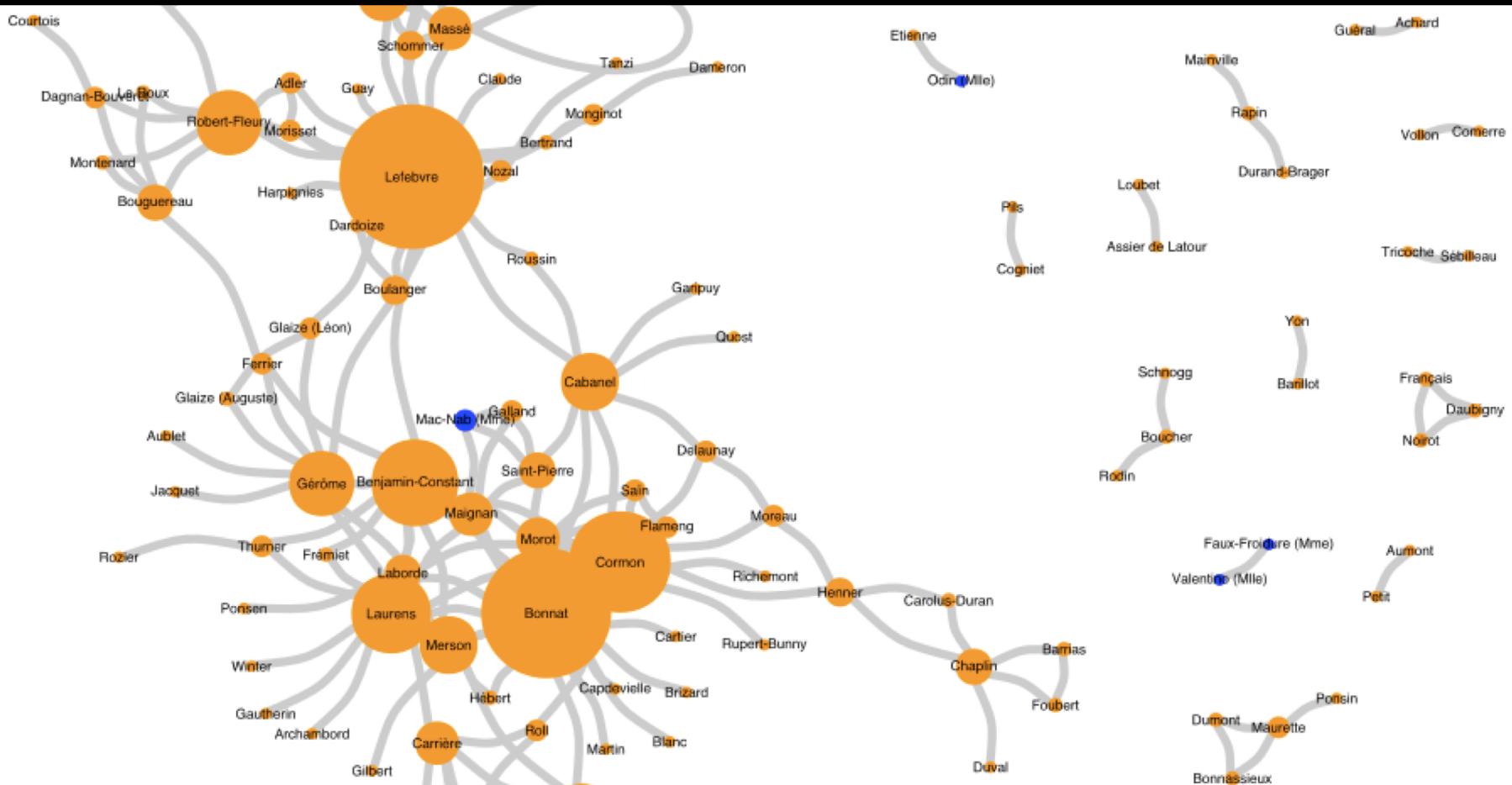


Network Analysis with R (and beyond!)



NA+DAH, April 14, 2021
A Getty Advanced Workshop on
Network Analysis and Digital Art History

Léa Saint-Raymond (ENS-PSL)

What do you want to do ?

Compute statistics

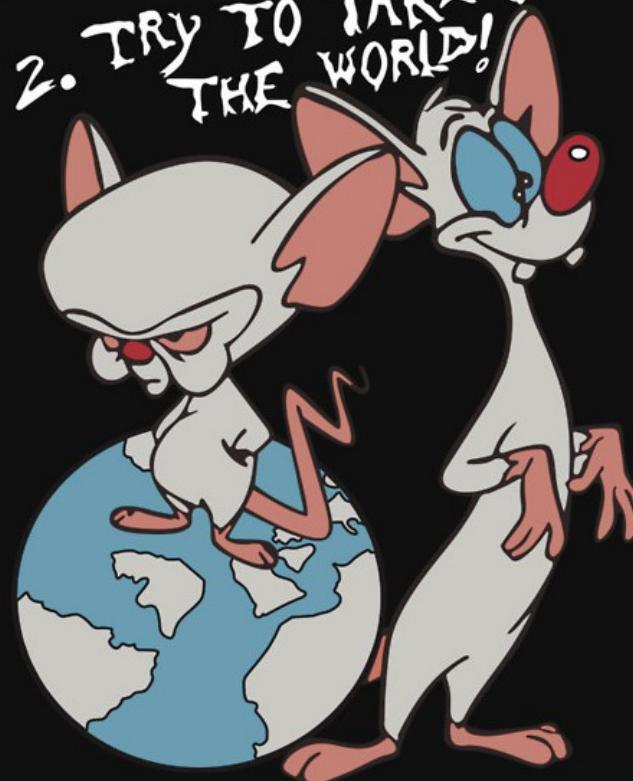
Go fast

Draw beautiful
networks (for publication)

Overlay a network
on a map

TO DO LIST:

1. WAIT FOR TONIGHT
2. TRY TO TAKE OVER THE WORLD!



What do you want to do ?

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Go fast

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Overlay a network
on a map

Use R

(it depends on the map!)



Clone the « tutorials » repository of my GitHub



Léa Saint-Raymond

Saint-Raymond

Observatoire des humanités
numériques de l'ENS-PSL

[Edit profile](#)

6 followers · 18 following · 0 stars



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<https://ens.academia.edu/LéaSaintRa...>

@LeaStRaymond

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tutorials Template

R 4 stars

34 contributions in the last year Contribution settings ▾

Learn how we count contributions.

Contribution activity

April 2021 2021

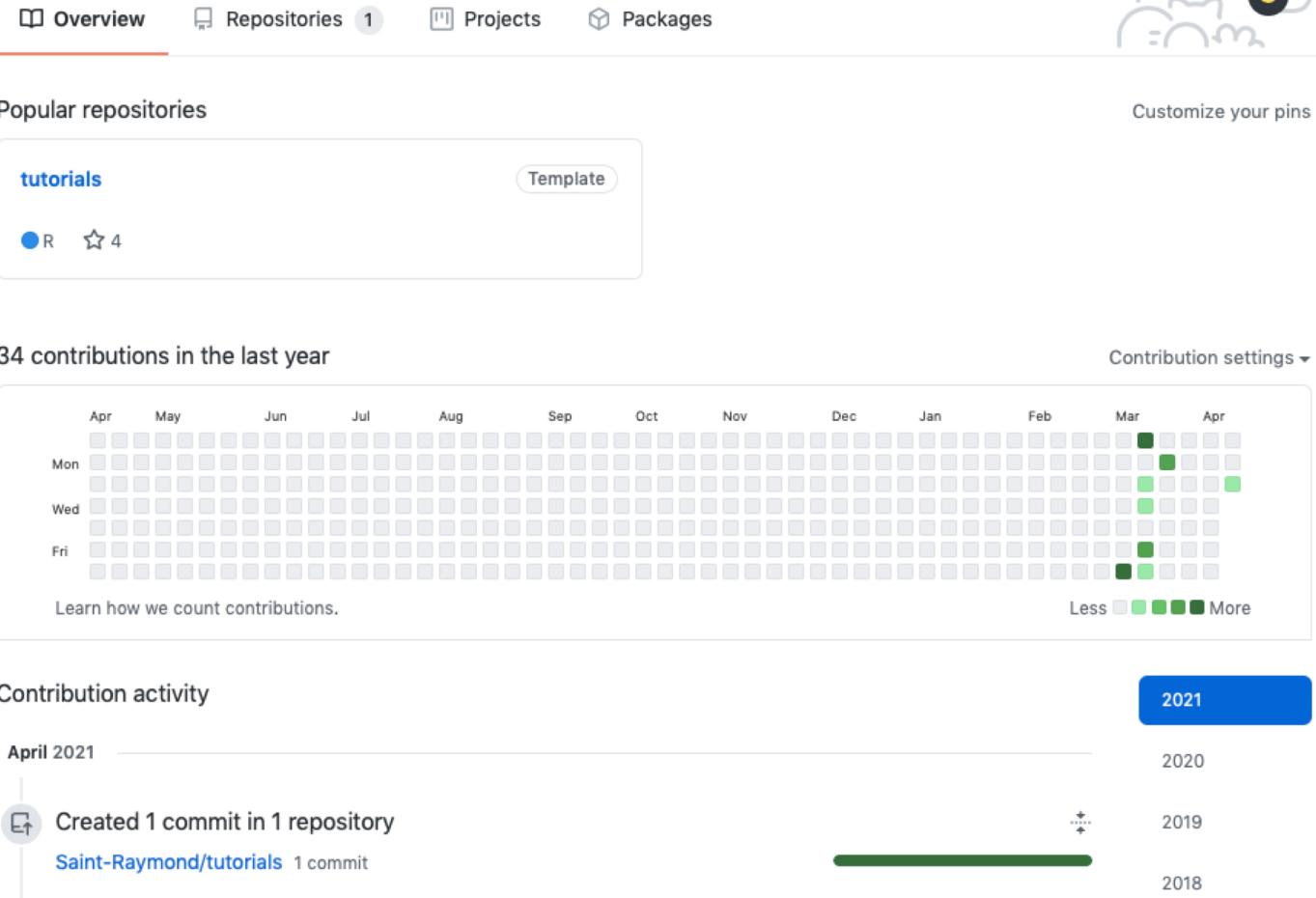
Created 1 commit in 1 repository Saint-Raymond/tutorials 1 commit

2020

2019

2018

Customize your pins

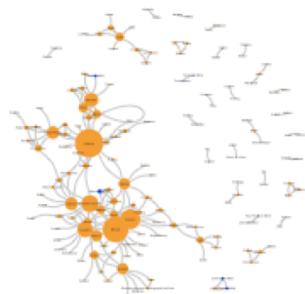


Download R, Rstudio and open the script.R file

The screenshot shows a GitHub repository page for 'Saint-Raymond / tutorials'. The repository has a 'Template' status. The main navigation bar includes links for Code, Issues, Pull requests, Discussions, Actions, Projects, Wiki, Security, and Insights. The repository structure is displayed under the 'main' branch. An orange oval highlights the 'tutorials / Networks /' folder. Inside this folder, several files are listed: '.DS_Store', 'Networks.pptx', 'auctionlinks.csv', 'auctionnodes.csv', 'lieutitre.csv', 'python_network_on_map.py', 'script.R', and '~\$Networks.pptx'. The 'script.R' file is also highlighted with an orange oval.

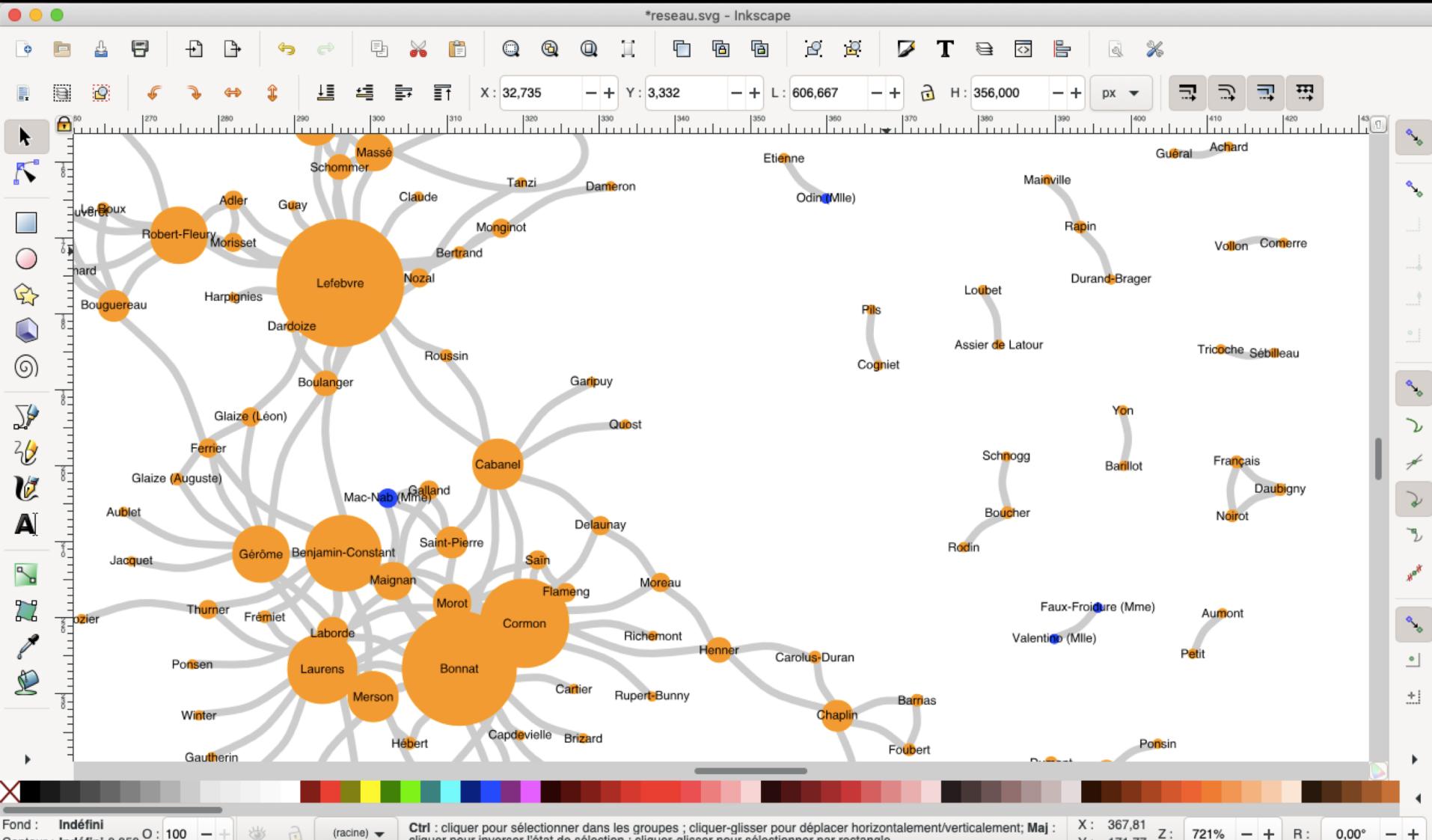
File	Type
.DS_Store	-
Networks.pptx	-
auctionlinks.csv	-
auctionnodes.csv	-
lieutitre.csv	-
python_network_on_map.py	-
script.R	-
~\$Networks.pptx	-

The output is quite tiny and ugly.



Save it as a svg file...

... and work on it with Inkscape.



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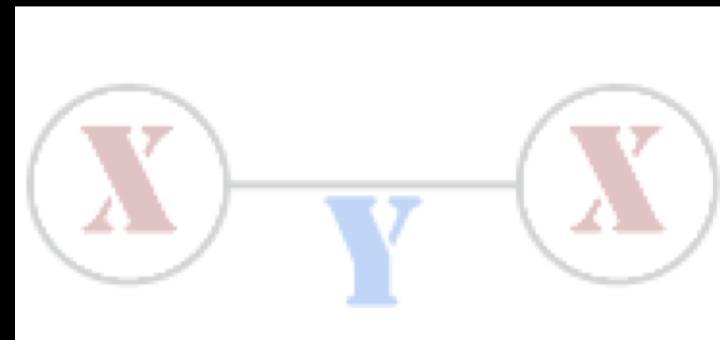


Use
Gephi

Overlay a network
on a map

Option #1 : normal network.

LUGT	Acteur
19595	Ridel
19595	Roussel
19595	Schroth
19595	Jeûneurs
19596	Bonnefons de Lavialle
19596	François
19596	Jeûneurs
19600	Ducrocq
19600	Simonet
19600	Bourse
19607	Bonnefons de Lavialle
19607	Laneuville
19614	Bonnefons de Lavialle
19614	Defer
19614	Jeûneurs
19615	Ridel
19615	Schroth
19615	Jeûneurs
19617	Bonnefons de Lavialle
19617	Messager
19617	Jeûneurs
19619	Danthonay
19619	Couet Francisque
19619	Bourse
19623	Ridel



I want a single type of nodes, for instance *art market actors*. They will be linked when they share a value in another column, for instance *Lugt number*.

Option #2 : bipartite network.

CP	Expert
Oudart	Barre
Oudart	Barre
Oudart	Barre
Boussaton	Durand-Ruel
Boussaton	Haro
Oudart	Martin et Paschal
Pillet	Weyl
Oudart	Barre
Oudart	Barre
Oudart	Barre
Pillet	Durand-Ruel
Oudart	Durand-Ruel
Oudart	Durand-Ruel
Escrive	Durand-Ruel
Pillet	Durand-Ruel
Pillet	Durand-Ruel
Boussaton	Durand-Ruel
Boussaton	Durand-Ruel



I want two types of nodes, for instance **auctioneers** (**CP**) and **experts**. So **column 1 = CP** and **column 2 = experts**.

Experts and CP will be linked if they appear in the same row of the table

Prepare your input file with <https://medialab.github.io/table2net/>

Table 2 Net + Médialab Tools



Table 2 Net

Extract a network from a table. Set a column for nodes and a column for edges. It deals with multiple items per cell.

Load your CSV table

It has to be **comma-separated** and the first row must be dedicated to **column names**.

aucun fichier sél.
Note: you can drag and drop a file

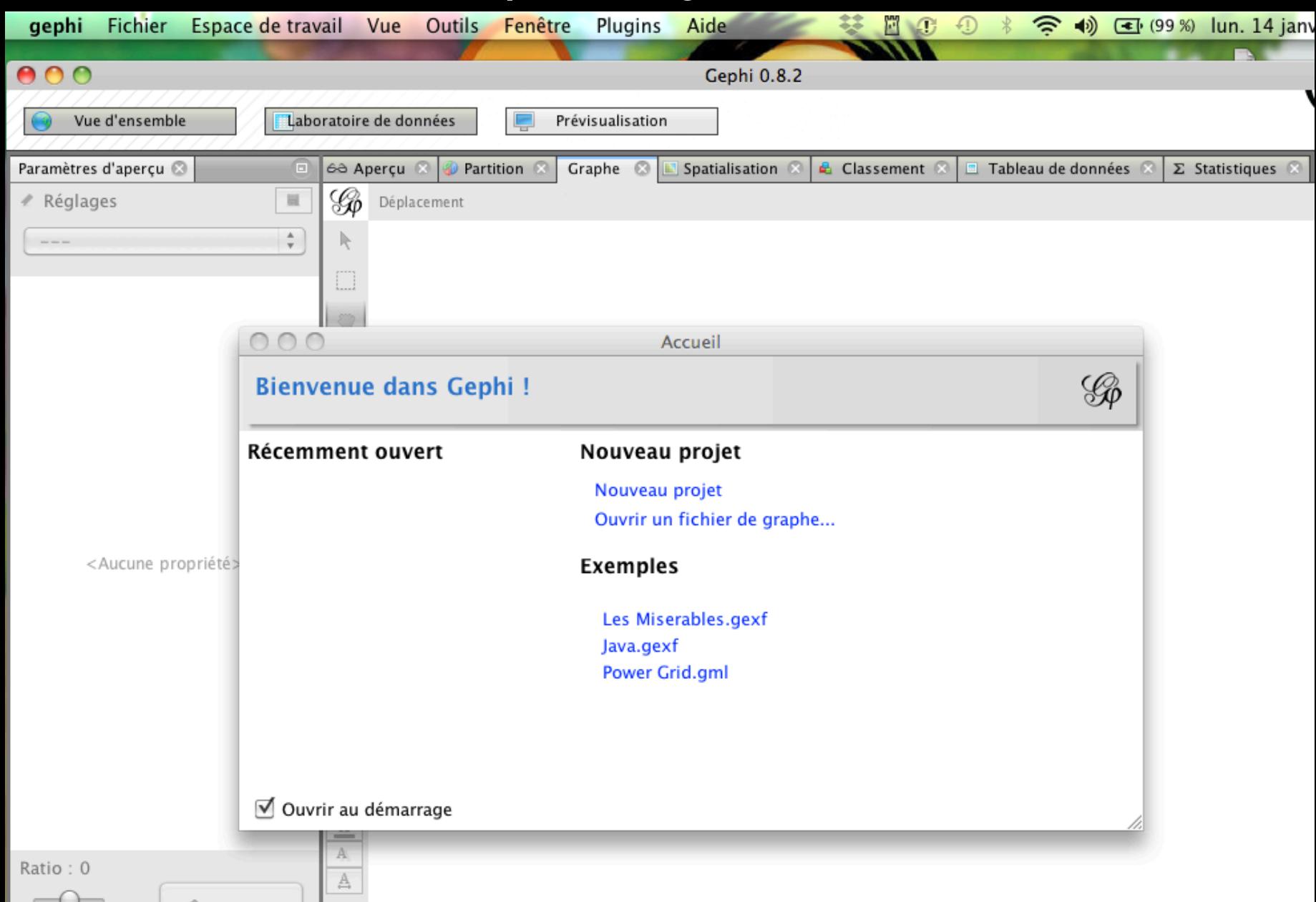
[Tweet](#)

See also our other tools at [Médialab Tools!](#)

We used:
[FileSaver.js](#), [Bootstrap](#), [jQuery](#), [Modernizr](#),
[Initializr](#)

 SciencesPo. | médialab
Developed by Mathieu Jacomy
at the Sciences-Po Medialab

Open the gexf file



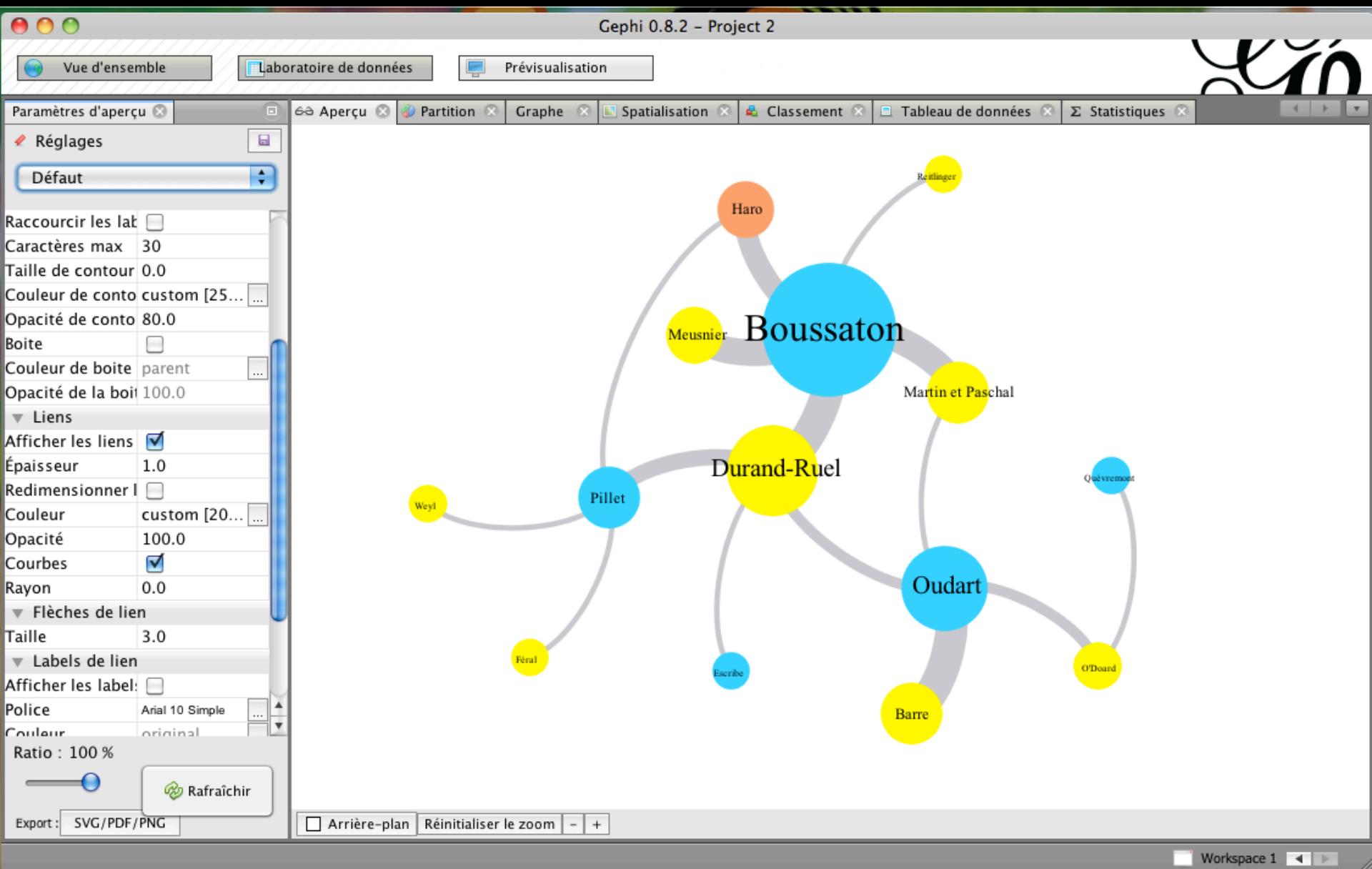
The « Vue d'ensemble » window allows to modify the shape of the network.

Screenshot of Gephi 0.8.2 - Project 2 showing the 'Vue d'ensemble' (Overview) window.

The interface includes:

- Top menu bar: Apple icon, gephigraph, Fichier, Espace de travail, Vue, Outils, Fenêtre, Plugins, Aide.
- System status bar: (99 %), lun. 14 janv. 4:47, Léa Sa
- Toolbar: Standard Mac OS X icons (red, yellow, green).
- Tab bar: Vue d'ensemble, Laboratoire de données, Prévisualisation, Aperçu, Partition, Graphe, Spatialisation, Classement, Tableau de données, Statistiques.
- Left sidebar: 'Paramètres d'aperçu' panel with sections for Nœuds, Labels de noeud, and Liens, each with various configuration options like size, color, and opacity.
- Right sidebar: 'Déplacement' panel with a toolbar of selection and transformation tools.
- Central workspace: A 3D-like view of a network graph with nodes and edges.
- Bottom toolbar: Refresh button, Export dropdown (SVG/PDF/PNG), and font/color/size controls.

The « prévisualisation » window allows to improve the network.



The « statistiques » window allows to compute the statistics of the network

Gephi 0.8.2 – Project 2

Vue d'ensemble Laboratoire de données Prévisualisation

Réglages

Défaut

Noeuds

- Largeur de la bordure: 1.0
- Couleur de la bordure parent:
- Opacité: 100.0

Labels de noeud

- Afficher les labels:
- Police: Arial
- Taille proportionnelle:
- Couleur: custom [0, 255, 255]
- Raccourcir les labels:
- Caractères max: 30
- Taille de contour: 0.0
- Couleur de contour: custom [255, 255, 255]
- Opacité de contour: 80.0
- Boîte:
- Couleur de boîte parent:
- Opacité de la boîte: 100.0

Liens

- Afficher les liens:
- Épaisseur: 2.0
- Redimensionner les liens:
- Couleur: custom [20, 20, 255]
- Ratio : 100 %

Paramètres

Vue générale du réseau

- Degré
- Degré pondéré
- Diamètre
- Densité
- HITS
- Modularité
- PageRank
- Composantes Connexes

Vue générale des noeuds

- Coefficient de Clustering
- Centralité Eigenvector

Vue générale des liens

- Plus courts chemins

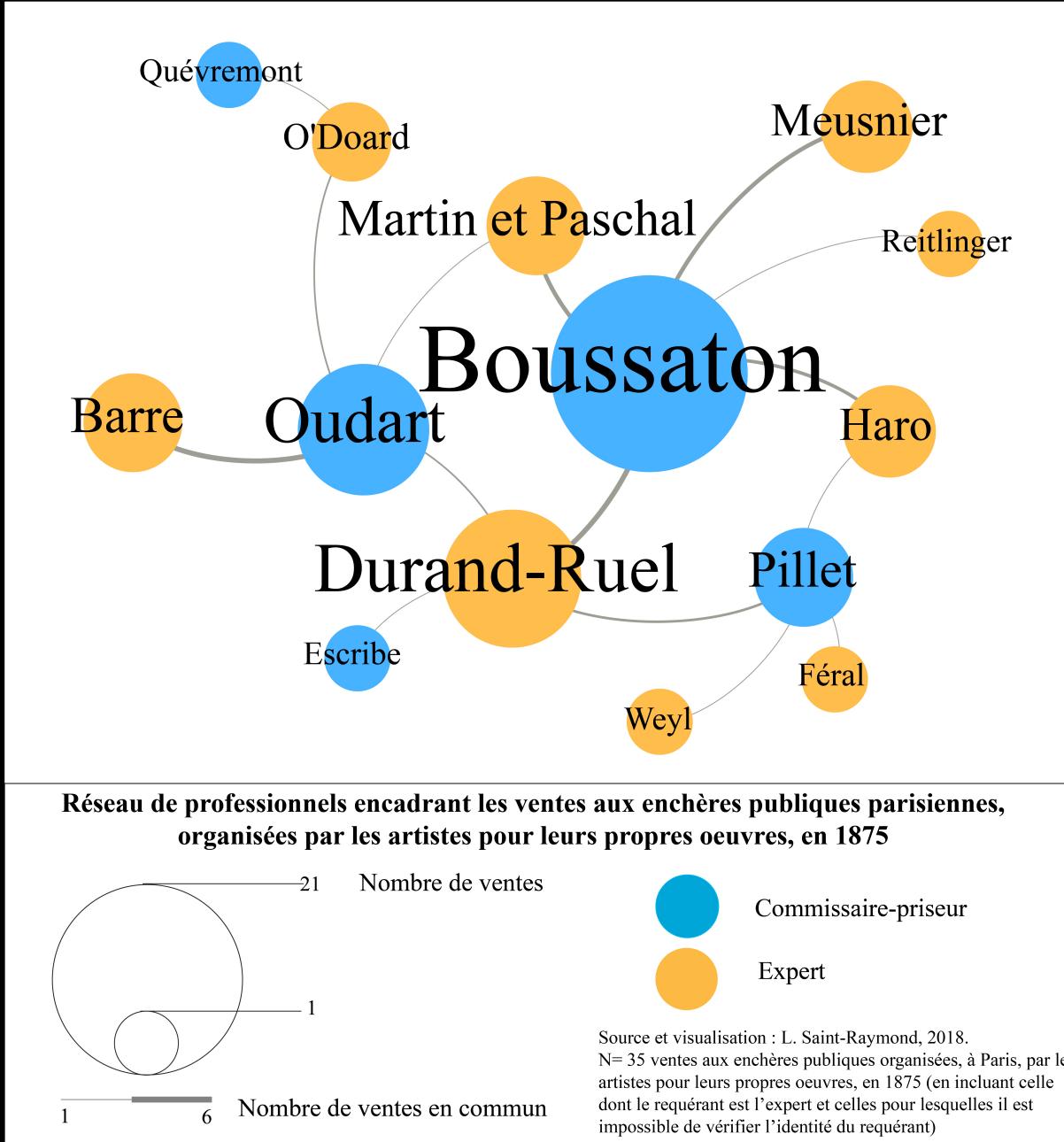
Exécuter

Rafraîchir

SVG/PDF/PNG

Workspace 1

Export as a svg file and add the legend with Inkscape



What do you want to do ?

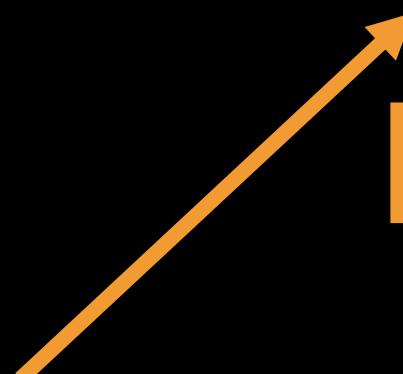
Compute statistics

Go fast

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Use
Python



Download Python and open the .py file

The screenshot shows a GitHub repository interface. At the top, the repository name is "Saint-Raymond / tutorials" with a "Template" badge. Below the header are navigation links: Code, Issues, Pull requests, Discussions, Actions, Projects, Wiki, Security, and Insights. The main content area displays a list of files in the "main" branch. An orange oval highlights the path "tutorials / Networks /". Another orange oval highlights the file "python_network_on_map.py".

Saint-Raymond / tutorials

Code Issues Pull requests Discussions Actions Projects Wiki Security Insights

main tutorials / Networks /

Saint-Raymond _

..

.DS_Store

Networks.pptx

auctionlinks.csv

auctionnodes.csv

lieutitre.csv

python_network_on_map.py

script.R

~\$Networks.pptx

```
Entrée [1]: # =====installing libraries =====
```

```
Entrée [2]: # on the Terminal, write (without #) :  
# if pip doesn't work, replace by pip3
```

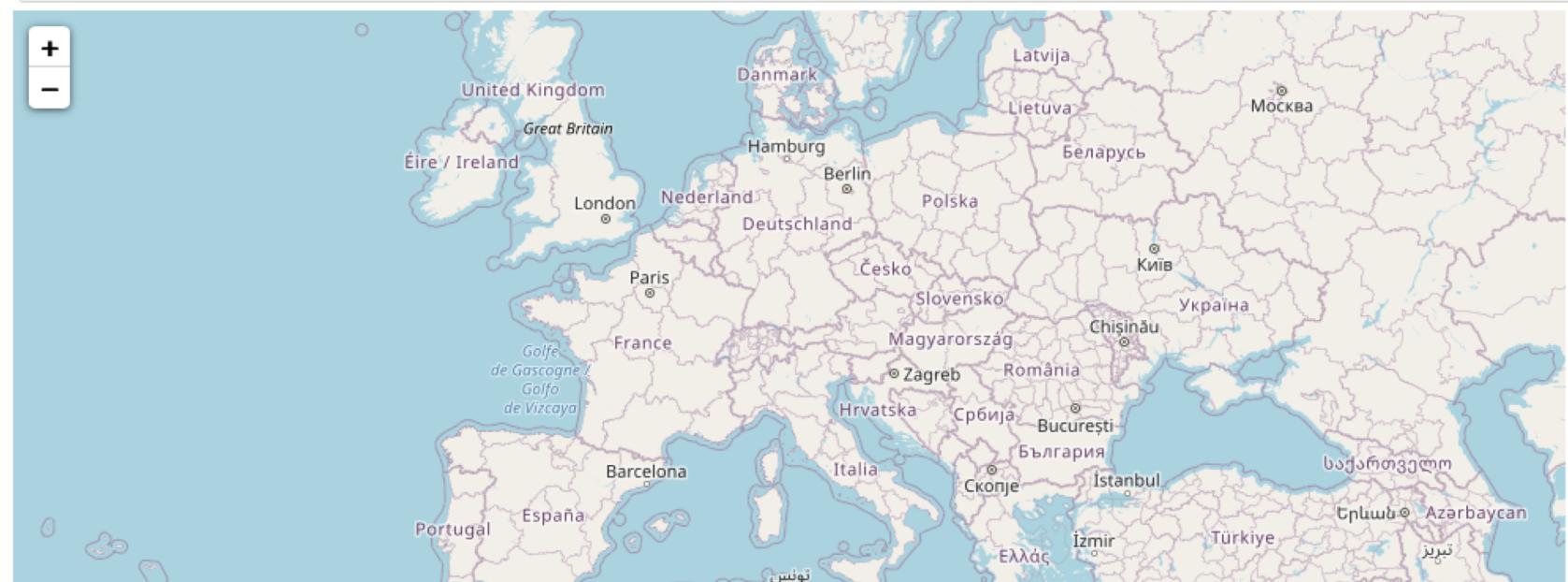
```
# pip install holoviz  
# pip install geopandas  
# pip install geoviews  
# pip install leaflet  
# pip install folium  
# pip install pandas  
# jupyter notebook  
  
# if you don't have jupyter notebook :  
# pip install --user jupyter  
# python3 -m notebook  
  
# Other method : in jupyter notebook :  
# check that the following modules have been downloaded into jupyter notebook, without the # in front:  
# !pip install holoviz  
# !pip install geopandas  
# !pip install geoviews  
# !pip install holoviews  
# !pip install leaflet  
# !pip install folium
```

```
Entrée [3]: # ======2. Visualization=====
```

```
Entrée [4]: # create a basemap:  
import folium  
coords = (46.539758, 2.430331)  
map = folium.Map(location=coords, tiles='OpenStreetMap', zoom_start=5)
```

```
Entrée [5]: map
```

Out[5]:



```
Entrée [6]: # open the pandas library and import the csv (it is in the Github repository)
```

```
import pandas

# I tell python to open such csv (I copied the path), I tell it what the delimiter is, here ";"
# I mention the columns of the csv that Python will have to use
# here "id_oe", "id_a", "name", "xaddress", "yaddress", "xtitle" and "ytitle"
# I call this corpus "bdx"

bdx = pandas.read_csv('/Users/leasant-raymond/Desktop/python/lieutitre.csv', delimiter=";",
                      usecols = ["id_oe", "id_a", "nom", "xadresse", "yadresse", "xtitre", "ytitre"])
```

```
Entrée [7]: # I plot the nodes that will constitute the node-sources on the basemap:
```

```
# for each line of bdx, Python places a point
# whose coordinates correspond to xaddress and yaddress (the artist's address)
# and whose diameter is 2
# the popup corresponds to the "name" ("nom") column of the artist.
# Be careful! All the addresses must be geolocalized !

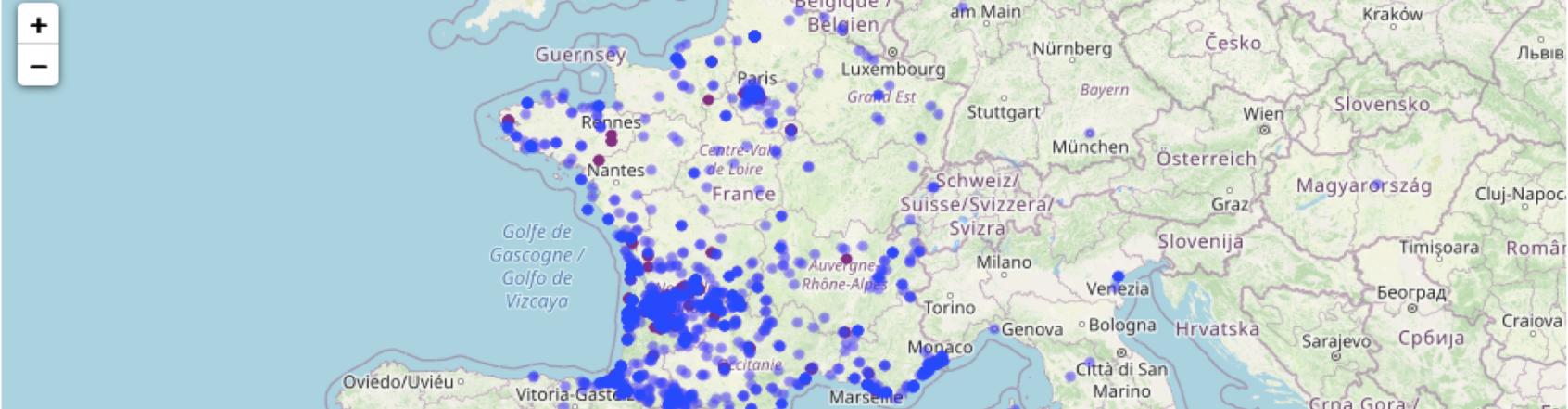
for i in range(len(bdx["id_oe"])):
    folium.CircleMarker(
        location = (bdx["xadresse"][i], bdx["yadresse"][i]),
        radius = 2,
        color = 'purple',
        fill = True,
        fill_color = 'purple',
        popup=str(bdx["nom"][i])
    ).add_to(map)
```

```
Entrée [9]: # I plot the nodes that will constitute the node-sources on the basemap:  
# here, the represented place whose coordinates are xtitre and ytitle.
```

```
for i in range(len(bdx["id_oe"])):   
    folium.CircleMarker(  
        location = (bdx["xtitre"][i], bdx["ytitre"][i]),  
        radius = 2,  
        color = 'blue',  
        fill = True,  
        fill_color = 'blue',  
        opacity = 0.4  
    ).add_to(map)
```

```
Entrée [10]: map
```

Out[10]:

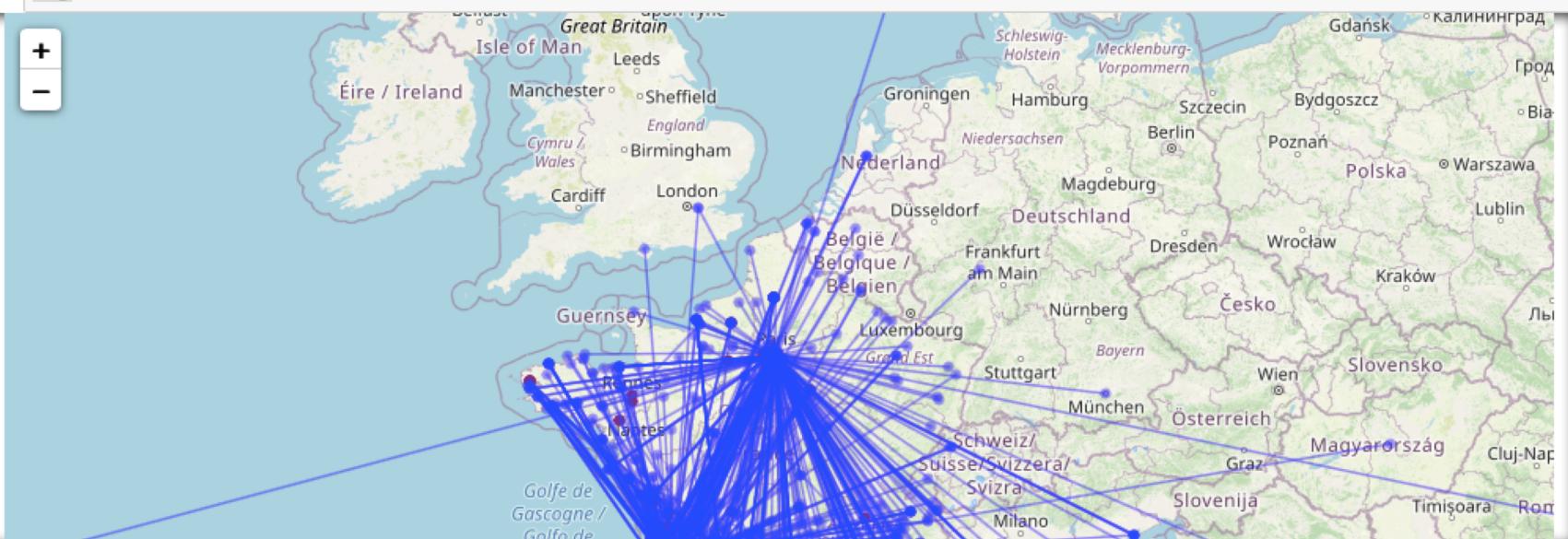


```
Entrée [11]: # Finally, I can connect the address points to the places represented:
```

```
Entrée [12]: for i in range(len(bdx["id_oe"])):
    folium.PolyLine([[bdx["xtitre"][i], bdx["ytitre"][i]],
                    [bdx["xadresse"][i], bdx["yadresse"][i]]],
                    color='blue', weight=1.5, opacity=0.5).add_to(map)
```

```
Entrée [13]: map
```

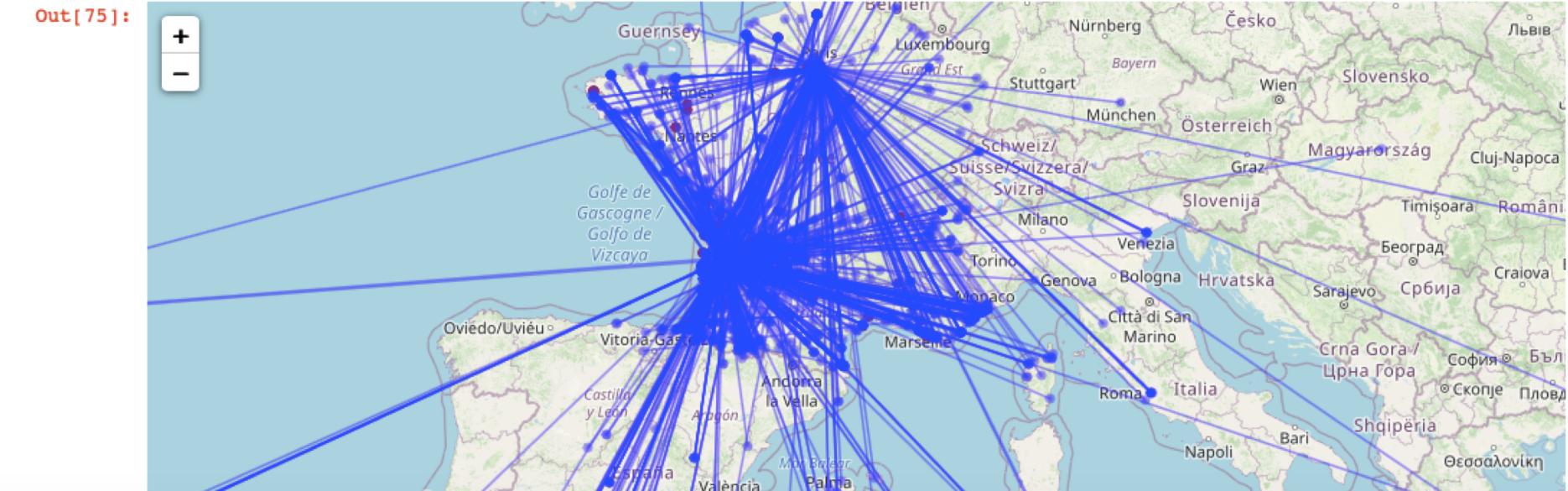
```
Out[13]:
```



Conclusion: The best is the enemy of the good.

```
Entrée [74]: for i in range(len(bdx["id_oe"])):
    folium.PolyLine([[bdx["xtitre"][i], bdx["ytitre"][i]],
                    [bdx["xadresse"][i], bdx["yadresse"][i]]],
                    color='blue', weight=1.5, opacity=0.5).add_to(map2)
```

```
Entrée [75]: map2
```



Network visualization is always a trade-off
between comprehensiveness and readability.

A last tip:
phylogenetic networks

See Philippe Gambette's conference at the DHAI seminar:



Rechercher un mot clef, Conférencier, Exposé...



▶ Accueil/ exposé

Thèmes

Conférenciers

Cycles

Dossiers

Mooc

Alignement et comparaison de textes pour les humanités numériques

mardi 24 novembre 2020

JW Player



Auteur(s)



Philippe Gambette

Université Paris-Est Marne-la-Vallée
Maître de conférences en informatique

Plus sur cet auteur
Voir la fiche de l'auteur

Annexes

Téléchargements :
- Télécharger la vidéo

Dernière mise à jour : 16/12/2020

<https://savoirs.ens.fr/expose.php?id=3912>

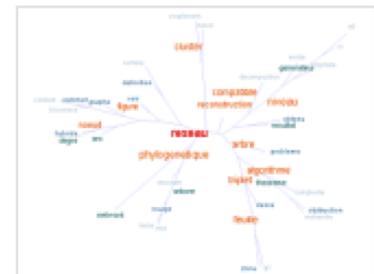
<http://treecloud.univ-mly.fr>



Create! **Downloads** **Gallery** **Credits** **FAQ**
Créer! **Téléchargements** **Galerie** **A propos** **FAQ**

This website helps you to generate **tree clouds** from a text, that is word clouds where the words are arranged on a tree which reflects their semantic proximity inside the text.

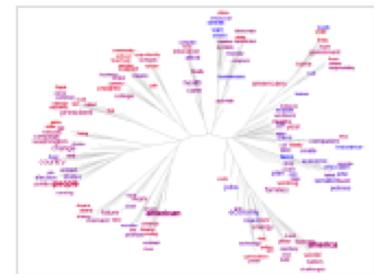
The first tree cloud appeared on [Jean Véronis's blog](#) in December 2007, you can now [create your own with this website](#), or [with the TreeCloud software](#).



Create your own tree cloud online!

Ce site web vous permet de générer des **nuages arborés** à partir d'un texte, c'est à dire des nuages de mots disposés autour d'un arbre qui indique leur proximité dans le texte.

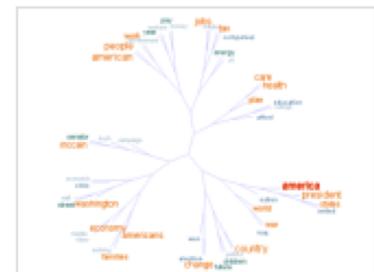
Le premier nuage arboré est apparu sur le [blog de Jean Véronis](#) en décembre 2007, vous pouvez maintenant [créer les vôtres avec ce site web](#), ou [avec le logiciel TreeCloud](#).



Créez vos propres nuages arborés en ligne !

Pour en savoir plus sur l'utilisation de TreeCloud, vous pouvez découvrir :

- [cette présentation](#)
- [ce tutoriel](#)



Create your own tree clouds!

Paste your text below, then click on button *Send* ! Beware, the next user will be able to see your text when he connects to the website. If you want to keep your texts private please use [TreeCloud](#) on your computer.

Text :

PASTE YOUR TEXT HERE

You can move the labels by drag-and-drop. Click it to make it come back to its original location. The tooltip gives the number of occurrences of the word.

Create your own tree clouds!

Paste your text below, then click on button *Send* ! Beware, the next user will be able to see your text when he connects to the website. If you want to keep your texts private please use [TreeCloud](#) on your computer.

Text :

Bagues des époques mérovingiennes et carolingiennes
Bijoux bressan anciens
Bijoux gallo-romains et mérovingiens, provenant de ses fouilles
Têtes gallo-romaines
Bronzes antiques
Bijoux Collection de bijoux araucans, du Chili
Bijoux scandinaves anciens
Religions et cultes de l'ancienne Grèce
Archéologie
Archéologie romaine

You can move the labels by drag-and-drop. Click it to make it come back to its original location. The tooltip gives the number of occurrences of the word.

