

```
# for details, see https://review.docs.microsoft.com/en-us/visualstudio/rtsv/sql-server  
# Test code  
library(RODBC)  
channel <- odbcDriverConnect(dbConnection)  
InputDataSet <- sqlQuery(channel, iconv(paste(readLines(  
  'c:/proj/rprojct1/rprojct1/storedprocedure.query.sql',  
  encoding = 'UTF-8', warn = FALSE), collapse = '\n'), from = 'UTF-8',  
  to = 'ASCII', sub = ''))  
odbcClose(channel)  
OutputDataSet <- InputDataSet
```



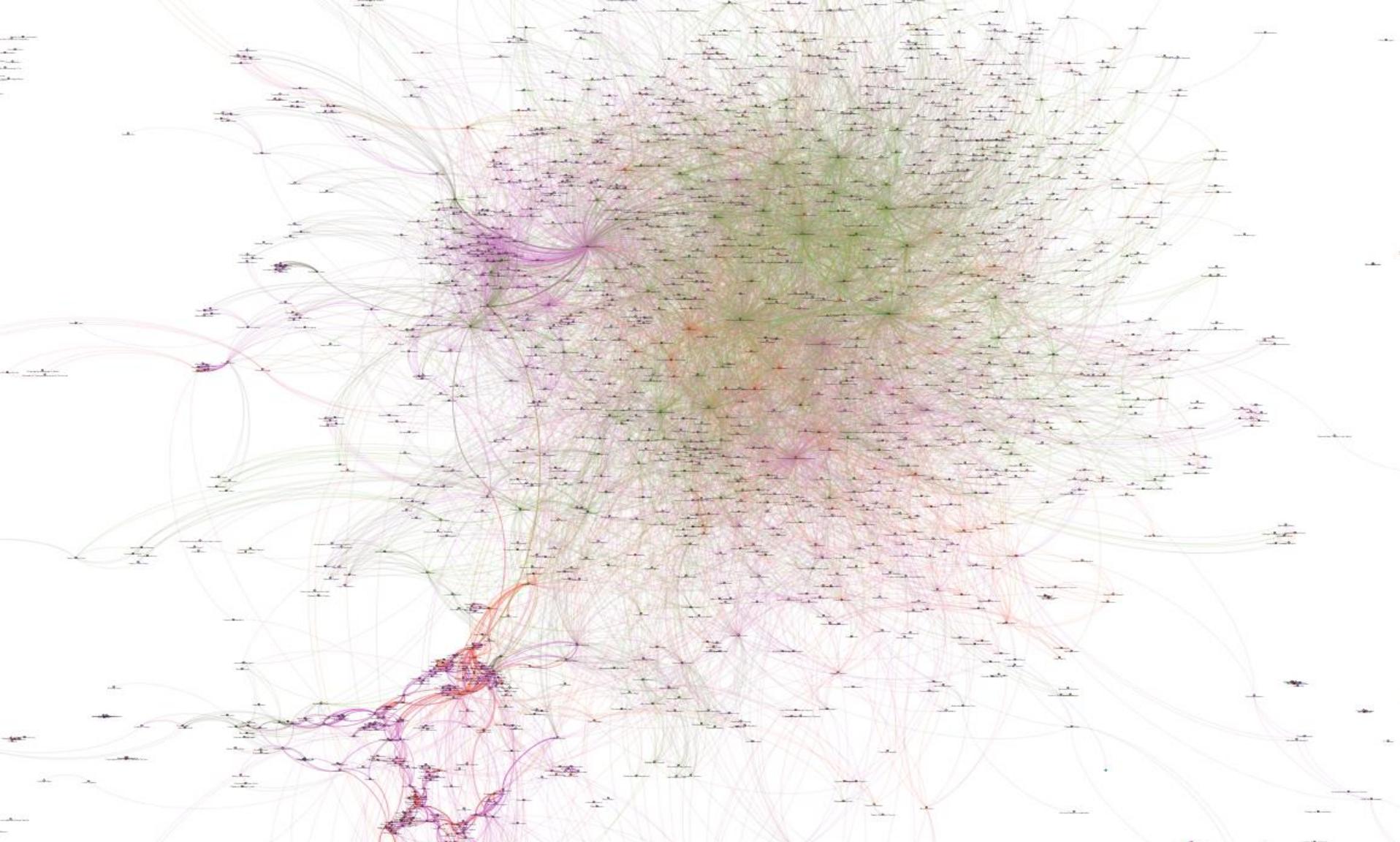
Gephi

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Martin Nicastro

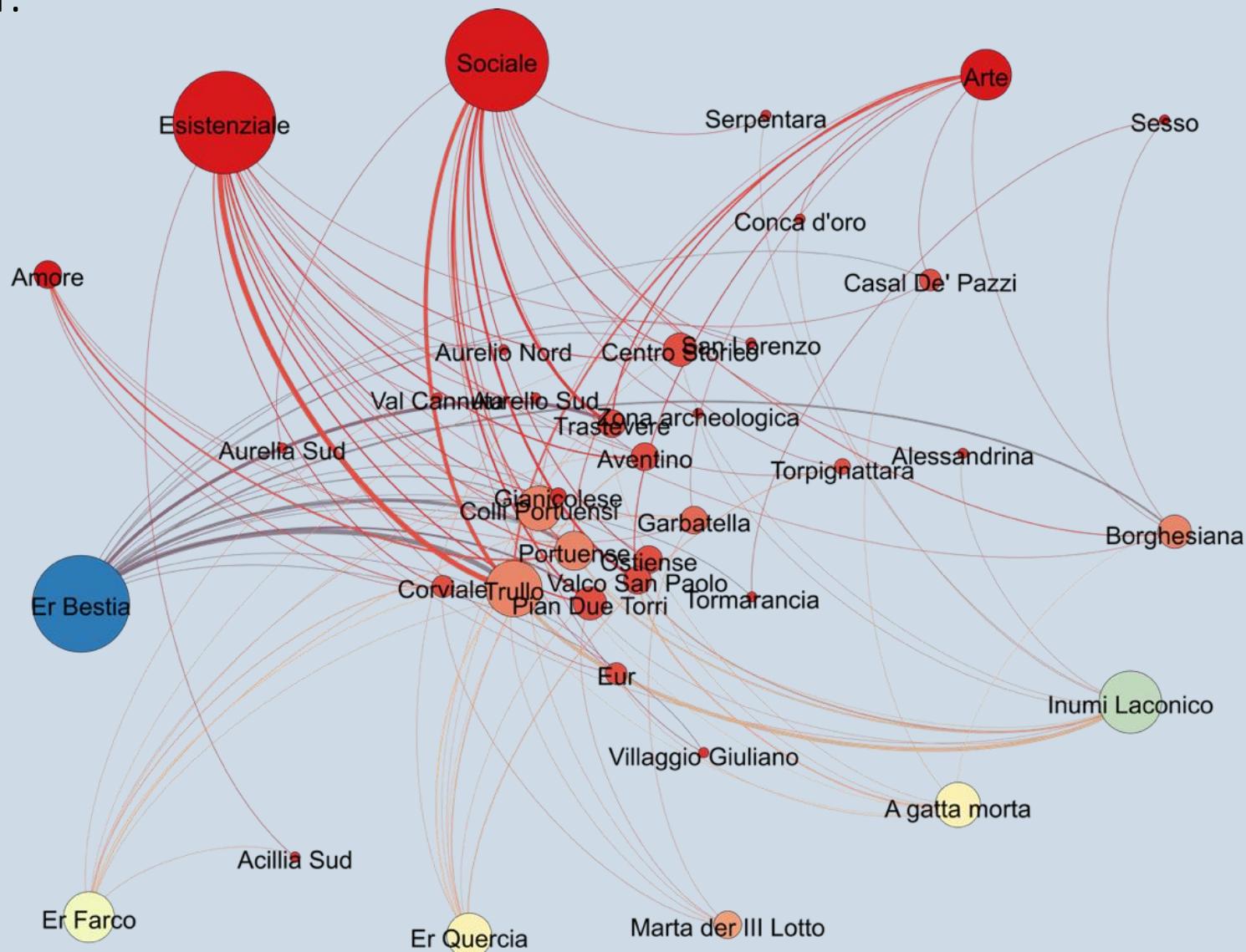
nicastromartin@gmail.com |
martin.nicastro01@universitadipavia.it

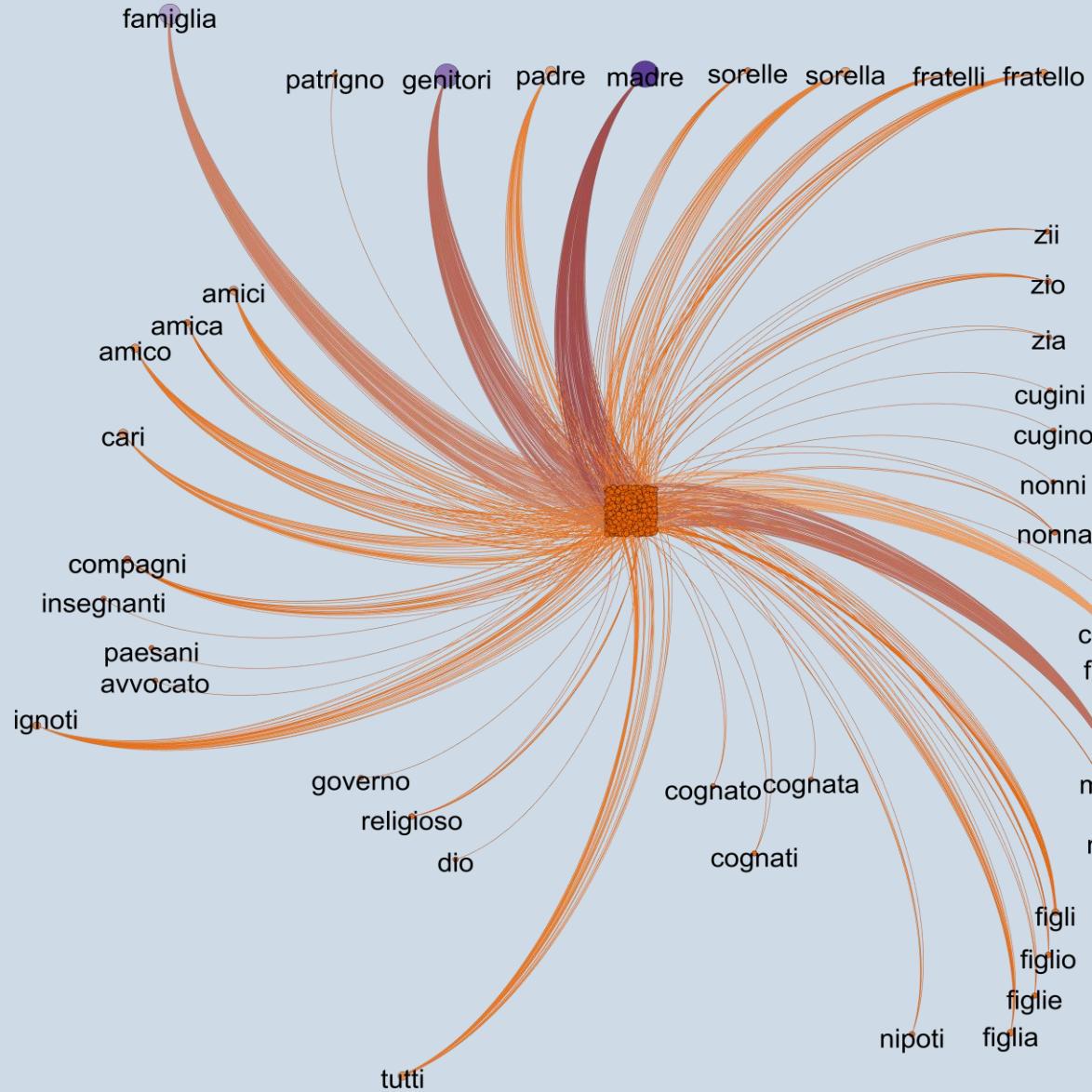


Milan 1958-62, performers-composers network

<https://bit.ly/3XrFZ6S>

STREET POETRY: Themes, Poets, Districts

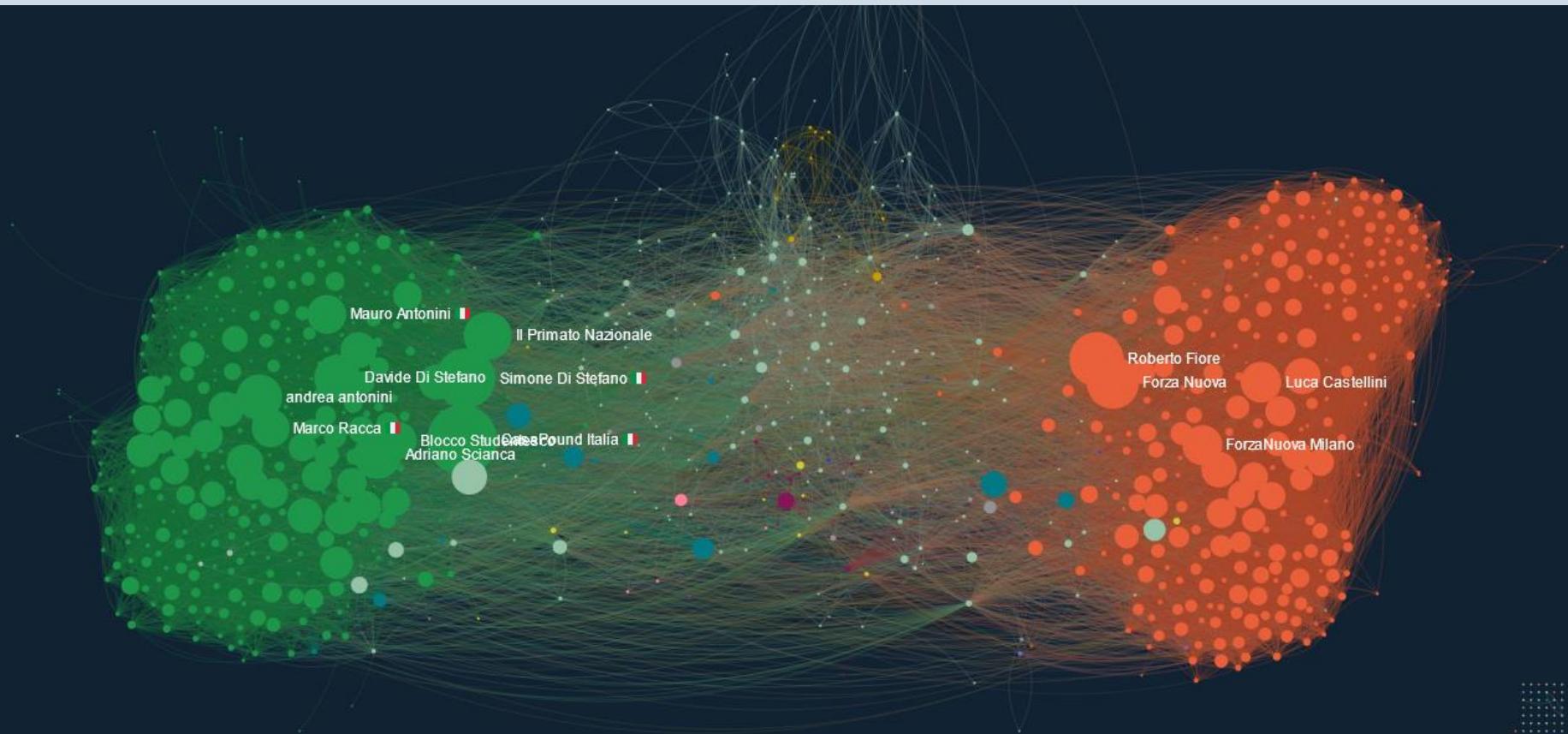




Addressees of the Last letters



Macerata - 27-3-1915
Caro mamma
Se ti è possibile vieni
subito, vorrei uscire per un po'
Grazie di venire una volta
ma anche finché
non mi vedrai sentire
che sto a trattenere e
dopo averlo se ne potrai
venire ancora. Io sto
benissimo spero che sia
di tutti quelli che chiedono
di me saluti a tutti
e te un abbraccio tuo aff.



SOCIAL NETWORK ANALYSIS <https://www.patriaindipendente.it/progetto-twitter/>

Geospatial analysis



Spanish Civil War



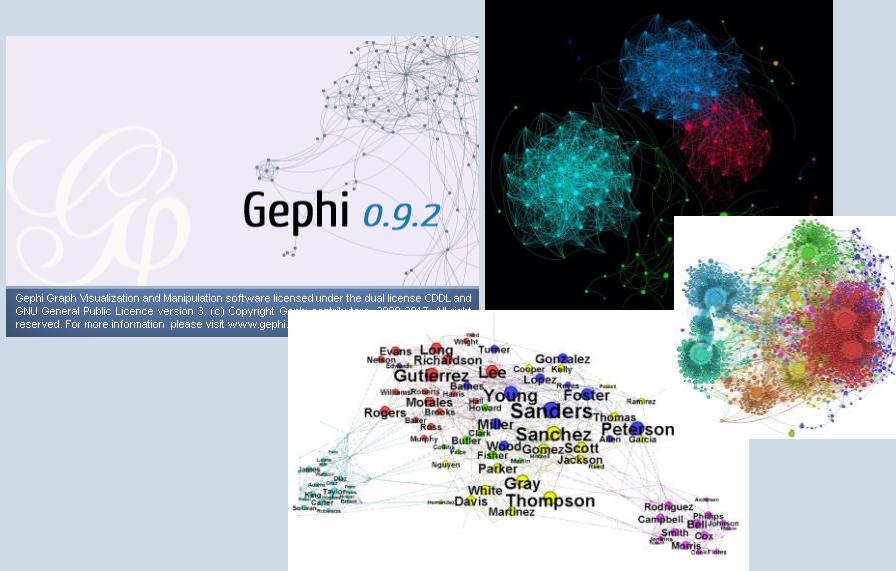
**Music in Milan
(1958-1962)**



Milan 1958-62, performers' birthplaces: <https://bit.ly/3ZP7zwE>



<https://gephi.org/>



Gephi is an open-source network analysis and visualization software package written in Java on the NetBeans platform.

Gephi has been used in a number of research projects in academia, journalism and elsewhere, for instance in visualizing the global connectivity of New York Times content and examining Twitter network traffic during social unrest along with more traditional network analysis topics. Gephi is widely used within the digital humanities (in history, literature, political sciences, etc.), a community where many of its developers are involved.

Source: <https://en.wikipedia.org/wiki/Gephi>

Gephi

Formats

- As input → All the tabular formats (csv is always the better one) included json or gdf,
- As outcome → Gephi can save and export in several formats such as png, pdf, svg, kml, shp, js.

Datasets

Red columns are mandatory. The standard variable may be direct (univocal relation) or indirect (bi-univocal relation) depending on the relation.

Edges

	A	B	C
1	Source	Target	Type
2	Giovanni	Nancy	Direct
3	Giovanni	Poitiers	Direct
4	Isabelle	Paris	Direct
5	Isabelle	Nancy	Direct
6	Laura	Nancy	Direct
7	Silvia	Paris	Direct
8	Silvia	Nancy	Direct

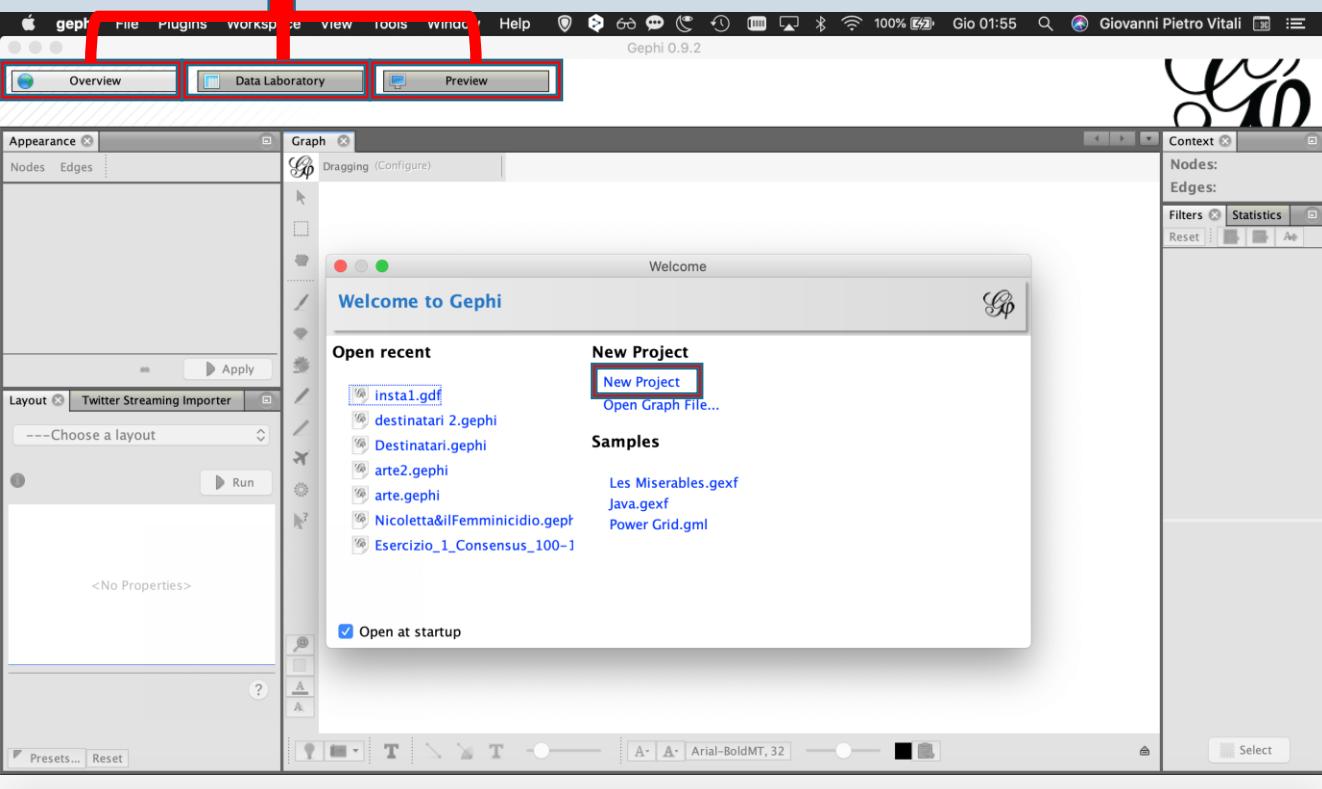
	A	B	C	D	E	F
1	ID	Label	attribute	role	lat	lng
2	Nancy	Nancy		4 city	48.692034	6.182367
3	Poitiers	Poitiers		1 city	46.580123	0.338505
4	Giovanni	Giovanni		2 teacher	44.074621	10.479448
5	Laura	Laura		1 professeur	45.537141	12.642686
6	Silvia	Silvia		2 teacher	45.064231	7.677655
7	Paris	Paris		2 city	48.859268	2.347747
8	Isabelle	Isabelle		2 professeur	45.837876	1.253814

Nodes

Nodes:
ID is the unique identification value of each element.
Label is the label that Gephi will display for that element.

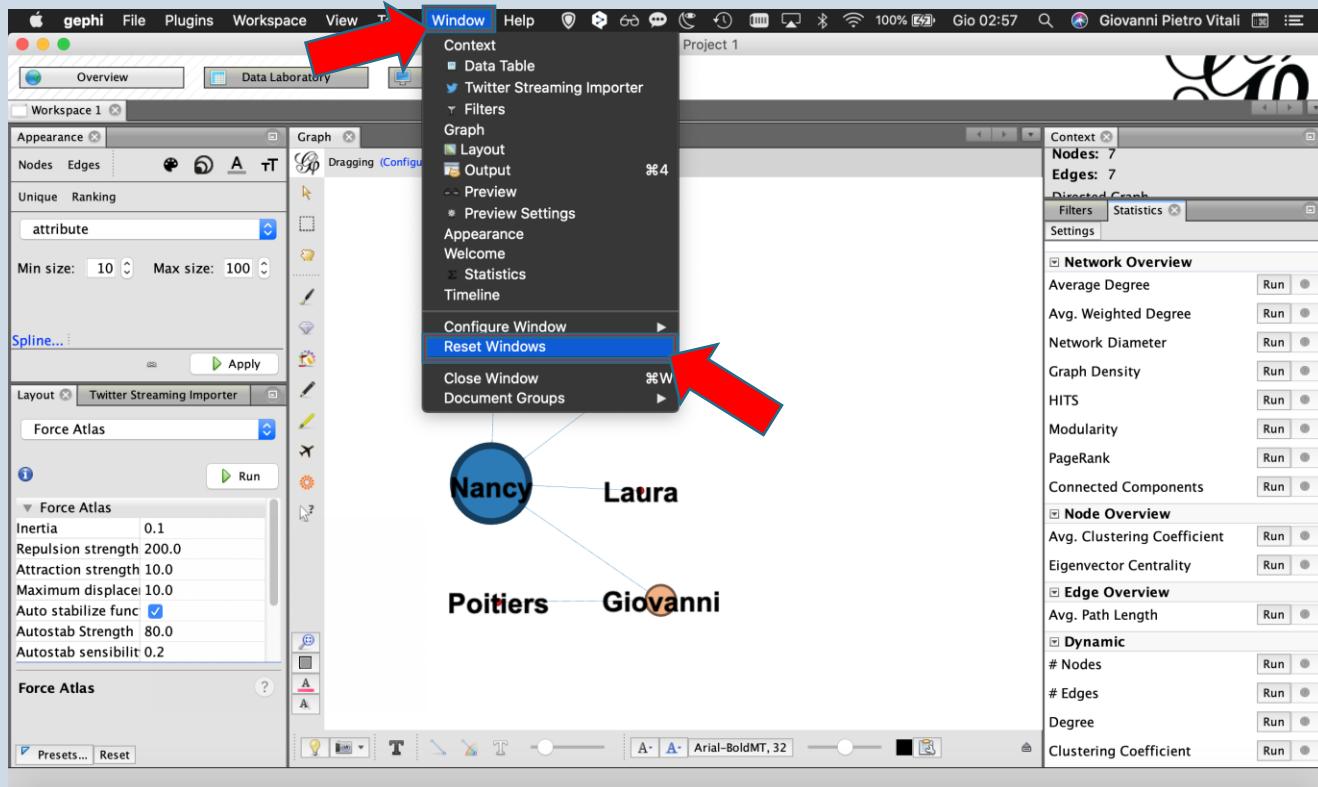
Edges:
Source and Target must express the ID values (table nodes).

Software



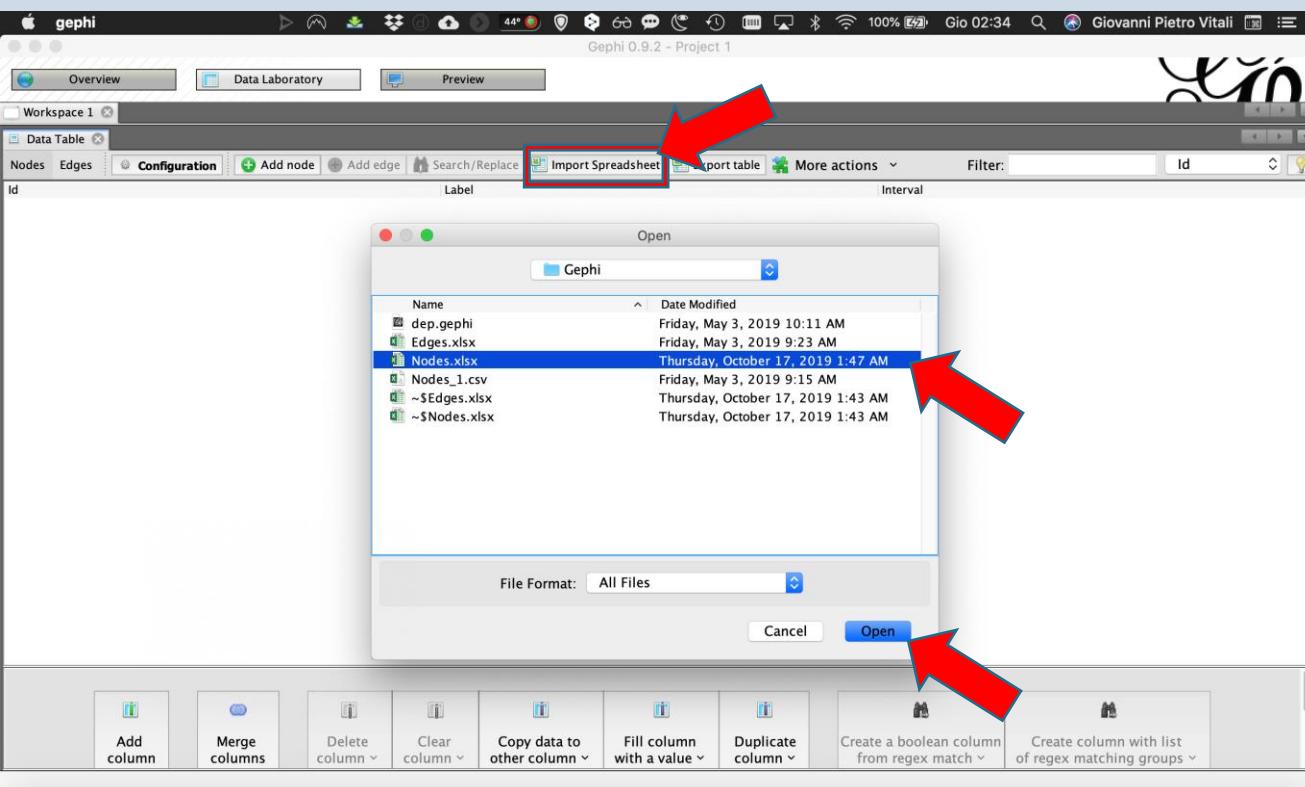
These three options must be used at the same time. For a good use of Gephi it is necessary to pass constantly between the **overview**, the **data laboratory** and the **preview**.

- The **data laboratory** contains the tables with data
- The **Overview** is a draft of the final graph where you can customize options such as colors, spatializations or sizes of nodes and edges.
- The **preview** is the graphical section where you can draw the last details of the graph and save or export.



Messy windows? Restart them!

Data Laboratory



You always start at the data laboratory after you create a new project.

It is always good practice to import nodes first.

Check import preview

The screenshot shows the Gephi interface with the 'Data Laboratory' tab selected. A dialog box titled 'General Excel Options (1 of 2)' is open, prompting the user to import an Excel file. The 'Sheet:' dropdown shows 'Foglio1' and the 'Import as:' dropdown shows 'Nodes ta...'. A preview table displays the following data:

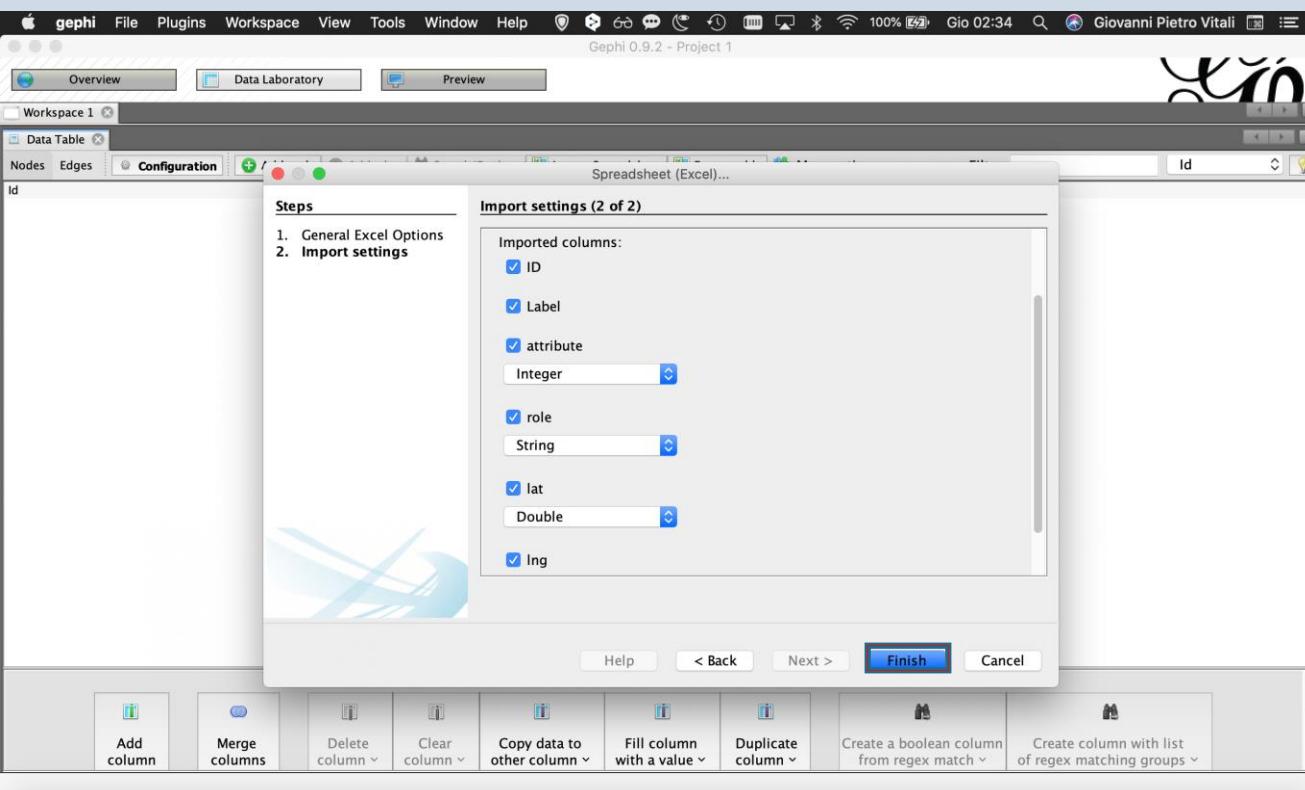
ID	Label	attribute	role	lat	long
Nancy	Nancy	4	city	48.692034	6.182367
Poitiers	Poitiers	1	city	46.580123	0.338505
Giovanni	Giovanni	2	teacher	44.074621	10.479448
Laura	Laura	1	professeur	45.537141	12.642686
Silvia	Silvia	2	teacher	45.064231	7.677655
Paris	Paris	2	city	48.859268	2.347747
Isabelle	Isabelle	2	professeur	45.837876	1.253814

The 'Next >' button at the bottom of the dialog is highlighted with a red box.

Below the dialog, a toolbar provides various data manipulation options:

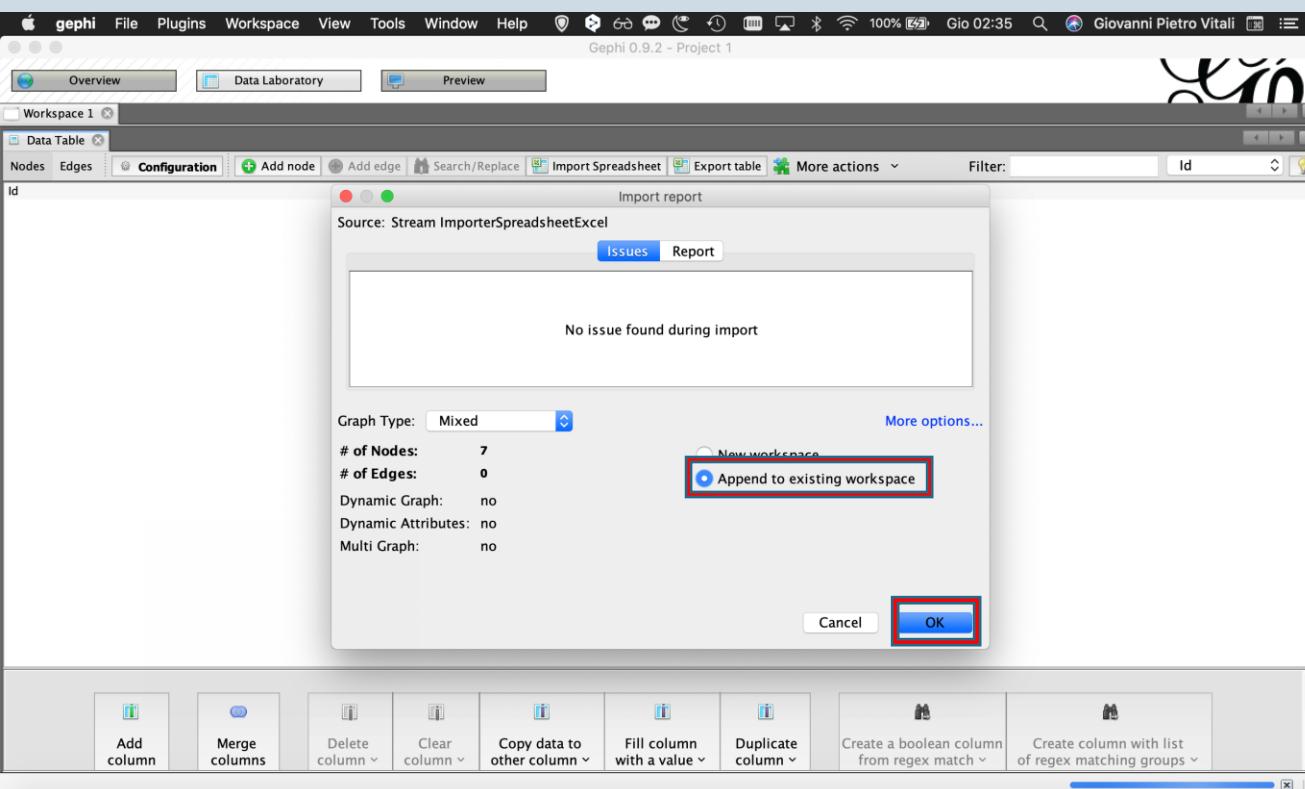
- Add column
- Merge columns
- Delete column
- Clear column
- Copy data to other column
- Fill column with a value
- Duplicate column
- Create a boolean column from regex match
- Create column with list of regex matching groups

Gephi matches each variable (column) with a typology.



The latitude and longitude variables must always be double.

Append to existing workspace!

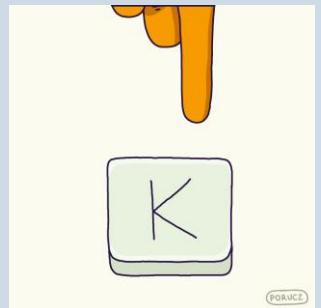


The data laboratory has been updated.

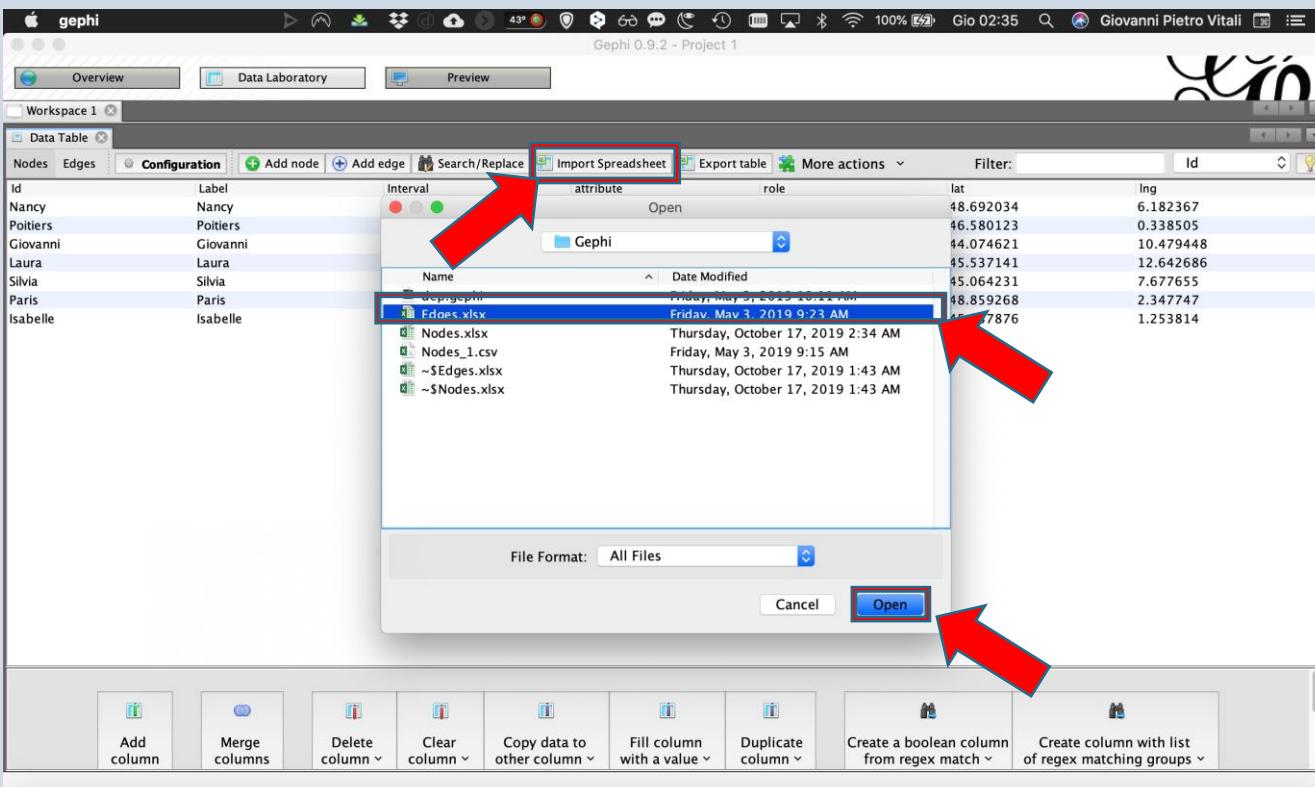
The screenshot shows the Gephi Data Laboratory interface. At the top, there are tabs for Overview, Data Laboratory, and Preview. Below the tabs, a workspace titled "Workspace 1" is selected. The main area displays a "Data Table" with the following columns: Id, Label, Interval, attribute, role, lat, lon, and Ing. The data rows are as follows:

Id	Label	Interval	attribute	role	lat	lon	Ing
Nancy	Nancy		4	city	48.692034		6.182367
Poitiers	Poitiers		1	city	46.580123		0.338505
Giovanni	Giovanni		2	teacher	44.074621		10.479448
Laura	Laura		1	professeur	45.537141		12.642686
Silvia	Silvia		2	teacher	45.064231		7.677655
Paris	Paris		2	city	48.859268		2.347747
Isabelle	Isabelle		2	professeur	45.837876		1.253814

At the bottom, there is a toolbar with icons for Add column, Merge columns, Delete column, Clear column, Copy data to other column, Fill column with a value, Duplicate column, Create a boolean column from regex match, and Create column with list of regex matching groups.



Repeat the same operation with the edges.



Check import preview

Screenshot of Gephi 0.9.2 showing the Data Laboratory interface for importing an Excel file.

The main window shows a workspace with nodes and edges. A "Data Laboratory" tab is active, displaying a preview of the imported data.

A modal dialog titled "General Excel Options (1 of 2)" is open, showing the following configuration:

- Excel file to import: /Users/Giovanni/Documents/UCC/Corsi/Tours/Exercises/Gephi/Edges.xlsx
- Sheet: Foglio1
- Import as: Edges table

The "Preview" section shows the following data:

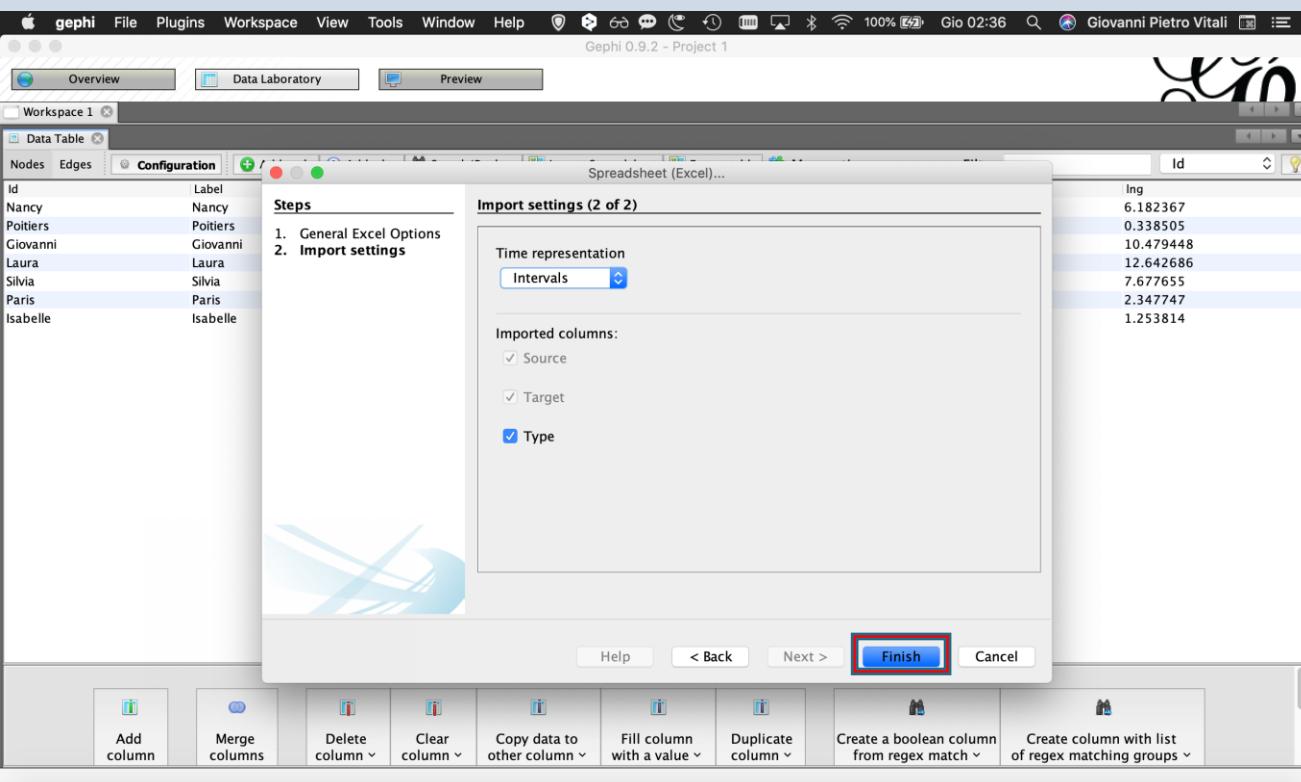
Source	Target	Type
Giovanni	Nancy	Direct
Giovanni	Poitiers	Direct
Isabelle	Paris	Direct
Isabelle	Nancy	Direct
Laura	Nancy	Direct
Silvia	Paris	Direct
Silvia	Nancy	Direct

At the bottom of the dialog, the "Next >" button is highlighted with a red box.

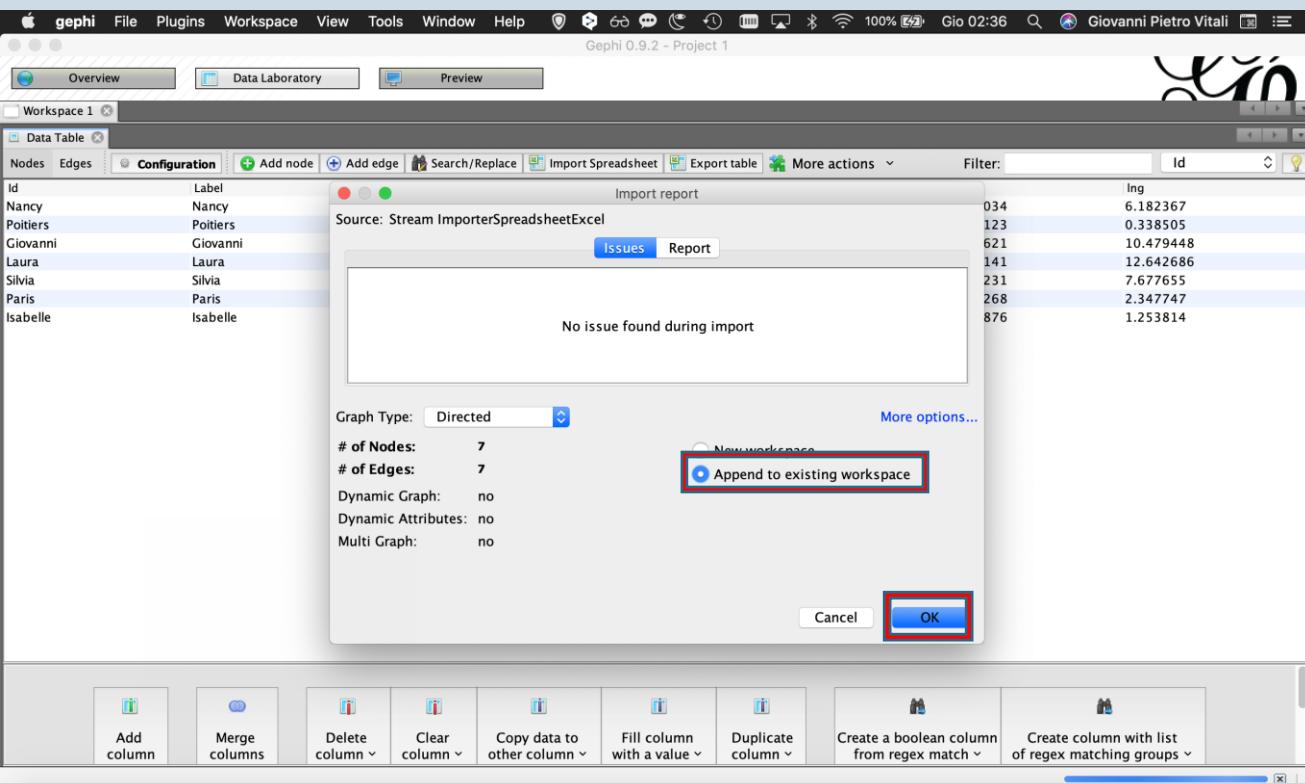
The bottom toolbar contains various data manipulation tools:

- Add column
- Merge columns
- Delete column
- Clear column
- Copy data to other column
- Fill column with a value
- Duplicate column
- Create a boolean column from regex match
- Create column with list of regex matching groups

Gephi matches each variable (column) with a typology.



Append to existing workspace!

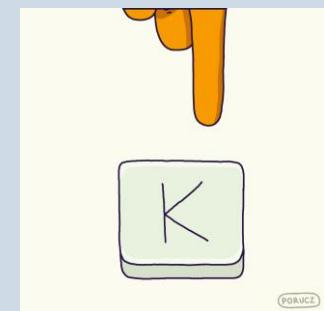


The data laboratory has been updated.

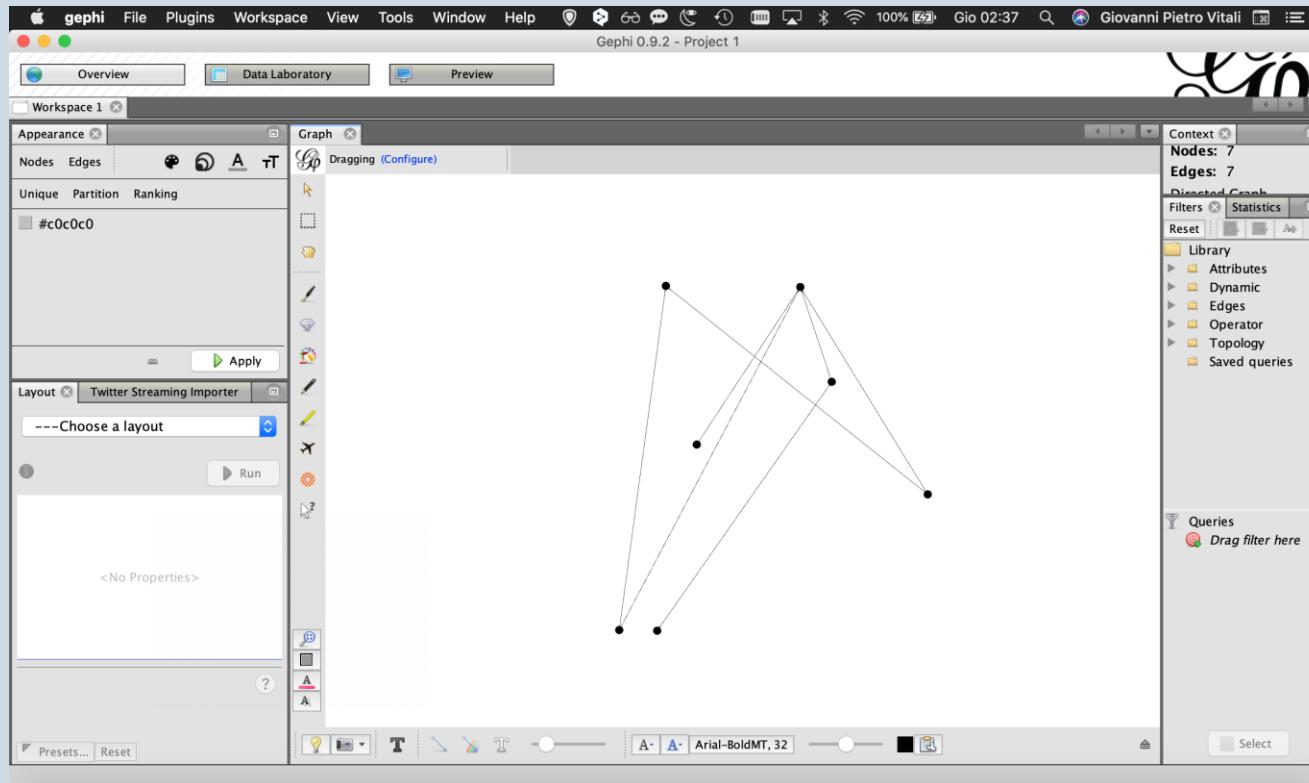
Screenshot of the Gephi 0.9.2 Data Laboratory interface. The window title is "Gephi 0.9.2 - Project 1". The top menu bar includes File, Plugins, Workspace, View, Tools, Window, Help, and a system tray showing battery level (100%), time (Gio 02:37), and signal strength. The main toolbar features Overview, Data Laboratory (selected), Preview, and a workspace switcher for "Workspace 1". Below the toolbar is a "Data Table" section with tabs for Nodes, Edges, Configuration, Add node, Add edge, Search/Replace, Import Spreadsheet, Export table, More actions, and a Filter dropdown. The configuration tab displays a table of edges:

Source	Target	Type	Id	Label	Interval	Weight
Giovanni	Nancy	Directed	0			1.0
Giovanni	Poitiers	Directed	1			1.0
Isabelle	Paris	Directed	2			1.0
Isabelle	Nancy	Directed	3			1.0
Laura	Nancy	Directed	4			1.0
Silvia	Paris	Directed	5			1.0
Silvia	Nancy	Directed	6			1.0

At the bottom of the Data Table panel are several icons for column operations: Add column, Merge columns, Delete column, Clear column, Copy data to other column, Fill column with a value, Duplicate column, Create a boolean column from regex match, and Create column with list of regex matching groups.



Overview

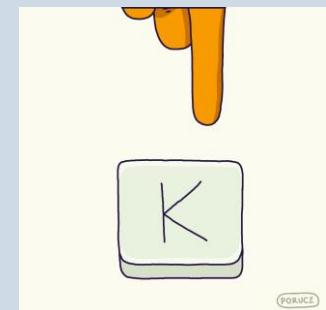
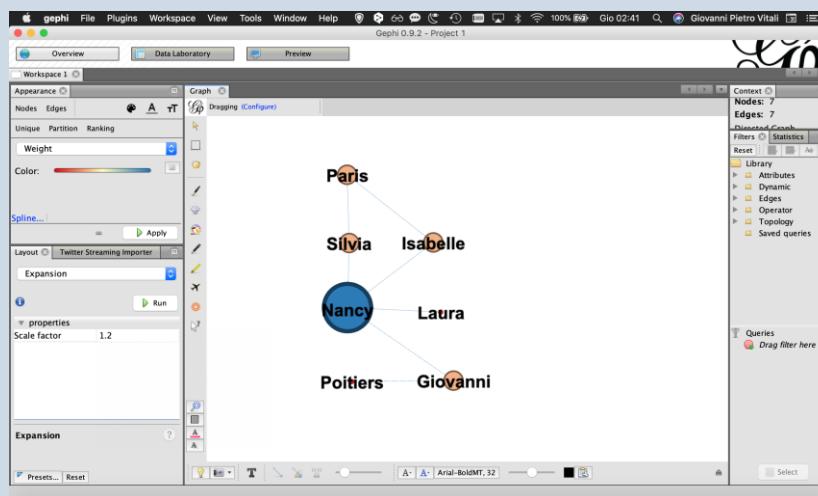


The parts of the Overview

The screenshot illustrates the NetworkX interface with several key components highlighted:

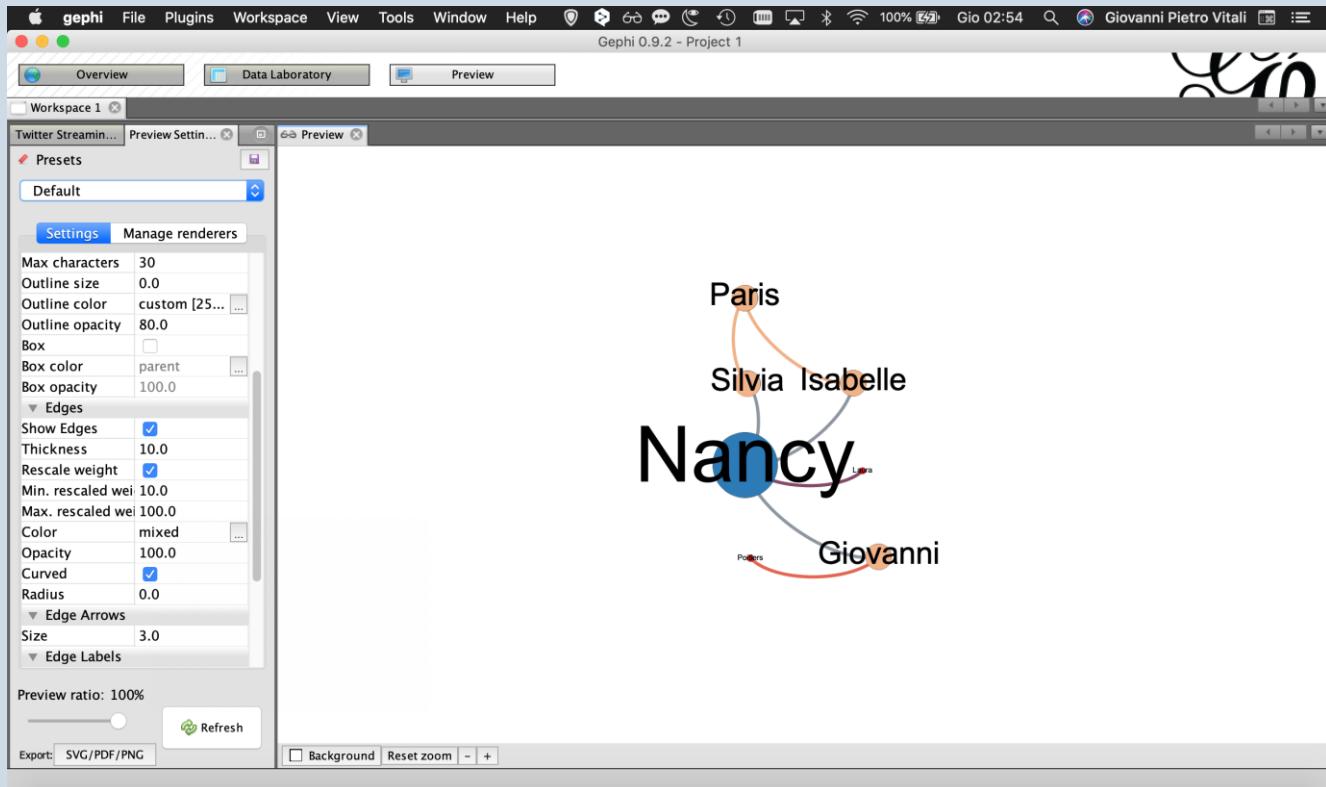
- Spatialisation:** On the left, the "Layout" tab is selected, showing the "Twitter Streaming Importer" and "Force Atlas" layout parameters.
- Appearance Settings:** In the center, the "Appearance" tab is open, showing settings for "Nodes" and "Edges". A red arrow points to the "Nodes" tab, which is highlighted with a red border. Another red arrow points to the "Edges" tab. To the right of these tabs are four icons: a color palette, a magnifying glass, a letter "A", and a letter "T". Red arrows point from the text labels "Element colours", "Element dimension", "Font colours", and "Font dimension" to these icons respectively.
- Statistical Analysis:** On the right, the "Context" tab shows "Nodes: 7" and "Edges: 7". Below it is a "Directed Graph" section with "Filters" and "Statistics" tabs. The "Statistics" tab is expanded, showing various network metrics with "Run" buttons:
 - Network Overview:** Average Degree, Avg. Weighted Degree, Network Diameter, Graph Density.
 - Node Overview:** Avg. Clustering Coefficient, Eigenvector Centrality.
 - Edge Overview:** Avg. Path Length.
 - Dynamic:** # Nodes, # Edges, Degree, Clustering Coefficient.

Customising the overview



Preview

At this point clicking on the preview the result of the overview has this aspect.



Preview's menus

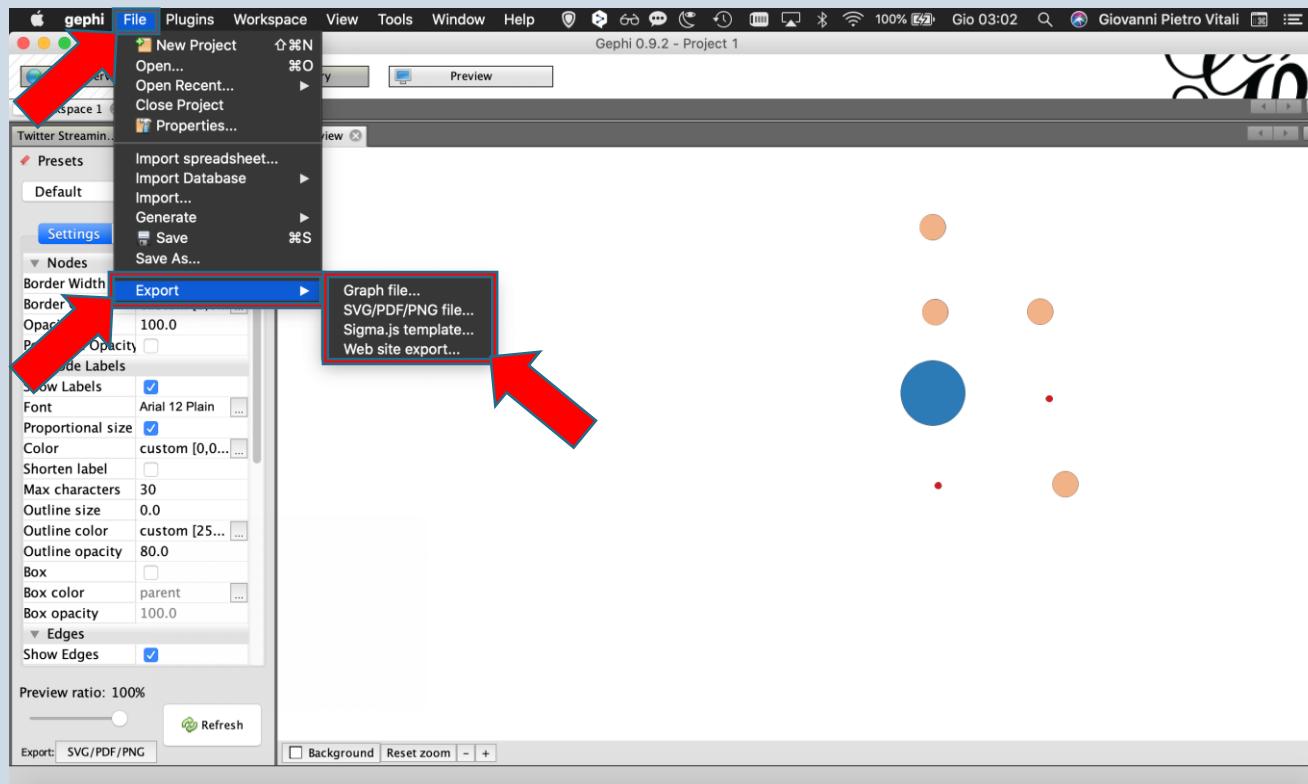
Nodes

▼ Nodes	
Border Width	1.0
Border Color	custom [0,0,0,1] <input type="button" value="..."/>
Opacity	100.0
Per-Node Opacity	<input type="checkbox"/>
▼ Node Labels	
Show Labels	<input checked="" type="checkbox"/>
Font	Arial 12 Plain <input type="button" value="..."/>
Proportional size	<input checked="" type="checkbox"/>
Color	custom [0,0,0,1] <input type="button" value="..."/>
Shorten label	<input type="checkbox"/>
Max characters	30
Outline size	0.0
Outline color	custom [25,25,25,1] <input type="button" value="..."/>
Outline opacity	80.0
Box	<input type="checkbox"/>
Box color	parent <input type="button" value="..."/>
Box opacity	100.0

Edges

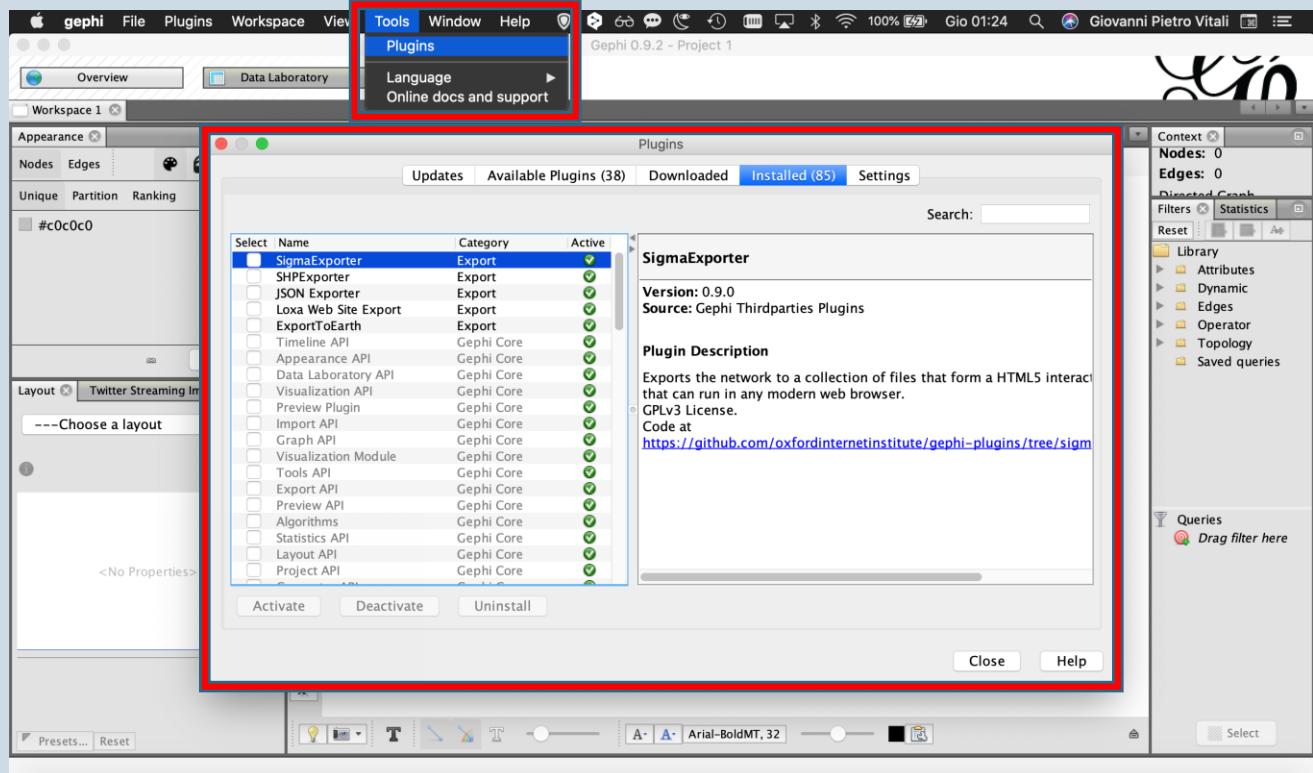
▼ Edges	
Show Edges	<input checked="" type="checkbox"/>
Thickness	10.0
Rescale weight	<input checked="" type="checkbox"/>
Min. rescaled wei	10.0
Max. rescaled wei	100.0
Color	mixed <input type="button" value="..."/>
Opacity	100.0
Curved	<input checked="" type="checkbox"/>
Radius	0.0
▼ Edge Arrows	
Size	3.0
▼ Edge Labels	
Show Labels	<input type="checkbox"/>
Font	Arial 10 Plain <input type="button" value="..."/>
Color	original <input type="button" value="..."/>
Shorten label	<input type="checkbox"/>
Max characters	30
Outline size	0.0
Outline color	custom [25,25,25,1] <input type="button" value="..."/>
Outline opacity	80.0

Export



Layouts

Plugins



- TwitterStreamingExporter
- Map of Countries
- Circular Layout
- MultiGravity Force Atlas 2
- GeoLayout

Exporters

- SigmaExporter
- SHPExporter
- JSON Exporter
- Loxa Web Site Export
- Export to Earth

Let's practice

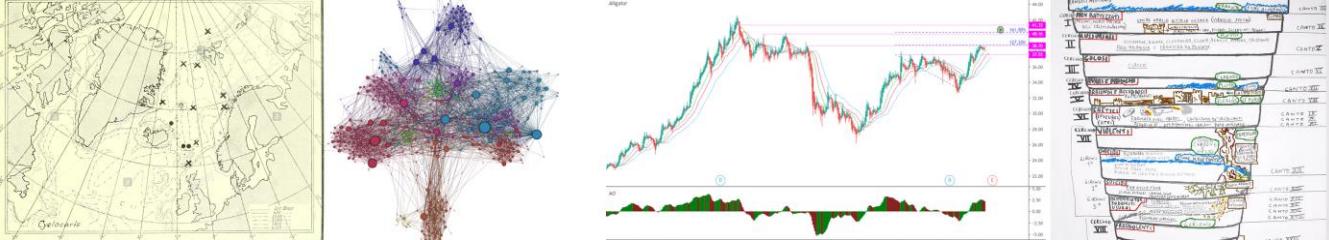


Nodes: <http://bit.ly/2MjTUd8>

Edges: <http://bit.ly/2VKPLCi>

<https://www.roughguides.com/gallery/most-beautiful-city-in-the-world/>

```
# for details, see https://review.docs.microsoft.com/en-us/visualstudio/rtsv/sql-server  
# Test code  
library(RODBC)  
channel <- odbcDriverConnect(dbConnection)  
InputDataSet <- sqlQuery(channel, iconv(paste(readLines(  
  'c:/proj/rproject1/rproject1/storedprocedure.query.sql',  
  encoding = 'UTF-8', warn = FALSE), collapse = '\n'), from = 'UTF-8',  
  to = 'ASCII', sub = ''))  
odbcClose(channel)  
OutputDataSet <- InputDataSet
```



Gephi

_end

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