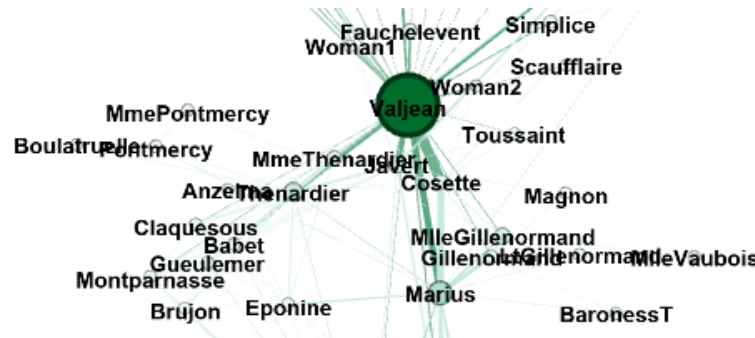
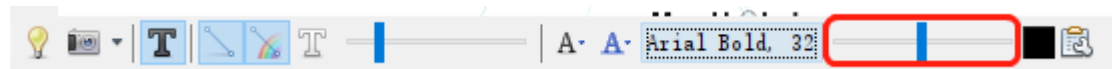
- Display node labels



- Set label size proportional to node size



- Set label size with the scale slider



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Community detection

The ability to detect and study communities is central in network analysis. We would like to colorize clusters in our example.

Gephi implements the Louvain method, available from the Statistics panel.

Click on Run near the “Modularity” line

Modularity

Run

- Select “Randomize” and “use weights” on the panel.
- Click on OK to launch the detection.



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Partition

The community detection algorithm created a “Modularity Class” value for each node.

The partition module can use this new data to colorize communities.

- Locate the Nodes>Partition on the left panel.
- click palette icon then select “Modularity Class” in the partition list.


You can see that 6 communities were found, could be different for you. A random color has been set for each community identifier.

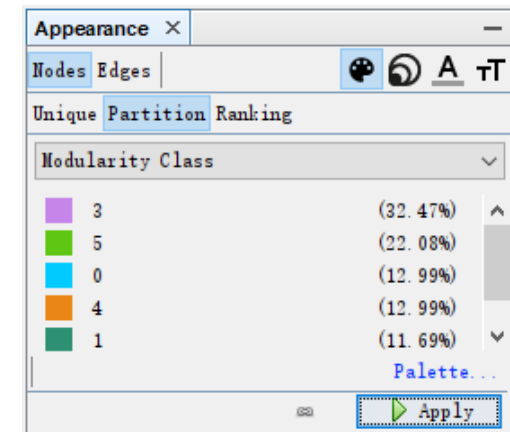
- Click on  to colorize nodes.



How to visualize nodes & edges columns?

See columns and values for nodes and edges by looking at the Data Table view.

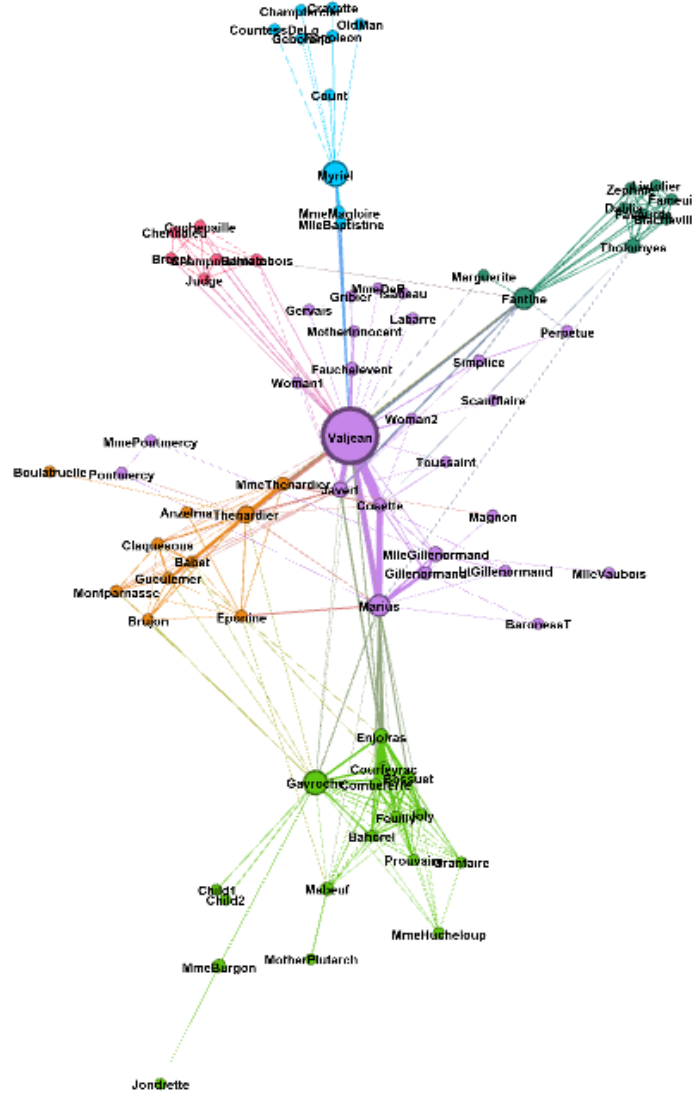
Select  Data Laboratory tab and click on “Nodes” to refresh the table.



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What the network looks like now

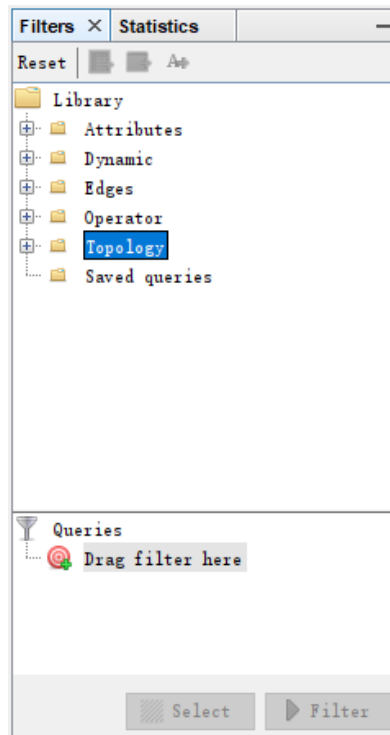


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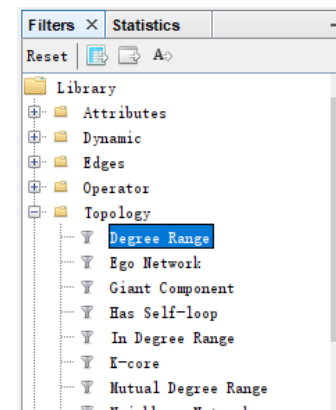
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Filter

The last manipulation step is filtering. You create filters that can hide nodes and edges on the network. We will create a filter to remove leaves, i.e. nodes with a single edge.



- Locate the Filters module on the right panel.
- Select "Degree Range" in the "Topology" category.



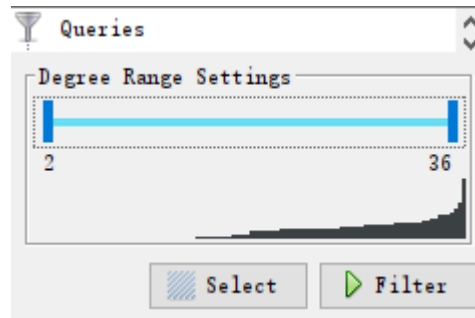
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Filter

It shows a range slider and the chart that represents the data, the degree distribution here.

- Move the slider to sets its lower bound to 2.

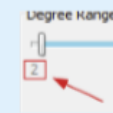


- Enable filtering by pushing the  **Filter** button.
- Nodes with a degree inferior to 2 are now hidden.



Tip

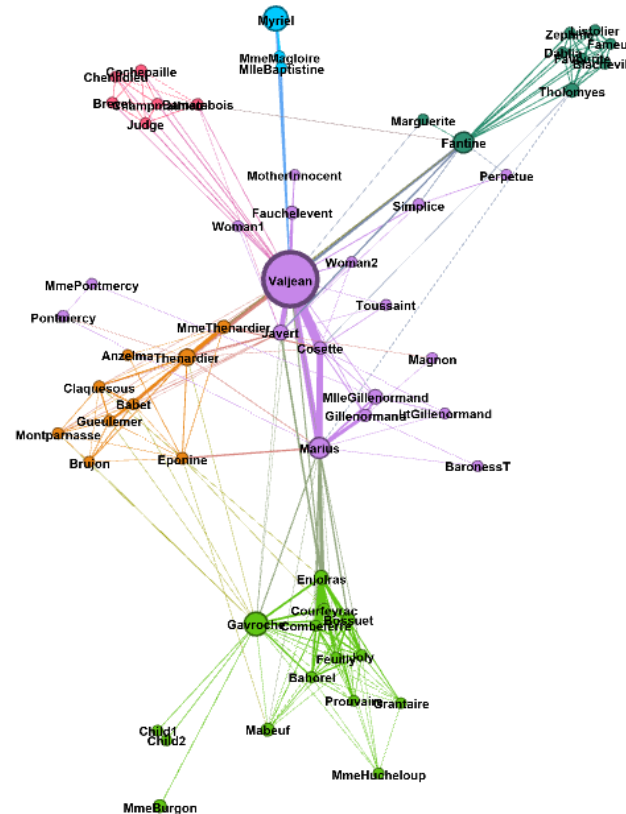
You can edit bounds manually by double-clicking on values.



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The filtered network



That ends the manipulation. We will now preview the rendering and prepare to export.

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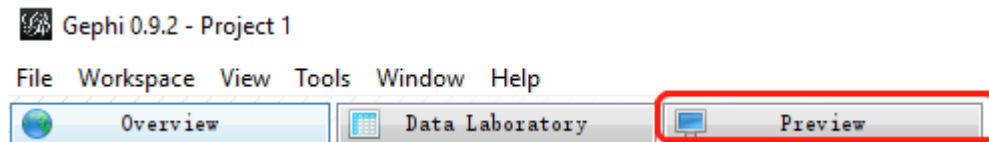
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Preview

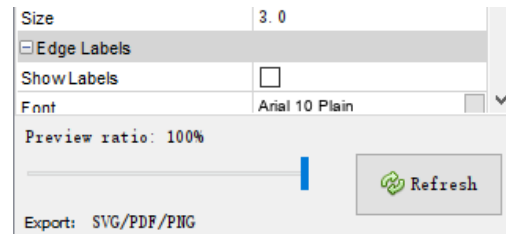
- Before exporting your graph as a SVG or PDF file, go to the Preview to:

- See exactly how the graph will look like
- Put the last touch

- Select the “Preview” tab in the banner:



- Click on Refresh to see the preview



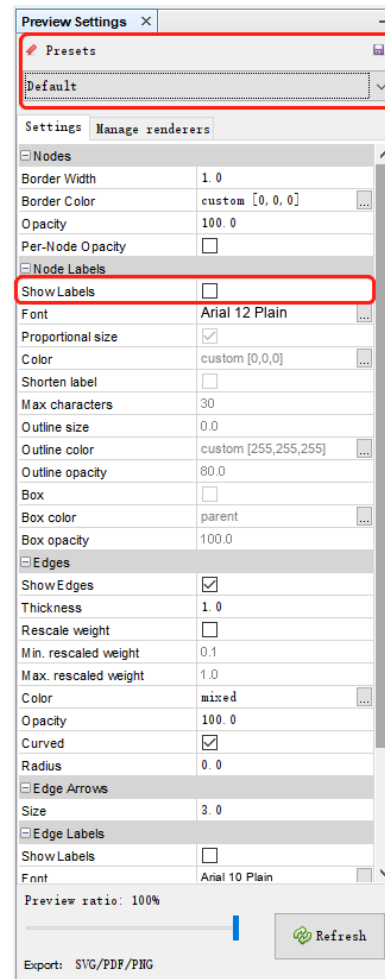
Tip

If the graph is big, reduce the “Preview ratio” slider to 50% or 25% to display a partial graph.

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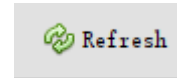
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Preview



- In the Node properties, find “Show Labels” and enable the option.

- Click on

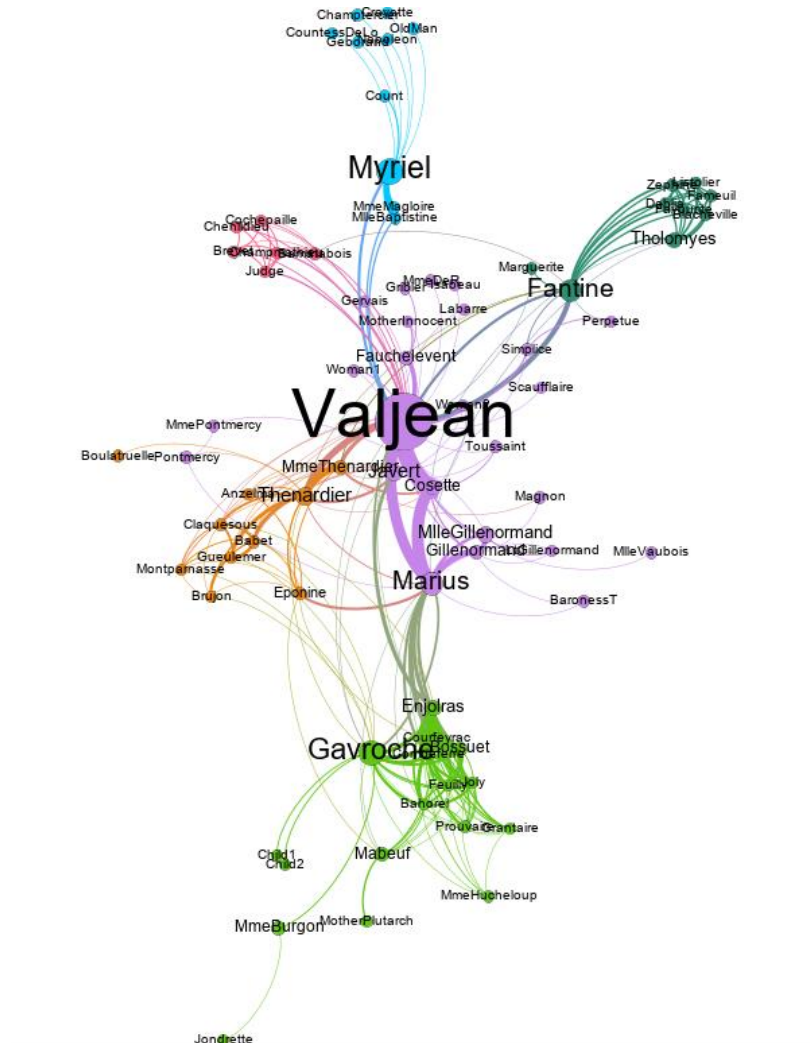


Preview Settings supports Presets, click on the presets list and try different configurations.

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The Previewed Graph

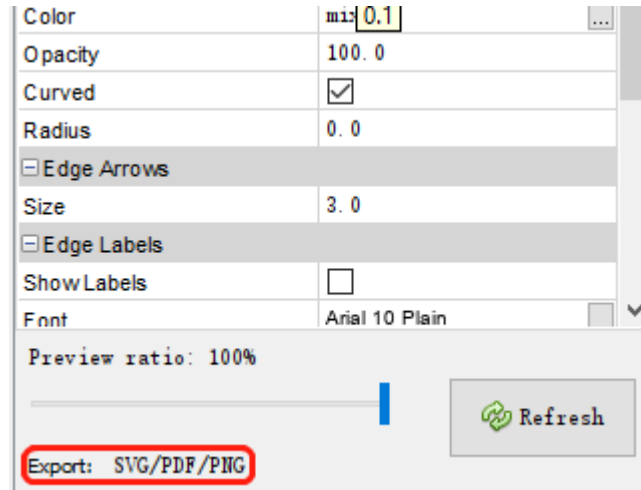


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Export as SVG/PDF/PNG

From Preview, click on SVG/PDF/PNG near Export.



i SVG Files are vectorial graphics, like PDF. Images scale smoothly to different sizes and can therefore be printed or integrated in high-res presentation.

Transform and manipulate SVG files in Inkscape or Adobe Illustrator.

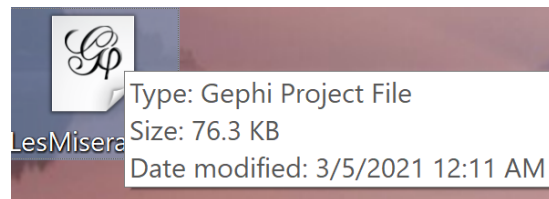
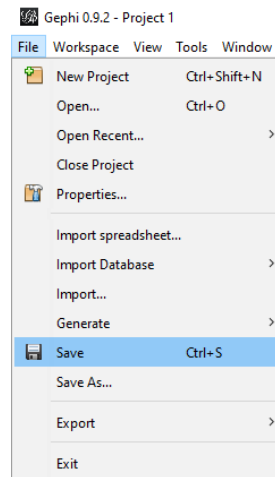


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Save your project

Saving your project encapsulates all data and results in a single session file.

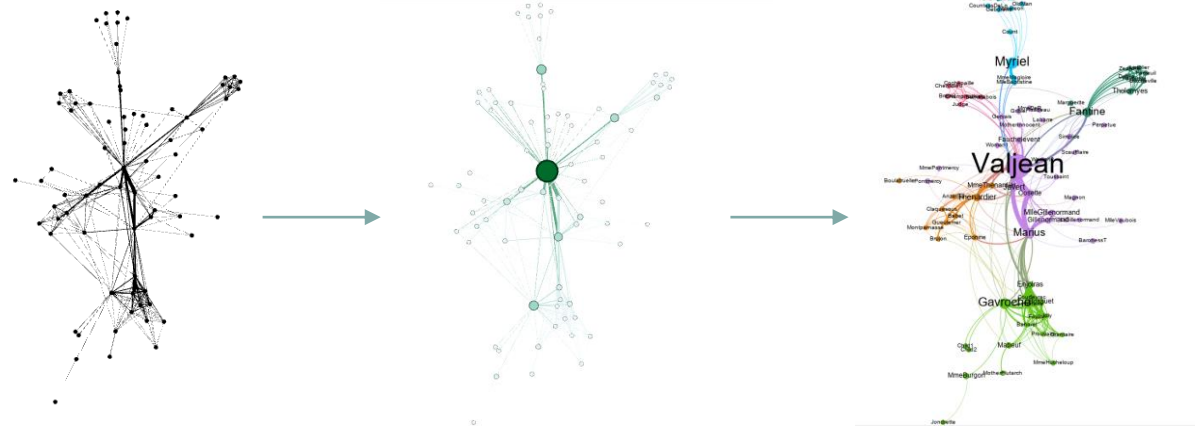


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Conclusion

In this tutorial you learned the basic process to open, visualize, manipulate and render a network file with Gephi.



Go further:

Gephi website: <https://gephi.org/>