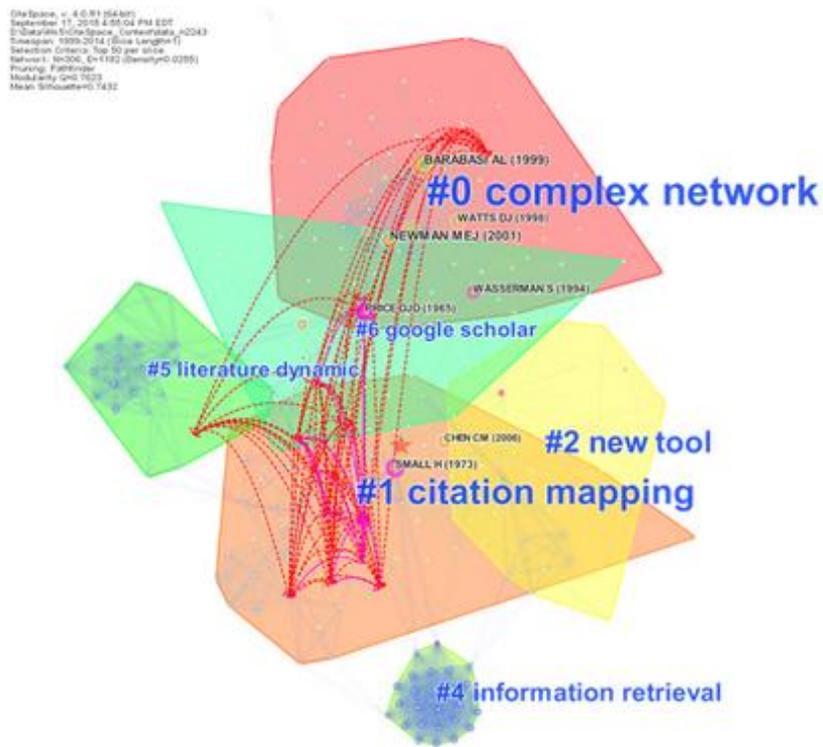


CiteSpace对网络结构变异分析



李杰¹, 陈超美²

1. 首都经济贸易大学-安全与环境工程学院

2. Drexel University- College of Computing and Informatics

2015年9月18日

小提示

要求版本至少为4.0.R1.64-bit.public.9.17.2015。下载地址
<http://cluster.ischool.drexel.edu/~cchen/citespace/current/4.0.R1.64-bit.public.9.17.2015.zip>

配套教程: 李杰, 陈超美著. CiteSpace科技文本挖掘及可视化[M]. 首都经济贸易大学出版社. 2016.

作者博客: 李杰博客: <http://blog.sciencenet.cn/u/jerrycueb>; 陈超美博客: <http://blog.sciencenet.cn/u/ChaomeiChen>

写在前面

- 关于结构变异理论 (Theory of Structural Variation) 的研究最初发表在2012年的一篇JASIST论文 (见下面参考文献), 其中也包括了几个案例研究, 题为“[结构性变化预测被引次数的效果](#)”。其核心问题是如何能够量化新发表的论文的新颖性。
- 结构变异分析(Structural Variation Analysis - SVA)一方面基于科学创造方面的研究, 尤其是新颖的重组在创造性思维中的作用和影响。这是基于以下观察: 科学发现或创新在很大的程度上都具有一个共性, 就是新思维能够容纳原本看似风马牛不相及的观念。换句话说, 类似于在不同岛屿之间架起的一座新桥梁。第2个验证 条件就是这座新桥上是否确实吸引很快变得车水马龙。

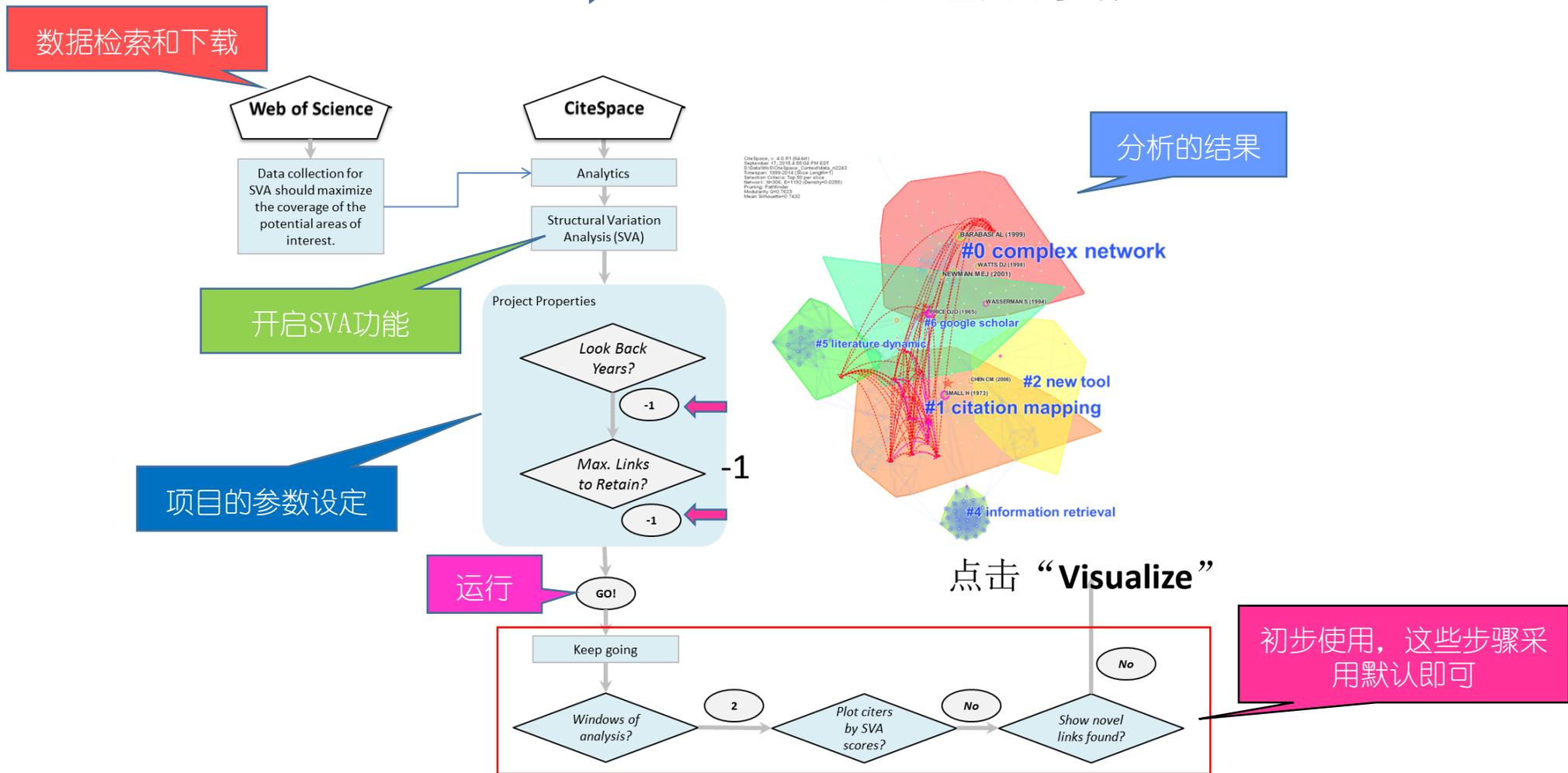
参考文献

- Chen, C. (2012) [Predictive effects of structural variation on citation counts](#). *Journal of the American Society for Information Science and Technology*, **63**(3), 431-449.
- Chen, C. (2014) [The Fitness of Information: Quantitative Assessments of Critical Evidence](#). Wiley.

基本步骤

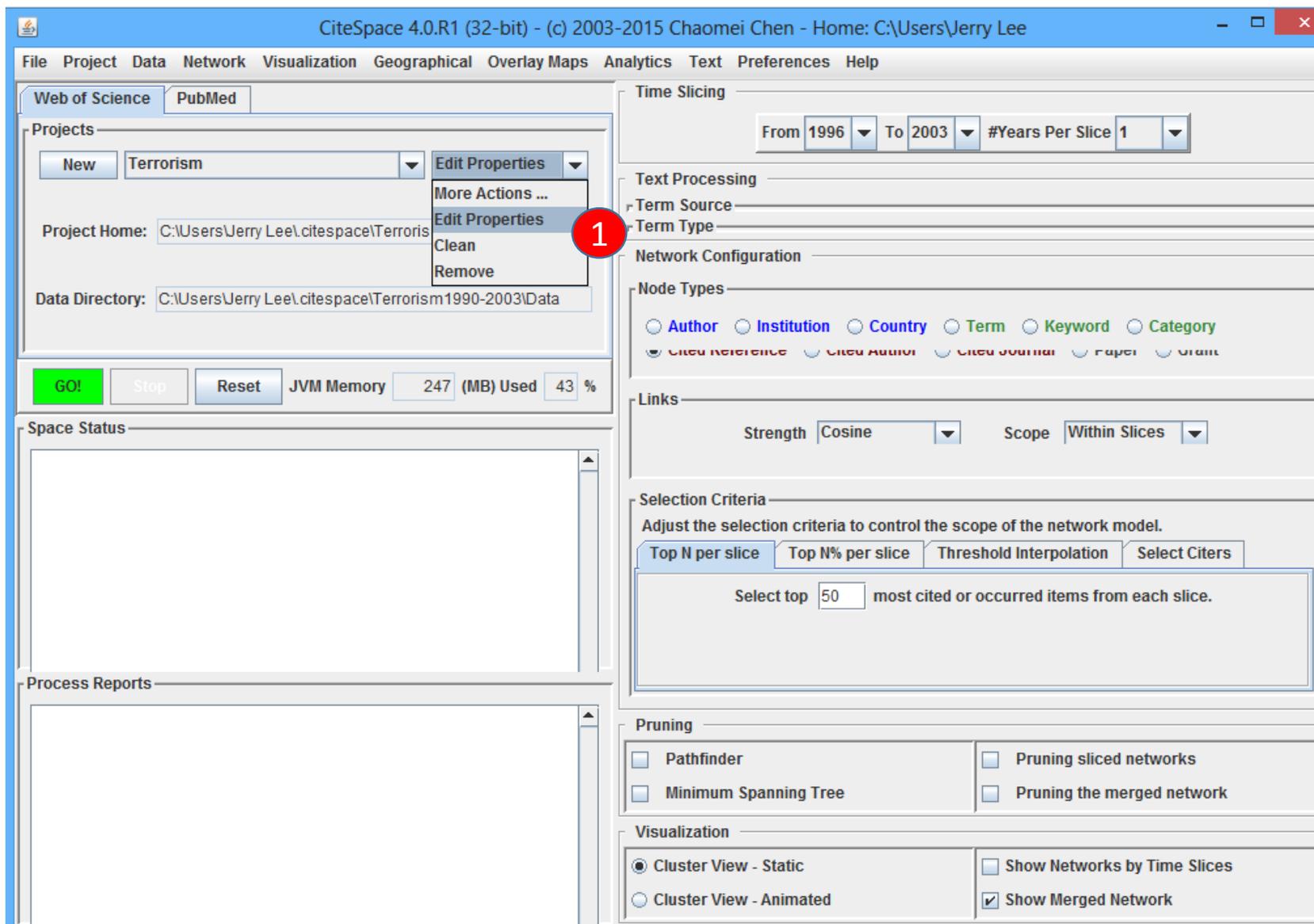


普通的分析是在没有开启SVA功能下进行的，而在菜单Analytics下开启SVA功能后再运行CiteSpace则会在“Visualize”执行前经过下面几个步骤。



下面仅仅给出具体操作步骤，对结果的进一步分析
解读请参照本PPT后面提供的原始文献。

建立好项目，对项目的参数进行进行调整。



建立好项目，对项目的参数进行进行调整。

New Project

Title: Terrorism

Project Home: C:\Users\Jerry Lee\citespace\Terrorism1990-2003\Projects

Data Directory: C:\Users\Jerry Lee\citespace\Terrorism1990-2003\Data

Language: English Chinese

SO Filter: SC Filter:

Alias List (on/off)	on	Exclusion List (on/off)	on
Export Space (on/off)	on	Export Abstracts (Time Consumption)	on
Export Matrices (csv) (off/on)	on	Enable JDIC (on/off)	on
Save Merged Slice (off/on)	off	Noun Phrase: Minimum Words	2
Noun Phrase: Maximum Word Length	4	Burst Term Threshold (0.00)	0.00
Maximum GML Node Label Length	8	CTSA (1-Disciplines, 2-Scientific)	1
Include GP (Group Author) (off/on)	off	Include ED (Editors) (off/on)	off
Node Degree Weighted (true)	true	Look Back Years (-1: unlimited)	-1
Max. No. Links to Retain (-1: unlimited)	6		

Normalize Citations Global Check

2

New Project

Title: Terrorism

Project Home: C:\Users\Jerry Lee\citespace\Terrorism1990-2003\Projects

Data Directory: C:\Users\Jerry Lee\citespace\Terrorism1990-2003\Data

Language: English Chinese

SO Filter: SC Filter:

Alias List (on/off)	on	Exclusion List (on/off)	on
Export Space (on/off)	on	Export Abstracts (Time Consumption)	on
Export Matrices (csv) (off/on)	on	Enable JDIC (on/off)	on
Save Merged Slice (off/on)	off	Noun Phrase: Minimum Words	2
Noun Phrase: Maximum Word Length	4	Burst Term Threshold (0.00)	0.00
Maximum GML Node Label Length	8	CTSA (1-Disciplines, 2-Scientific)	1
Include GP (Group Author) (off/on)	off	Include ED (Editors) (off/on)	off
Node Degree Weighted (true)	true	Look Back Years (-1: unlimited)	-1
Max. No. Links to Retain (-1: unlimited)	-1		

Normalize Citations Global Check

3

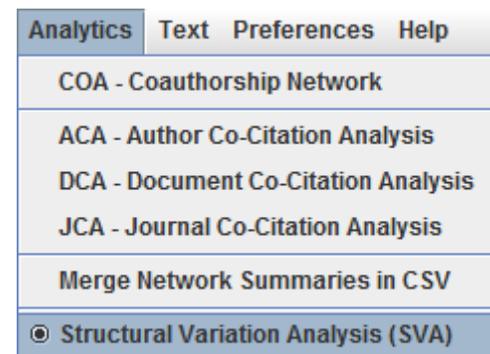
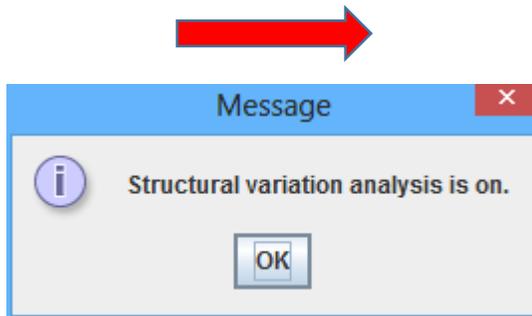
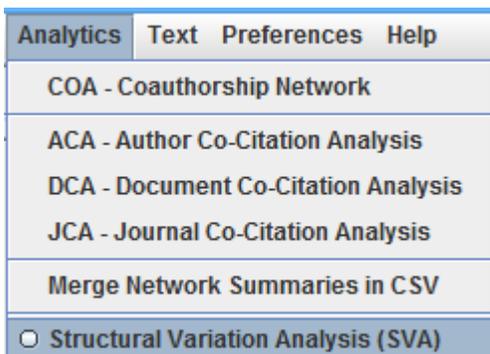
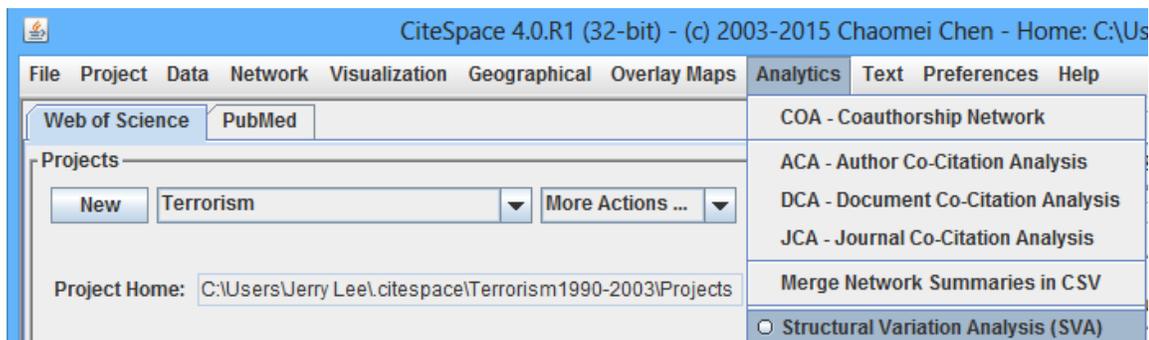
小提示

如果你不太清楚如何调整CiteSpace里project的参数，那么可以参见下面的博文：
<http://blog.sciencenet.cn/blog-496649-914950.html>

开启SVA功能

小提示

SVA的新功能就是加在了功能参数区的“Analytics”菜单中的“Structural VAnalysis (SVA)”中。默认条件下该功能是关闭的，需要选择开启。



点击SVA后，在提示的信息框中点击“OK”即可开启SVA功能

在进行结果相关参数设置和开启SVA功能后，就可以点击“GO”运行分析结果。

CiteSpace 4.0.R1 (32-bit) - (c) 2003-2015 Chaomei Chen - Home: C:\Users\Jerry Lee

File Project Data Network Visualization Geographical Overlay Maps Analytics Text Preferences Help

Web of Science PubMed

Projects: New Terrorism Edit Properties

Project Home: C:\Users\Jerry Lee\citespace\Terrorism1990-2003\Projects

Data Directory: C:\Users\Jerry Lee\citespace\Terrorism1990-2003\Data

GO! Stop Reset JVM Memory 247 (MB) Used 56 %

Space Status

1-year slices	criteria	space	nodes
1996-1996	top 50	1033	50
1997-1997	top 50	1599	50
1998-1998	top 50	1301	50
1999-1999	top 50	1656	50
2000-2000	top 50	2301	50
2001-2001	top 50	3068	50
2002-2002	top 50	276	50

Pruning configuration:

1996-1996	top 50	1033
1997-1997	top 50	1599

Pruning

Pathfinder Pruning sliced networks

Minimum Spanning Tree Pruning the merged network

Visualization

Cluster View - Static Show Networks by Time Slices

Cluster View - Animated Show Merged Network

Records in the dataset: 1513
Records within the chosen range: 1143

Valid references: 26990 100.0000%
Invalid references: 0 0.0000%

Parsing Time: 11.843 seconds
Total Run time: 5.943 seconds

Please Confirm

Use GO on Patents

Keep going Check a local database of patents

Scope: Within Slices

Select top 50 most cited or occurred items from each slice.

Click "GO"

Select "Keep going"

CiteSpace 4.0.R1 (32-bit) - (c) 2003-2015 Chaomei Chen - Home: C:\Users\Jerry Lee

File Project Data Network Visualization Geographical Overlay Maps Analytics Text Preferences Help

Web of Science PubMed

Projects: New Terrorism Edit Properties

Project Home: C:\Users\Jerry Lee\citespace\Terrorism1990-2003\Projects

Data Directory: C:\Users\Jerry Lee\citespace\Terrorism1990-2003\Data

GO! Stop Reset JVM Memory 247

Space Status

1-year slices	criteria	space	nodes
1996-1996	top 50	1033	50
1997-1997	top 50	1599	50
1998-1998	top 50	1301	50
1999-1999	top 50	1656	50
2000-2000	top 50	2301	50
2001-2001	top 50	3068	50
2002-2002	top 50	276	50

Pruning configuration:

1996-1996	top 50	1033
1997-1997	top 50	1599

Pruning

Pathfinder Pruning sliced networks

Minimum Spanning Tree Pruning the merged network

Visualization

Cluster View - Static Show Networks by Time Slices

Cluster View - Animated Show Merged Network

Records in the dataset: 1513
Records within the chosen range: 1143

Valid references: 26990 100.0000%
Invalid references: 0 0.0000%

Parsing Time: 11.843 seconds
Total Run time: 5.943 seconds

Input

Choose windows of analysis:

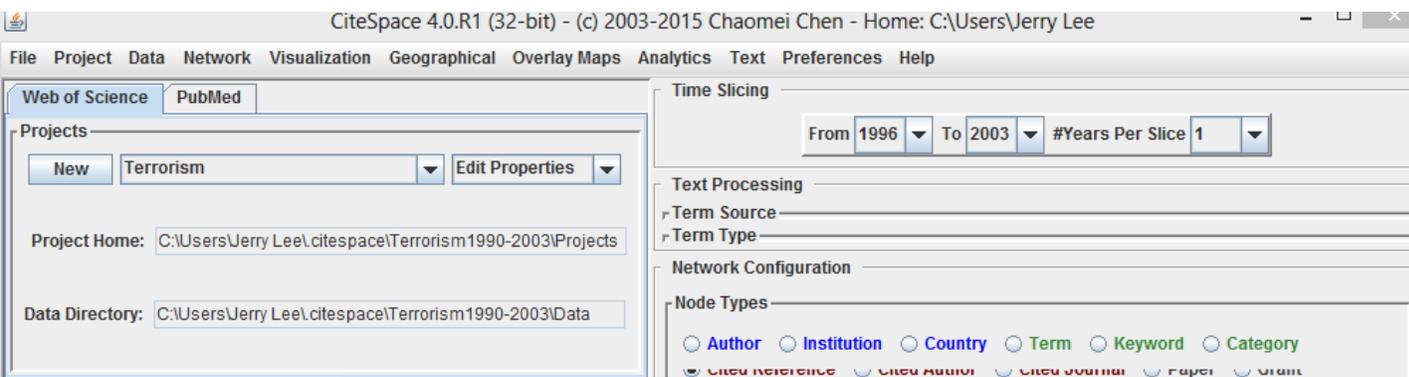
0 - Do not use sliding windows

n - Use n-year span sliding windows (n=1, 2, ...):

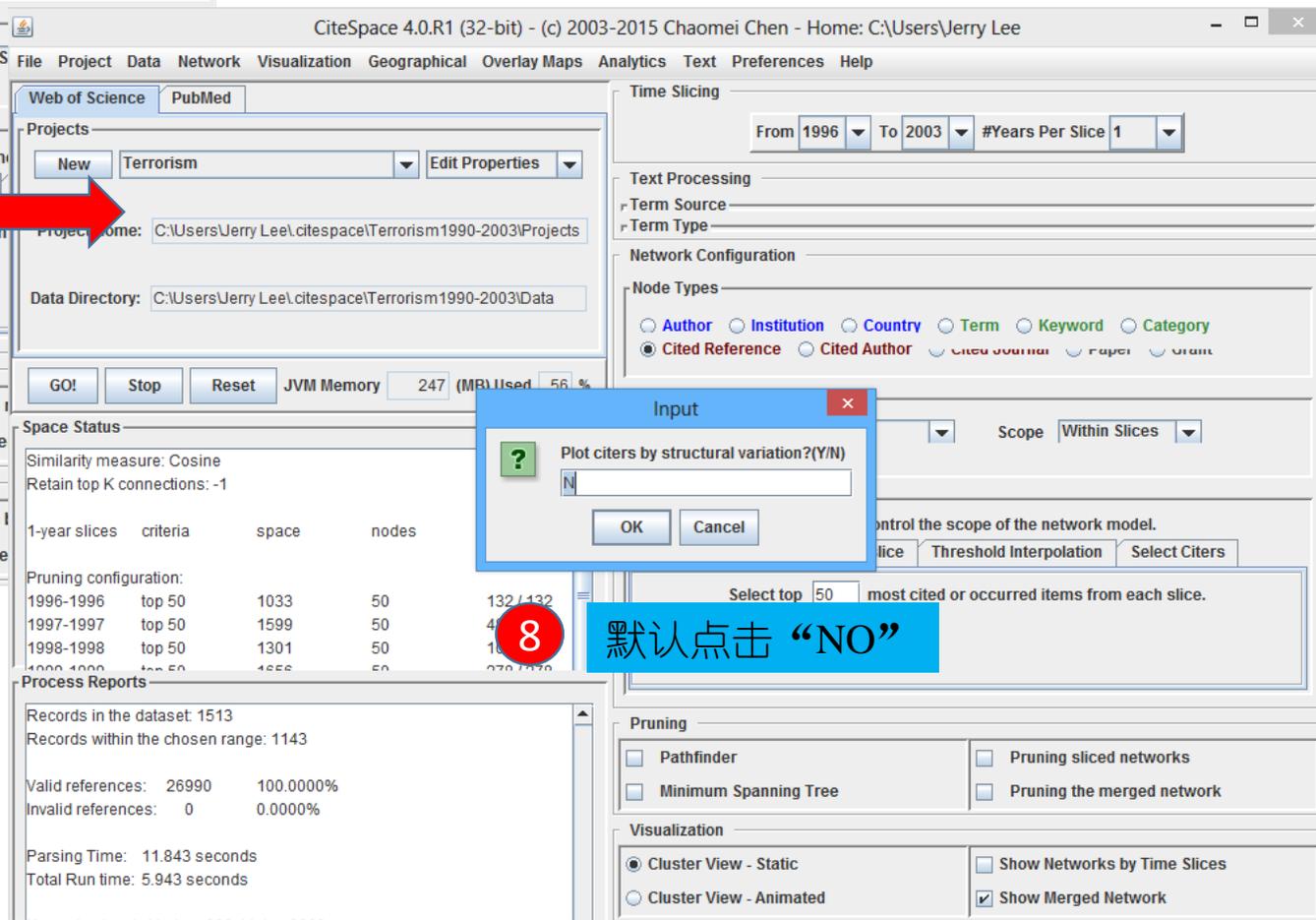
2

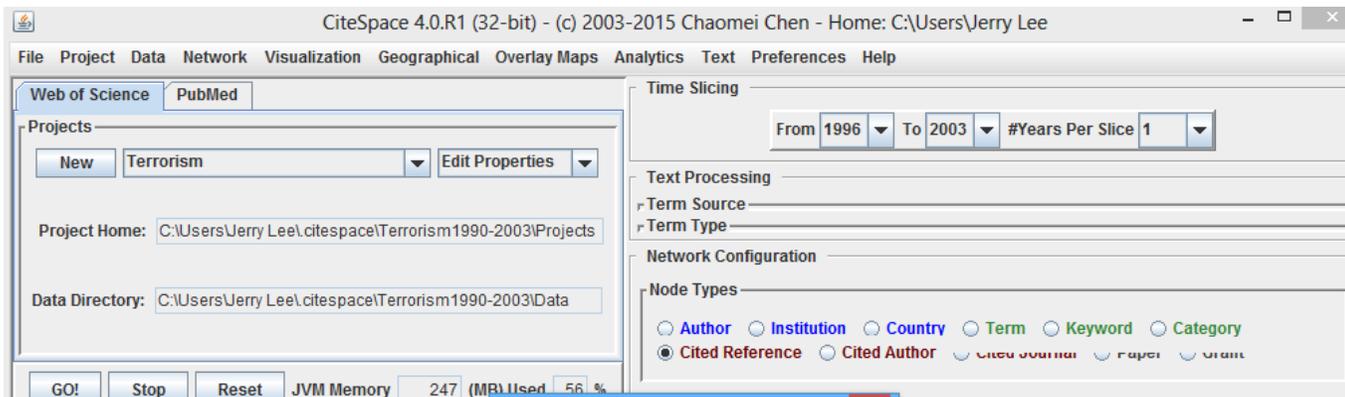
OK Cancel

Default click "OK"



默认点击“OK”





9

默认点击“NO”

Space Status

Similarity measure: Cosine
Retain top K connections: -1

1-year slices	criteria	space	nodes
1996-1996	top 50	1033	50
1997-1997	top 50	1599	50
1998-1998	top 50	1301	50
1999-1999	top 50	1858	50

Pruning configuration:

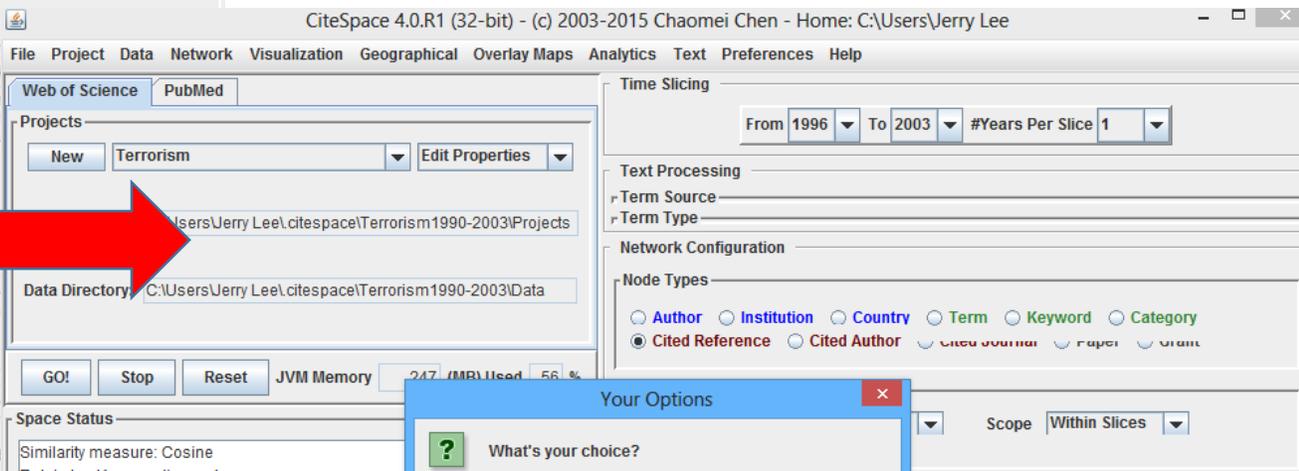
1-year slices	criteria	space	nodes
1996-1996	top 50	1033	50
1997-1997	top 50	1599	50
1998-1998	top 50	1301	50
1999-1999	top 50	1858	50

Process Reports

Records in the dataset: 1513
Records within the chosen range: 1143

Valid references: 26990 100.0000%
Invalid references: 0 0.0000%

Parsing Time: 11.843 seconds
Total Run time: 5.943 seconds



10

点击“Visualize”

Space Status

Similarity measure: Cosine
Retain top K connections: -1

1-year slices	criteria	space	nodes
1996-1996	top 50	1033	50
1997-1997	top 50	1599	50
1998-1998	top 50	1301	50
1999-1999	top 50	1858	50

Pruning configuration:

1-year slices	criteria	space	nodes
1996-1996	top 50	1033	50
1997-1997	top 50	1599	50
1998-1998	top 50	1301	50
1999-1999	top 50	1858	50

Process Reports

Records in the dataset: 1513
Records within the chosen range: 1143

Valid references: 26990 100.0000%
Invalid references: 0 0.0000%

Parsing Time: 11.843 seconds
Total Run time: 5.943 seconds

Pruning

<input type="checkbox"/> Pathfinder	<input type="checkbox"/> Pruning sliced networks
<input type="checkbox"/> Minimum Spanning Tree	<input type="checkbox"/> Pruning the merged network

Visualization

<input checked="" type="radio"/> Cluster View - Static	<input type="checkbox"/> Show Networks by Time Slices
<input type="radio"/> Cluster View - Animated	<input checked="" type="checkbox"/> Show Merged Network

进入可视化界面后，首先可以发现现在可视化界面的左侧增加了一个信息列表栏。

CiteSpace: Display Merged - (c) 2003-2015 Chaomei Chen - Project Home: C:\Users\Jerry Lee\.citespace\Terrorism1990-2003\Projects

File Metrics View Layout Display Network Overlays Filters Clusters Export Help

Cited	S	F	Δ	Δ	Δ	In	T	Y	Citing Articles
SCH...	2	0	0	0	0	0	0	1	INGLESBY TV, 1999,...
FRA...	1	0	0	0	0	2	0	2	INGLESBY TV, 2000,...
GALE...	89	0	0	0	0	0	0	2	SCHUSTER MA, 200...
INGL...	75	0	0	0	0	0	0	2	GALEA S, 2002, N E...
HEN...	34	0	0	0	0	0	0	2	SCHLENGER WE, 2...
TOR...	28	0	0	0	0	0	0	2	MAYER TA, 2001, JA...
HEN...	28	2	0	0	0	1	7	2	MACINTYRE AG, 200...
NOR...	25	0	0	0	0	0	0	2	ROSENTHAL SR, 20...
*AM ...	24	2	0	0	0	6	9	2	WETTER DC, 2001, ...
MES...	21	0	0	0	0	1	1	2	BARBERA J, 2001, J...
COO...	19	0	0	0	0	0	0	1	SHARP TW, 1998, A...
FRYK...	19	0	0	0	0	0	0	1	BRENNAN RJ, 1999...
HOF...	19	0	0	0	0	0	0	1	LALLEMENT G, 199...
CHRI...	18	4	0	0	0	1	1	2	BALK SJ, 2000, PED...
KATZ...	18	0	0	0	0	0	0	2	BELGRADER P, 200...
TUC...	17	0	0	0	0	0	0	1	RICHARDS CF, 199...
SIMO...	17	0	0	0	0	0	0	2	BOZZETTE SA, 2003...
SCH...	15	0	0	0	0	0	0	2	SINGH AK, 2000, AN...
MALL...	14	0	0	0	0	0	0	2	OTOOLE T, 2002, C...
HOR...	14	0	0	0	0	0	0	2	PFEFFERBAUM B, 2...
BRIS...	13	0	0	0	0	0	0	2	SAUER SW, 2001, A...
HOL...	13	0	0	0	0	0	0	2	MILIT...
INGL...	12	0	0	0	0	0	0	2	...
SCH...	12	0	0	0	0	0	0	2	SUR...
OKU...	12	0	0	0	0	0	0	1	DIGIOVANNI C, 1999...
ALIB...	11	2	0	0	0	8	9	2	WAECKERLE JF, 20...
KAUF...	11	0	0	0	0	1	4	1	HOGAN DE, 1999, A...
KOLA...	11	0	0	0	0	1	0	2	CIESLAK TJ, 2000, ...
ZILIN...	11	0	0	0	0	0	0	2	GOSTIN LO, 2002, J...
HAD...	10	0	0	0	0	0	0	2	SILVER RC, 2002, J...
WET...	10	0	0	0	0	0	0	2	PITTMAN PR, 2001, ...
FRYK...	10	0	0	0	0	0	0	2	TUCKER P, 2000, J...
MELT...	10	0	0	0	0	0	0	1	LALLEMENT G, 199...
KES...	10	0	0	0	0	0	0	2	KHAN AS, 2001, PU...
OKU...	9	0	0	0	0	0	0	2	VLAHOV D, 2002, AM...
MACI...	9	0	0	0	0	0	0	2	VOLPP L, 2002, UCL...

Spotlight Citation/Frequency Burst Link Walkthrough

1996 1997 1998 1999 2000 2001 2002 2003

CiteSpace, v. 4.0.R1 (32-bit)
September 18, 2015 5:41:43 PM CST
C:\Users\Jerry Lee\.citespace\Terrorism1990-2003\Data
Timespan: 1996-2003 (Slice Length=1)
Selection Criteria: Top 50 per slice
Network: N=309, E=2039 (Density=0.0428)
Pruning: None

SCHUSTER MA (2001)

FRANZ DR (1997)

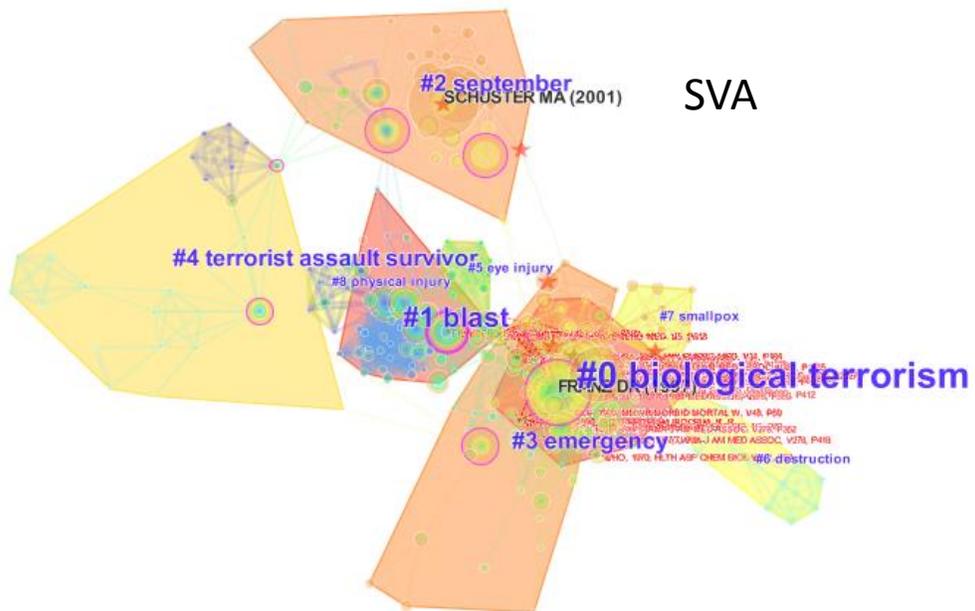
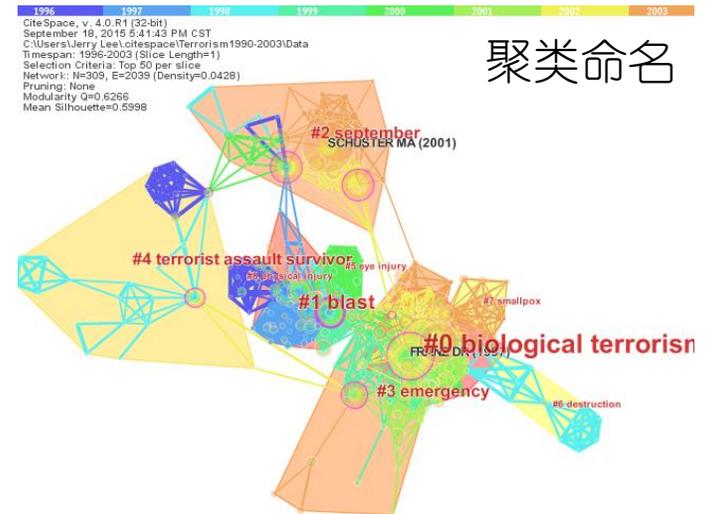
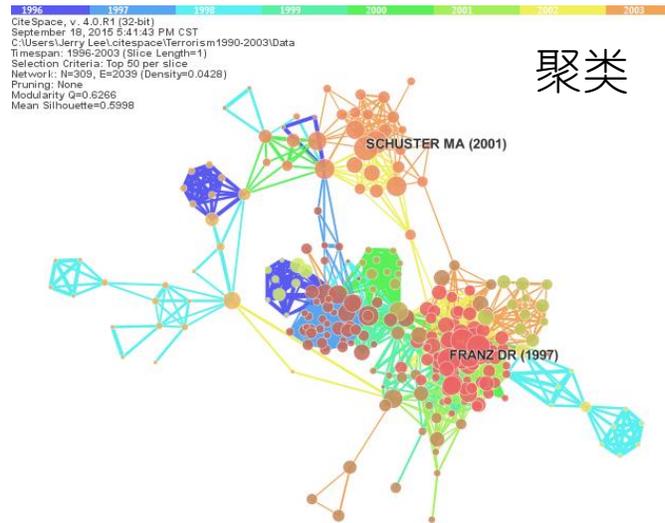
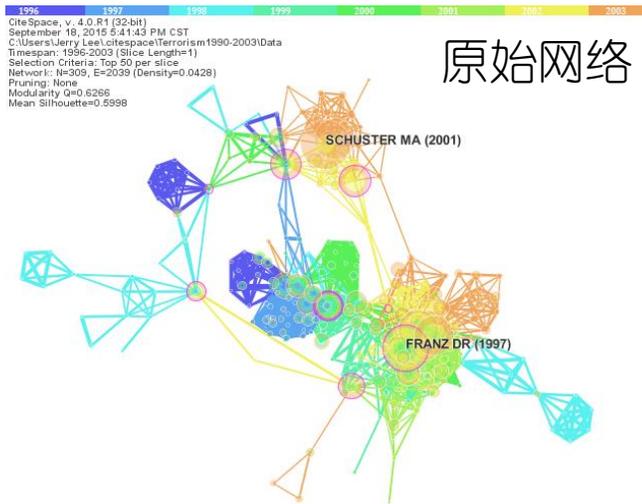
详细参见下页



File Metrics View Layout Display Network Overlays Filters Clusters Export Help

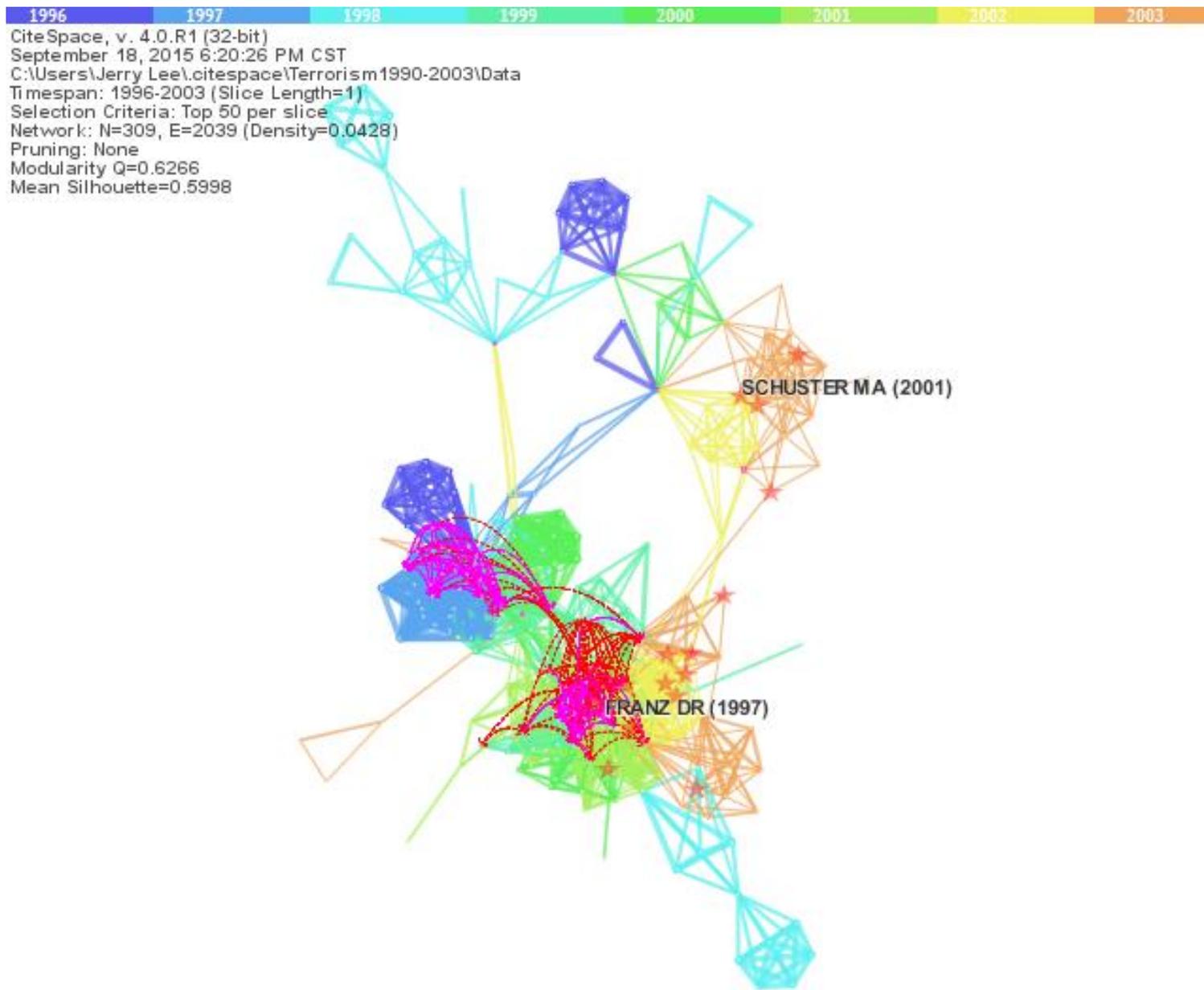
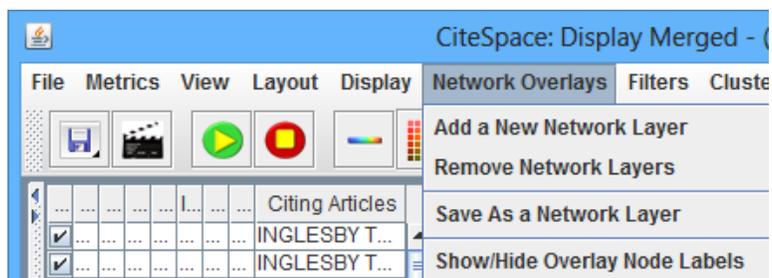


Show Links	Freq	Δ Modularity	Δ C-C Linkage	Δ Centrality	Incremental Links	Transformative ...	Year	Citing Articles
<input type="checkbox"/>	211	0.00	0.00	0.00	0.00	0.00	1999	INGLESBY TV, 1999, J...
<input type="checkbox"/>	106	0.10	0.00	0.00	2.00	0.00	2000	INGLESBY TV, 2000, J...
<input type="checkbox"/>	89	0.00	0.00	0.00	0.00	0.00	2001	SCHUSTER MA, 2001, ...
<input type="checkbox"/>	75	0.00	0.00	0.00	0.00	0.00	2002	GALEA S, 2002, N EN...
<input type="checkbox"/>	34	0.00	0.00	0.00	0.00	0.00	2002	SCHLENGER WE, 20...
<input type="checkbox"/>	28	2.63	0.01	0.13	1.00	7.00	2000	MACINTYRE AG, 2000, ...
<input type="checkbox"/>	28	0.00	0.00	0.00	0.00	0.00	2001	MAYER TA, 2001, JAM...
<input type="checkbox"/>	25	0.00	0.00	0.00	0.00	0.00	2001	ROSENTHAL SR, 200...
<input type="checkbox"/>	24	2.85	0.11	0.01	6.00	9.00	2001	WETTER DC, 2001, A...
<input type="checkbox"/>	21	0.30	0.00	0.00	1.00	1.00	2001	BARBERA J, 2001, JA...
<input type="checkbox"/>	19	0.00	0.00	0.00	0.00	0.00	1998	SHARP TW, 1998, AN...
<input type="checkbox"/>	19	0.00	0.00	0.00	0.00	0.00	1999	BRENNAN RJ, 1999, A...
<input type="checkbox"/>	19	0.00	0.00	0.00	0.00	0.00	1998	LALLEMENT G, 1998, ...
<input type="checkbox"/>	18	4.48	0.08	0.19	12.00	10.00	2000	BALK SJ, 2000, PEDIA...
<input type="checkbox"/>	18	0.00	0.00	0.00	0.00	0.00	2001	BELGRADER P, 2001, ...
<input type="checkbox"/>	17	0.00	0.00	0.00	0.00	0.00	1999	RICHARDS CF, 1999, ...
<input type="checkbox"/>	17	0.00	0.00	0.00	0.00	0.00	2003	BOZZETTE SA, 2003, ...
<input type="checkbox"/>	15	0.00	0.00	0.00	0.00	0.00	2000	SINGH AK, 2000, ANA...
<input type="checkbox"/>	14	0.00	0.00	0.00	0.00	0.00	2002	OTOOLE T, 2002, CLI...
<input type="checkbox"/>	14	0.00	0.00	0.00	0.00	0.00	2001	PFEFFERBAUM B, 20...
<input type="checkbox"/>	13	0.00	0.00	0.00	0.00	0.00	2001	SAUER SW, 2001, AN...
<input type="checkbox"/>	13	0.00	0.00	0.00	0.00	0.00	1999	HAIL AS, 1999, MILIT ...
<input type="checkbox"/>	12	1.00	0.03	0.00	2.00	6.00	1999	STEIN M, 1999, SURG...
<input type="checkbox"/>	12	0.00	0.00	0.00	0.00	0.00	1998	FELICIANO DV, 1998, ...
<input type="checkbox"/>	12	0.00	0.00	0.00	0.00	0.00	1999	DIGIOVANNI C, 1999, ...
<input type="checkbox"/>	11	2.85	0.09	0.01	8.00	9.00	2001	WAECKERLE JF, 200...
<input type="checkbox"/>	11	0.82	0.01	0.00	1.00	4.00	1999	HOGAN DE, 1999, AN...
<input type="checkbox"/>	11	0.05	0.00	0.00	1.00	0.00	2000	CIESLAK TJ, 2000, CL...
<input type="checkbox"/>	11	0.00	0.00	0.00	0.00	0.00	2002	GOSTIN LO, 2002, JA...
<input type="checkbox"/>	10	0.00	0.00	0.00	0.00	0.00	2002	SILVER RC, 2002, JA...
<input type="checkbox"/>	10	0.00	0.00	0.00	0.00	0.00	2001	PITTMAN PR, 2001, VA...
<input type="checkbox"/>	10	0.00	0.00	0.00	0.00	0.00	2000	TUCKER P, 2000, J B...
<input type="checkbox"/>	10	0.00	0.00	0.00	0.00	0.00	1999	LALLEMENT G, 1999, ...
<input type="checkbox"/>	10	0.00	0.00	0.00	0.00	0.00	2001	KHAN AS, 2001, PUBL...
<input type="checkbox"/>	9	0.00	0.00	0.00	0.00	0.00	2002	VLAHOV D, 2002, AME...
<input type="checkbox"/>	9	0.00	0.00	0.00	0.00	0.00	2002	VOLPP L, 2002, UCLA ...

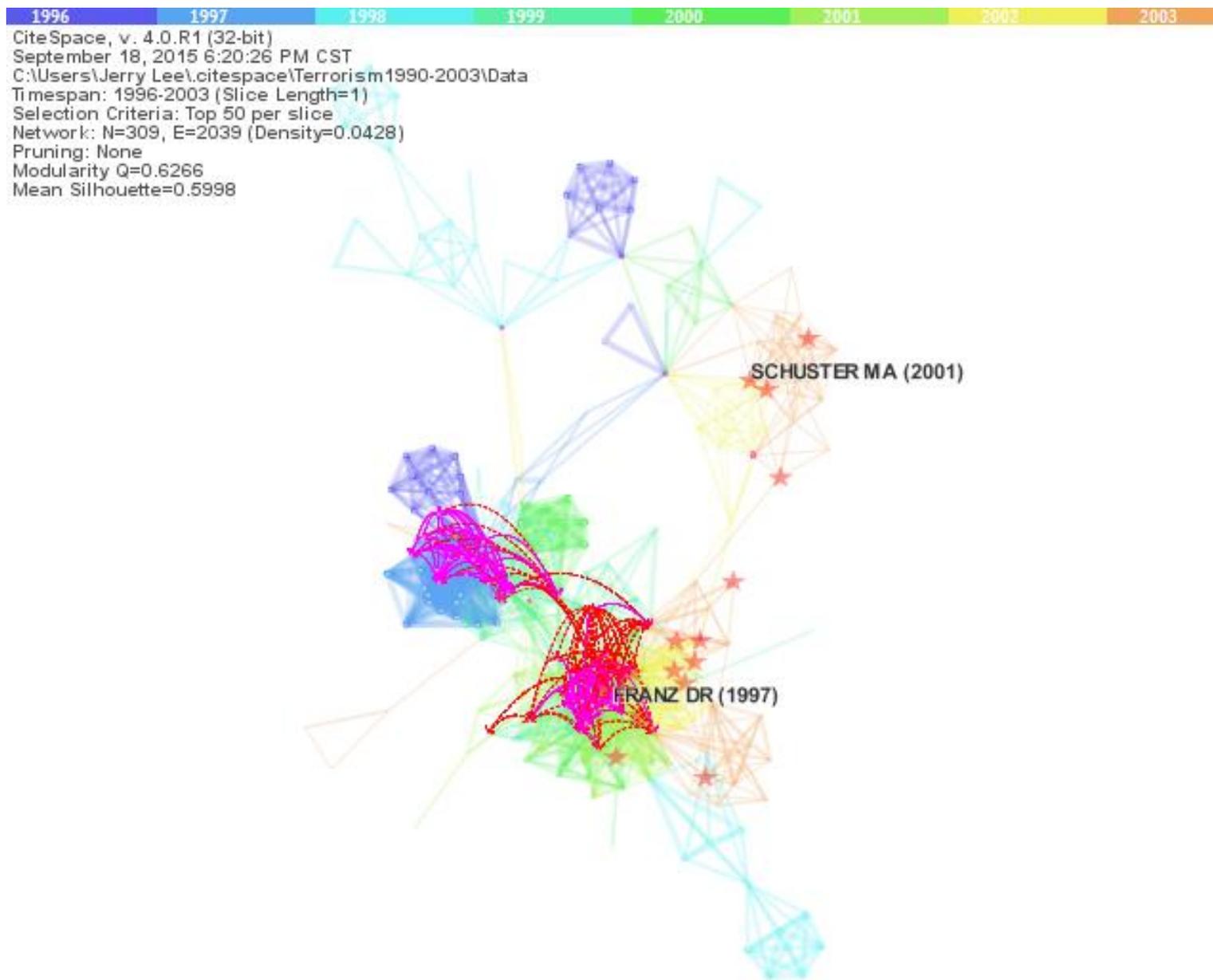
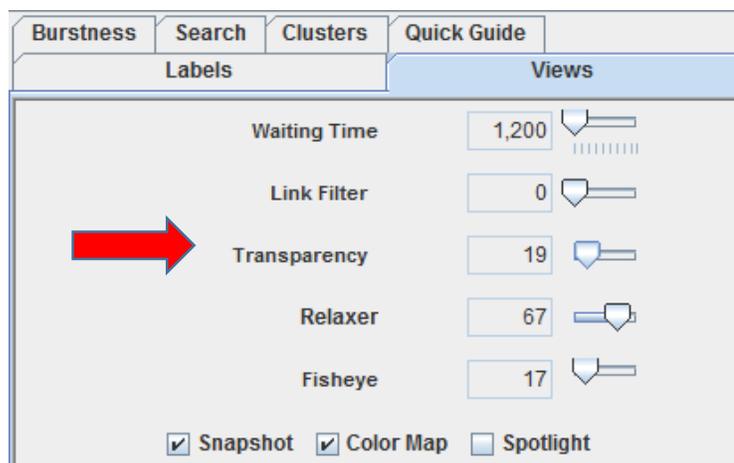


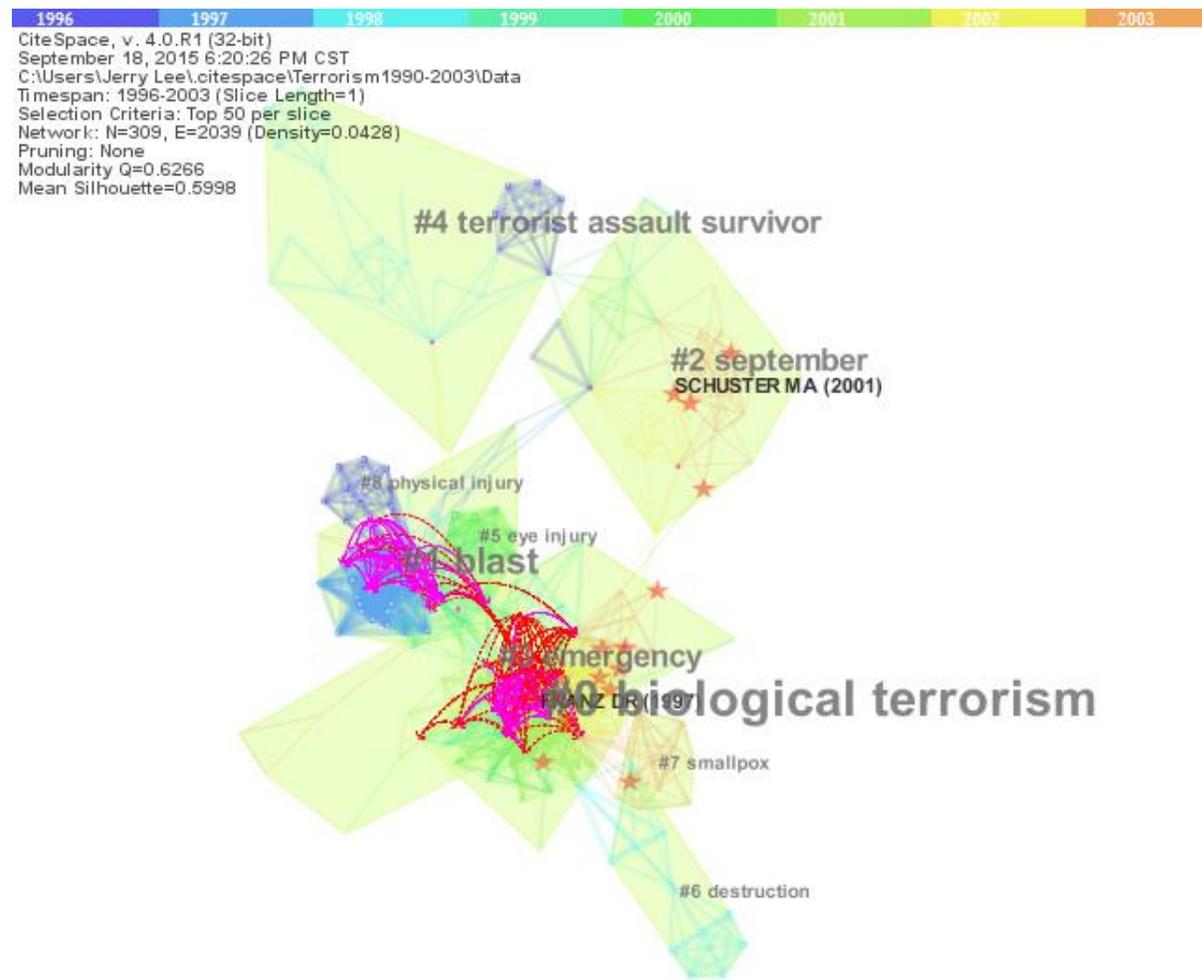
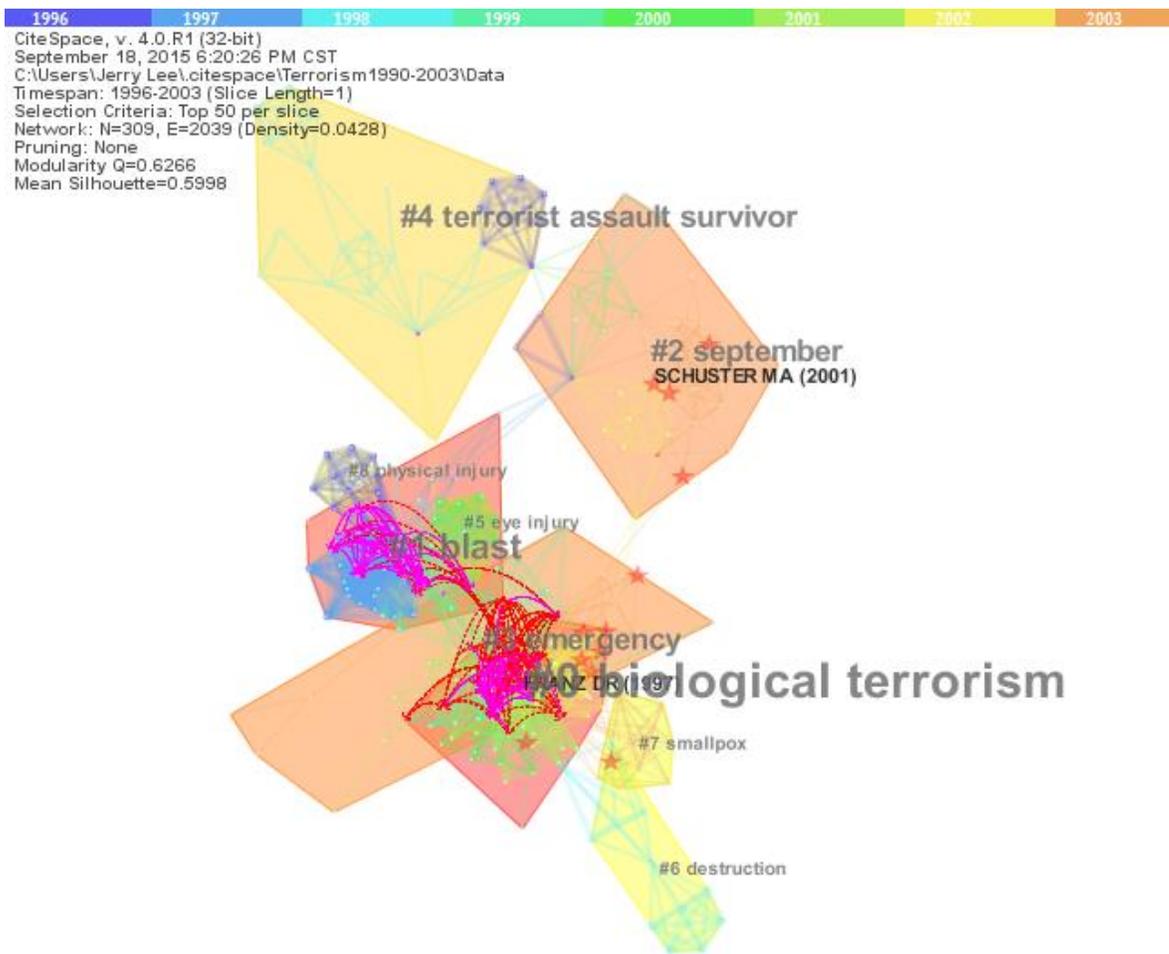
接着我们这里依次完成网络的聚类、聚类命名以及图形的调整。通过左侧新的列表信息来进行分析。勾选需要关注的文献，会发现图上有对应的变化，显示了标签和红色虚线。

为了使得图形比较简洁，可以取消掉红色的标签。具体步骤如下：Network overlay→Show/Hide Overlay Node Labels。



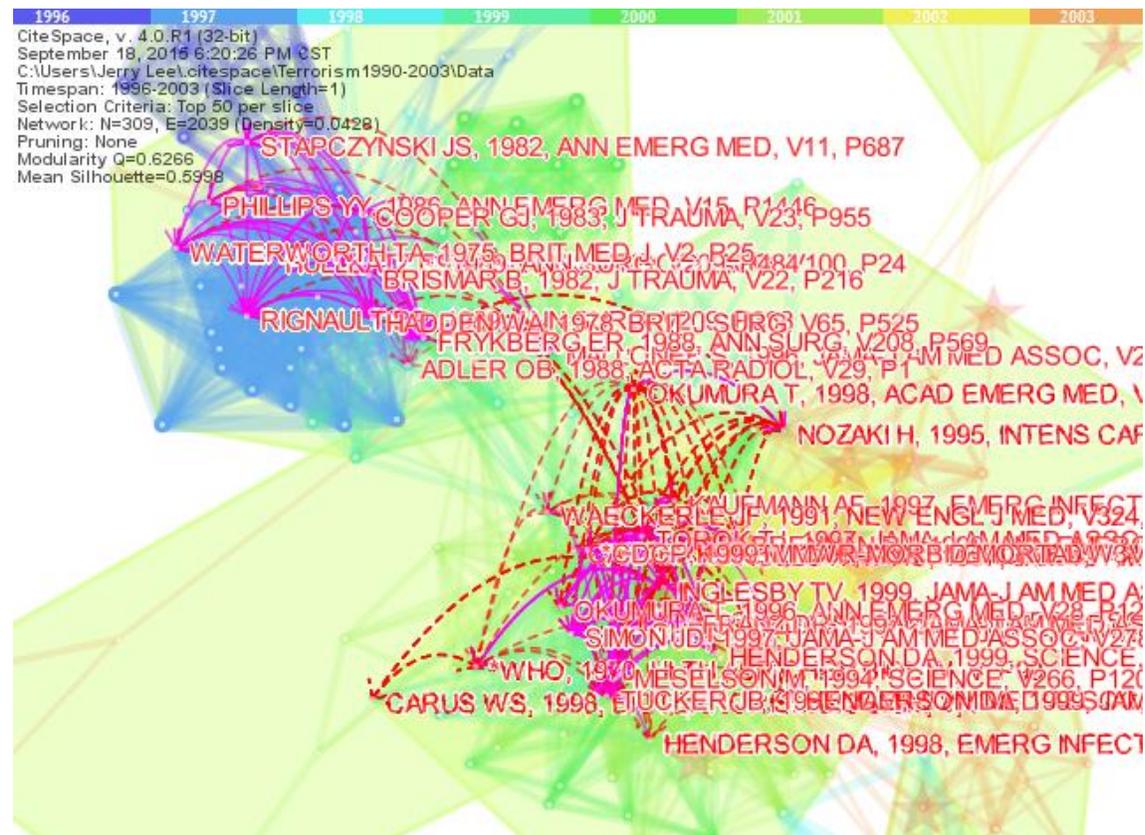
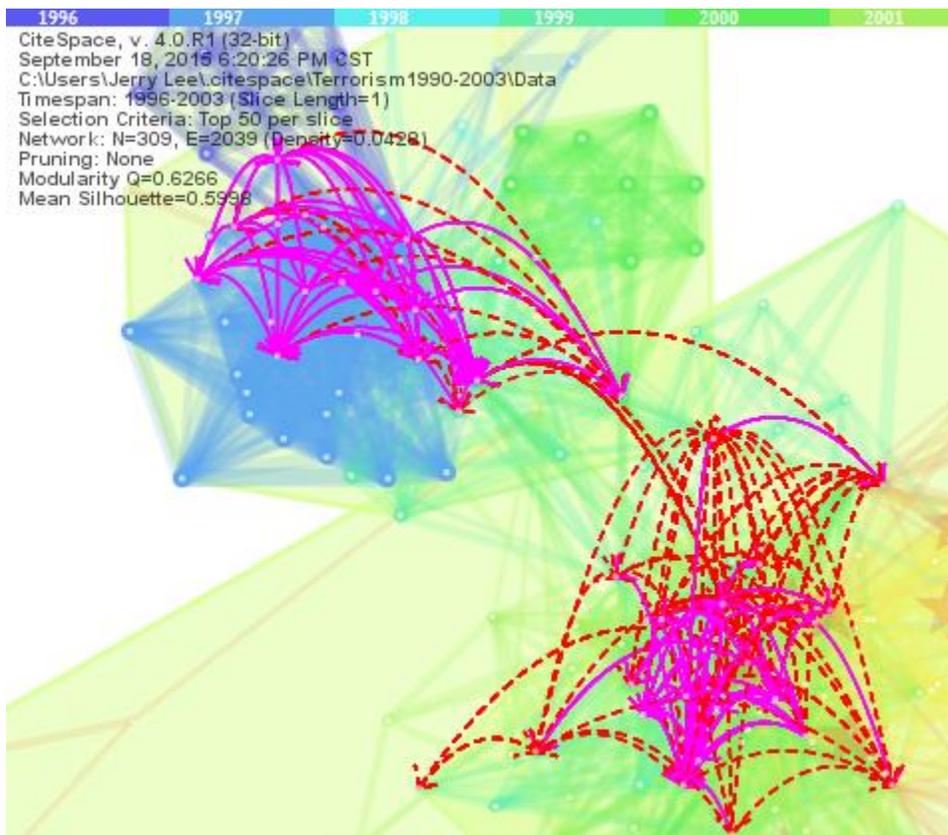
调整共被引连线的透明度，来凸显SVA分析的结果。





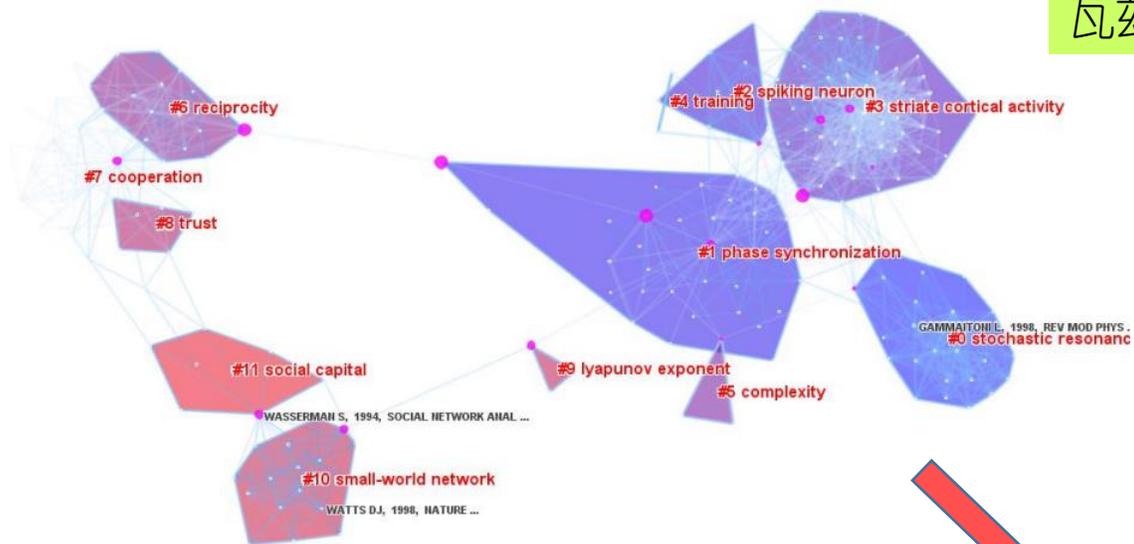
当然也可以把聚类信息加上，这样就能看到所关注的结果在哪些类里面。另外为了显示的简洁，也可以将聚类的背景颜色调整为淡色。

可以放大看看这里都是些什么内容。实线为已有连接，虚线为新增连接。



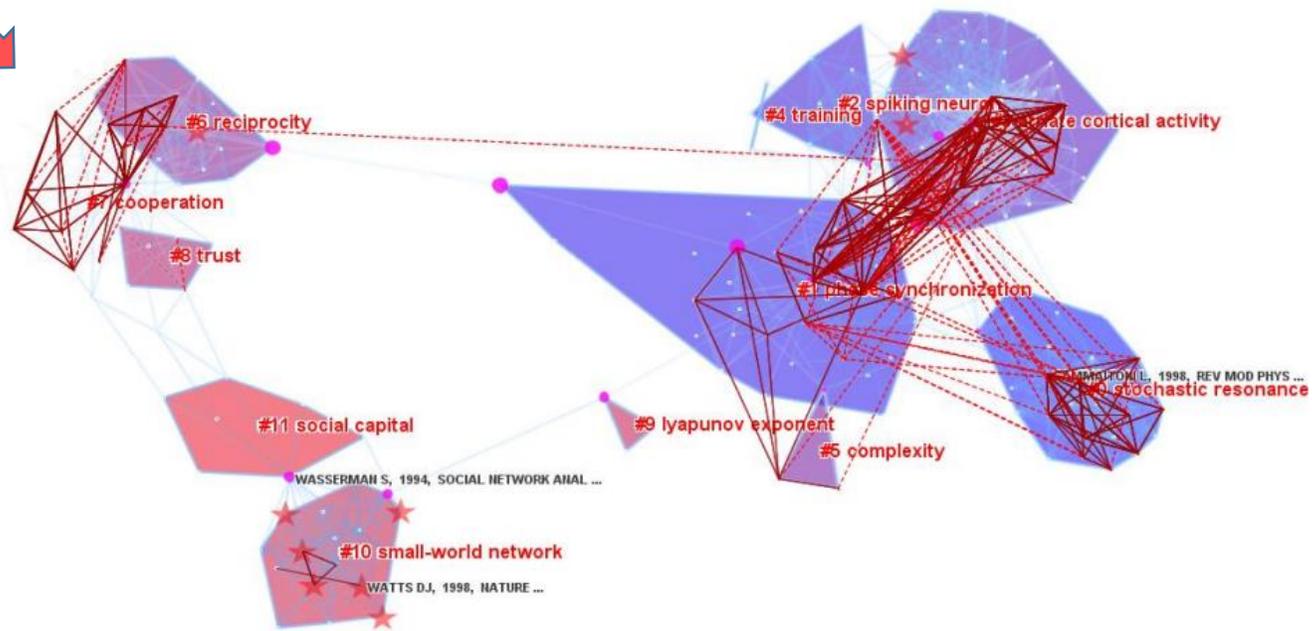
更多的例子

瓦兹论文发表前



瓦兹论文发表前后的网络结构

瓦兹论文发表后



详见: Chen, C. (2014) [The Fitness of Information: Quantitative Assessments of Critical Evidence](#). Wiley.

参考文献

有关该功能的原理及应用请读者参见下列文献：

1. Chen, C. (2012) [Predictive effects of structural variation on citation counts](#). Journal of the American Society for Information Science and Technology, 63(3), 431-449.
2. Chen, C. (2014) [The Fitness of Information: Quantitative Assessments of Critical Evidence](#). Wiley.
3. Chen (2015) Boundary-Spanning Turning Points and Emerging Paradigms. <http://blog.sciencenet.cn/blog-496649-903442.html>

相关介绍：

1. CiteSpace 4.0.R1增加结构变异分析功能. <http://blog.sciencenet.cn/blog-496649-921630.html>
2. Structural Variation Analysis (SVA). <https://sites.google.com/site/citespace101/11-advanced-topics/11-3structural-variation-analysis-sva>

更多Citespace学习资料：

1. Chen, C. (2014) The CiteSpace Manual. <https://leanpub.com/howtousecitespace>
2. 李杰, 陈超美. 如何使用CiteSpace的一组示范及常见问题解答 <http://blog.sciencenet.cn/blog-496649-838067.html>
3. 李杰. CiteSpace中文指南. <http://blog.sciencenet.cn/blog-496649-886962.html>
4. 李杰, 陈超美. (2016) CiteSpace科技文本挖掘及可视化[M]. 首都经济贸易大学出版社.
5. 李杰,(2015)安全科学知识图谱导论[M].化学工业出版社.
6. 李杰等,(2014)安全科学技术信息检索基础[M].首都经济贸易大学出版社.
7. 陈悦, 陈超美等 (2014) 引文空间分析原理与应用[M].科学出版社.