How to Create an Overlay Map of Science Using the Web of Science

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Contents

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Version 5.13.1 Categories in both Pajek[4] and VOSviewer[5].
These are expanded step-by-step instructions of how to create an overlay map of science from: Loet Leydesdorff, Stephen Carley, Ismael Rafols Source: February 9, 2012, INSNA Listserve post:
Global Maps of Science based on the new Web-of-Science Categories
http://arxiv.org/ftp/arxiv/papers/1202/1202.1914.pdf

In January 2014, Thomson Reuters launched version 5.13.1 of the Science and Social Science Citation Index in the Web of Science (WoS). In 2012 the 222 ISI Subject Categories (SCs) for these two databases in version 4 of WoS were renamed and extended to 225 WoS Categories (WCs). Since we previously used the ISI SCs as the baseline for a global map in Pajek (Rafols et al., 2010) and brought this facility online (http://www.leydesdorff.net/overlaytoolkit), we recalibrated this map for the new WC categories using the Journal Citation Reports 2010. In addition to Pajek, the new base maps can also be made using VOSviewer (Van Eck &Waltman, 2010). " Note: as of March 31, 2014 there are 251 WoS Subject Categories.

Part.1 Overview

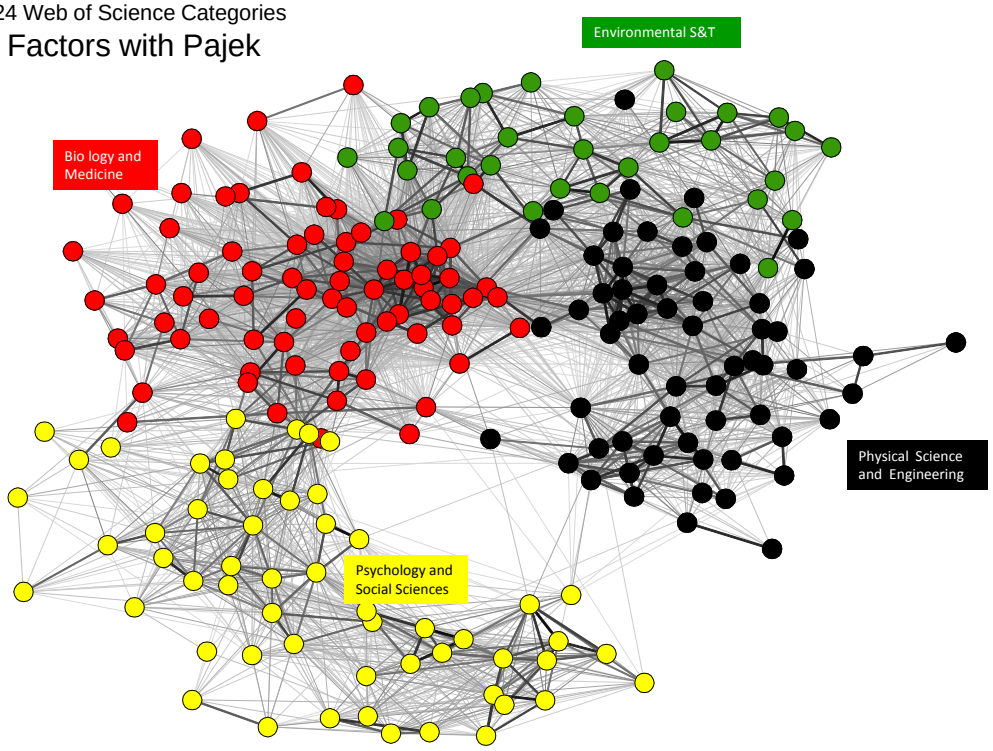
The following instructions enable the user to create a custom map of science for an author, set of authors, institution or set of institutions using the Web of Science search results and then mapping the results on a standardized template in either Pajek or VOSviewer with aggregation labels of 4, 6 or 19 factors.

These instructions assume the following:
1. You have a PC with internet access
2. You have access to the Web of Science Database version 5.13.1.
Note: The overlay toolkit software does not run on a Mac. However, if you have
Parallels or other virtual machine software on the Mac it will work.

Here are the basemaps[6] in 4, 6 or 19 factors in Pajek.

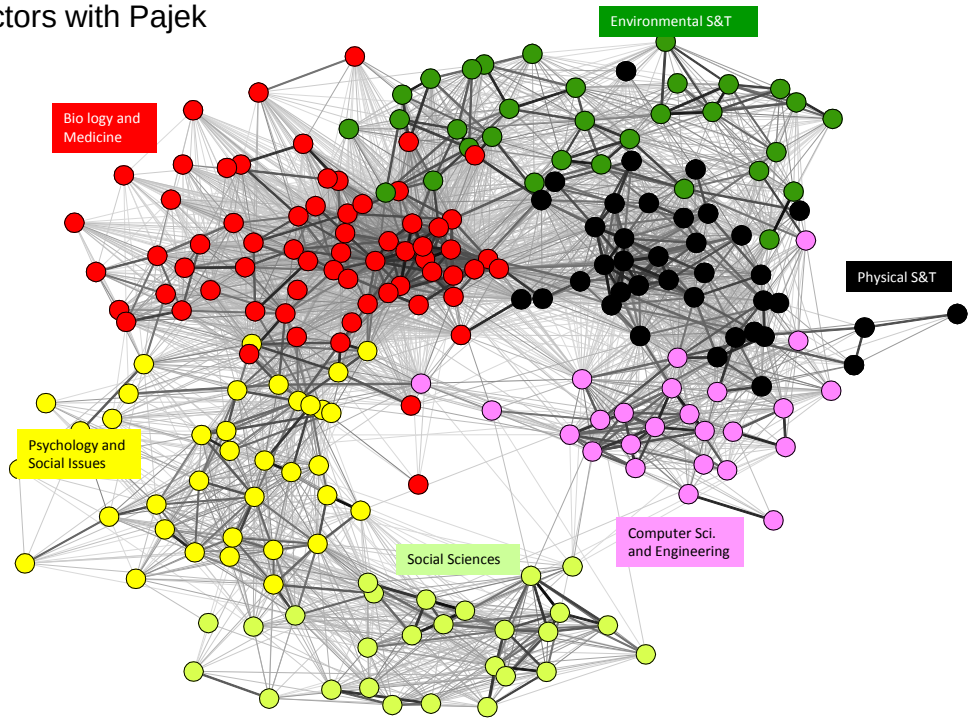
4 Pajek is freely available at http://vlado.fmf.uni-lj.si/pub/networks/pajek/
5 VOSviewer is freely available at http://www.VOSviewer.com/
6 Base maps available at http://www.leydesdorff.net/overlaytoolkit/basemaps.ppt

Global Map of Science, 2010 update
224 Web of Science Categories
4 Factors with Pajek



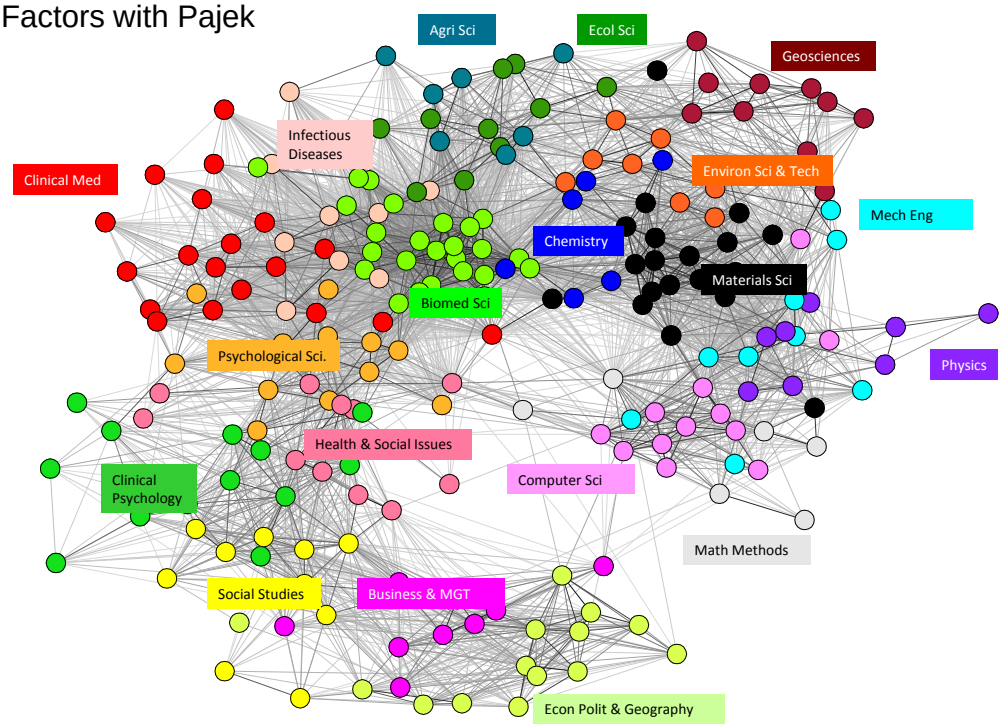
Method from Rafols, Porter and Leydesdorff (2009)

Global Map of Science, 2010 update
224 Web of Science Categories
6 Factors with Pajek



Method from Rafols, Porter and Leydesdorff (2009)

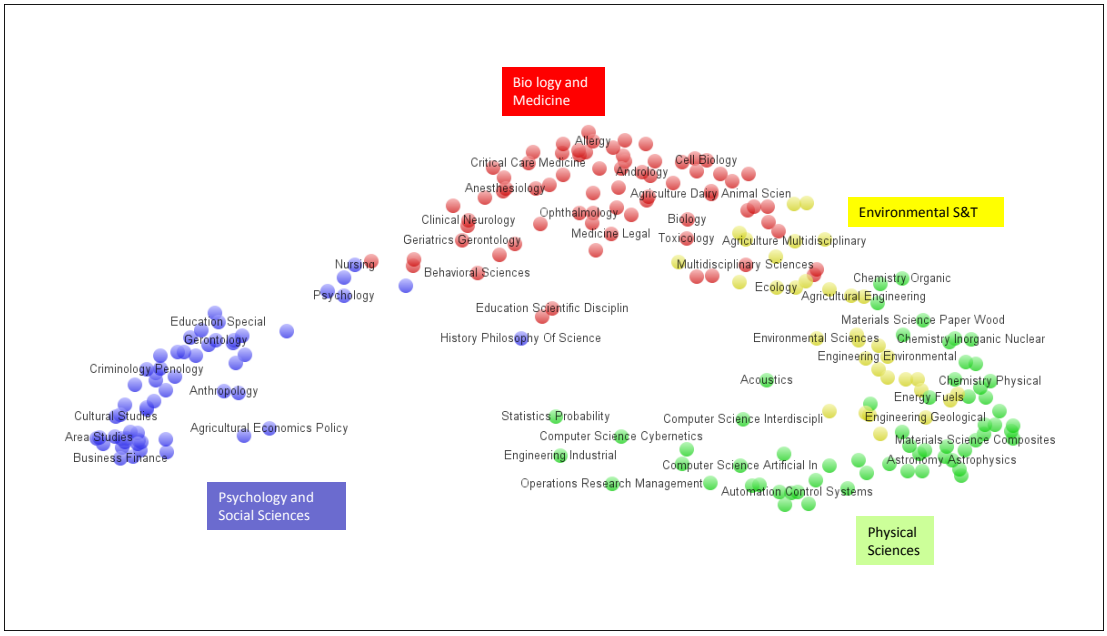
Global Map of Science, 2010 update
224 Web of Science Categories
19 Factors with Pajek



Method from Rafols, Porter and Leydesdorff (2009)

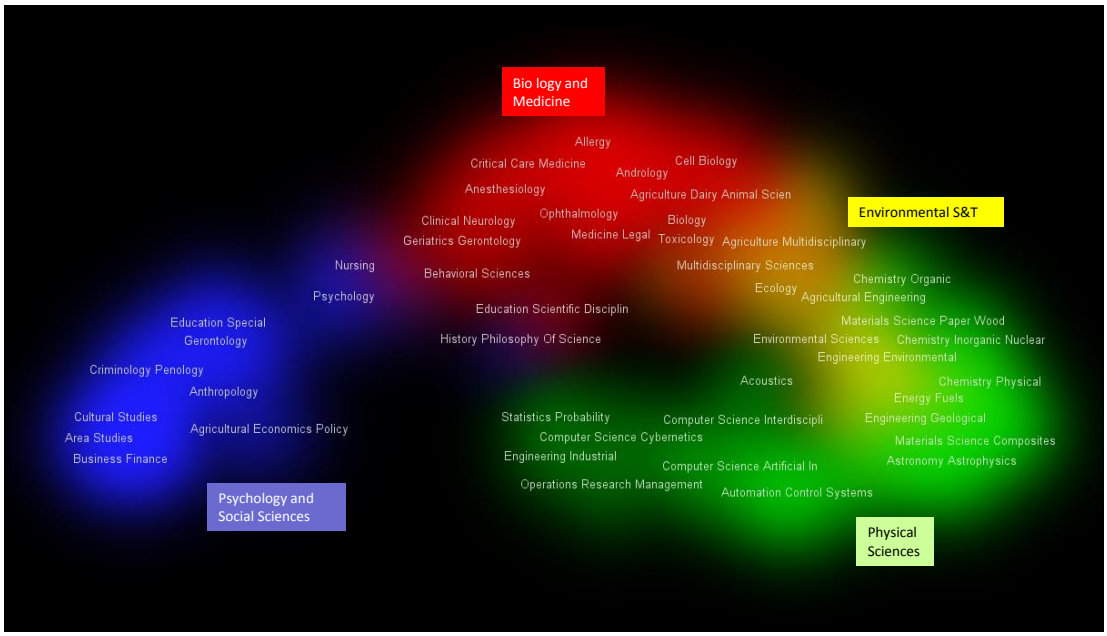
Here are the base maps[7] in 4, or 6 VOSviewer:

Global Map of Science, 2010 update
224 Web of Science Categories
4 Factors with VOSviewer

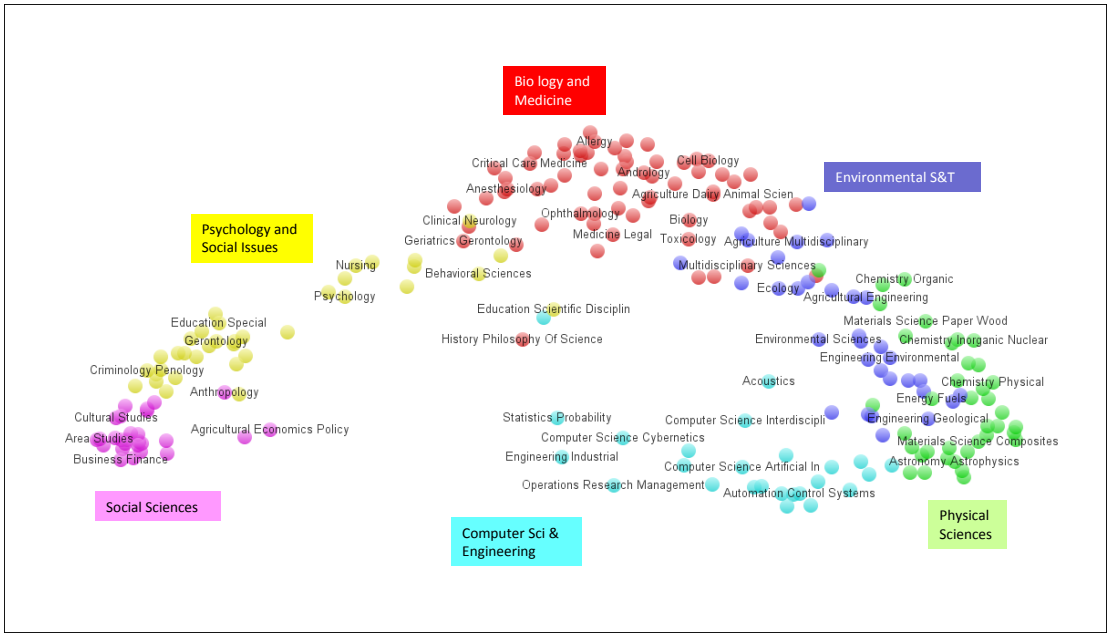


7 Base maps available at http://www.leydesdorff.net/overlaytoolkit/basemaps.ppt

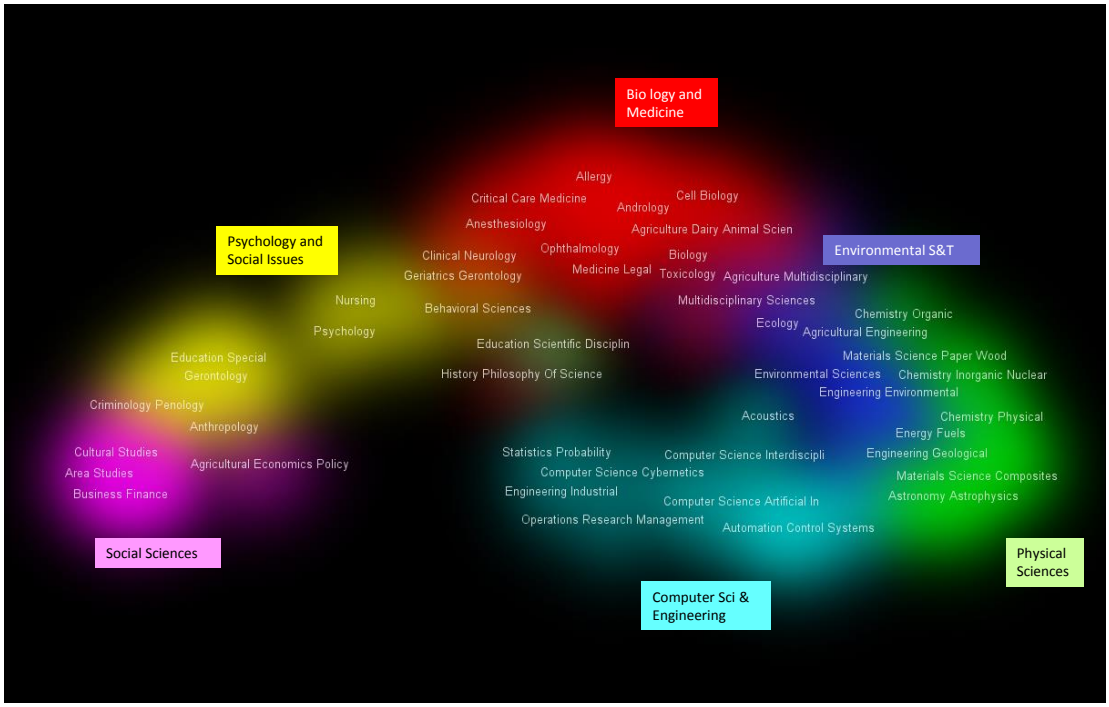
Global Map of Science, 2010 update
224 Web of Science Categories
4 Factors with VOSviewer



Global Map of Science, 2010 update
224 Web of Science Categories
6 Factors with VOSviewer



Global Map of Science, 2010 update
224 Web of Science Categories
6 Factors with VOSviewer



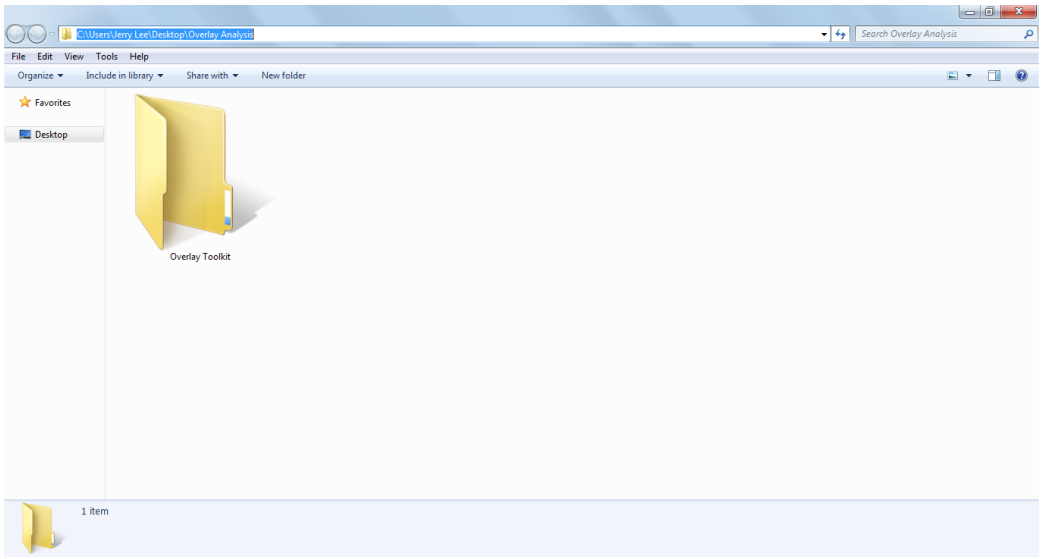
Part.2 Detail steps to create overlay map

Instructions are for a PC only[8].

Step1. Create a folder

Create a folder, such as, Overlay Toolkit

Note: address C:\Users\Jerry Lee\Desktop\Overlay Analysis



Step2. Overlaytoolkit preparation

Download overlaytoolkit files from these links:

a. The Windows DOS executable file: wc10.exe

8 Note: the original instructions are at: ttp://www.leydesdorff.net/overlaytoolkit/

http://www.leydesdorff.net/overlaytoolkit/wc10.exe

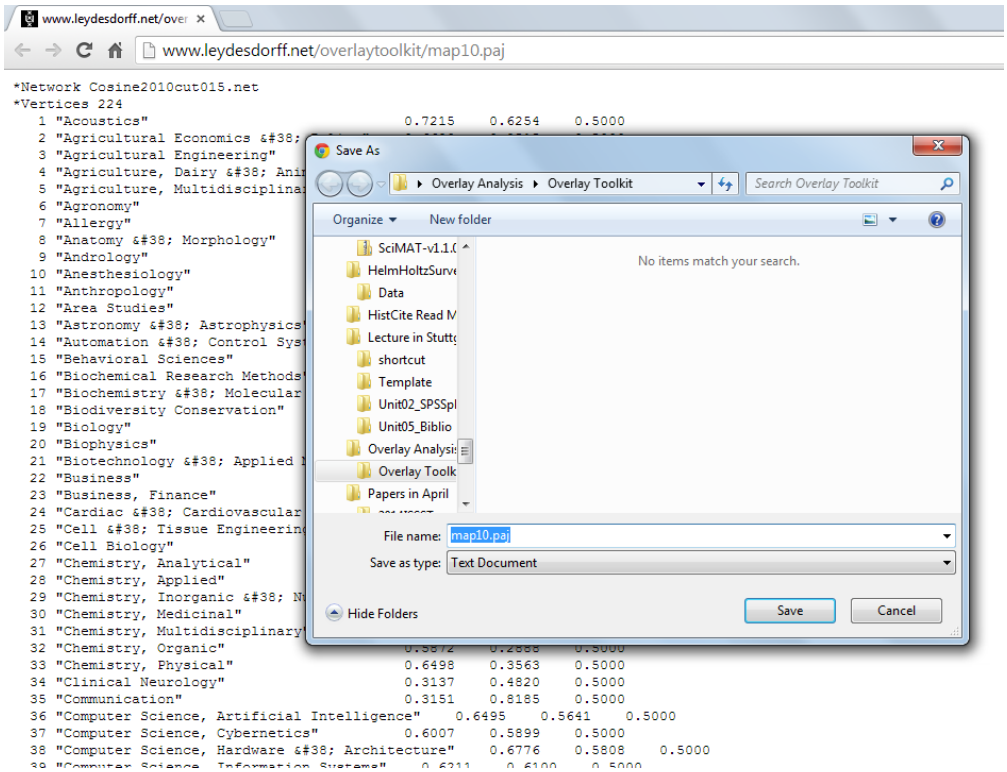
The wc10.exe file converts a Web of Science search results file, called "analyse.txt," into Pajek and VOSviewer files for mapping.

b. *The Pajek base map file: map10.paj*

http://www.leydesdorff.net/overlaytoolkit/map10.paj

Note: Make sure to save file as text with extension ".paj"

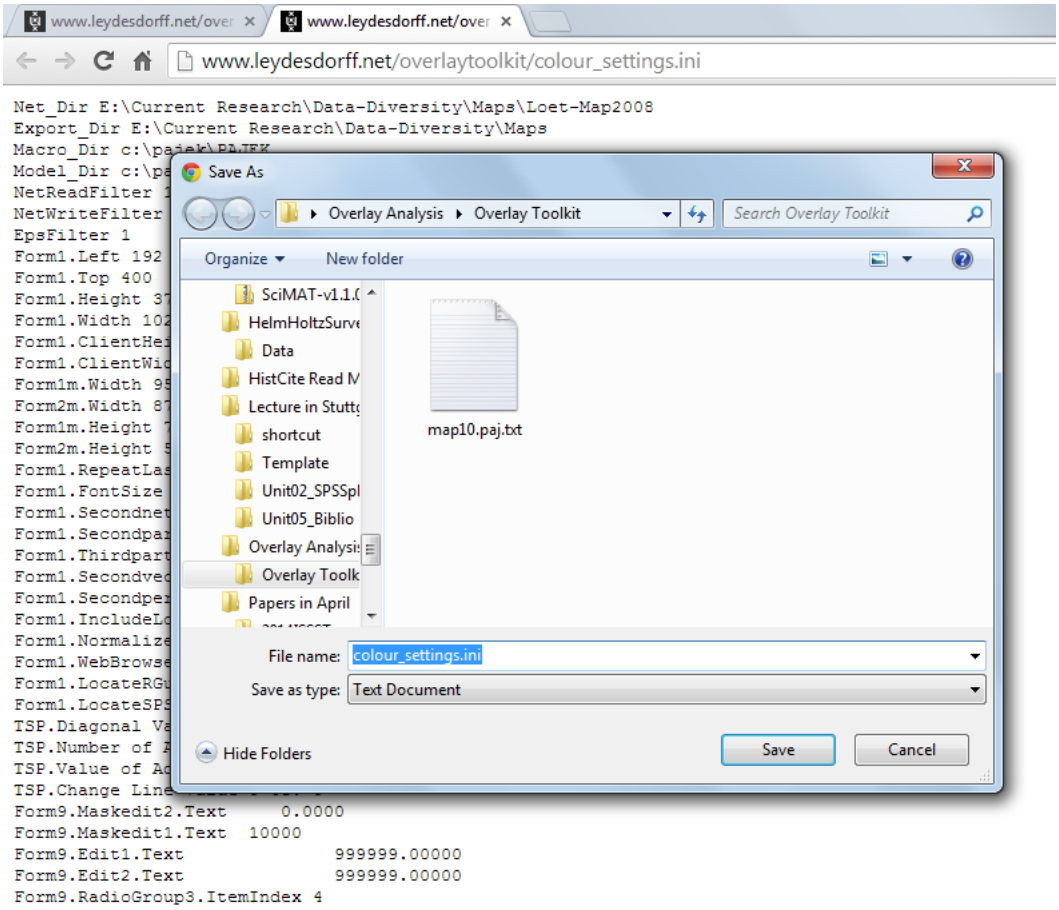
The map10.paj is a Pajek project file which serves as the base map.



c. *The Pajek Color setting ini file:*

http://www.leydesdorff.net/overlaytoolkit/colour_settings.ini

The Pajek Color settings file provides a standard color settings.



d. The basemap PowerPoint file:

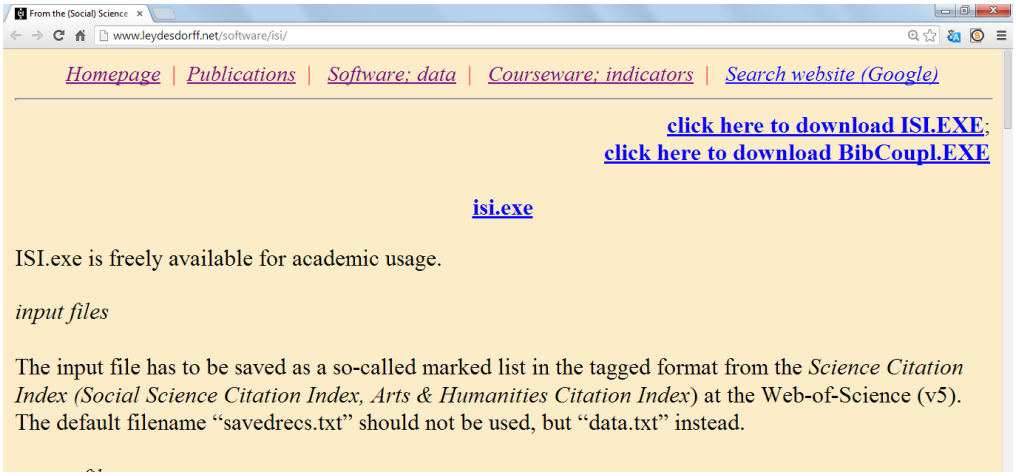
http://www.leydesdorff.net/overlaytoolkit/basemaps.ppt

This PowerPoint file contains 15 slides with the base maps and labels for the 4, 6, and 19 factors for Pajek and VOSviewer as well as sample maps.

e. The toolkit Windows DOS executable: isi.exe

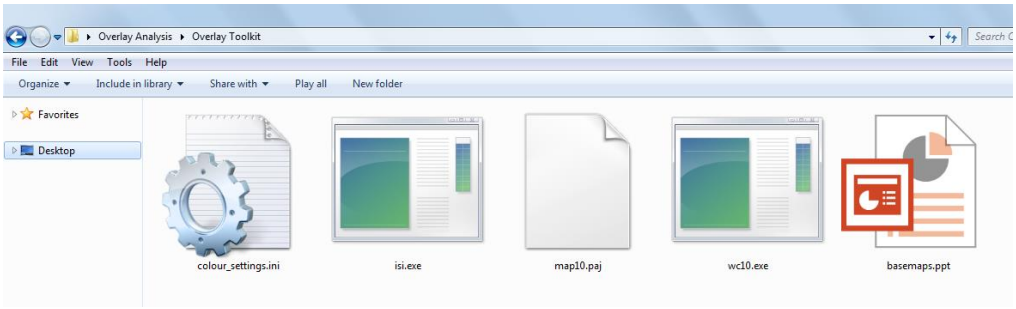
http://www.leydesdorff.net/software/isi

Note: This link takes you page to download the isi.exe file. Right click on the isi.exe to download and save.



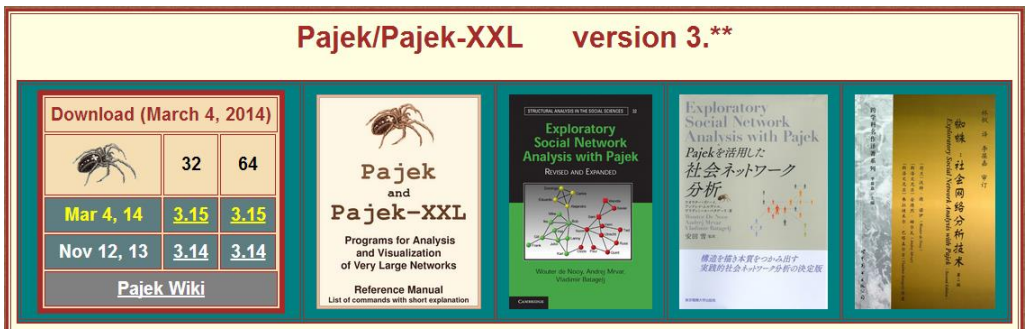
The ISI.exe produces the wc10.vec file and other files with information on fields such as authors or journals that may be of interest.

Note: For each file, Click Save, navigate to your target folder, e.g., OverlayToolKit, Click Save.
The following 5 files should then appear in your designated folder:

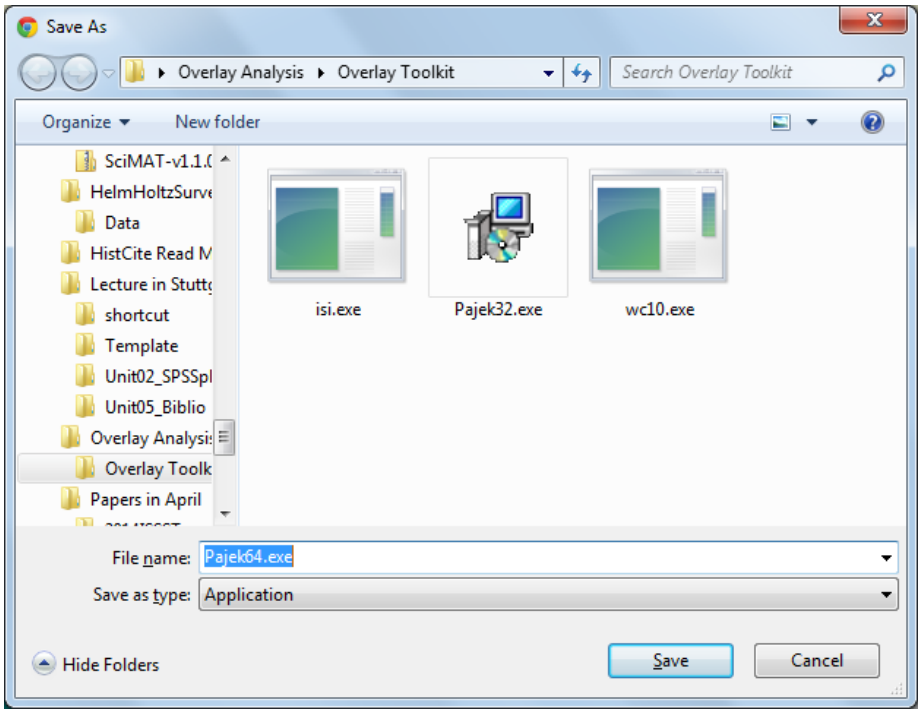


Step3. Download and install Pajek.

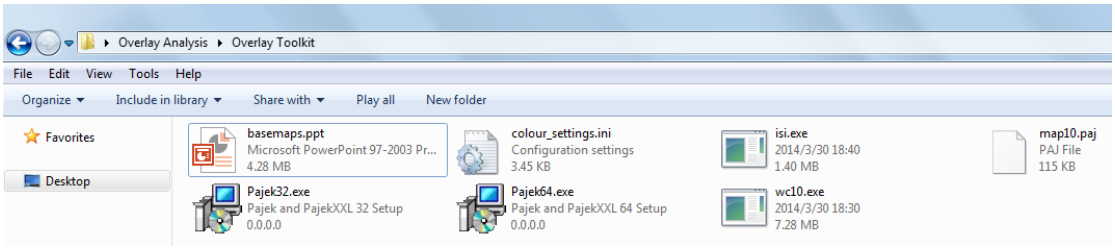
a. Choose the 32 or 64 bit version depending upon your computer. http://mrvar.fdv.uni-lj.si/pajek/default.htm



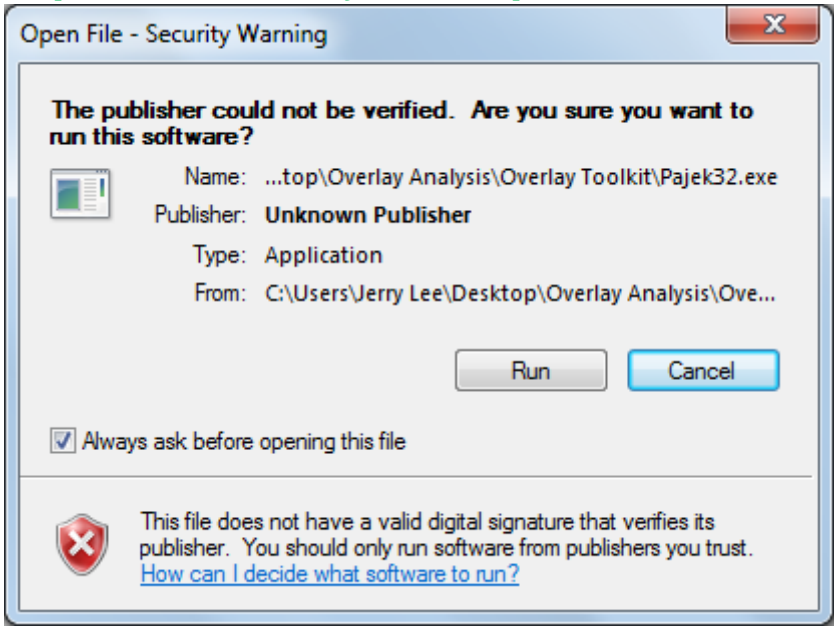
b. Click Save

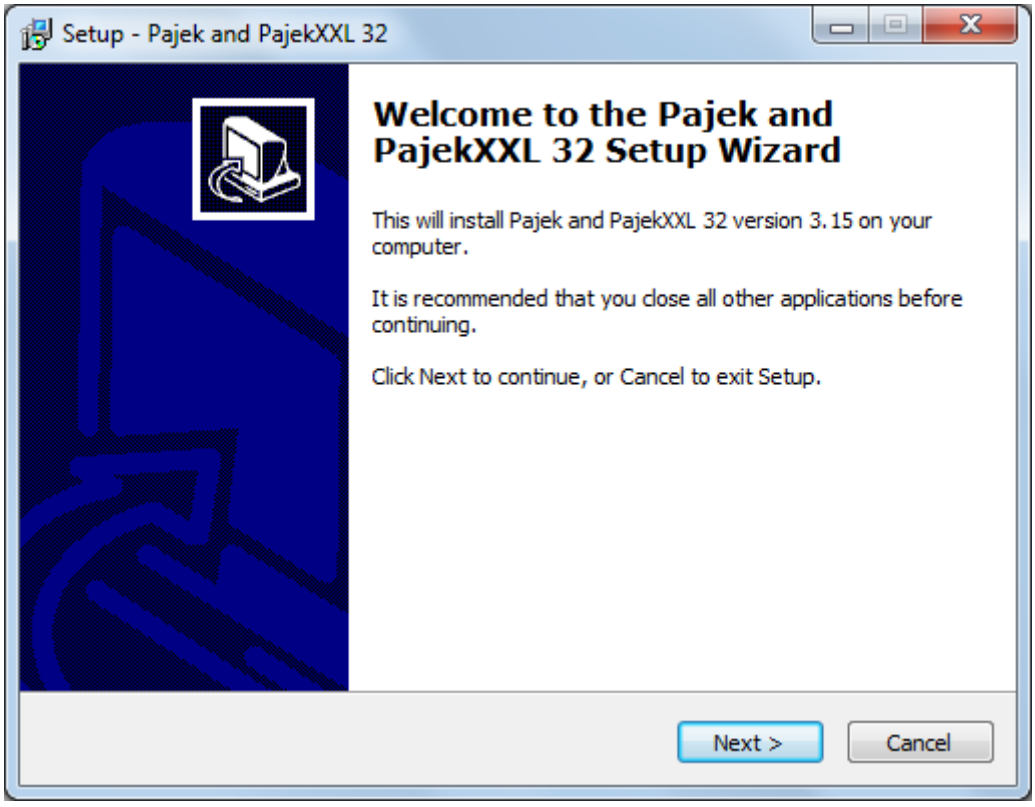


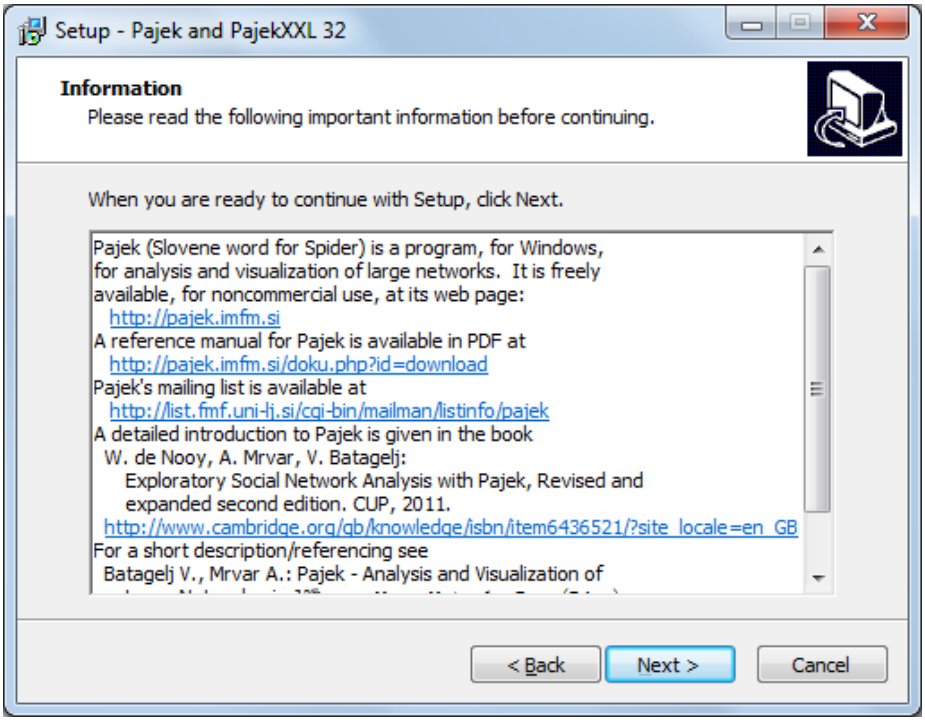
c. After the download is complete, Click "Open Folder. You should see this file in your folder.

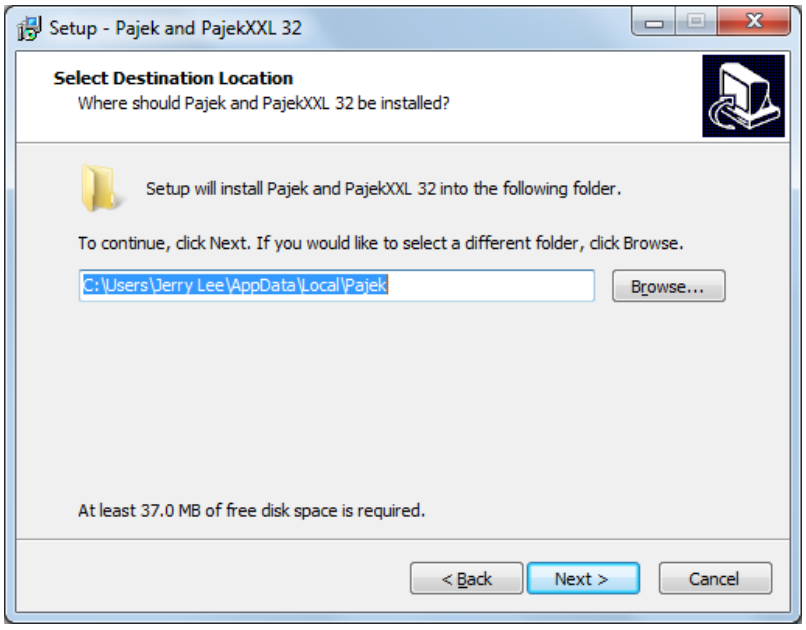


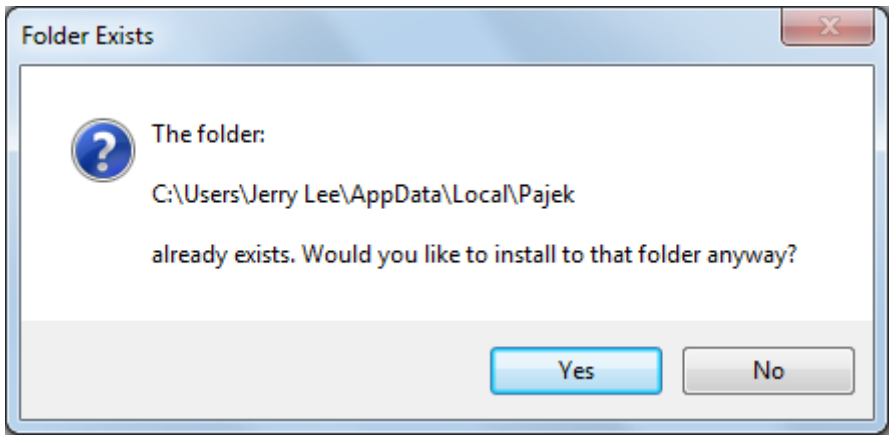
d. Double click in the Pajek installation file Pajek32. A Security Warning window opens, Click Run. And flow the step below..

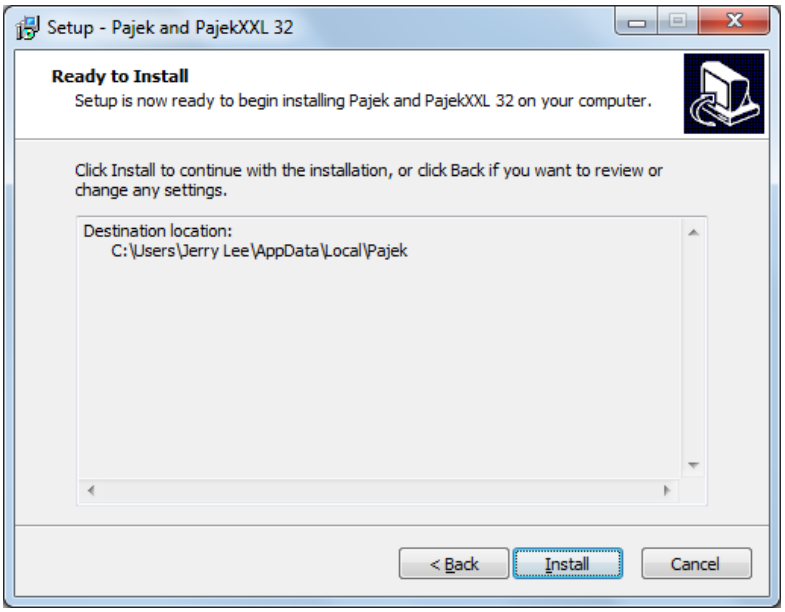


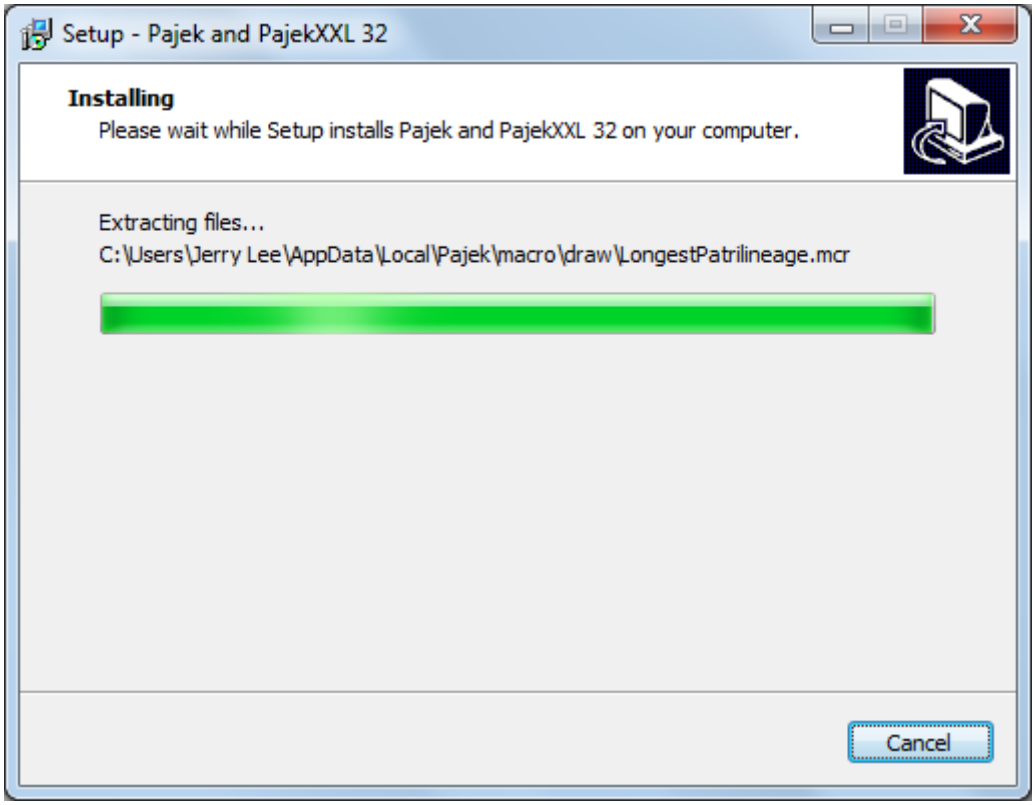


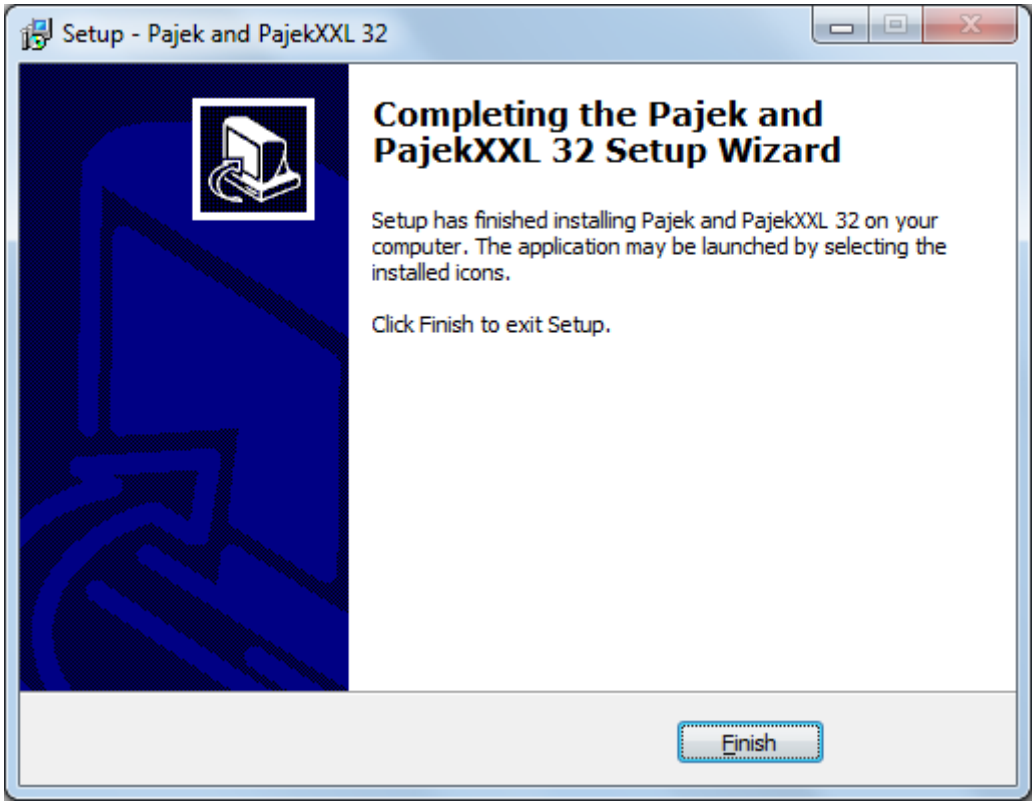

Setup - Pajek and PajekXXL 32
Information
Please read the following important information before continuing.
When you are ready to continue with Setup, click Next.
Pajek (Slovene word for Spider) is a program, for Windows,
for analysis and visualization of large networks. It is freely
available, for noncommercial use, at its web page:
http://pajek.imfm.si
A reference manual for Pajek is available in PDF at
http://pajek.imfm.si/doku.php?id=download
Pajek's mailing list is available at
http://list.fmf.uni-lj.si/cgi-bin/mailman/listinfo/pajek
A detailed introduction to Pajek is given in the book
W. de Nooy, A. Mrvar, V. Batagelj:
Exploratory Social Network Analysis with Pajek, Revised and
expanded second edition. CUP, 2011.
http://www.cambridge.org/gb/knowledge/isbn/item6436521/?site_locale=en_GB
For a short description/referencing see
Batagelj V., Mrvar A.: Pajek - Analysis and Visualization of
< Back
Next >
Cancel


Setup - Pajek and PajekXXL 32
Select Destination Location
Where should Pajek and PajekXXL 32 be installed?
Setup will install Pajek and PajekXXL 32 into the following folder.
To continue, click Next. If you would like to select a different folder, click Browse.
C:\Users\Jerry Lee\AppData\Local\Pajek
Browse...
At least 37.0 MB of free disk space is required.
< Back
Next >
Cancel

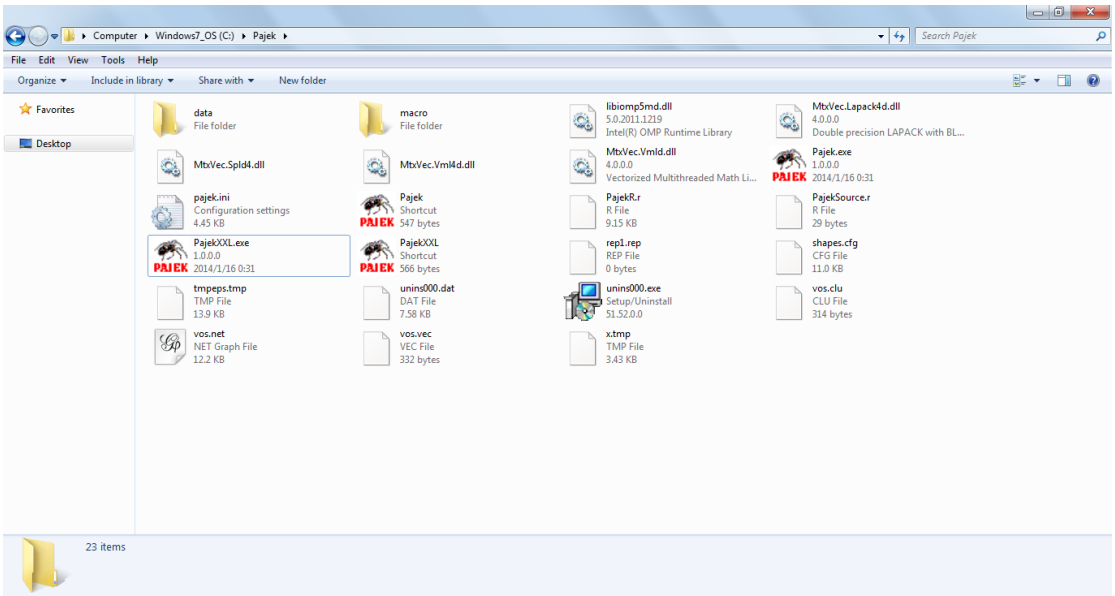

Folder Exists
The folder:
C:\Users\Jerry Lee\AppData\Local\Pajek
already exists. Would you like to install to that folder anyway?
Yes
No


Setup - Pajek and PajekXXL 32
Ready to Install
Setup is now ready to begin installing Pajek and PajekXXL 32 on your computer.
Click Install to continue with the installation, or click Back if you want to review or change any settings.
Destination location:
C:\Users\Jerry Lee\AppData\Local\Pajek
< Back
Install
Cancel


Setup - Pajek and PajekXXL 32
Installing
Please wait while Setup installs Pajek and PajekXXL 32 on your computer.
Extracting files...
C:\Users\Jerry Lee\AppData\Local\Pajek\macro\draw\LongestPatrilineage.mcr
Cancel



e. A folder window will open display the Pajek Program Folder and shortcut icon. Or go to the Pajek installation folder. The default is: C:\pajek



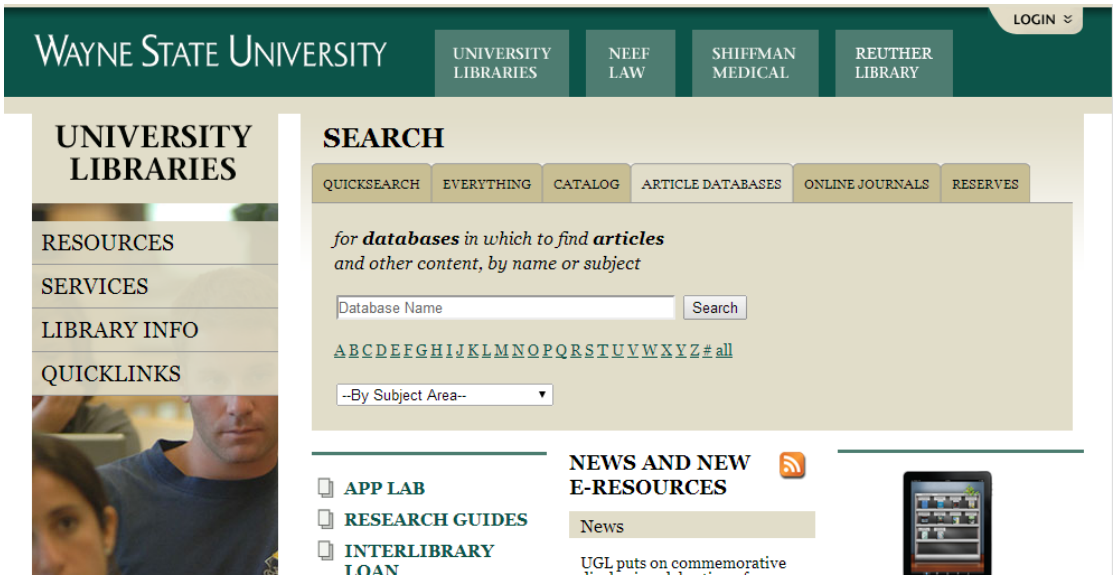
To start Pajek, just double click the Pajek Shortcut.

Note: This completes the one time installation of the OverelayToolKit software and the Pajek software.

Step4. Create an overlay map using the Web of Science

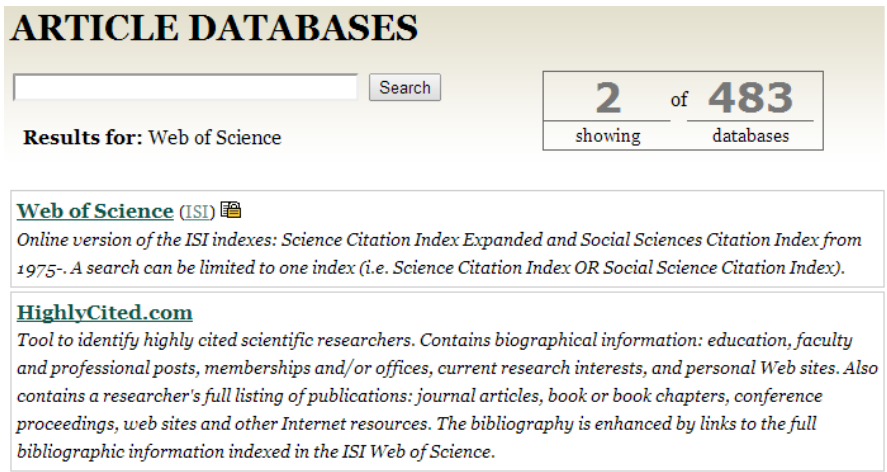
This steps describe How to create an overlay map using the Web of Science version 5.13.1 and the OverlayToolKit program wc10.exe and mapping it with Pajek.

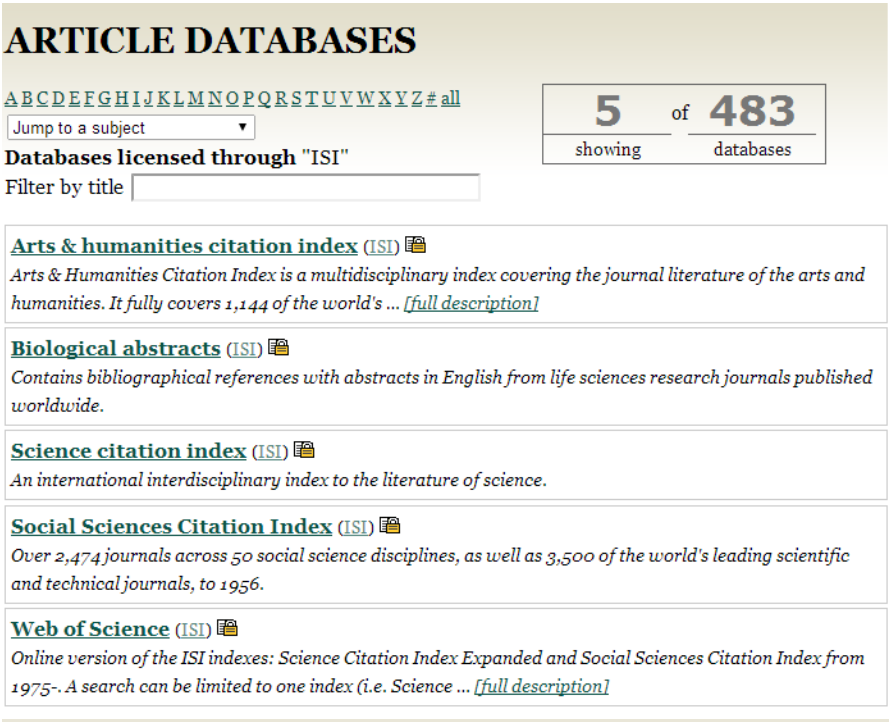
Step1. Login into your University Library and access the Web of Science database, find the access in the homepage of you library.
For example http://www.lib.wayne.edu/

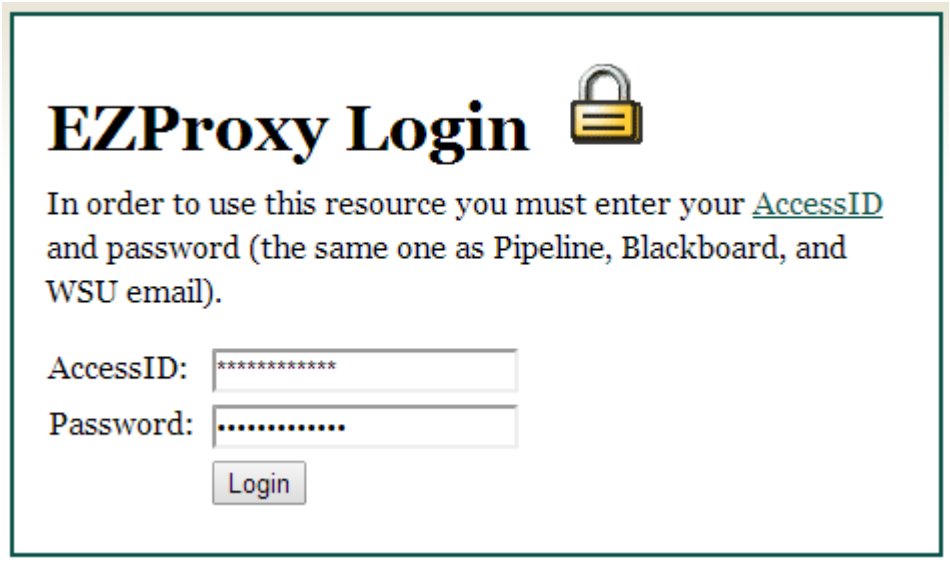


Step2. Enter "Web of Science" into the Search Box, Click Search

Step3. Click the Web of Science database icon

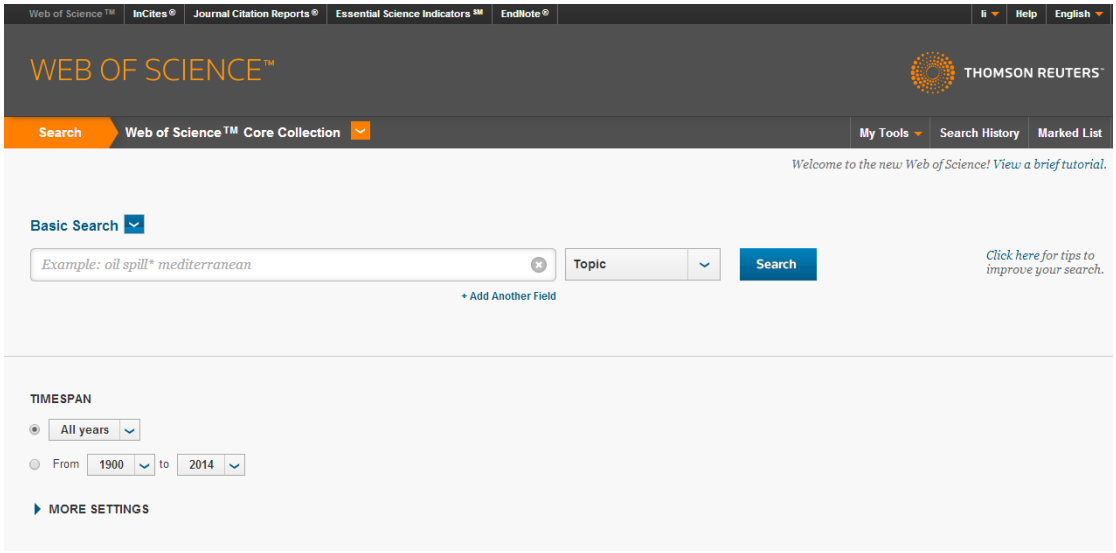






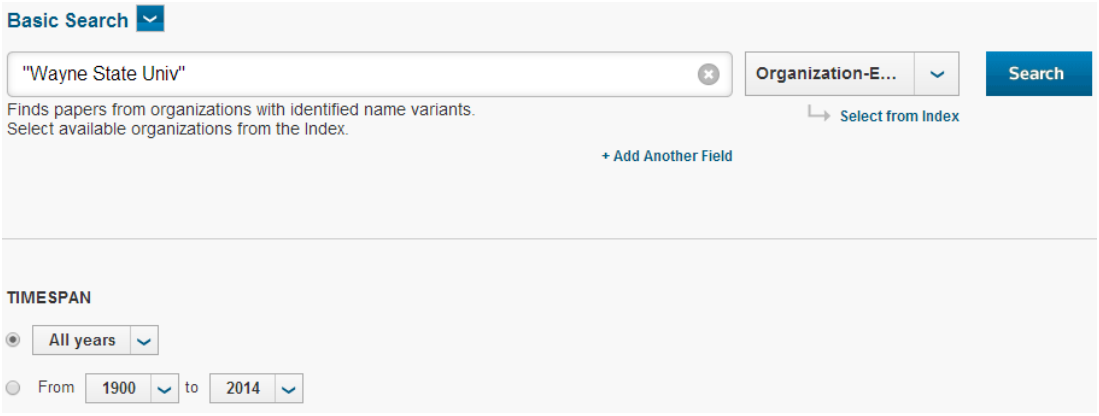
Note: these library instructions may vary depending upon your local situation.

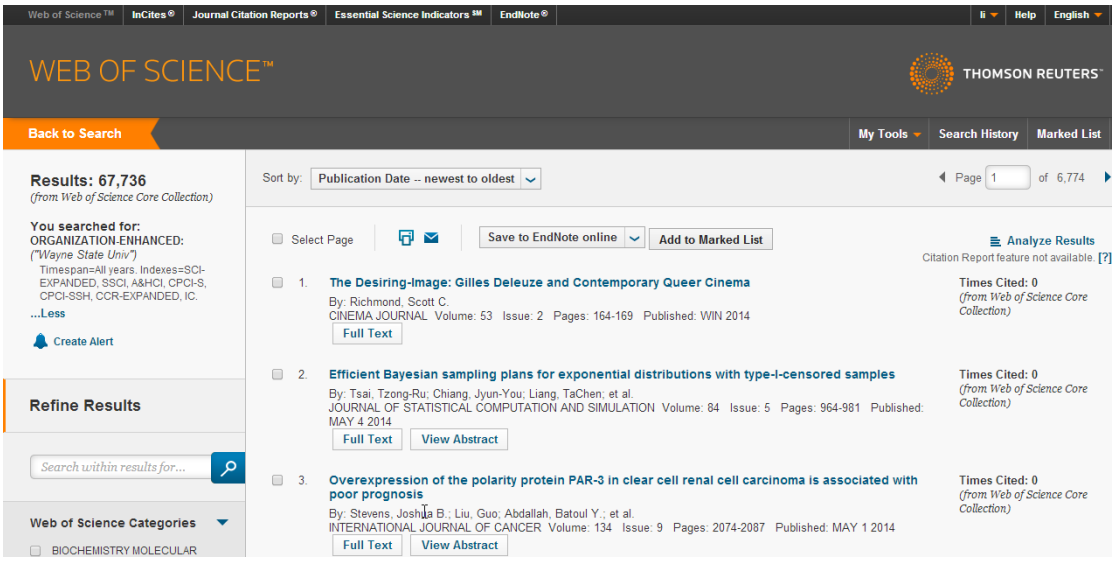
Step4. The Web of Science search interface will open.



Step5. Conduct your search you wish to map.

For example, to search for all of Wayne State University publications for all year. Search: AD = Wayne State University; Timespan: all year
Data last updated: 2014-03-28.





Step6. Analyze Results

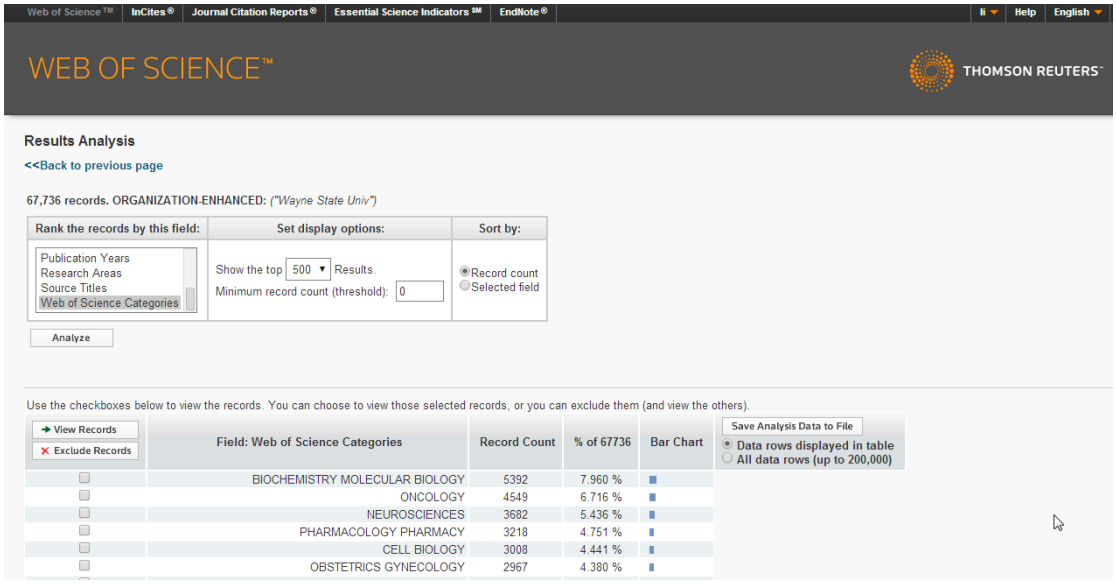
Set the following three parameters:

a. Rank the Records by this field: Web of Science Categories

b. Set Display Options to Show Top 500 results

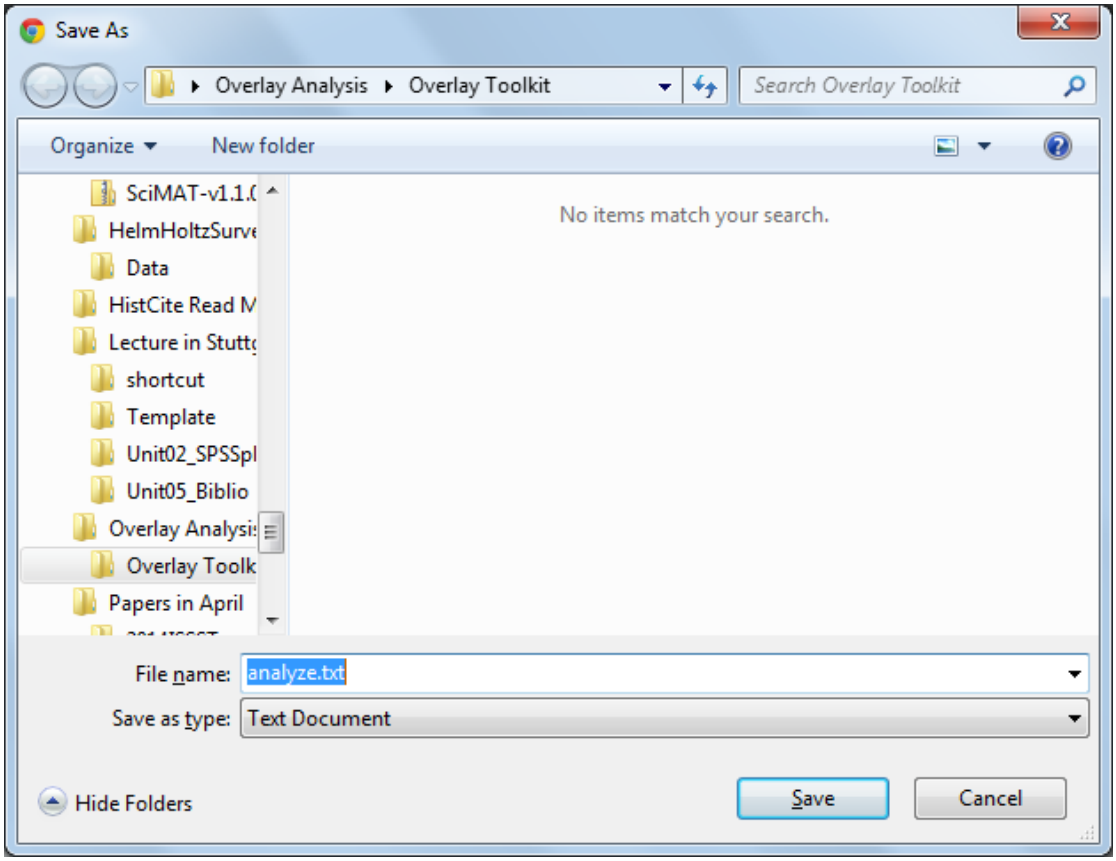
c. Minimum Record count: 0

d. Click Analyze



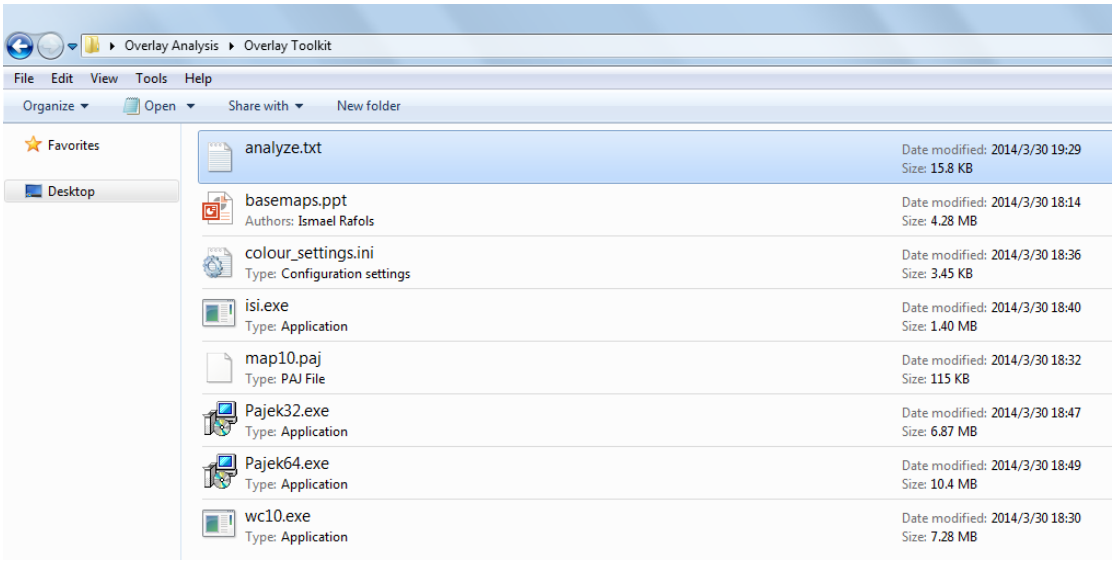
e. After the records are analyzed a window will display the results.

f. Check the Save Analysis Data to File *on the right. Click Save at the window and Navigate to your desired location and Click Save.*

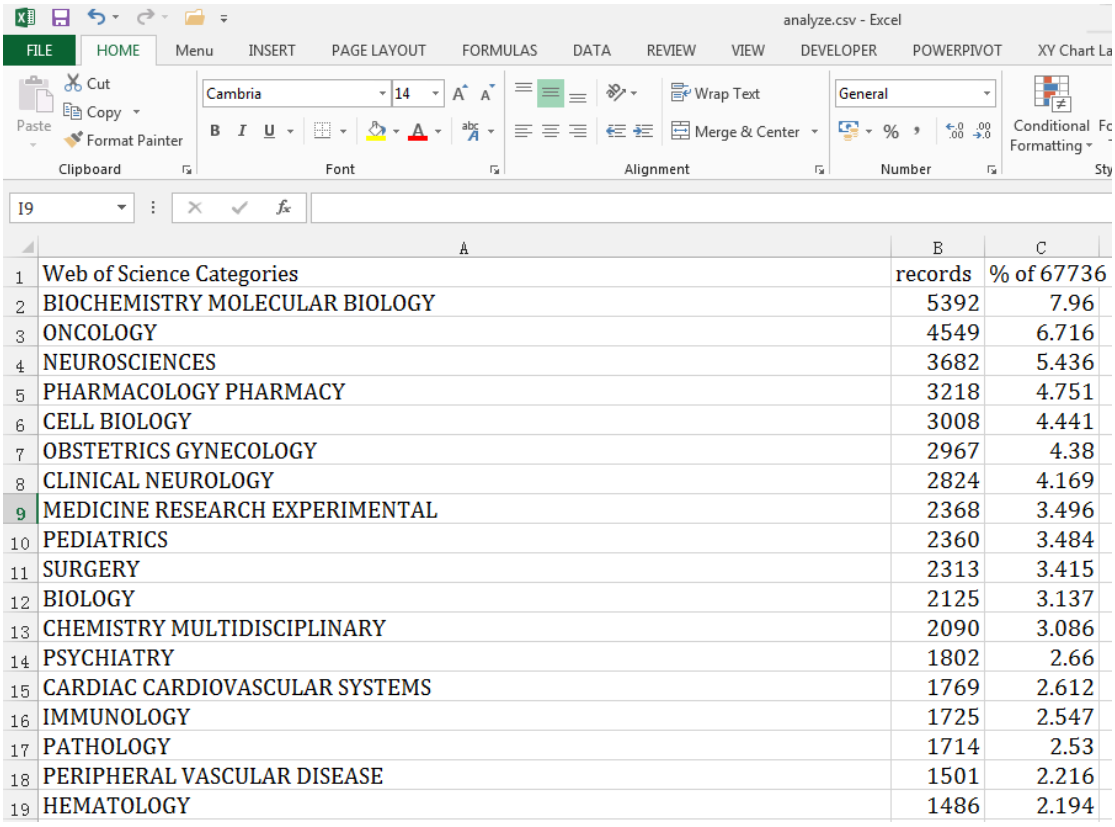


g. After the file is Downloaded ,Click Open Folder You should see the file

Analze.txt



Note: If you open the file with Excel it will display: The Web of Science Categories, the Record Count and the % of those publications in each Science Categories. It is these counts that Pajek uses to draw the size of the Science Categories circles. Note: the Record Count Total will often be more than the search result count because the same publication may be assigned to more than one Science Category.

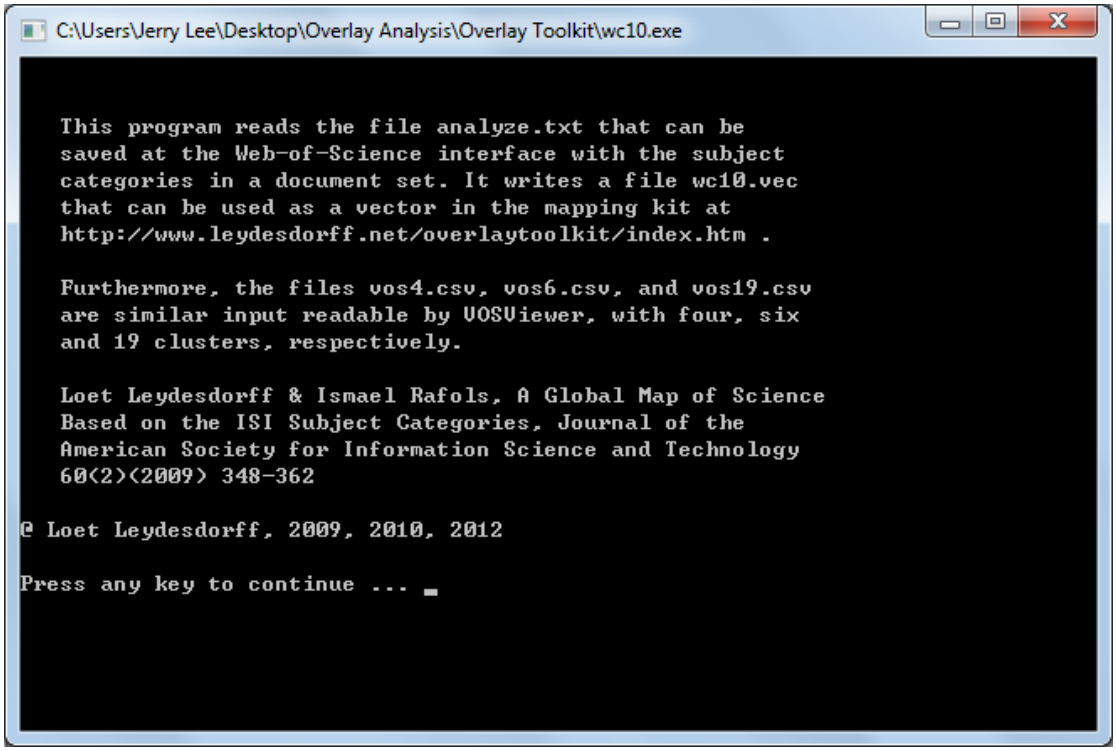


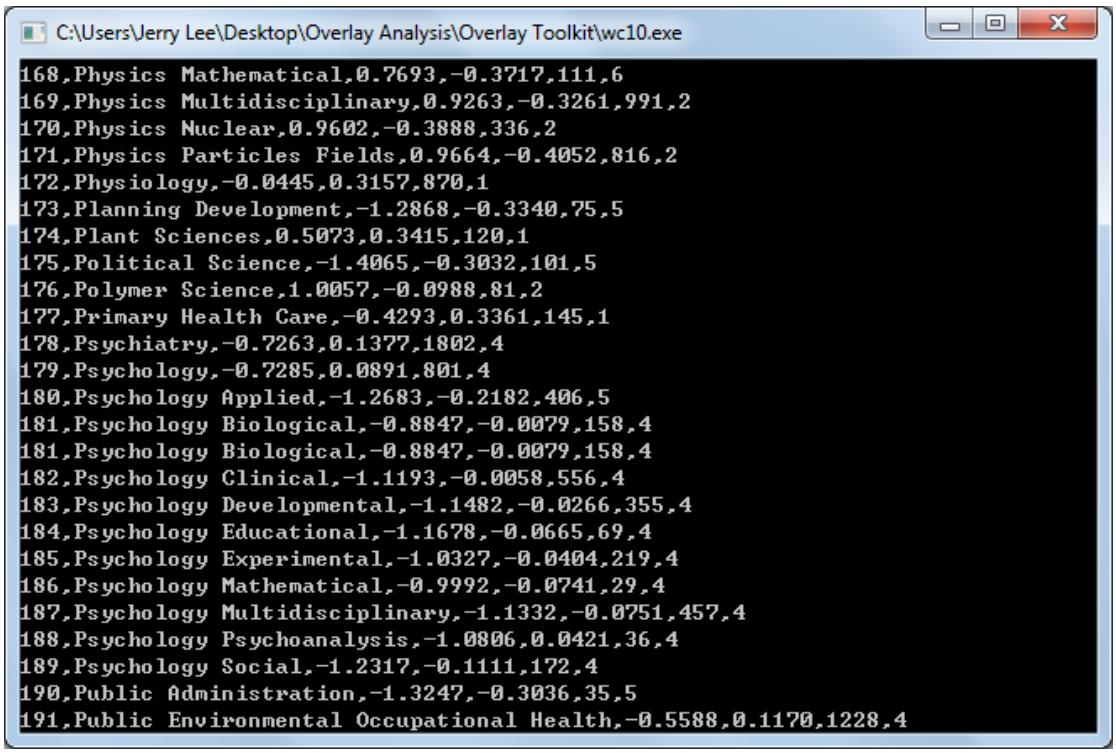
	A	B	C
1	Web of Science Categories	records	% of 67736
2	BIOCHEMISTRY MOLECULAR BIOLOGY	5392	7.96
3	ONCOLOGY	4549	6.716
4	NEUROSCIENCES	3682	5.436
5	PHARMACOLOGY PHARMACY	3218	4.751
6	CELL BIOLOGY	3008	4.441
7	OBSTETRICS GYNECOLOGY	2967	4.38
8	CLINICAL NEUROLOGY	2824	4.169
9	MEDICINE RESEARCH EXPERIMENTAL	2368	3.496
10	PEDIATRICS	2360	3.484
11	SURGERY	2313	3.415
12	BIOLOGY	2125	3.137
13	CHEMISTRY MULTIDISCIPLINARY	2090	3.086
14	PSYCHIATRY	1802	2.66
15	CARDIAC CARDIOVASCULAR SYSTEMS	1769	2.612
16	IMMUNOLOGY	1725	2.547
17	PATHOLOGY	1714	2.53
18	PERIPHERAL VASCULAR DISEASE	1501	2.216
19	HEMATOLOGY	1486	2.194

h. The next step is to Convert the Analyze.txt with the wc10.exe dos program.

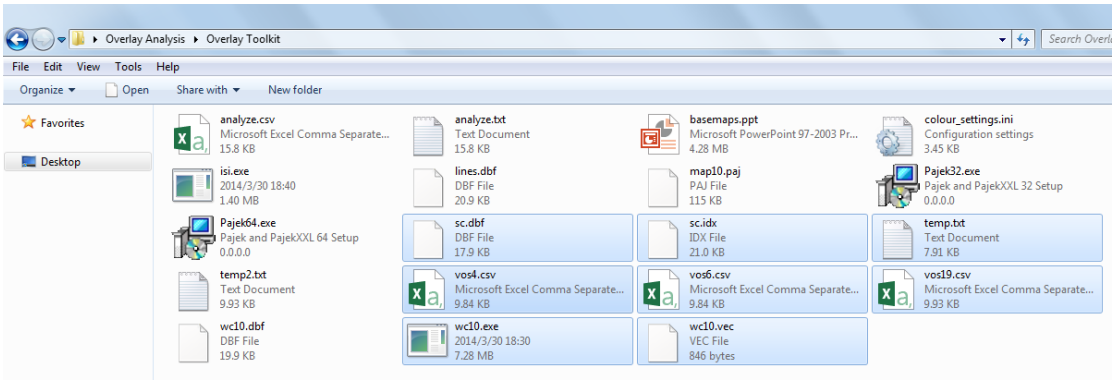
Note: Make sure the wc10.exe file is in the same folder as the Analyze.txt file.

i. Double Click wc10.exe. Click Run at the Security Window, A Dos window will open, press any to continue at the prompt.

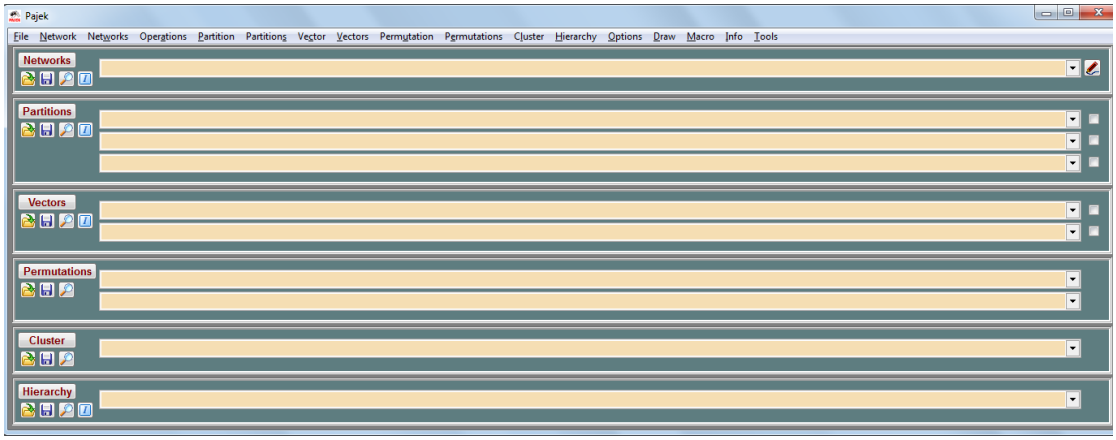




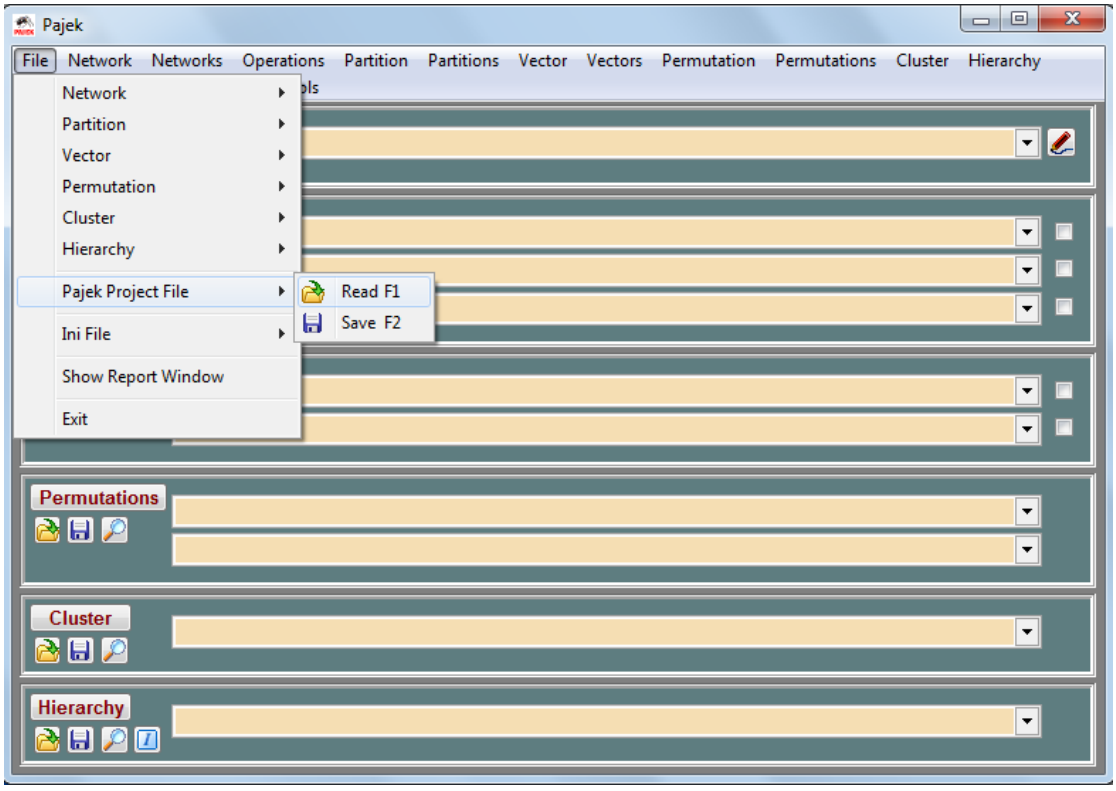
j. The wc10.exe creates nine output files:



k. Start Pajek by clicking on the program shortcut icon. The Pajek program screen will open.



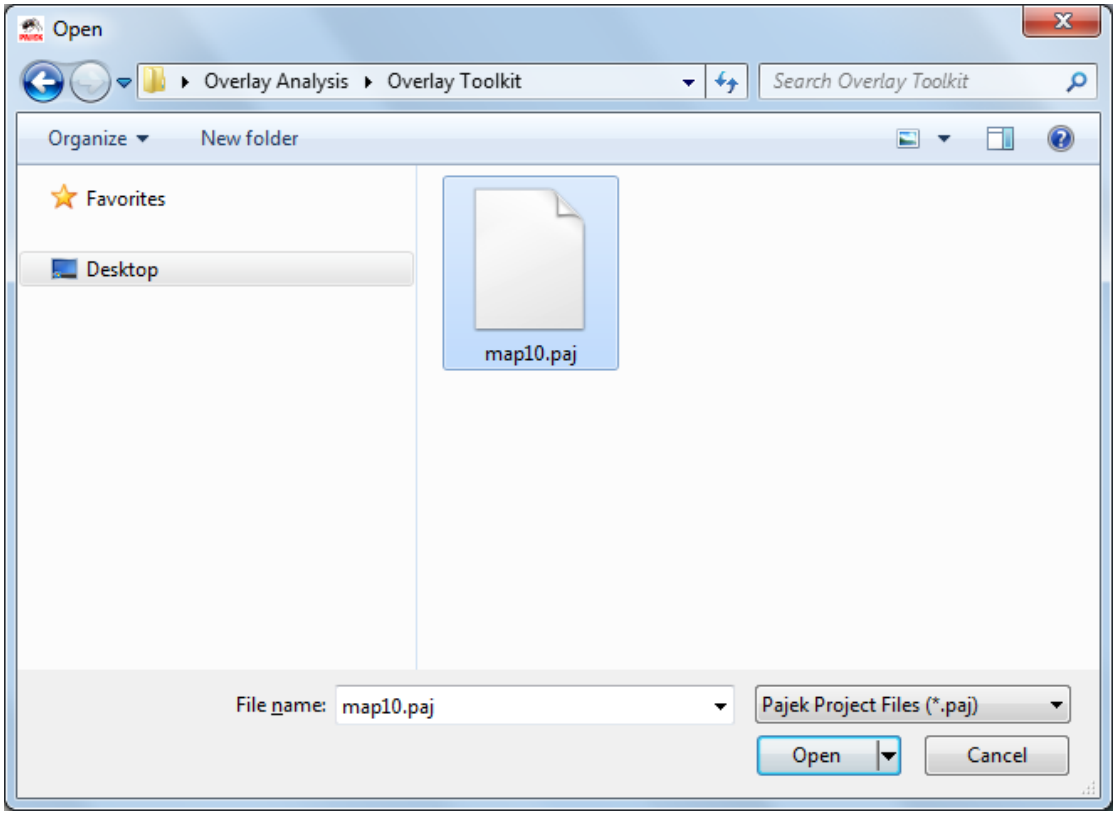
l. Load the base 2010 Science map. Click File, then Click File, then Pajek Project File, then Read F1

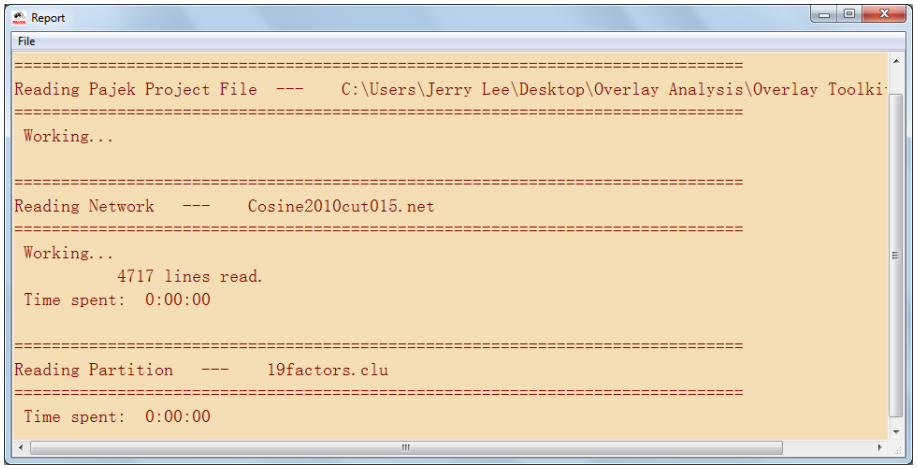


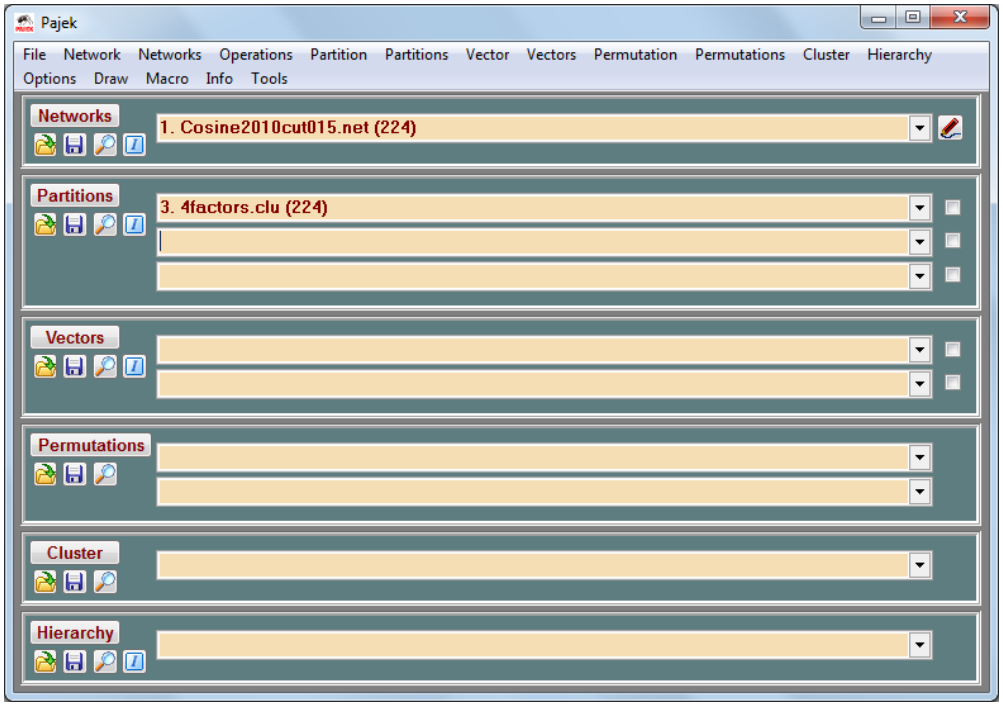
m. Navigate to the folder where the file map10.paj is, select it, and Click Open.

A Report window will open. Close it.

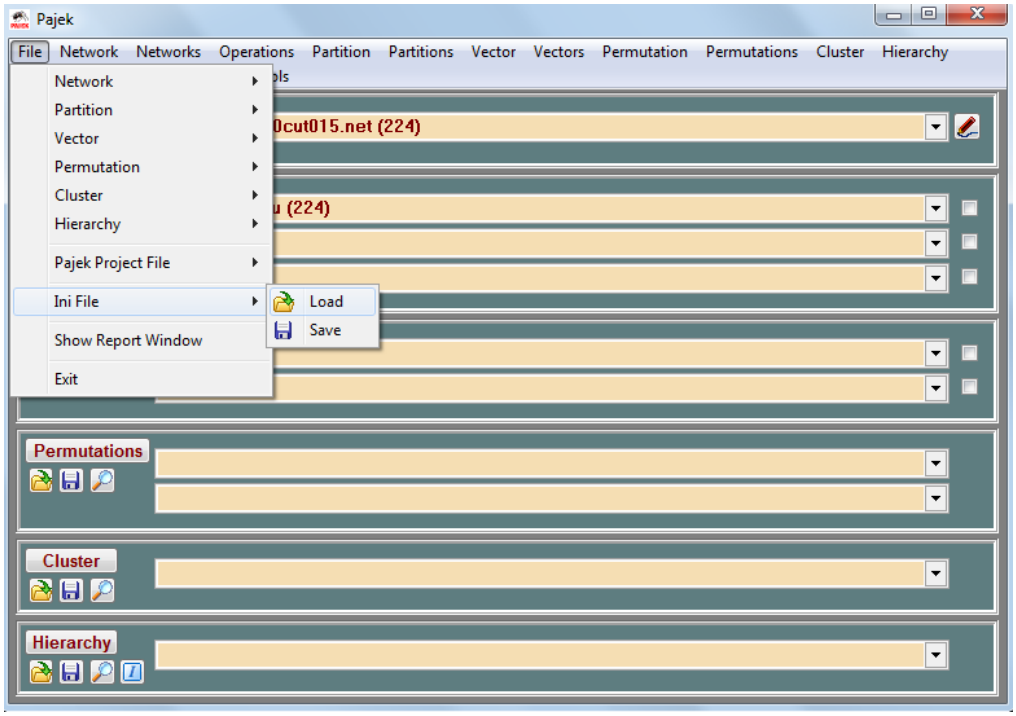
Pajek will display that the project has been loaded.

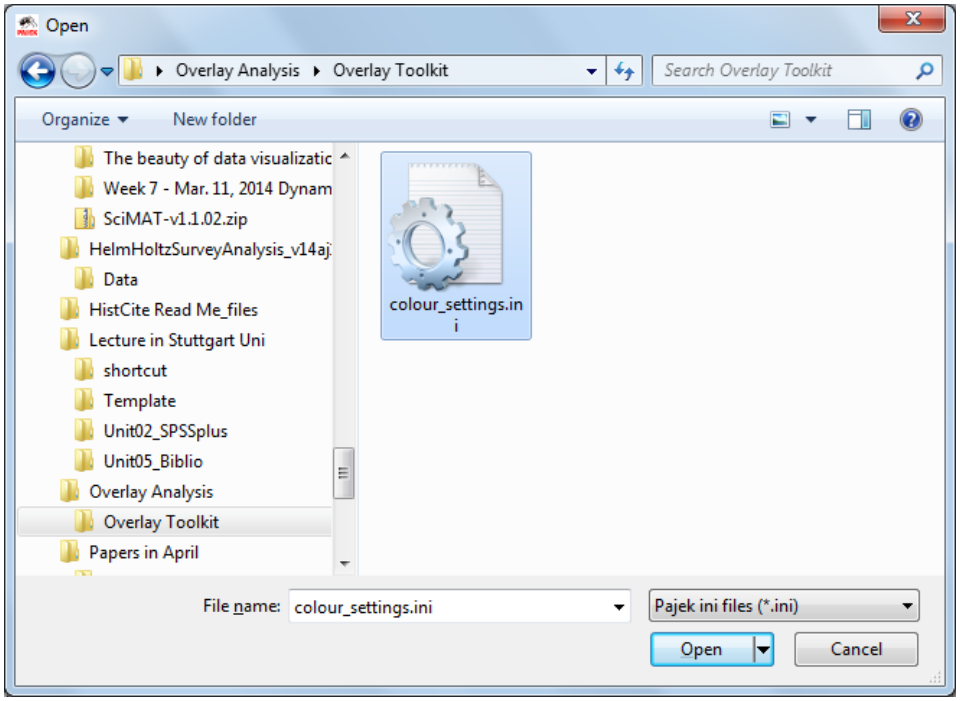






n. Next load the ini file to set the standardized color set. On the menu click Options INI File, then Load



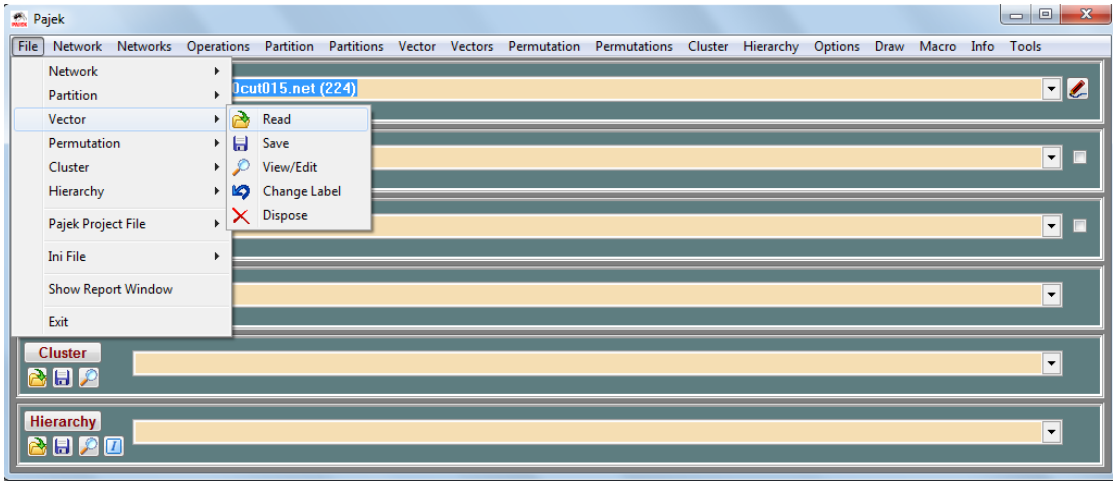


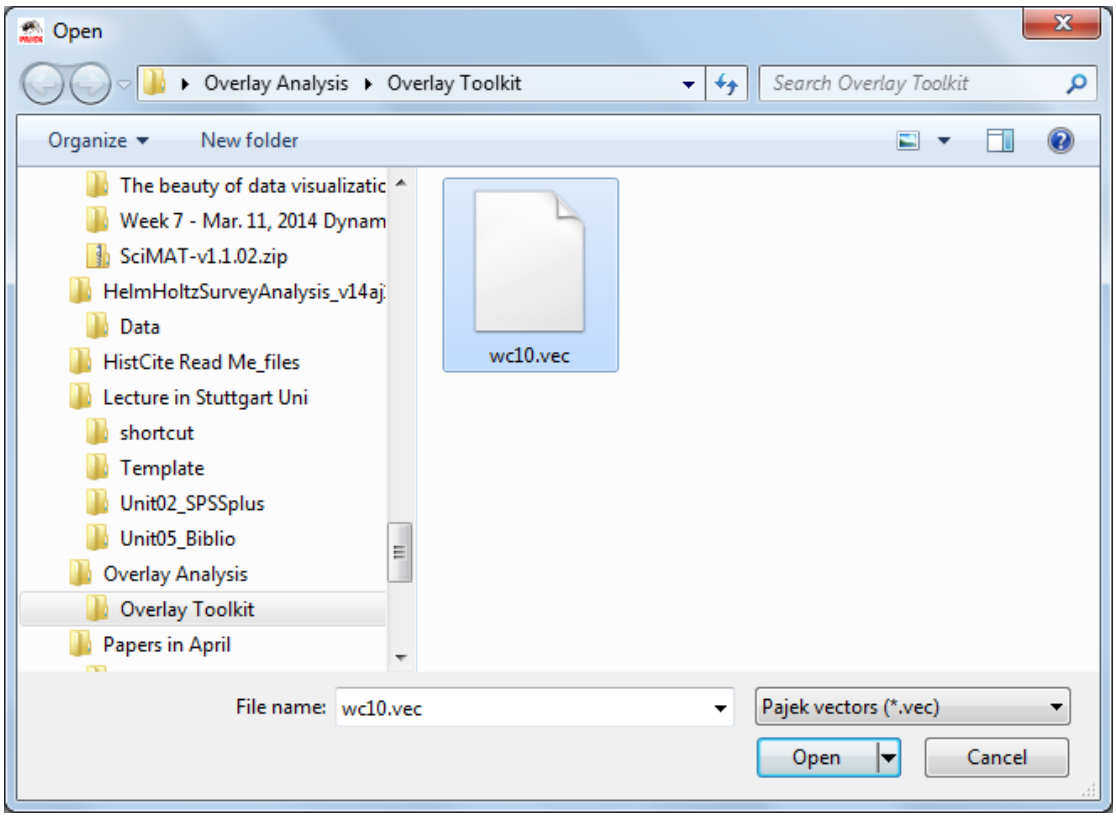
o. Next load the new overlay vector file.

Click File>Vector>Read

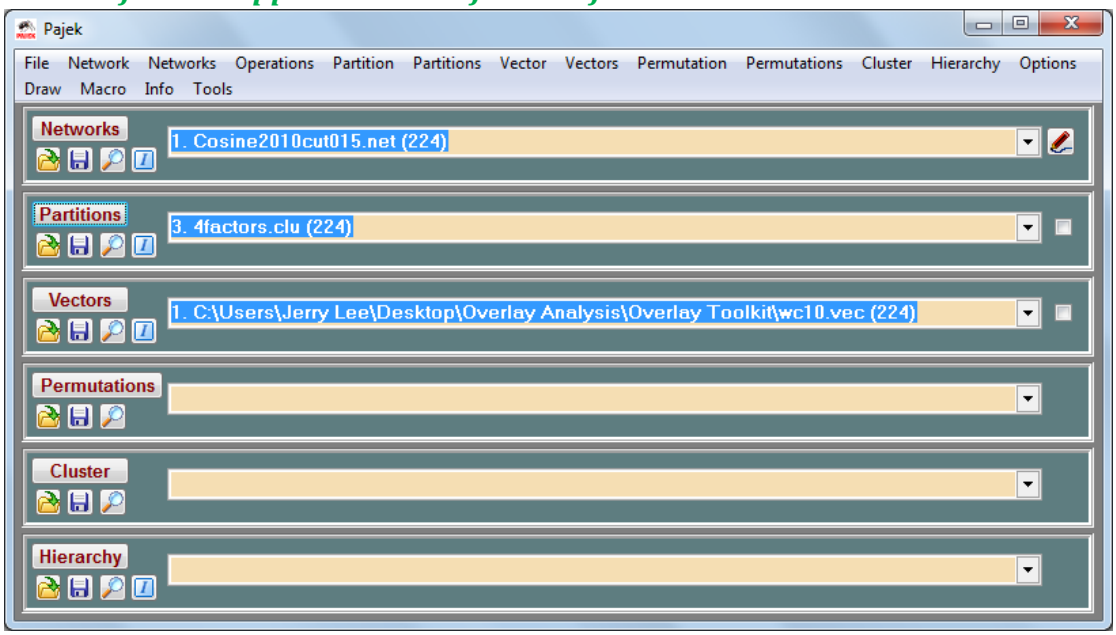
Navigate to the "wc10.vec" file, select it, and click Open.

A report window opens, click Close

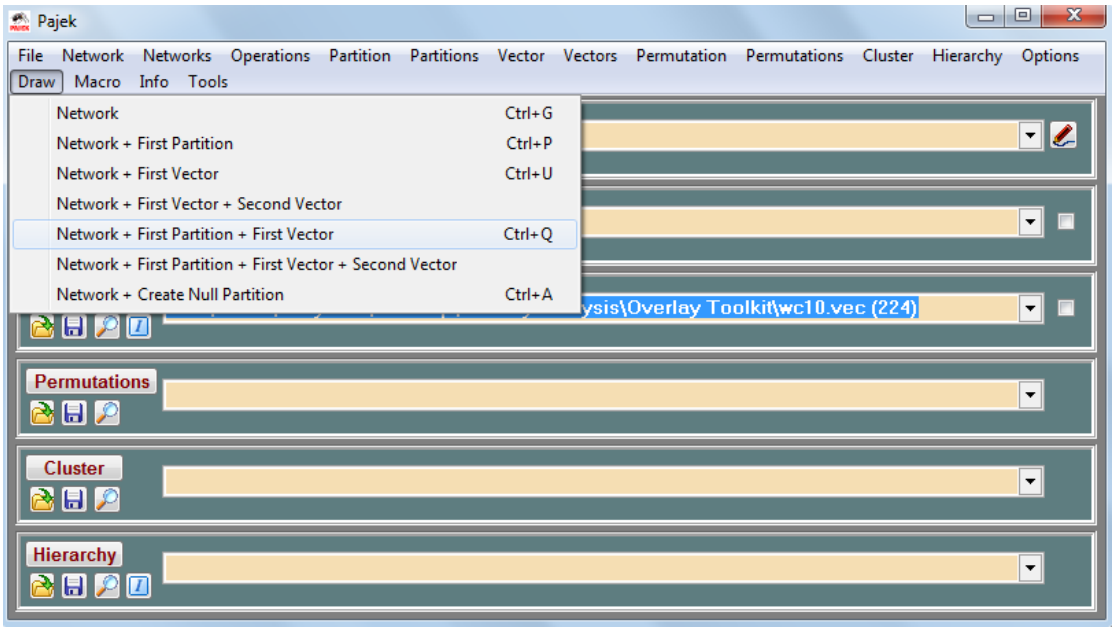


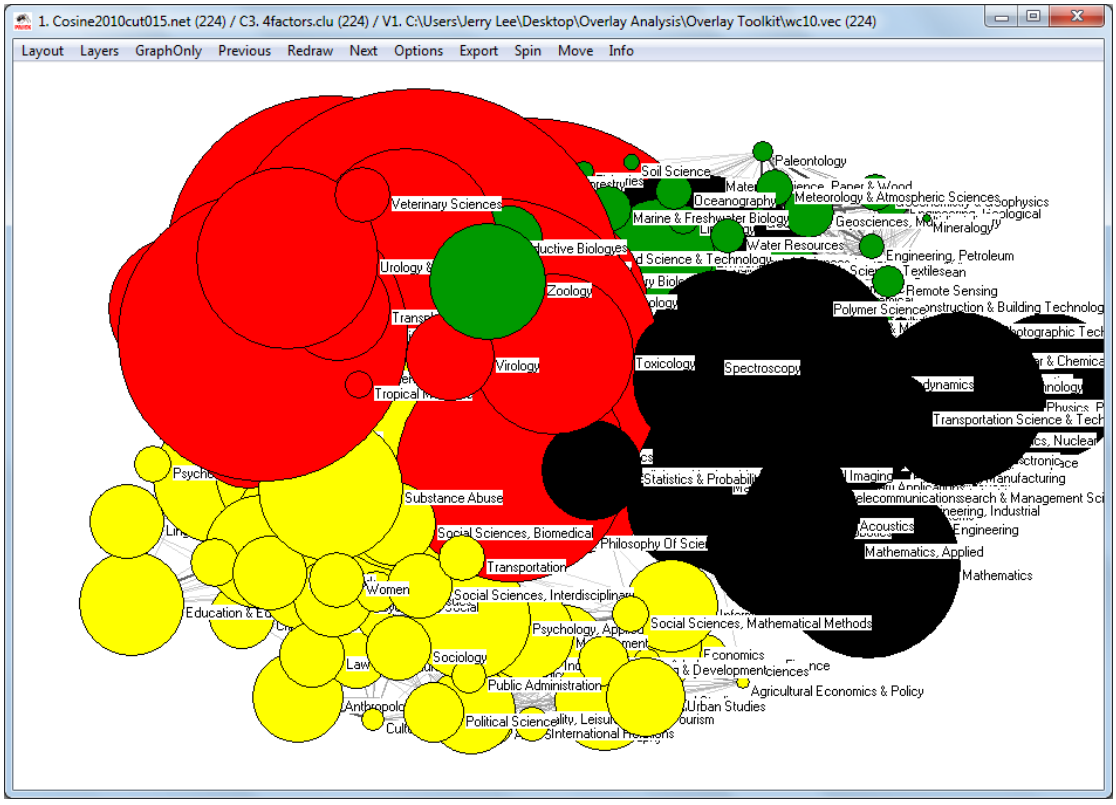


The file will appear in the Pajek interface Vector window

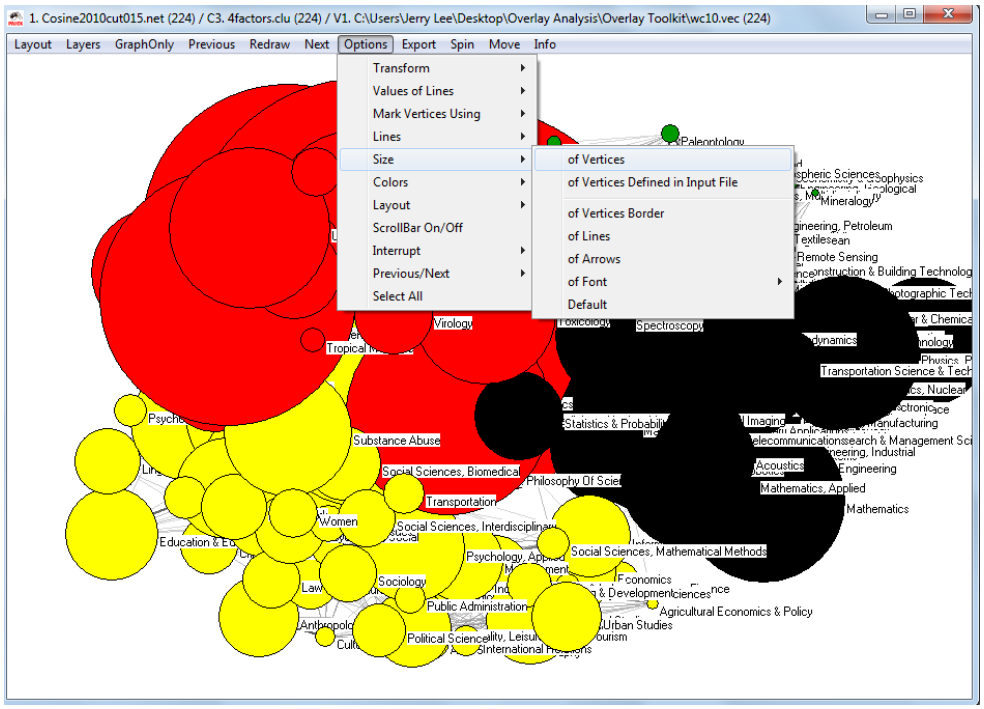


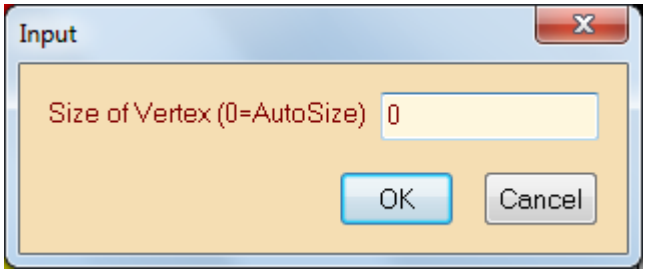
p. To Draw the overlap map, on the menu click Draw>Draw-Partition-Vector
A map will be drawn.

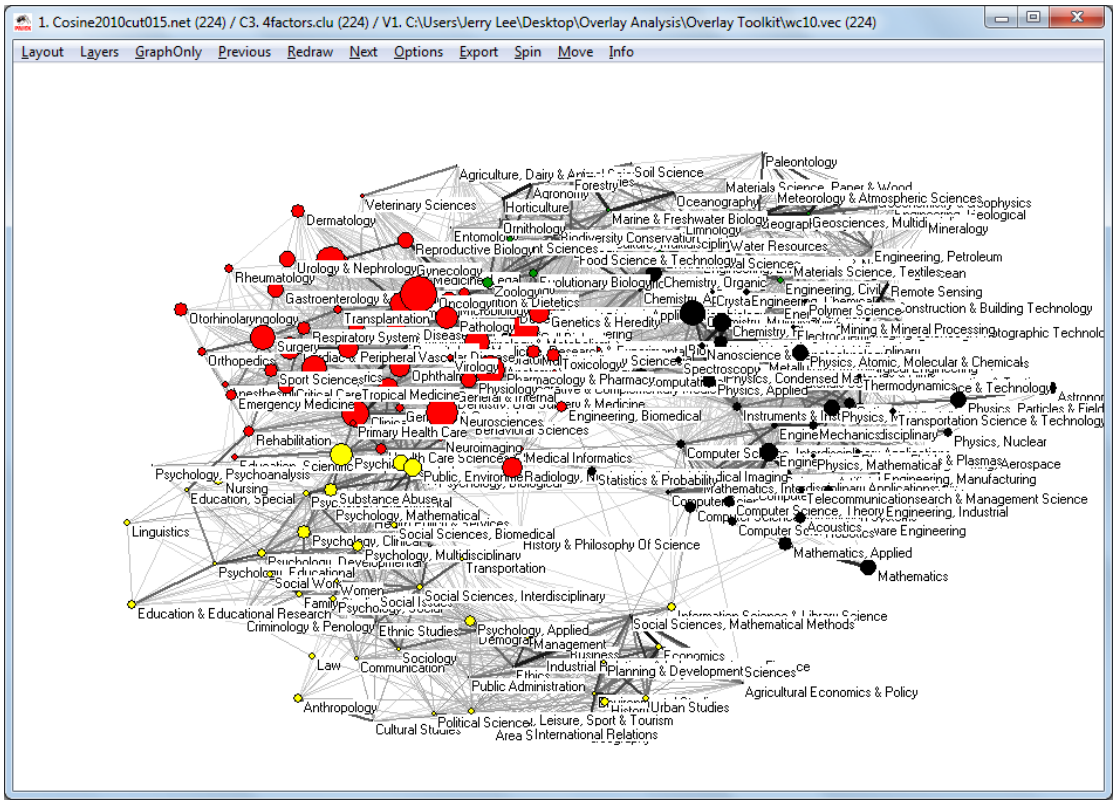




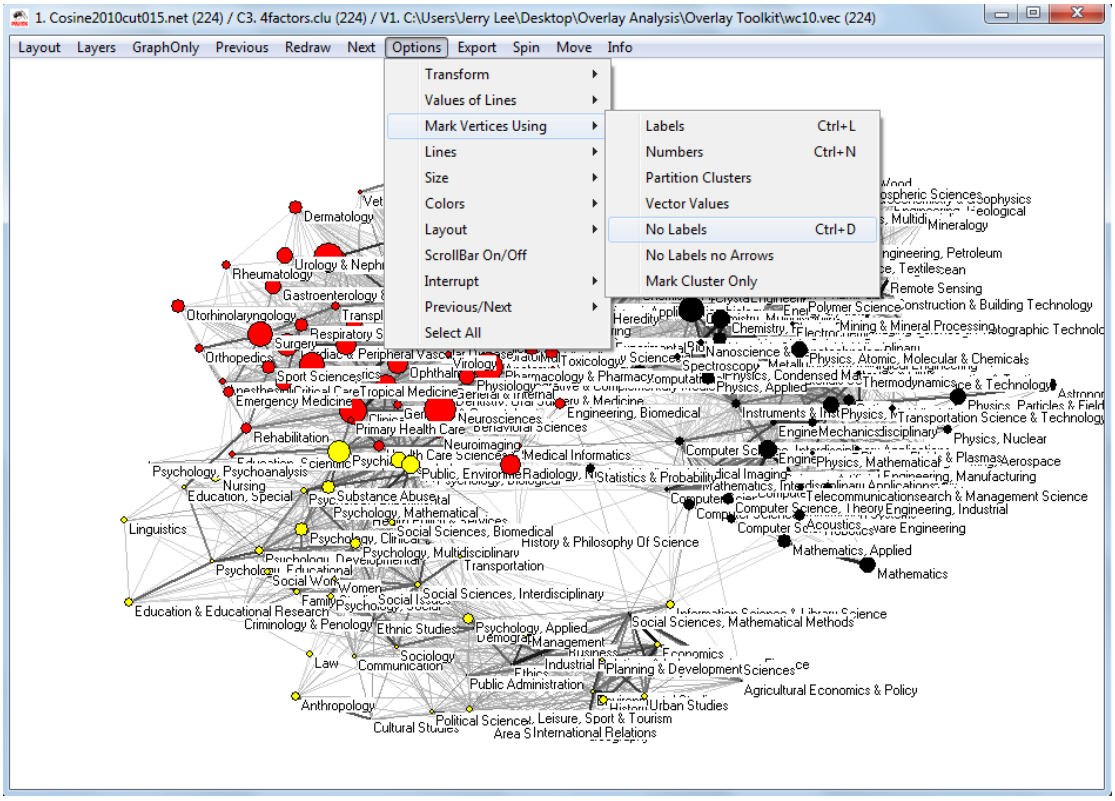
q. To resize the circles, on the menu click Options then Size, then of Vertices Reduce the unit size to a lower number, or set it to 0 for auto sizing. Conversely, if the circles are tool small, increase the


1. Cosine2010cut015.net (224) / C3. 4factors.clu (224) / V1. C:\Users\Jerry Lee\Desktop\Overlay Analysis\Overlay Toolkit\wc10.vec (224)
Layout Layers GraphOnly Previous Redraw Next Options Export Spin Move Info
Transform
Values of Lines
Mark Vertices Using
Lines
Size
Colors
Layout
ScrollBar On/Off
Interrupt
Previous/Next
Select All
of Vertices
of Vertices Defined in Input File
of Vertices Border
of Lines
of Arrows
of Font
Default

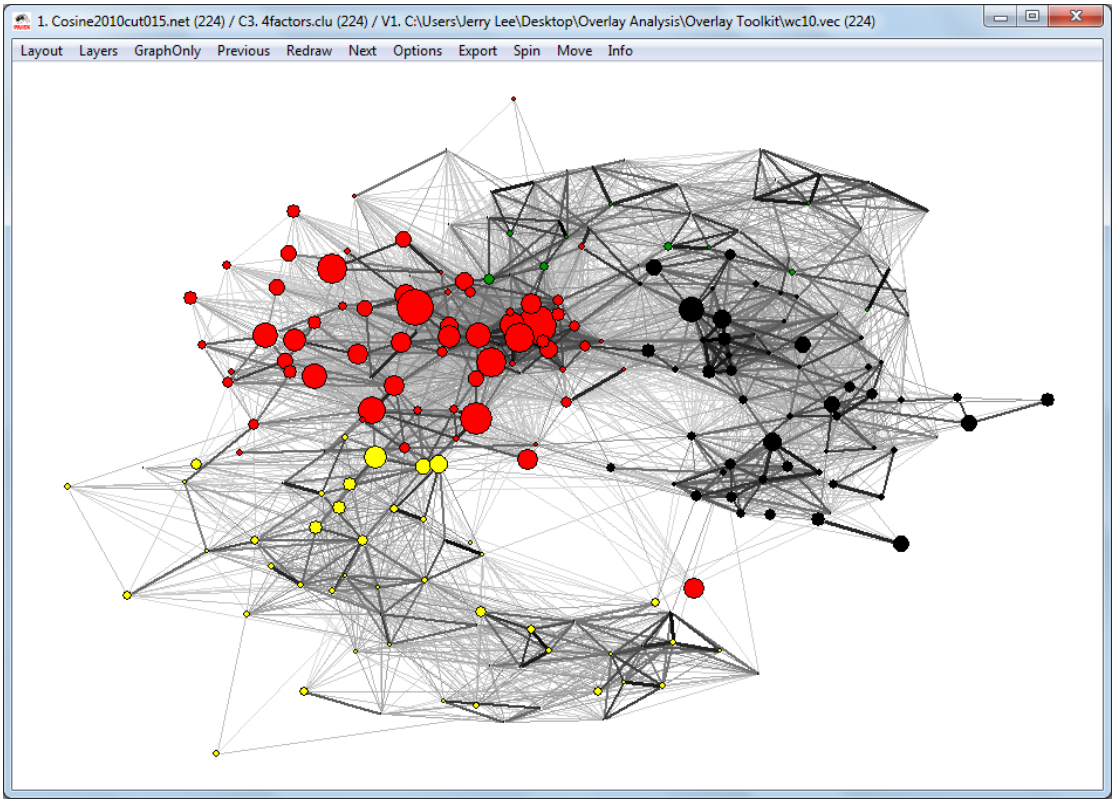

Input
Size of Vertex (0=AutoSize)
0
OK
Cancel


1. Cosine2010cut015.net (224) / C3. 4factors.clu (224) / V1. C:\Users\Jerry Lee\Desktop\Overlay Analysis\Overlay Toolkit\wc10.vec (224)
Layout Layers GraphOnly Previous Redraw Next Options Export Spin Move Info

r. To toggle the labels off or on, Click Options, Mark Vertices Using, No Labels or Labels.



Here is the final overlay sample map.



Results: 67,736

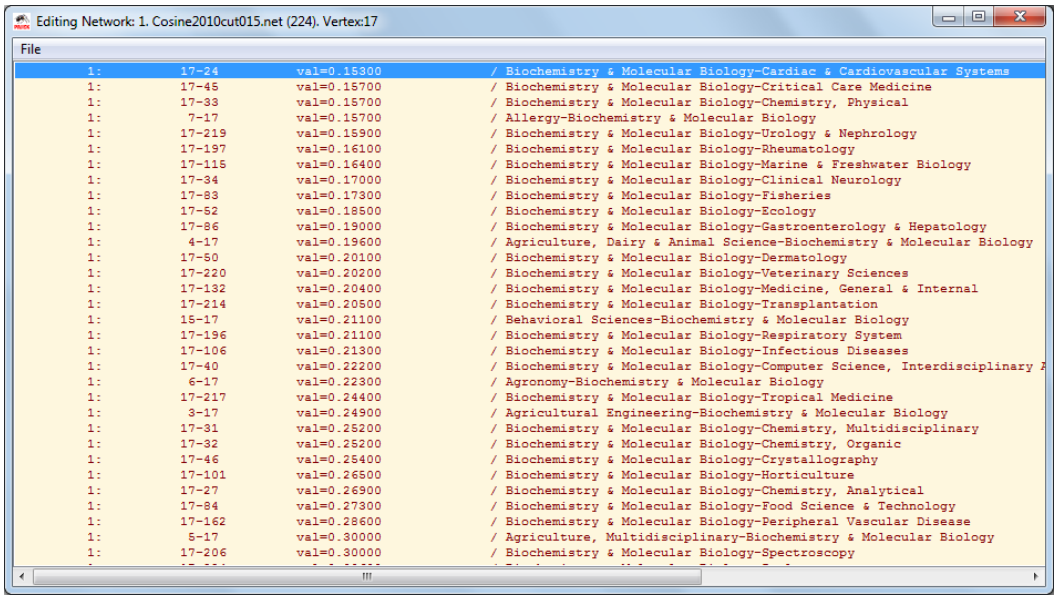
(from Web of Science Core Collection)

You searched for:

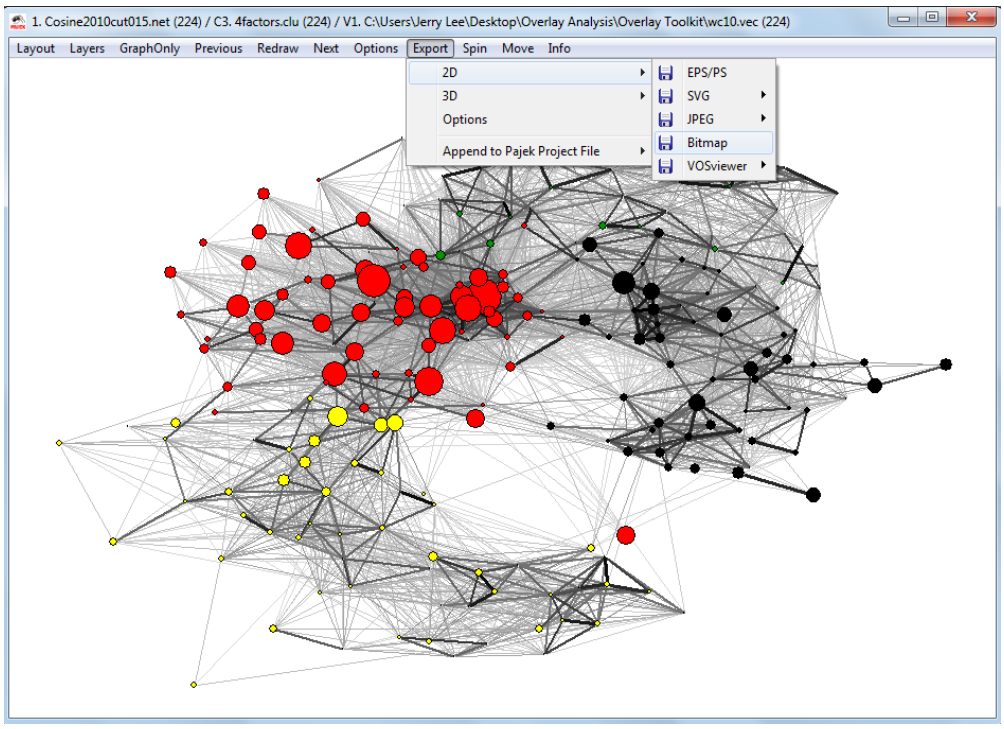
ORGANIZATION-ENHANCED:*("Wayne State Univ")*

Timespan=All years. Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, CCR-EXPANDED, IC.

s. To view the labels, on the menu, click Options, Vertices, and Labels. To see the Science Categories, right click on a node or vertices



To make a bitmap picture, on the Draw menu, click Export, then 2D then Bitmap



Repeat steps to created different overlays based on your Web of Science search results.

Part.3 Visualization with VOSviewer

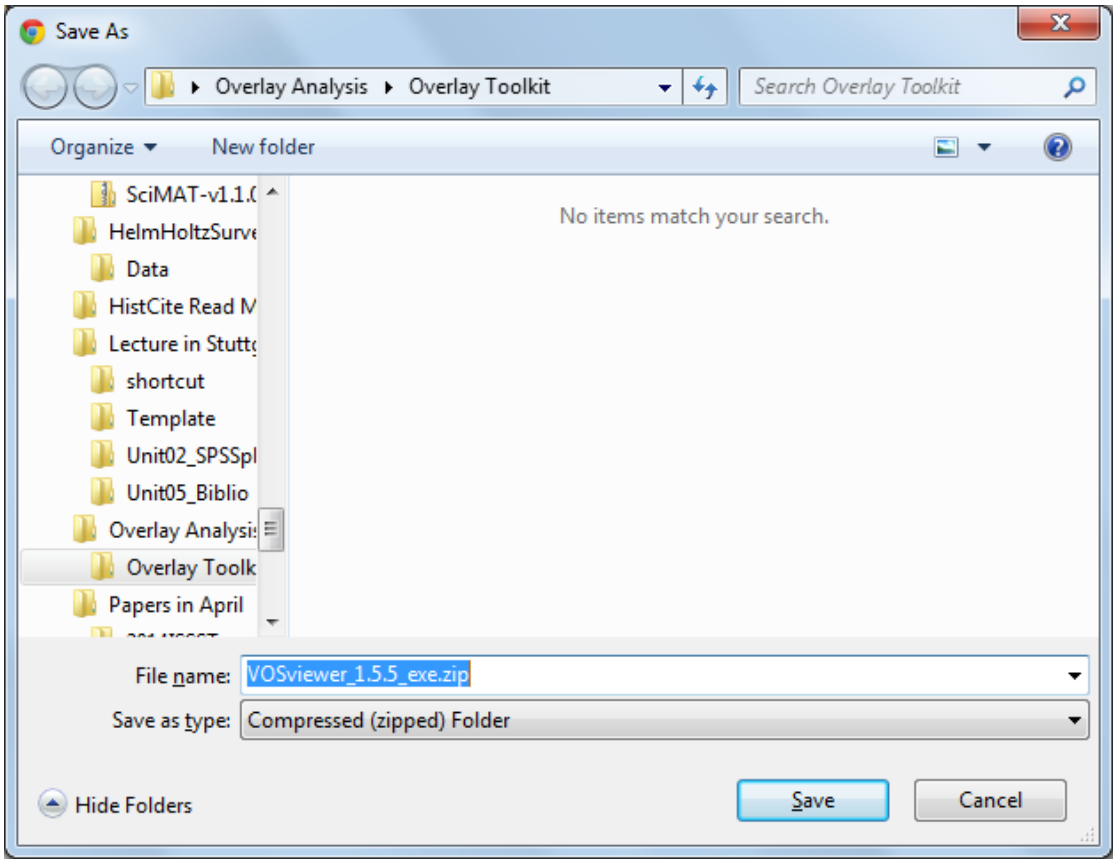
The following instructions are how to map your Web of Science Search Results using VOSviewer.

Step1. Download VOSviewer for the PC from this link:

http://www.vosviewer.com/download/

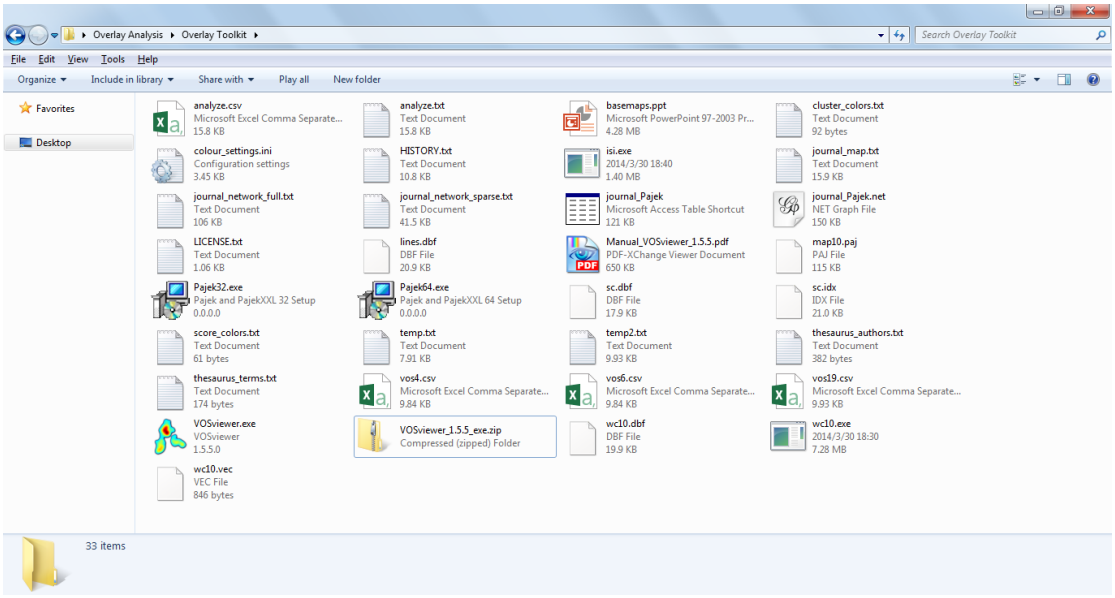
Step2. Click on the "Download this ZIP file" text link. Click Save.

Note: Navigate to desired folder, and save the file "VOSviewer_1.5.5_exe.zip"



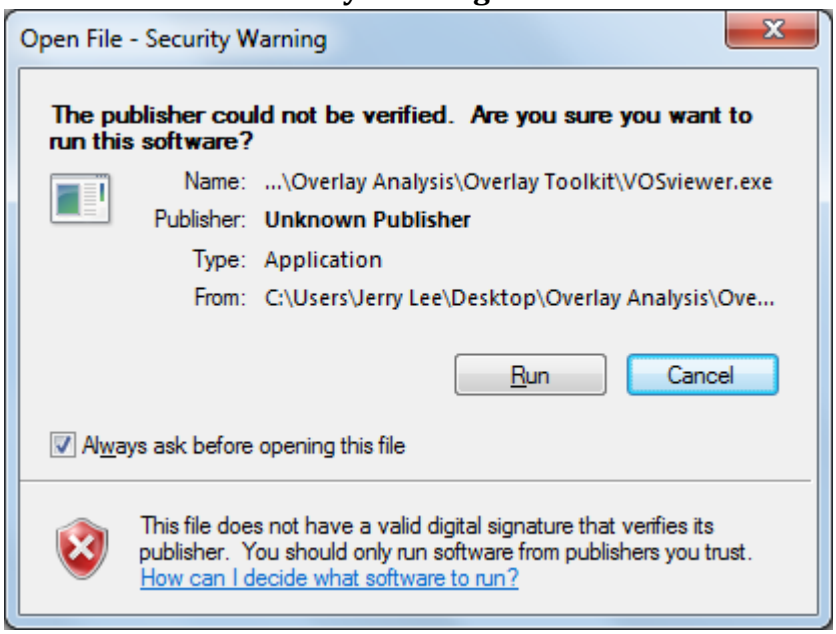
Step3. Unzip the file VOSviewer_1.5.5_exe.zip.

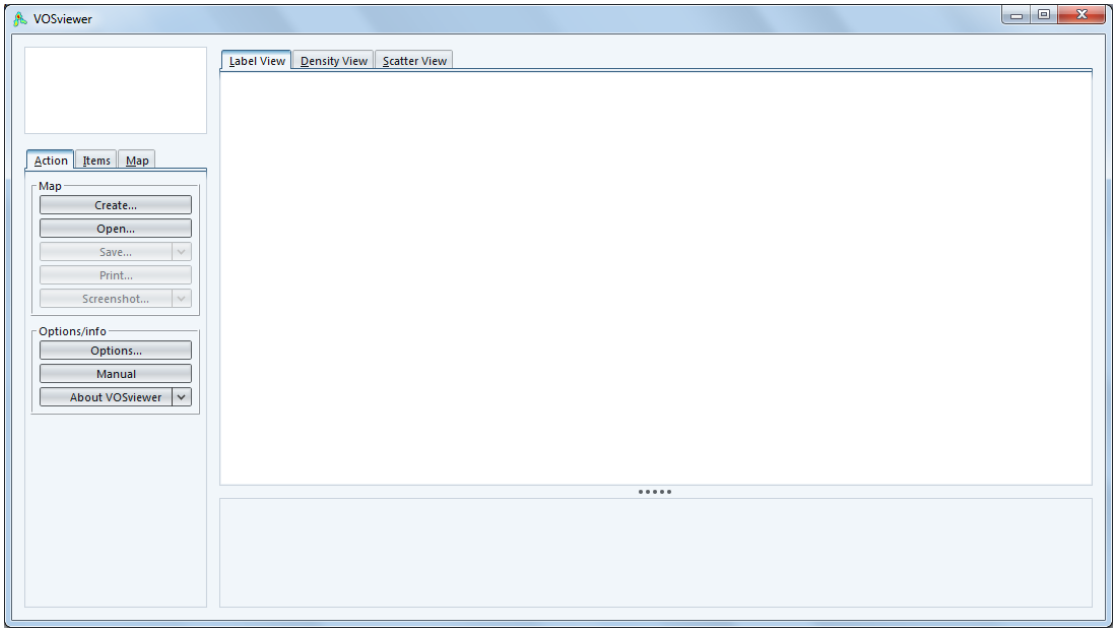
These files will be appear in your folder:



Step4. Double click the VOSviewer.exe file to start the program.

Click Run at the security warning.





Note: Click on the 'Open' tab in VOSviewer.

The program WC10.exe generates three files which can be opened in VOSviewer as the so-called "map-files": vos4.csv, vos6.csv, and vos19.csv.

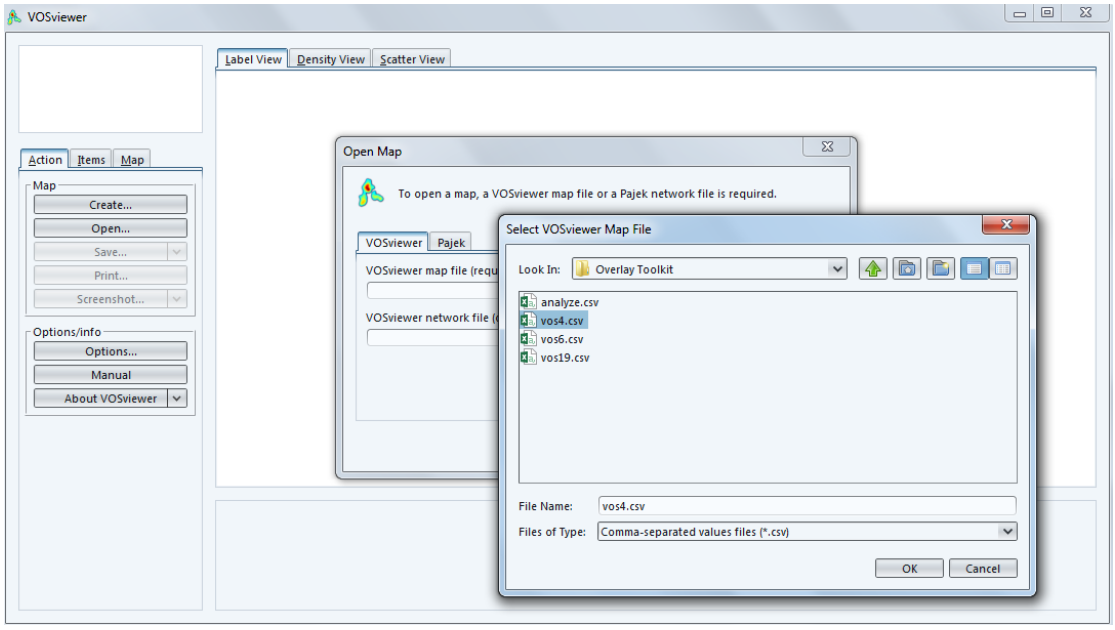
These files are based on 4, 6, or 19 clusters with different colors.

(The extension "csv" stands for "comma-separated variables"; the files can be edited both in excel and using a text editor.)

Step5. Open Map with VOSviewer

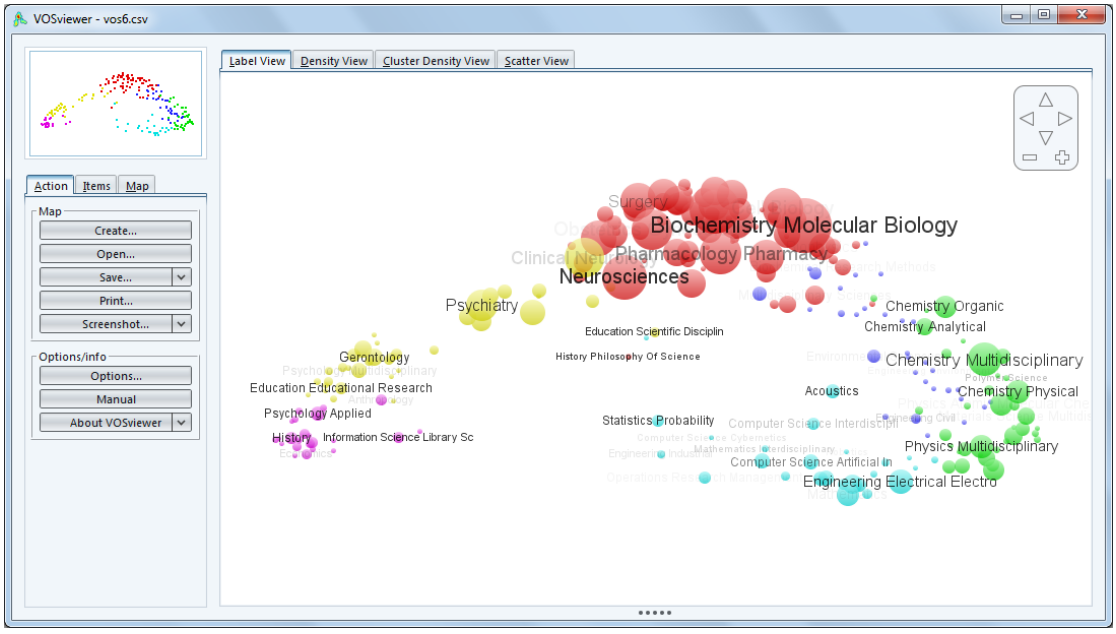
Navigate to the vos4.csv, vos6.csv and vos19.csv files and select one and click Ok.

Note: Change the "Files of Type" to "*.csv" to see these files in the window.

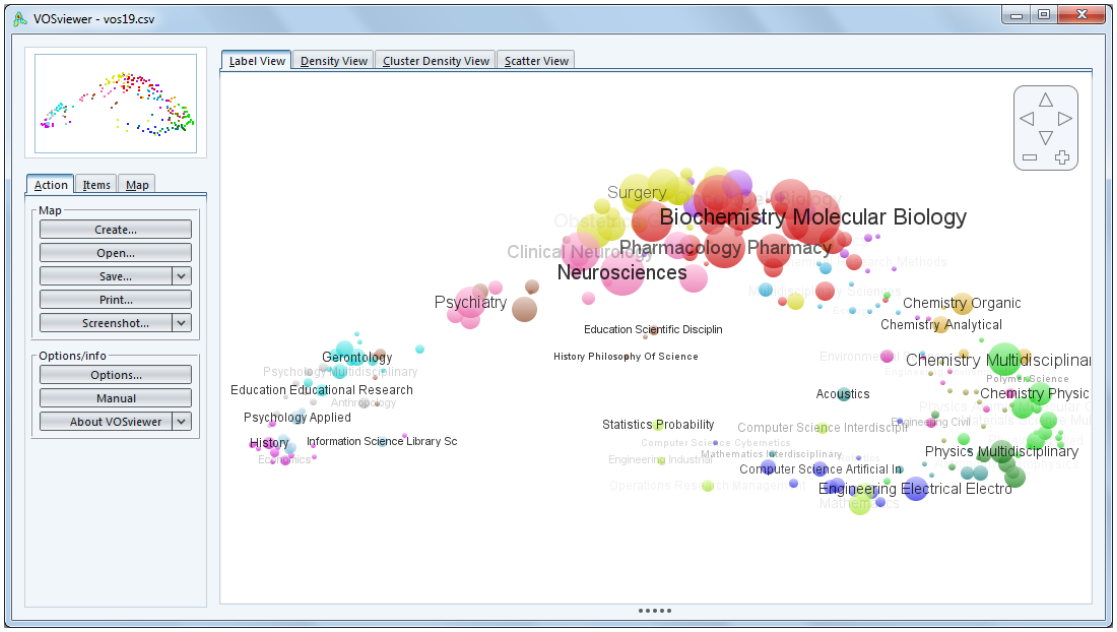


A map is displayed. This the vos4.csv file.

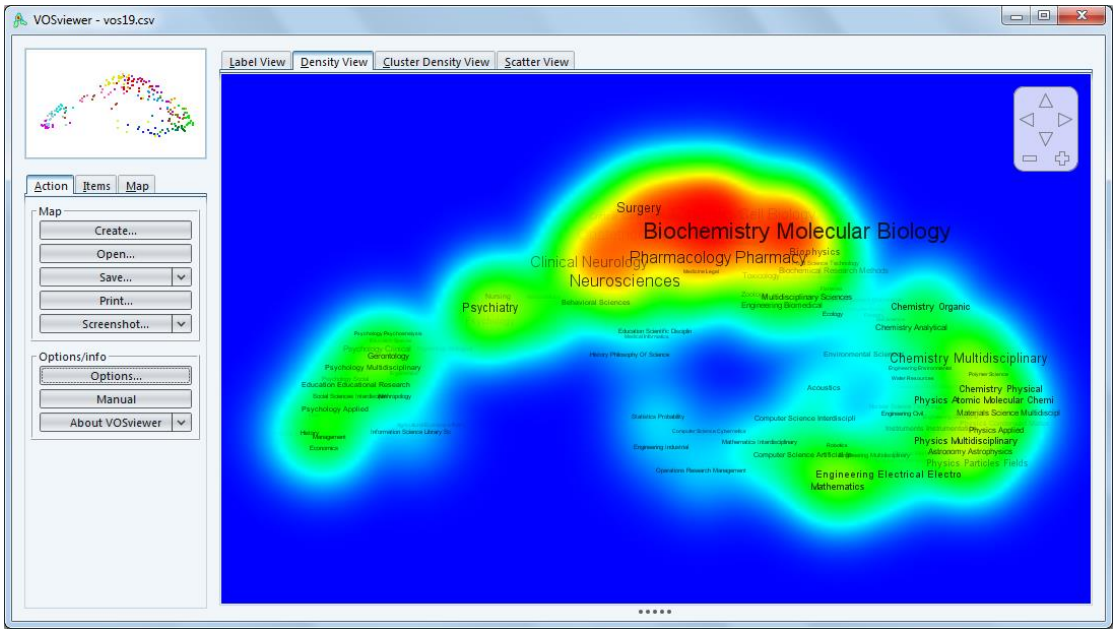
This is the vos6.csv file.



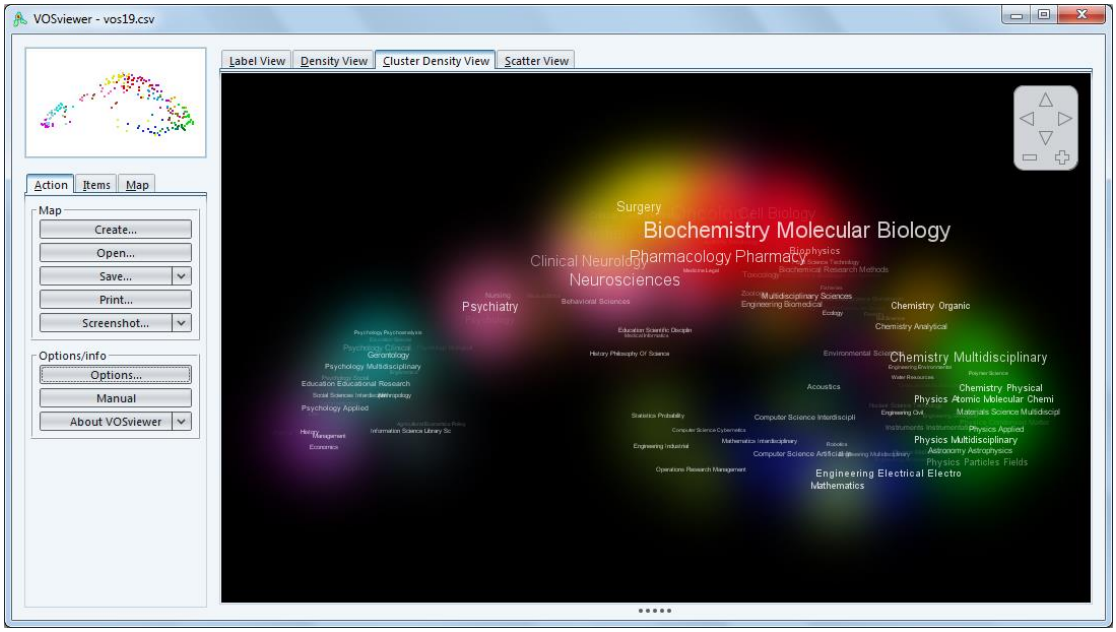
This is the vos19.csv file



Click on the Density or Cluster Density View to Change the visualization. Here is the Density view.



Here is the Cluster Density View.



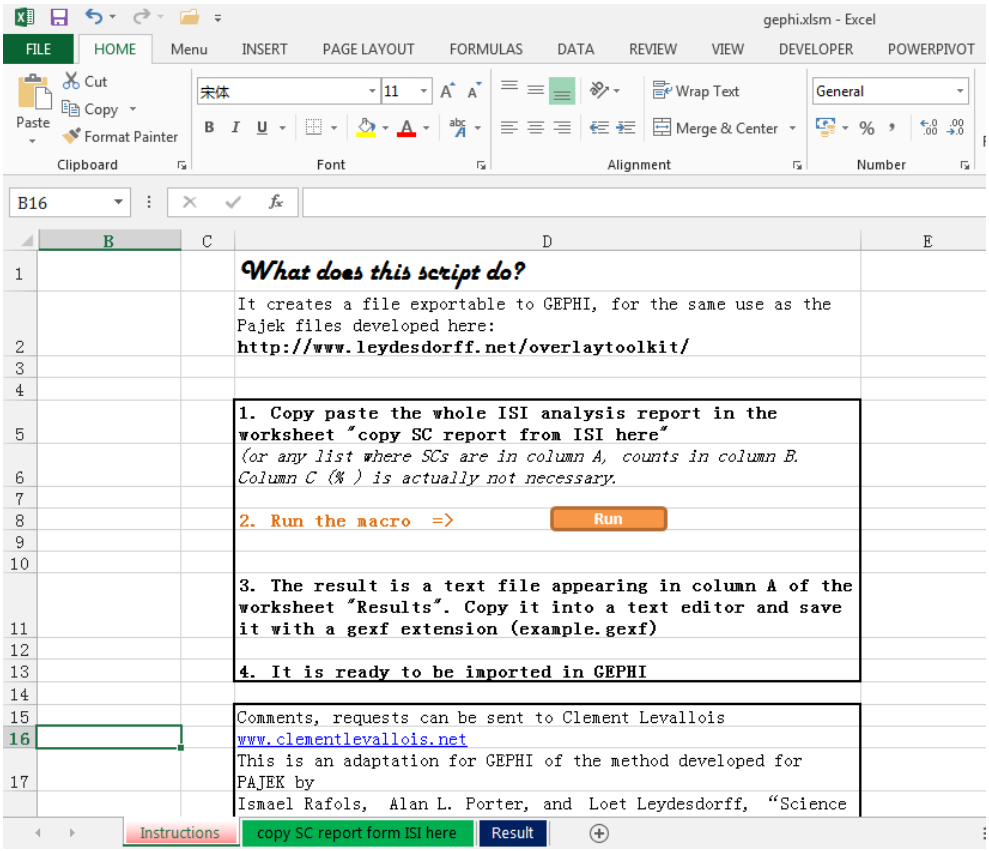
See VOSviewer manual for more details.
http://www.vosviewer.com/documentation/Manual_VOSviewer_1.5.5.pdf

Part.4 Visualization with Gephi

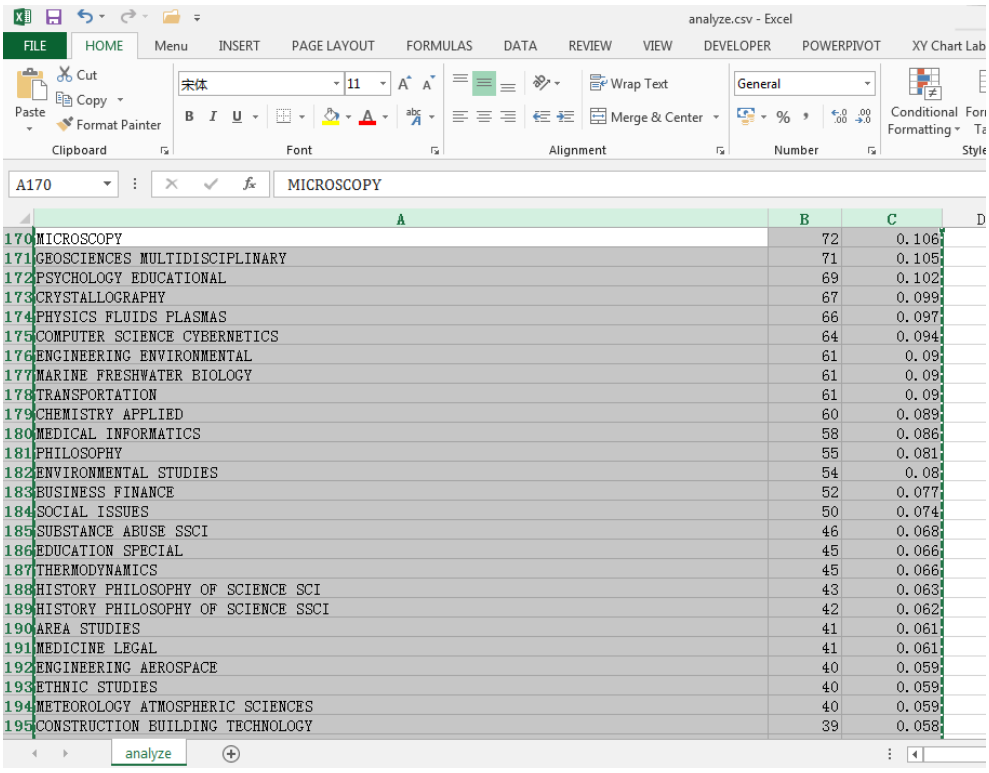
Extension for GEPHI(Visualization with Gephi[9])
Clement Levallois < CLevallois@rsm.nl > was so kind to make an excel file with a macro <gephi.xlsm> which allows for generating the corresponding input file for GEPHI (as an alternative to Pajek for the visualization). Save this file under the name gephi.xlsm by right clicking on the hyperlink.

Step1. Download the file excel Macro
http://www.leydesdorff.net/overlaytoolkit/gephi.xlsm
Step2. Open the Macro in Excel

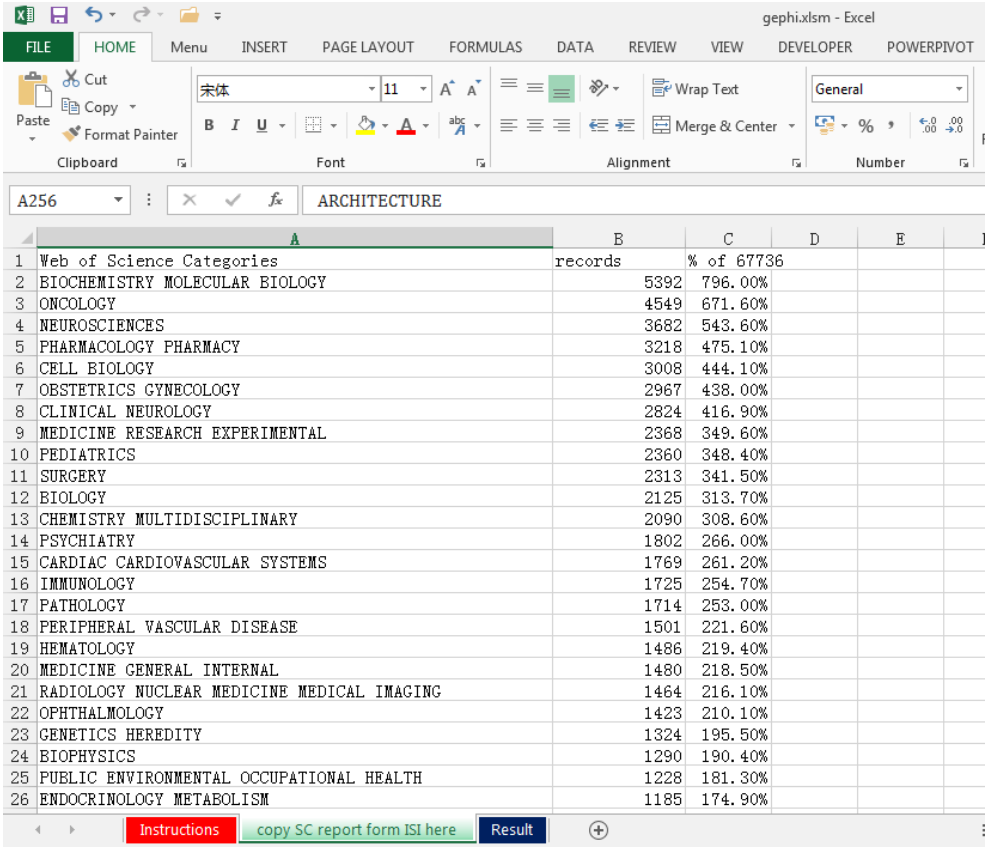
9 Gephi is freely available at http://gephi.org/



Step3. Open the data "analyze.txt" with Excel



Step4. Copy the data "analyze.txt" to "copy SC report form ISI here"



gephi.xlsm - Excel

FILE HOME Menu INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW DEVELOPER POWERPIVOT

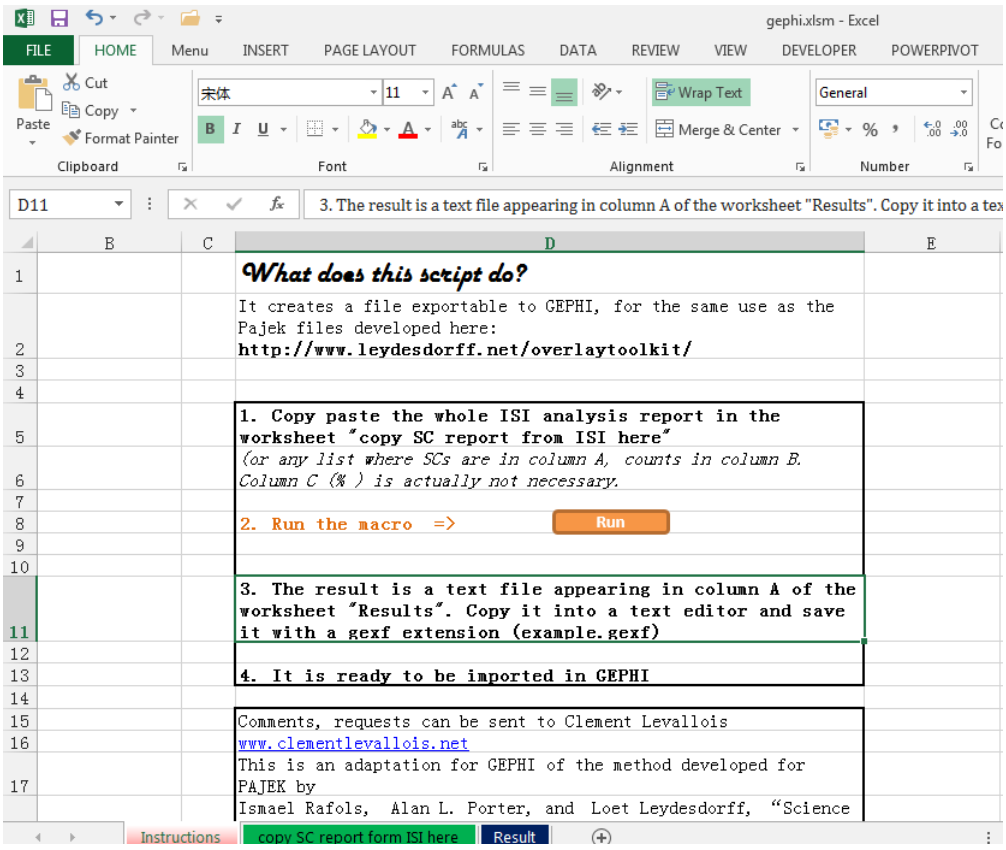
Cut Copy Format Painter Paste Clipboard 宋体 11 Font Wrap Text Merge & Center Alignment General Number

A256 ARCHITECTURE

	A	B	C	D	E
1	Web of Science Categories	records	% of 67736		
2	BIOCHEMISTRY MOLECULAR BIOLOGY	5392	796.00%		
3	ONCOLOGY	4549	671.60%		
4	NEUROSCIENCES	3682	543.60%		
5	PHARMACOLOGY PHARMACY	3218	475.10%		
6	CELL BIOLOGY	3008	444.10%		
7	OBSTETRICS GYNECOLOGY	2967	438.00%		
8	CLINICAL NEUROLOGY	2824	416.90%		
9	MEDICINE RESEARCH EXPERIMENTAL	2368	349.60%		
10	PEDIATRICS	2360	348.40%		
11	SURGERY	2313	341.50%		
12	BIOLOGY	2125	313.70%		
13	CHEMISTRY MULTIDISCIPLINARY	2090	308.60%		
14	PSYCHIATRY	1802	266.00%		
15	CARDIAC CARDIOVASCULAR SYSTEMS	1769	261.20%		
16	IMMUNOLOGY	1725	254.70%		
17	PATHOLOGY	1714	253.00%		
18	PERIPHERAL VASCULAR DISEASE	1501	221.60%		
19	HEMATOLOGY	1486	219.40%		
20	MEDICINE GENERAL INTERNAL	1480	218.50%		
21	RADIOLOGY NUCLEAR MEDICINE MEDICAL IMAGING	1464	216.10%		
22	OPHTHALMOLOGY	1423	210.10%		
23	GENETICS HEREDITY	1324	195.50%		
24	BIOPHYSICS	1290	190.40%		
25	PUBLIC ENVIRONMENTAL OCCUPATIONAL HEALTH	1228	181.30%		
26	ENDOCRINOLOGY METABOLISM	1185	174.90%		

Instructions | copy SC report form ISI here | Result

Step5. Click "Run" in the "Instructions"



gephi.xlsm - Excel

FILE HOME Menu INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW DEVELOPER POWERPIVOT

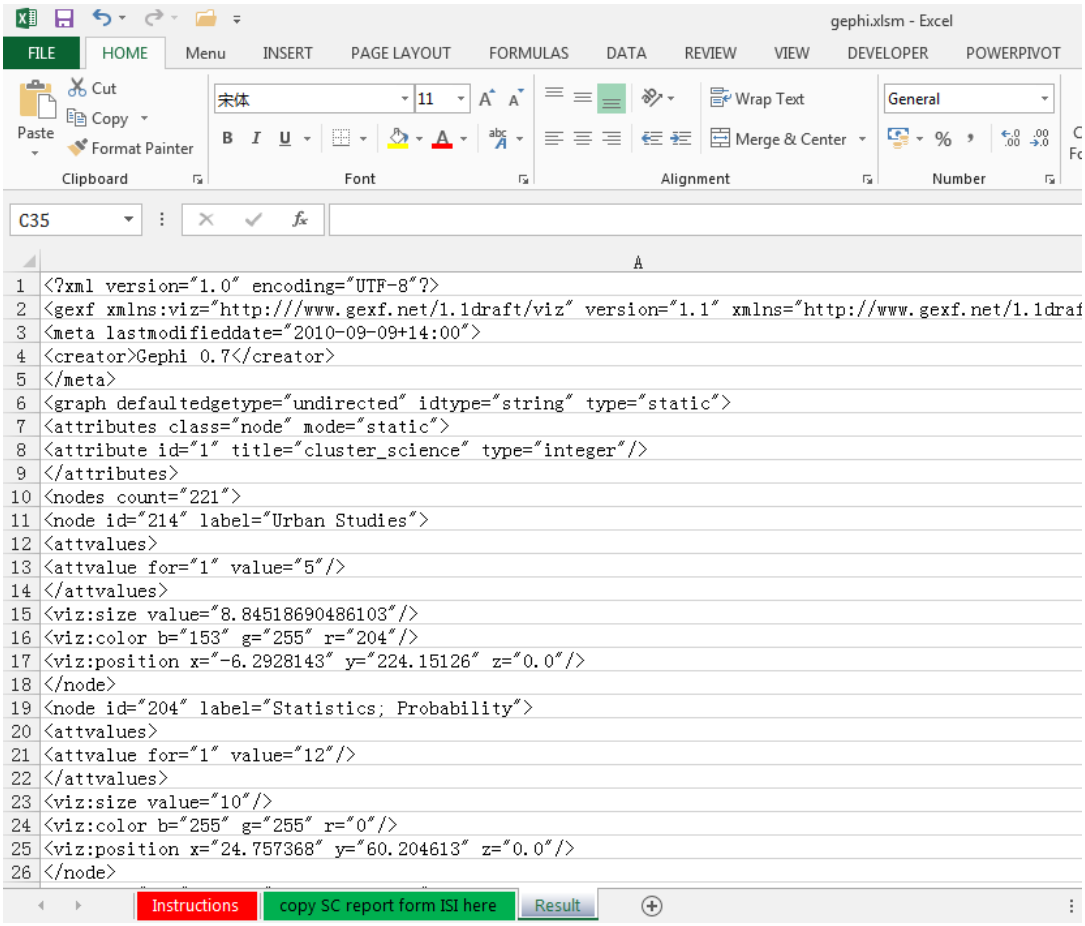
Cut Copy Format Painter Paste Clipboard 宋体 11 Font Wrap Text Merge & Center Alignment General Number

D11 3. The result is a text file appearing in column A of the worksheet "Results". Copy it into a tex

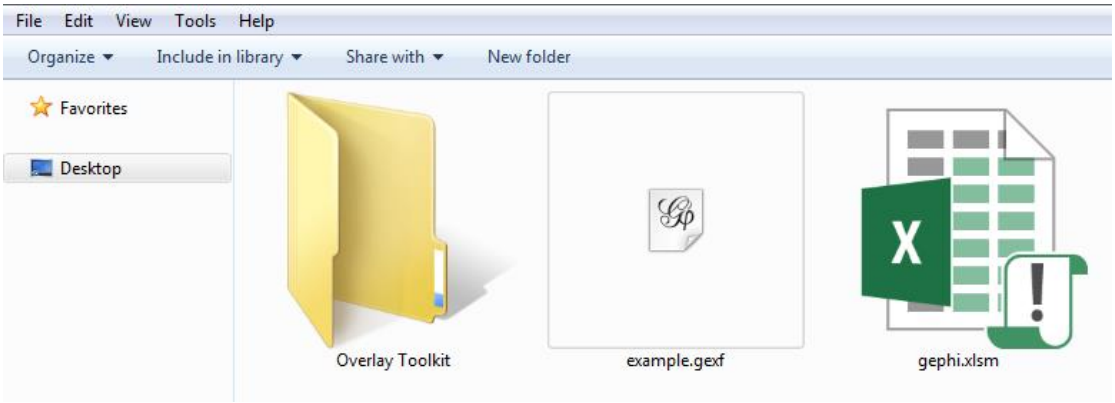
	B	C	D	E
1			**What does this script do?**	
2			It creates a file exportable to GEPHI, for the same use as the Pajek files developed here: **http://www.leydesdorff.net/overlaytoolkit/**	
3				
4				
5			**1. Copy paste the whole ISI analysis report in the worksheet "copy SC report from ISI here"**	
6			*(or any list where SCs are in column A, counts in column B. Column C (%) is actually not necessary.*	
7				
8			2. Run the macro => Run	
9				
10				
11			**3. The result is a text file appearing in column A of the worksheet "Results". Copy it into a text editor and save it with a gexf extension (example.gexf)**	
12				
13			**4. It is ready to be imported in GEPHI**	
14				
15			Comments, requests can be sent to Clement Levallois	
16			www.clementlevallois.net	
17			This is an adaptation for GEPHI of the method developed for PAJEK by Ismael Rafols, Alan L. Porter, and Loet Leydesdorff, "Science	

Instructions | copy SC report form ISI here | Result

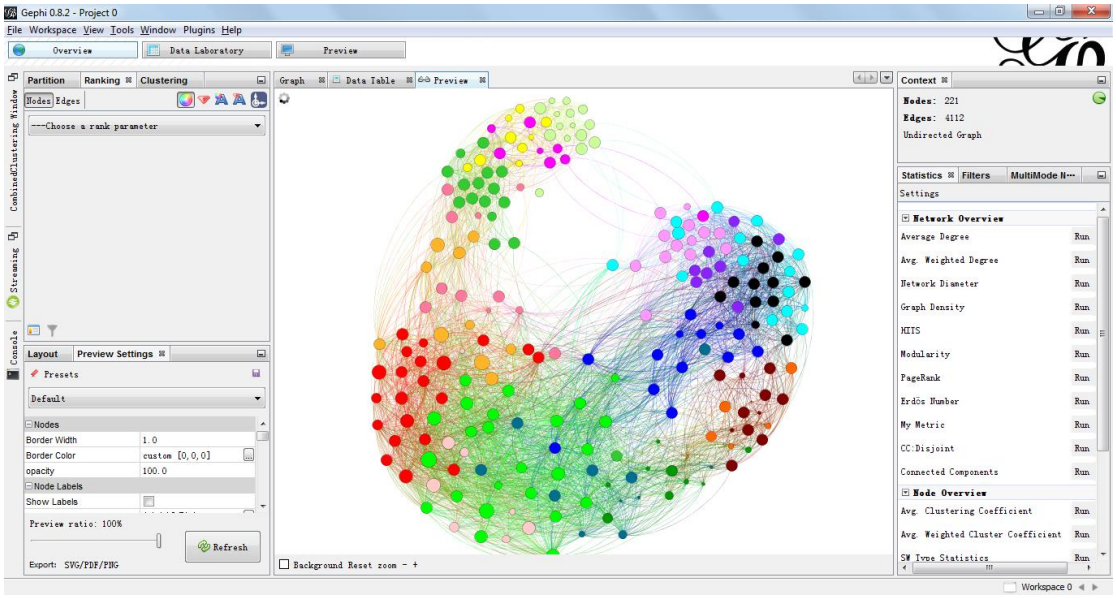
Step6. Get the results from "Result"

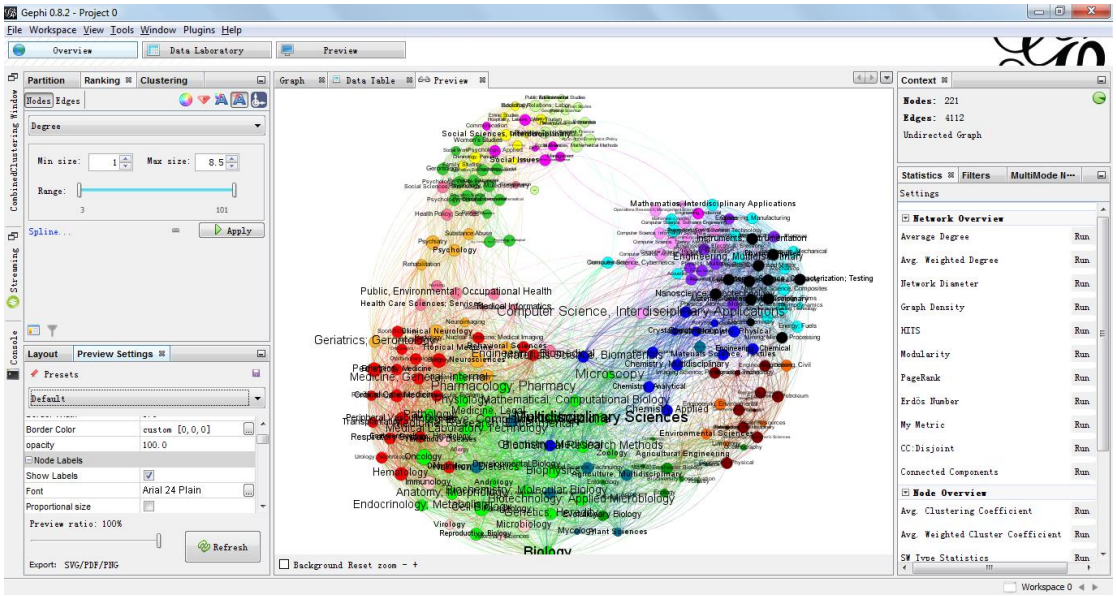


Step7. Copy the results to the new".txt" file, and change the file name to ".gexf"



Step8. Open the ".gexf" file.





Part.5 Visualization with IDR map of science

Step1. Download the instruction

How to prepare the file for uploading in the IDR map of science

http://idr.gatech.edu/doc/IDR_upload_instruction.pdf

Step2. Upload your data

http://www.idr.gatech.edu/upload.php

Part.6 Open Access data in this instruction

The related data and software in this instruction are shared below:

https://drive.google.com/folderview?id=0B0HnDMi5NBF8a0lhb1lVT3NjUU0&usp=sharing

Note: More information visit to

http://www.leydesdorff.net/overlaytoolkit/index.htm