NodeXL Pro Tutorial:

Social network and content analysis with Twitter network data – step by step

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A project from the socialmedia RESEARCH FOUNDATION

About this Tutorial

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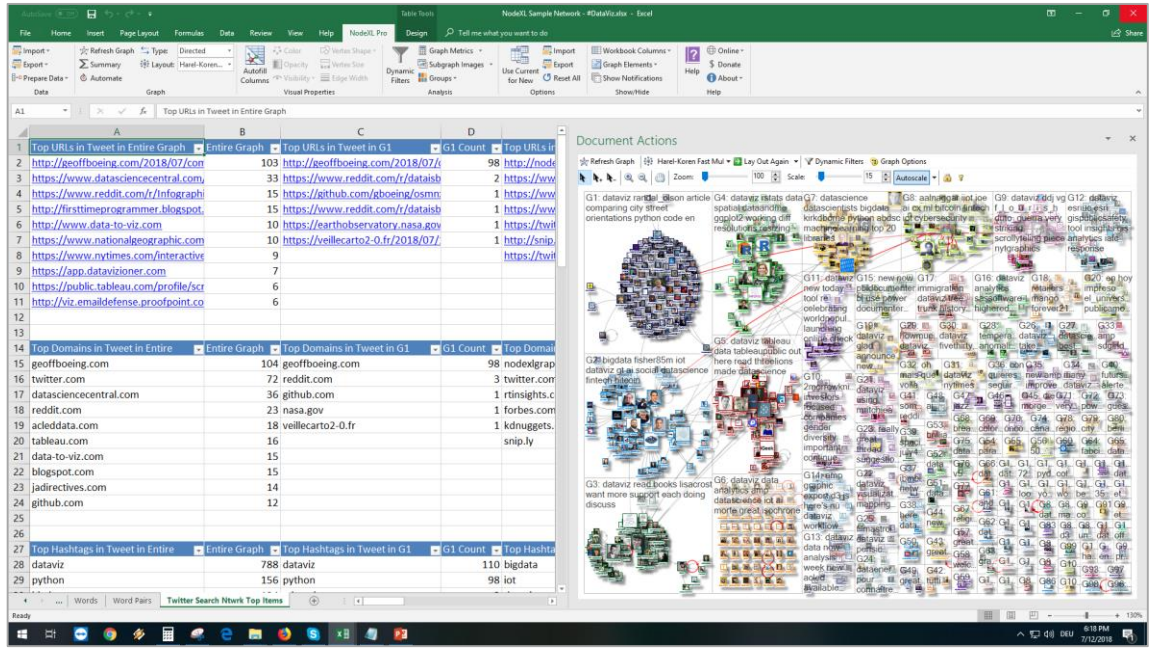
This tutorial shows you how you can run a full social network and content analysis with NodeXL Pro.

While we will use Twitter network data as an example, this approach can be applied to any network dataset of your choice (depending on the available metadata).



If you have any questions, please send us an email: info@smrfoundation.org

More NodeXL Pro Tutorials can be found here: https://www.smrfoundation.org/nodexl/tutorials

1. Getting Started

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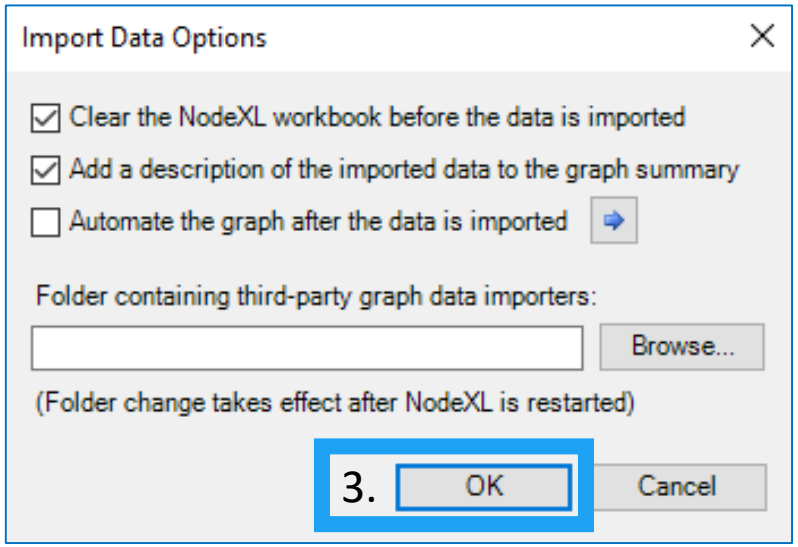
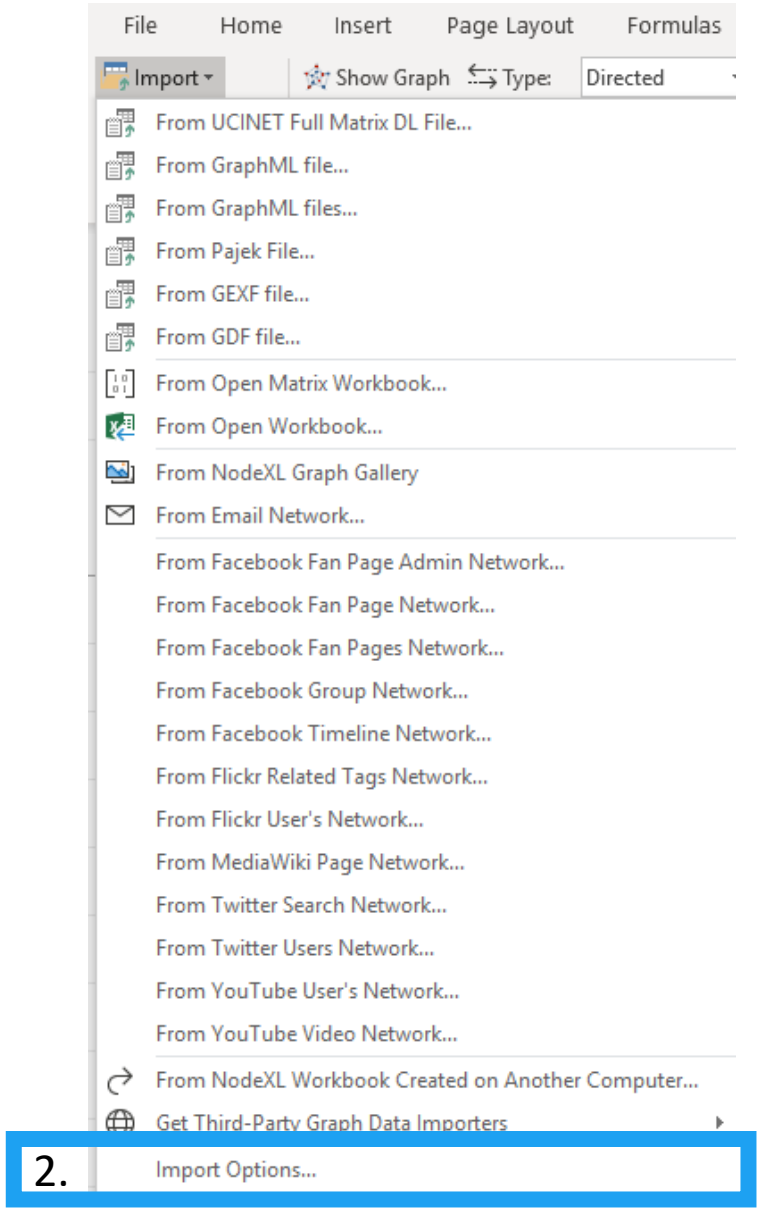
1. Before downloading network data, **save the file** to your machine. It is helpful to add the data source and date to the name file e.g.:

   Social Network Analysis Twitter 2019-01-25.xlsx

2. Open the **Import Data Options** window to select basic options related to the data import: D**ata > Import > Import Options**

3. Select the options shown below and click **OK**.





2. Data Import

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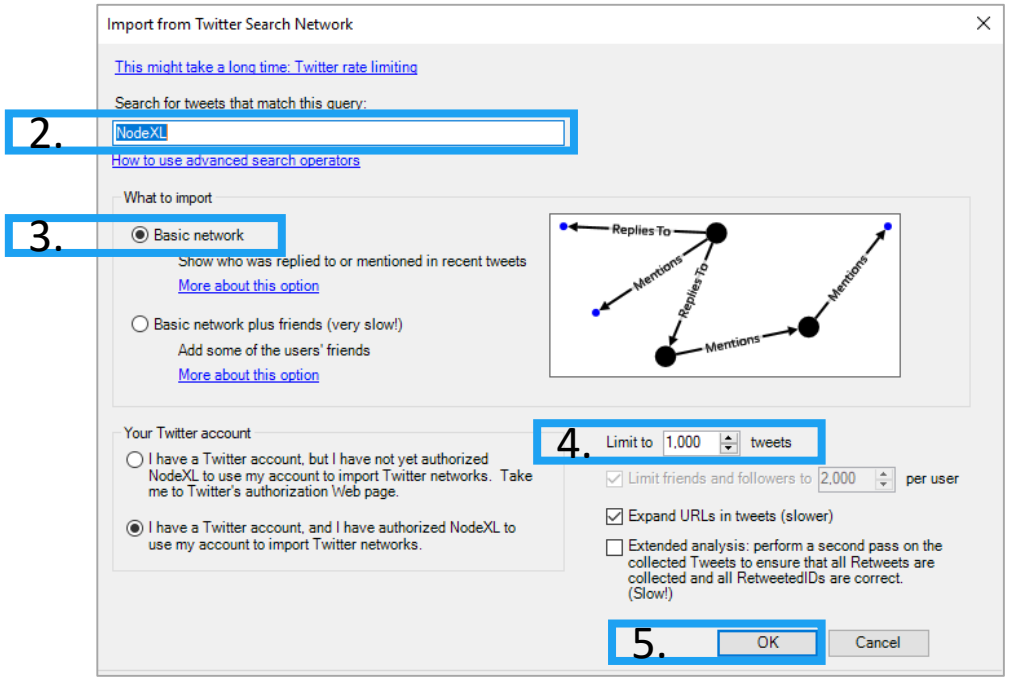
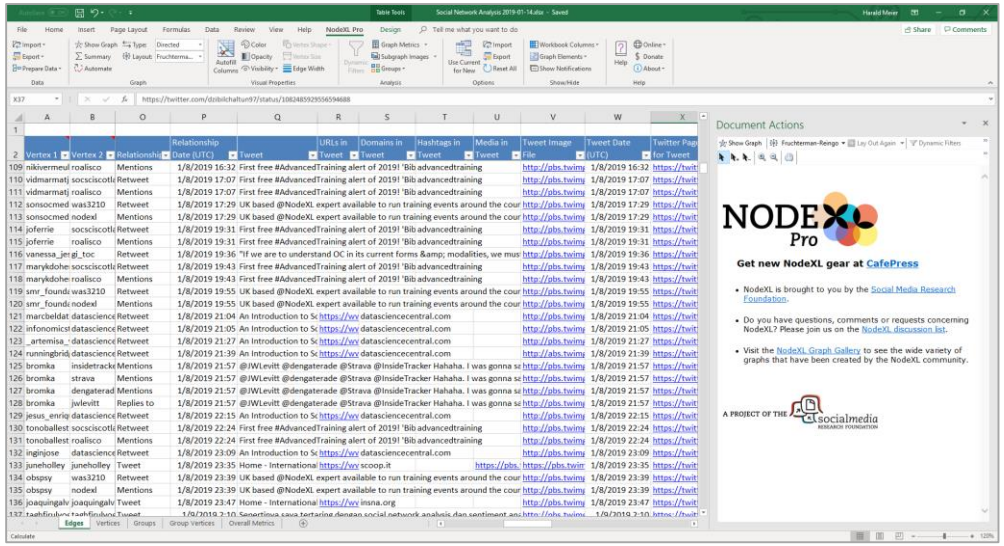
1. Open the Twitter Search Network importer: **Data > Import > From Twitter Search Network…**
2. Enter a search query of your choice.
3. Select **Basic network.**
4. Limit # of tweets to **1.000**.
5. Click **OK**.
6. Wait for approx. 3-5 minutes.
7. **Save the file** after the data download is finished.

The **Edges** and **Vertices spreadsheets** now contains network data and additional metadata. Take a look at the worksheets and explore the data.





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You can build advanced search queries with **Twitter Standard Search Operators:**
https://developer.twitter.com/en/docs/tweets/rules-and-filtering/overview/standard-operators

Standard search:	Tesla
Exact phrase:	“Tesla Autopilot“
Exclude term:	Tesla –Nikola
Boolean query:	electric (car OR vehicle)
User search:	@Tesla
Search by language:	Tesla lang:en (fr/de/nl/…)
Search by date:	Tesla from:2019-02-05
	Tesla until:2018-02-12
List analysis:	list:cspan/senators

(!) Test your query before downloading data: https://twitter.com/search-home

URL encoding might be necessary: https://www.urlencoder.org/

2. Data Import

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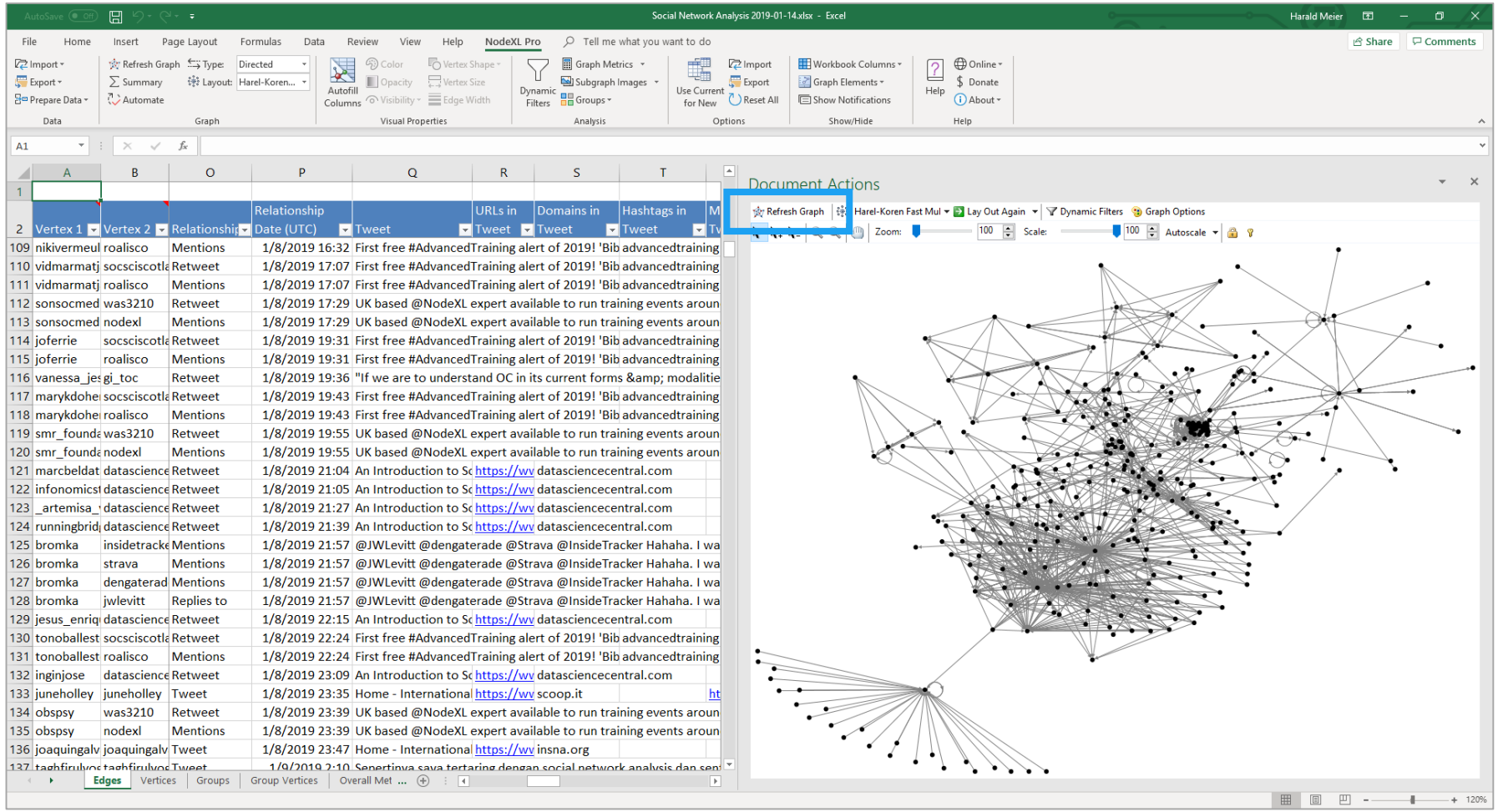
When you click on **Show Graph/Refresh Graph** at the top of the graph window, you can already observe the connected structure of the downloaded raw data.



3. Prepare Data

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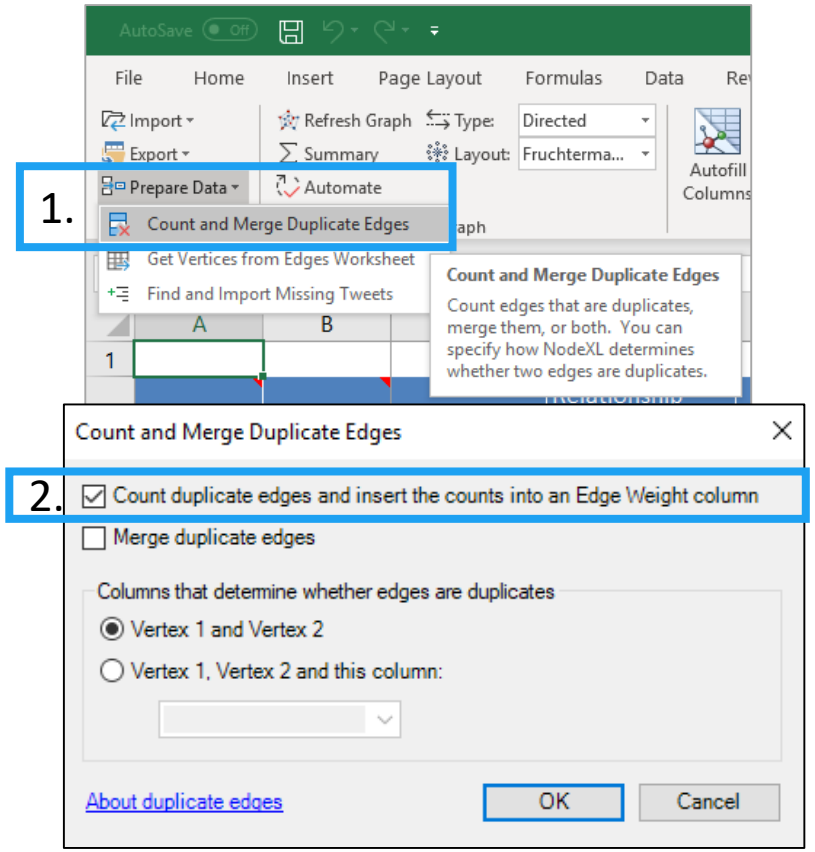
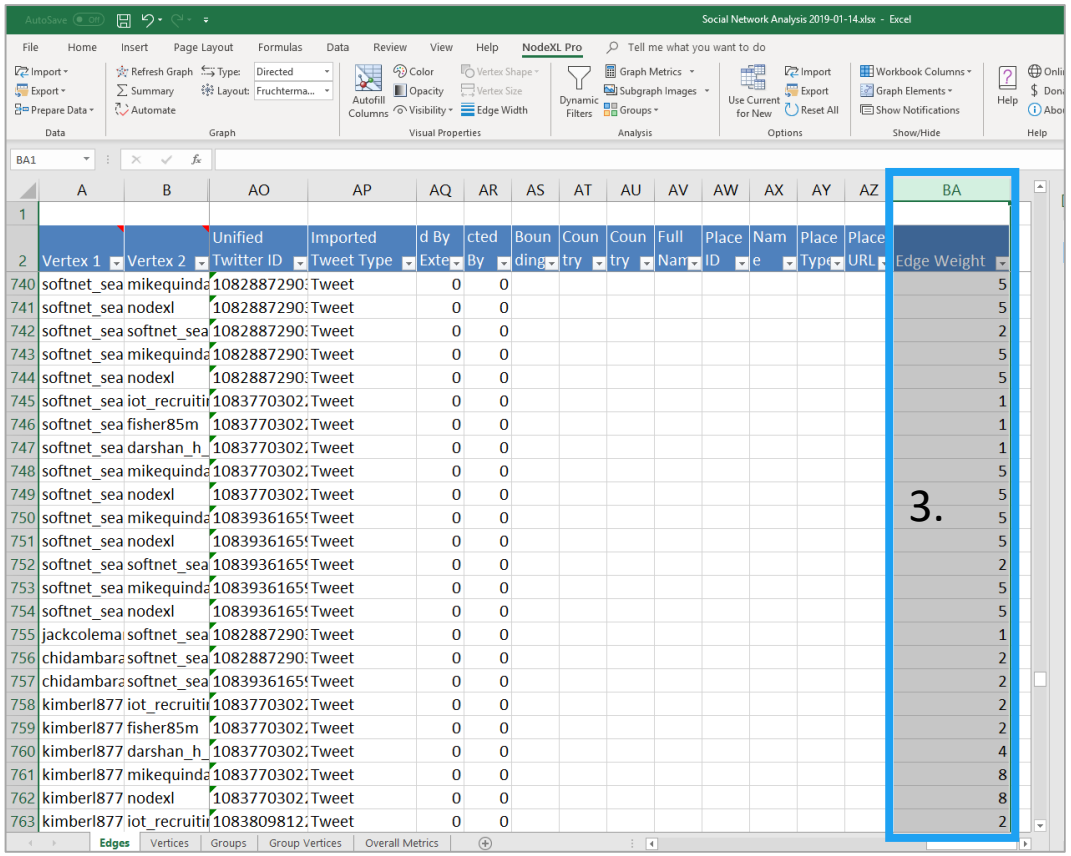
1. Click on **Data > Prepare Data > Count and Merge Duplicate Edges.**
2. Check the box **Count duplicate edges and insert the counts into an Edge Weight column** and click **OK**.
3. Navigate to **column BA Edge Weight** that has just been created in the **Edges worksheet**. This column will be used later to visulize the strength of connections between the vertices.





4. Group by Cluster

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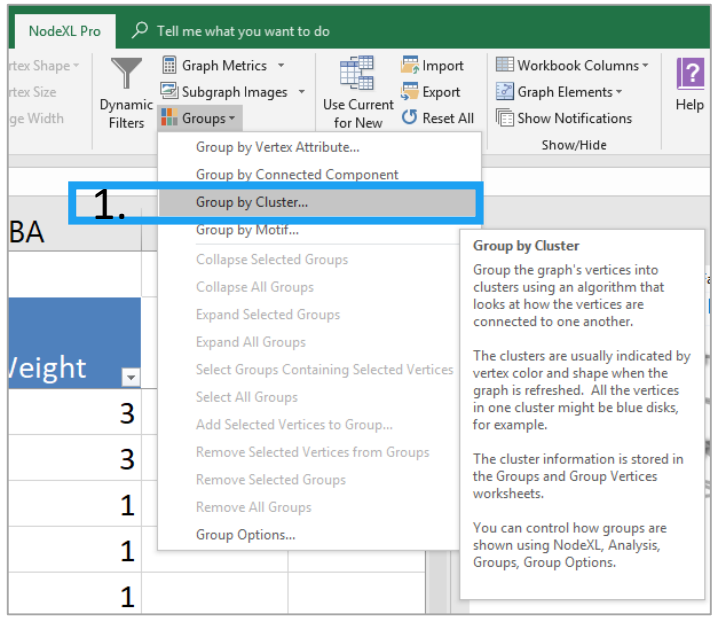
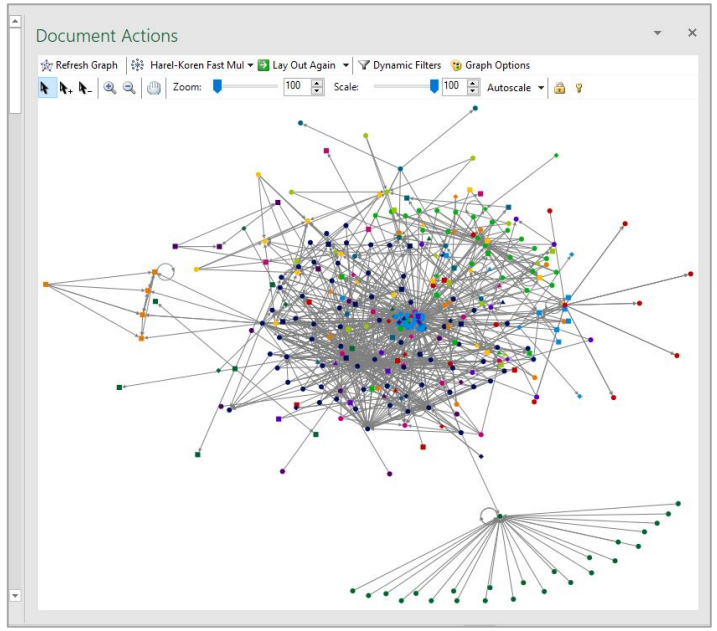
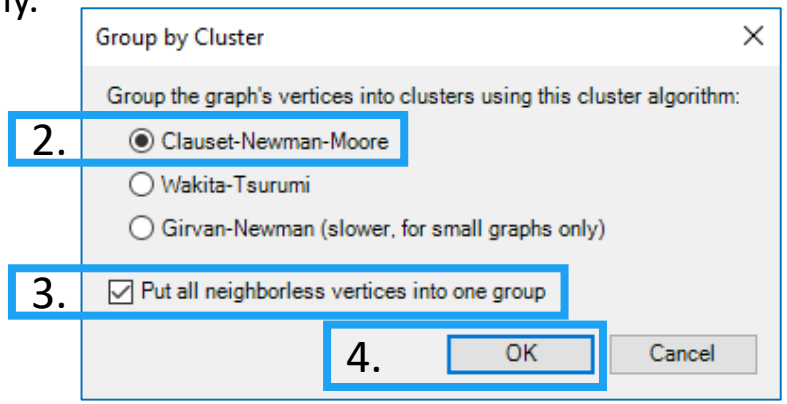
1. Open the Group by cluster window: **Analysis > Groups > Group by Cluster…**
2. Select **Clauset-Newman-Moore.**
3. Select **Put all neighborless vertices into one group.**
4. Click **OK** and wait**.**
5. Take a look the **Group Vertices** and **Group Edges worksheets** which have just been created. Further, group related columns have been added to the **Edges** and **Vertices worksheets**.
6. Click **Refresh Graph**. Vertex colors and shapes have been added automatically.



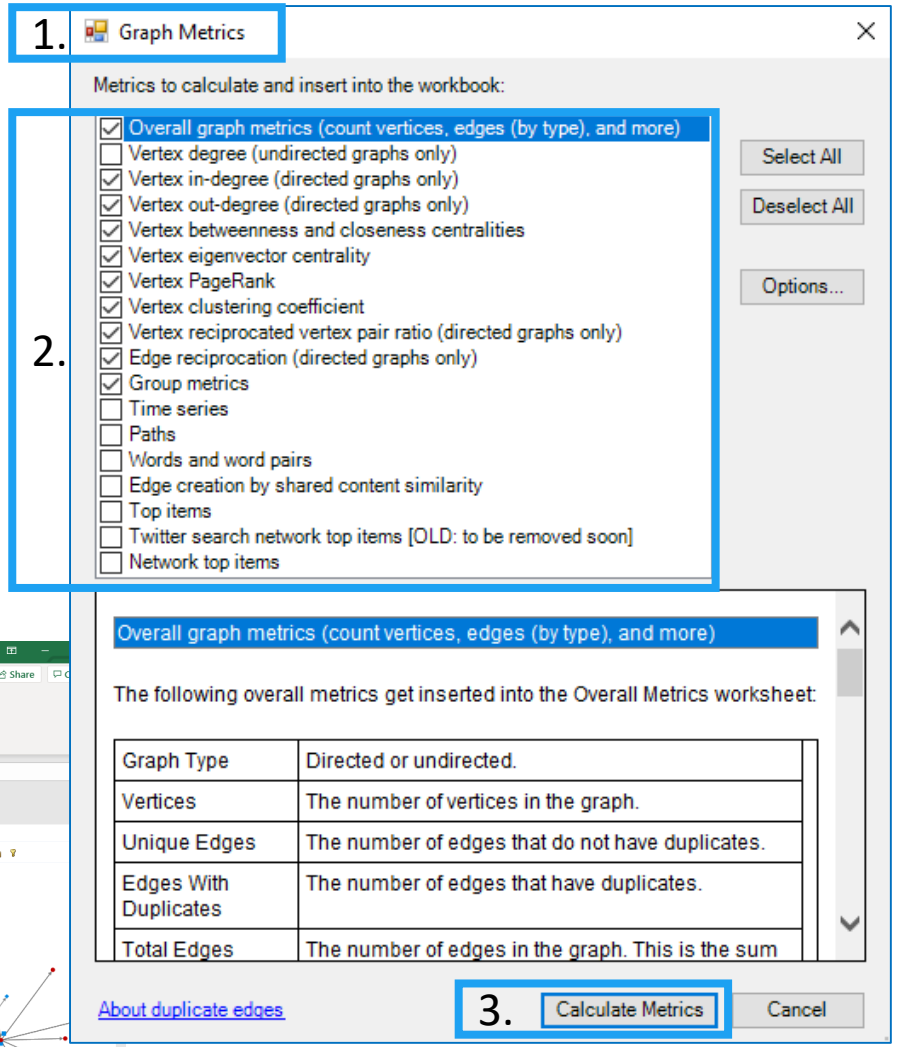


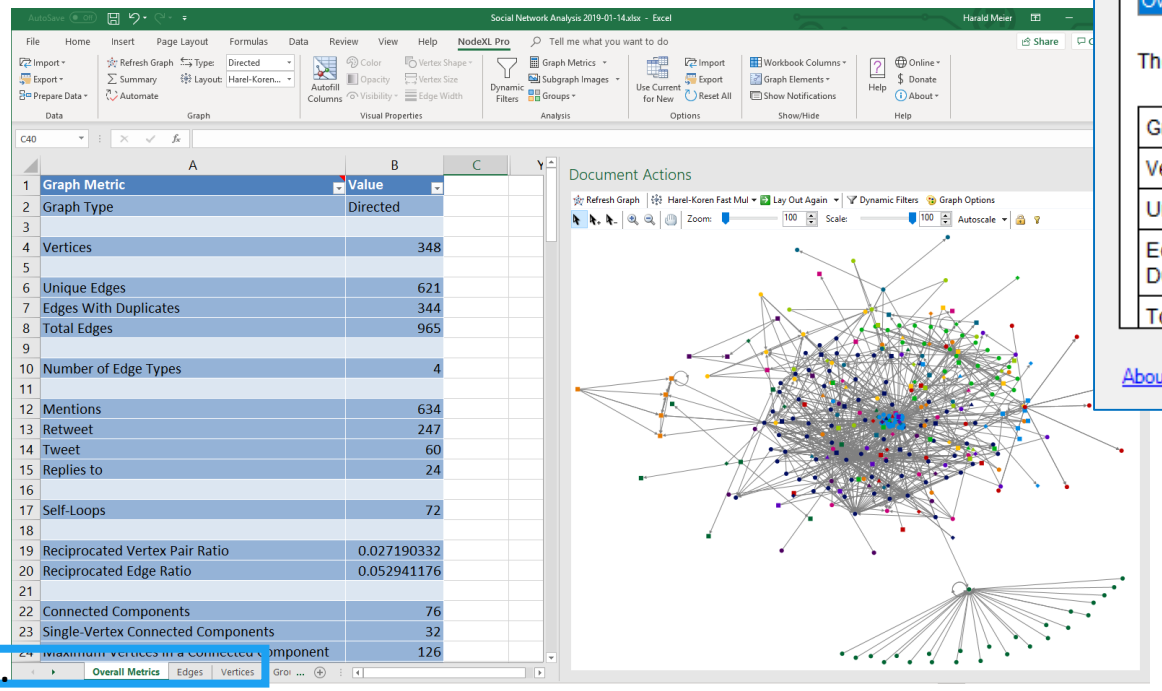


Learn more about the Clauset-Newman-Moore clustering algorithm: A. Clauset, M. E. J. Newman, and C. Moore (2004): Finding community structure in very large networks. In: Phys. Rev. E 70.

5. Calculate Metrics

1. Open the Graph Metrics window: **Analysis > Graph Metrics > Graph Metrics**
2. Check the boxes as seen on the right.
3. Click **Calculate Metrics** and wait.
4. Have a look at the newly created worksheet **Overall Metrics** to analyze the composition of the network. Also take a look at the **Vertices** and **Groups worksheets** where the metrics have been added.





6. Time Series Analysis

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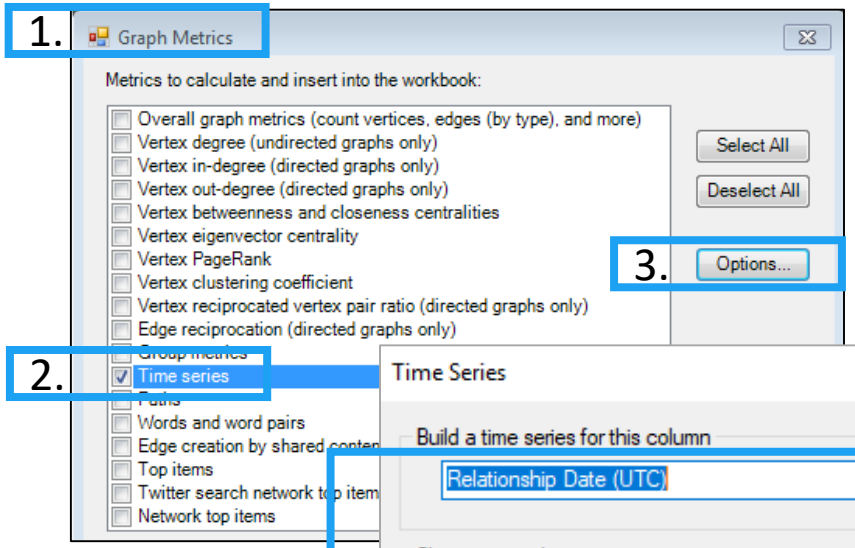
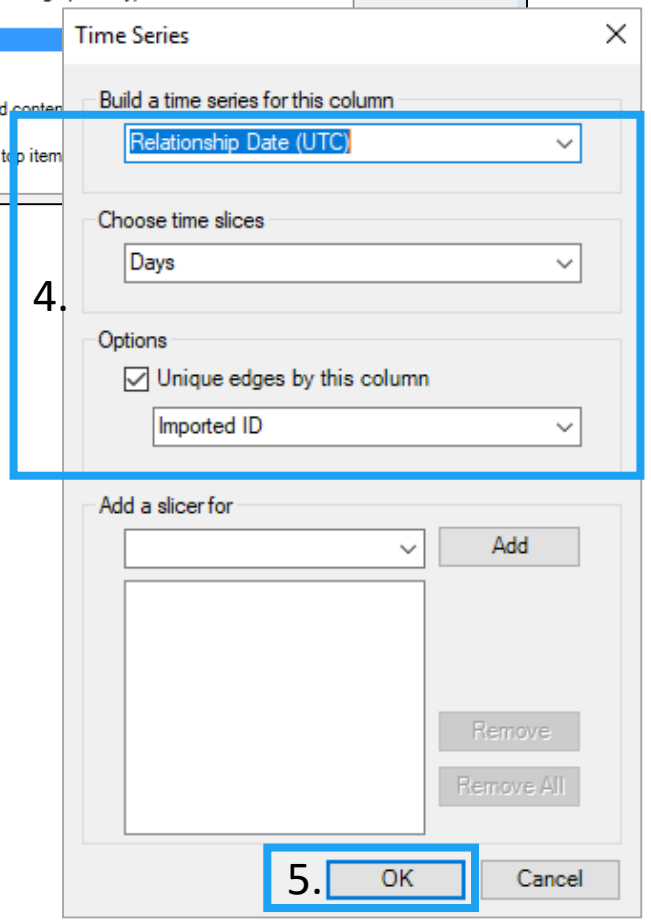
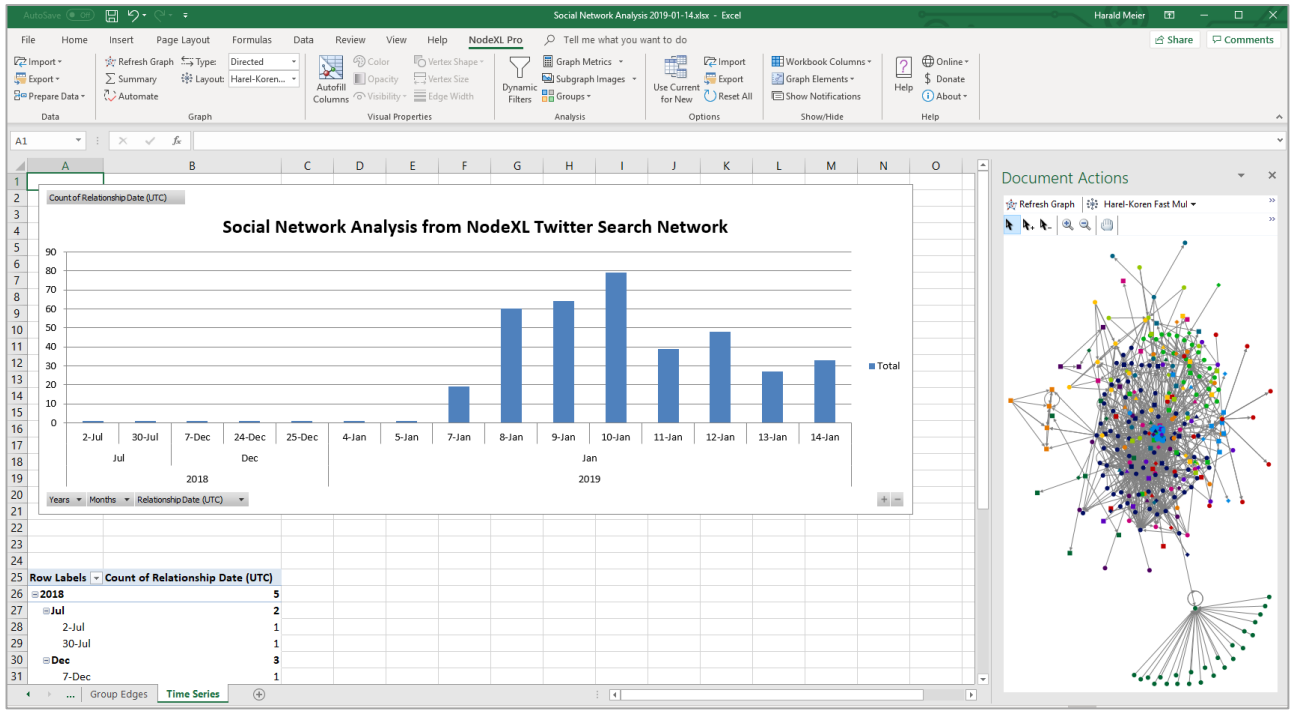
1. Open the Graph Metrics window: **Analysis > Graph Metrics > Graph Metrics**
2. Deselect everything but **Time Series**.
3. Click on **Options** to open the Time Series window.
4. Select the options as seen on the right.
5. Click **OK** and then **Calculate Metrics** to create the new spreadsheet **Time Series.**







7. Text / Sentiment Analysis

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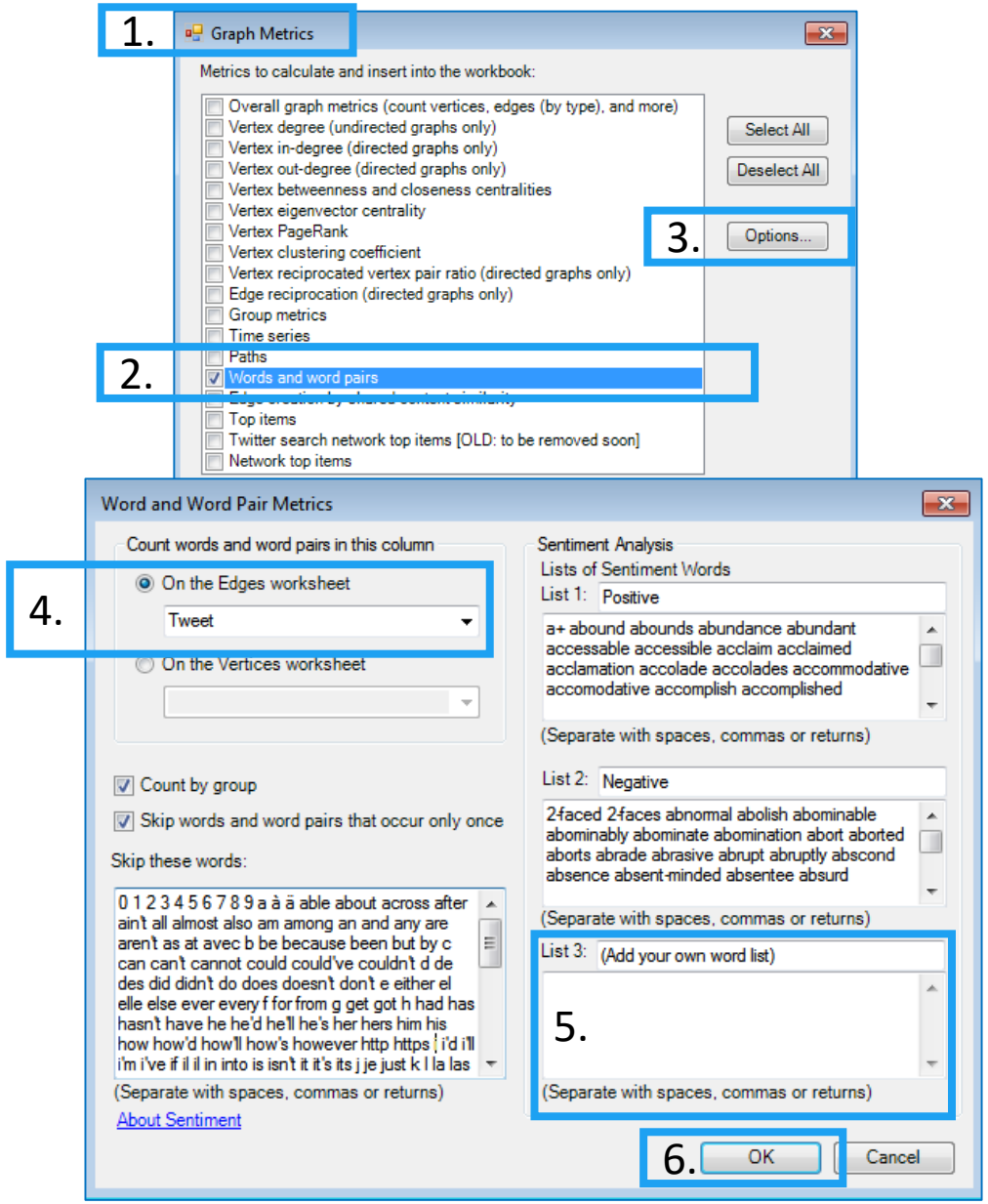
NodeXL Pro is shipped with a skip word list as well as a positive and a negative sentiment words list in English language. These lists can be modified to your needs.

This feature counts the frequency of words and word pairs in a text column. At the same time any word is checked for occurence in one of the sentiment lists.

1. Open the Graph Metrics window: **Analysis > Graph Metrics > Graph Metrics**
2. Deselect everything but **Words and Word Pairs**.
3. Click on **Options** to open the **Word and Word Pair Metrics** window.
4. Choose column **Tweet**.
5. Optional: Enter your own list of keywords into **List 3**.
6. Click **OK** and then **Calculate Metrics.**
7. Take a look at the two new spreadsheets **Words** and **Word Pairs** that have just been created. Further, sentiment related columns have been added to the **Edges** and **Vertices spreadsheets**.



8. Network Top Items

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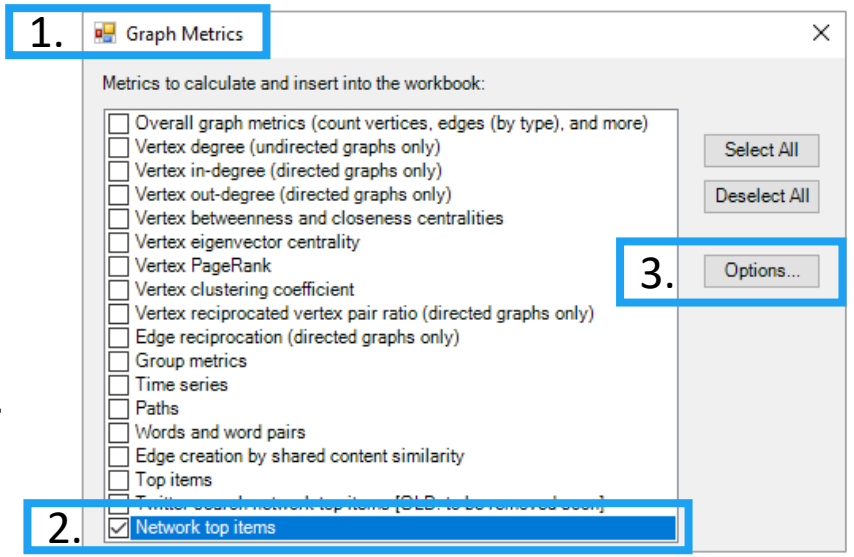
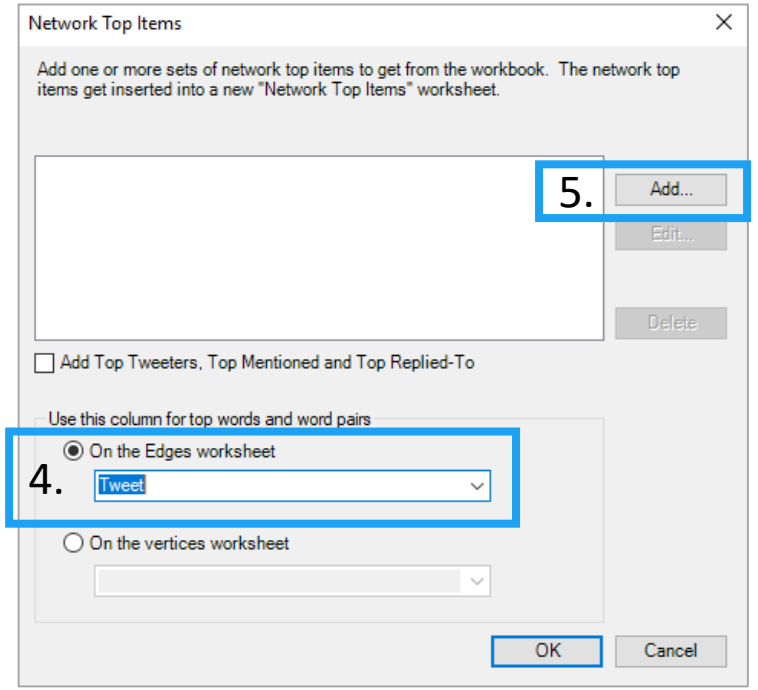
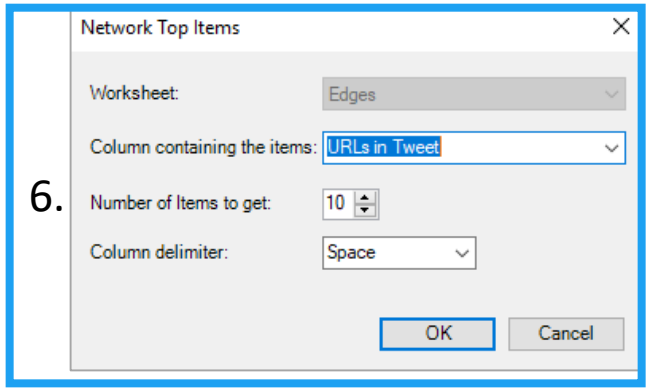
Literature/Links

This feature summarizes the top contents of the network data by collecting the most frequently occuring URLs, domains, hashtags, words and word pairs from the Edges worksheet.

1. Open the Graph Metrics window: **Analysis > Graph Metrics > Graph Metrics**
2. Deselect everything but **Network Top Items.**
3. Click on **Options** to open the **Network Top Items** window.
4. Select **Tweet** to collect top words and word pairs from the Edges worksheet).
5. Click on **Add…** to open the window below.
6. Select the column **URLs in Tweet**, choose the number of items to get and set the column delimiter to **Space**. Click **OK**.







8. Network Top Items

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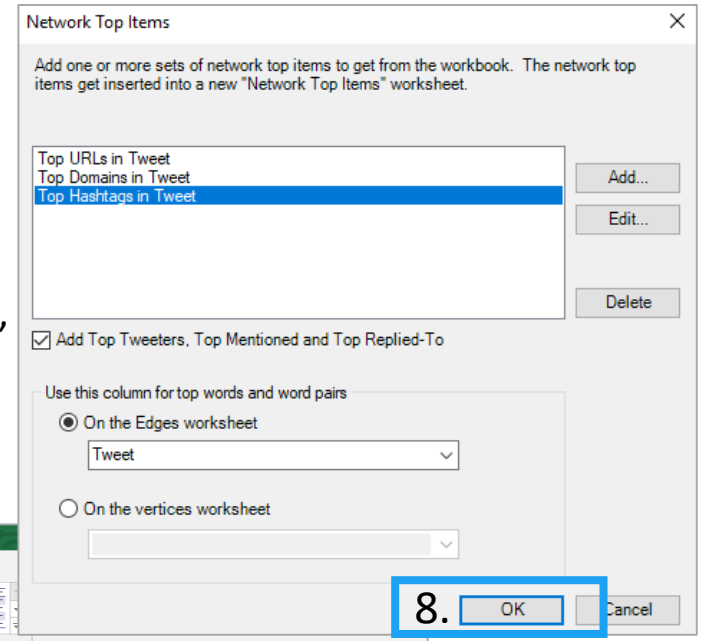
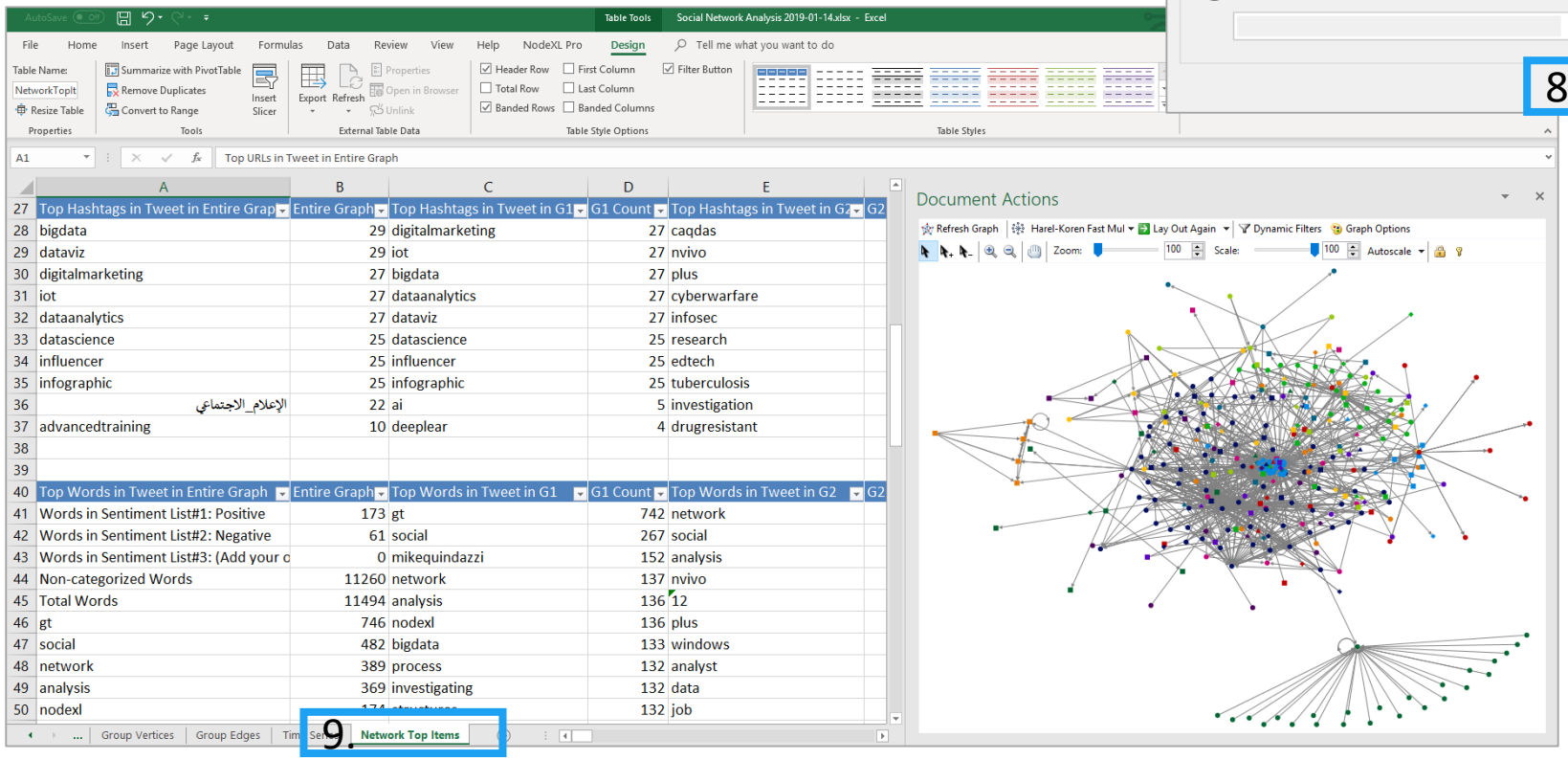
7. Repeat step six from the previous page for columns **Domains in Tweet** and **Hashtags in Tweet.**
8. When the **Network Top Items window** looks like the one on the right, click **OK** and then **Calculate Metrics.** This step may take a few minutes.
9. Have a look at the new worksheet **Network Top items**.





9. Autofill Columns

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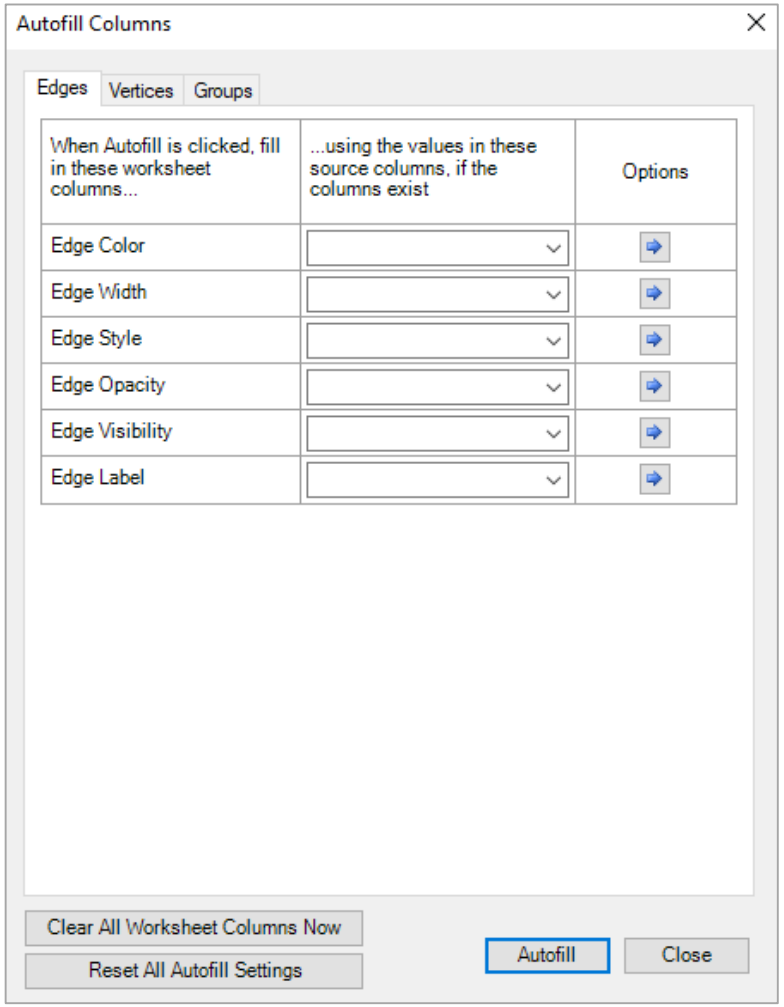
Based on the previous calculations, we will now start with the visualization. The **Autofill Columns** feature helps to fill a number of columns with a few clicks.

1. Go to **Visual Properties > Autofill columns** to open the Autofill Columns window seen on the right.
2. Choose source columns and set the options for **Edges, Vertices and Groups** as shown on the next three pages.



9. Autofill Columns: Edges

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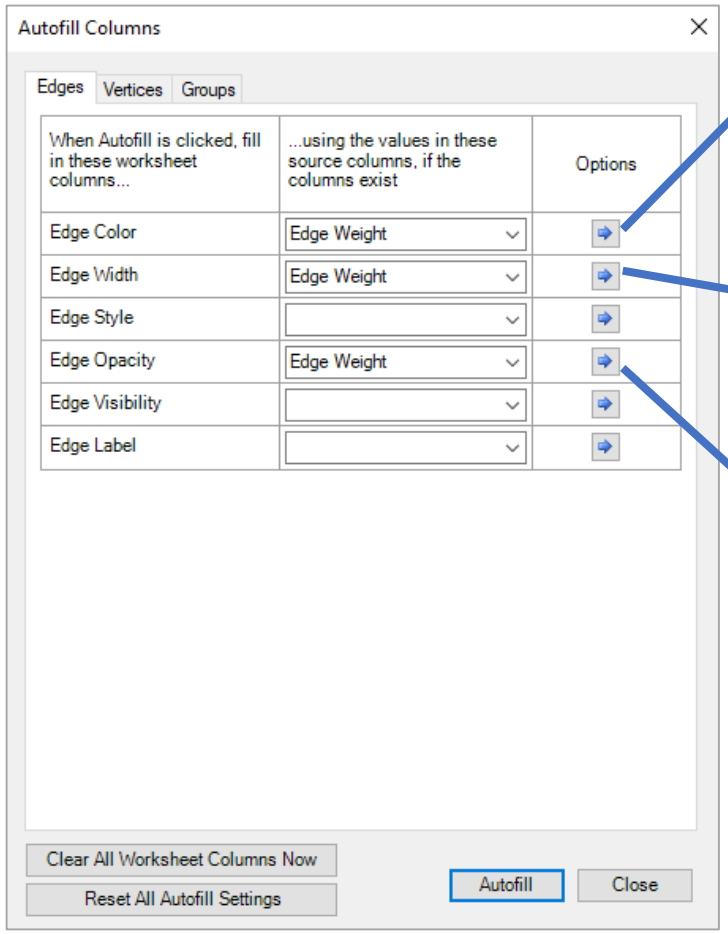

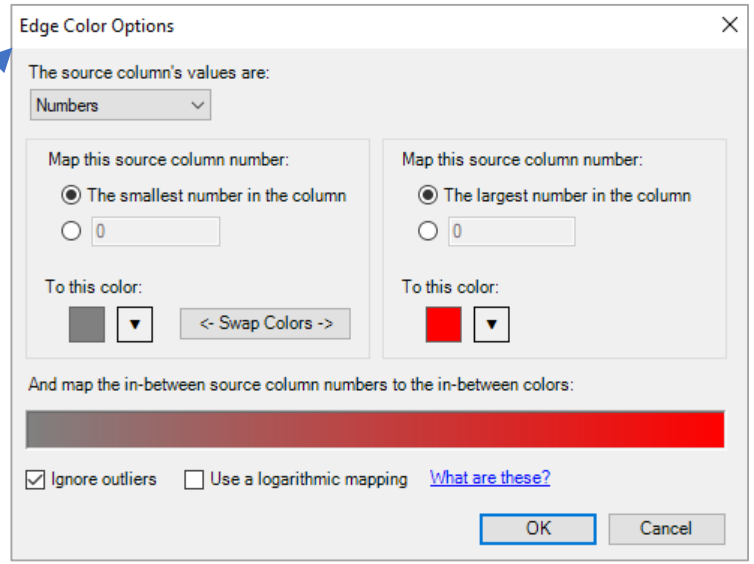

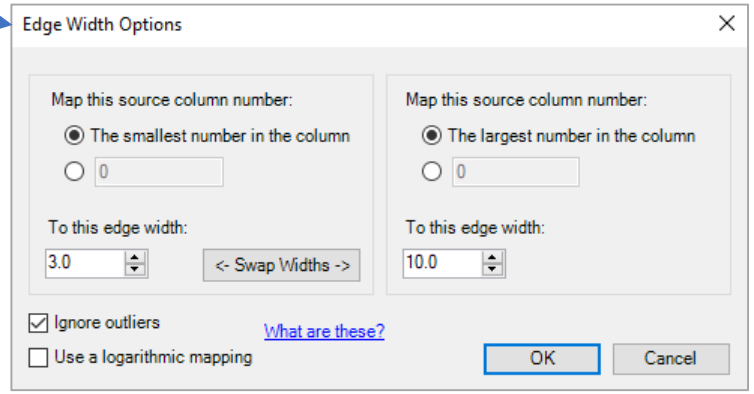

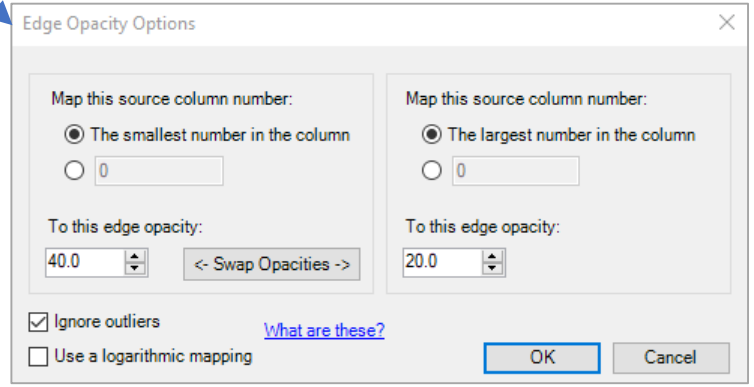

9. Autofill Columns: Vertices

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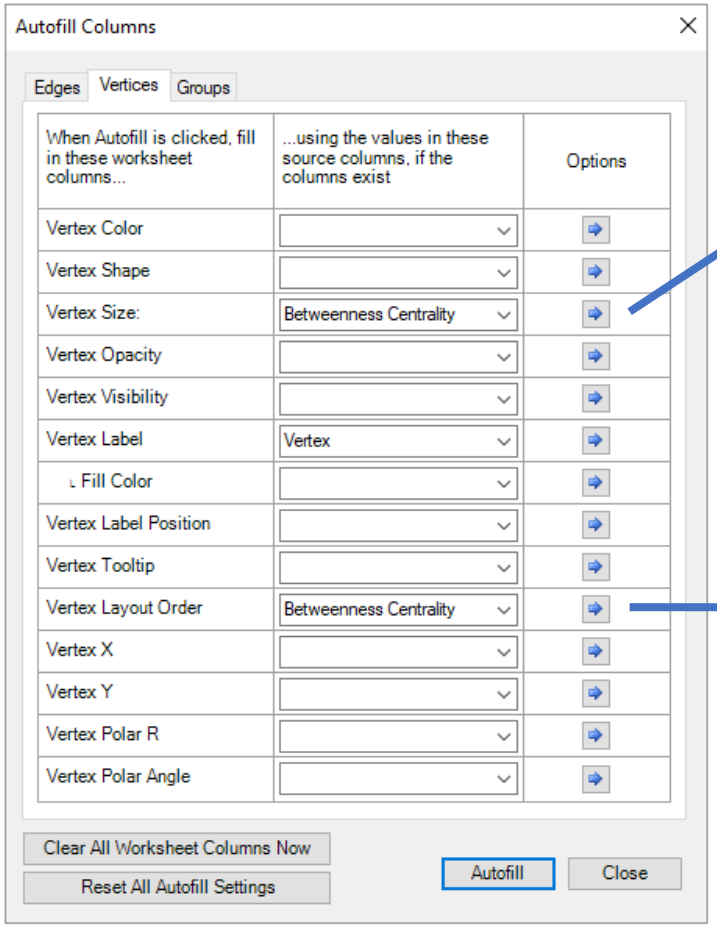

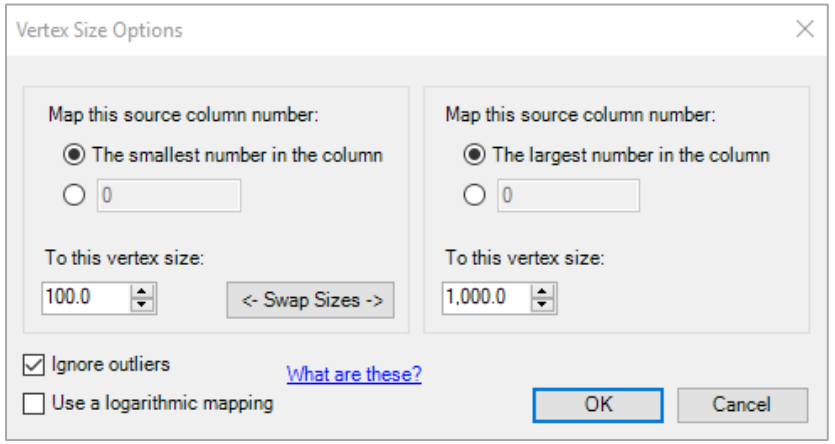

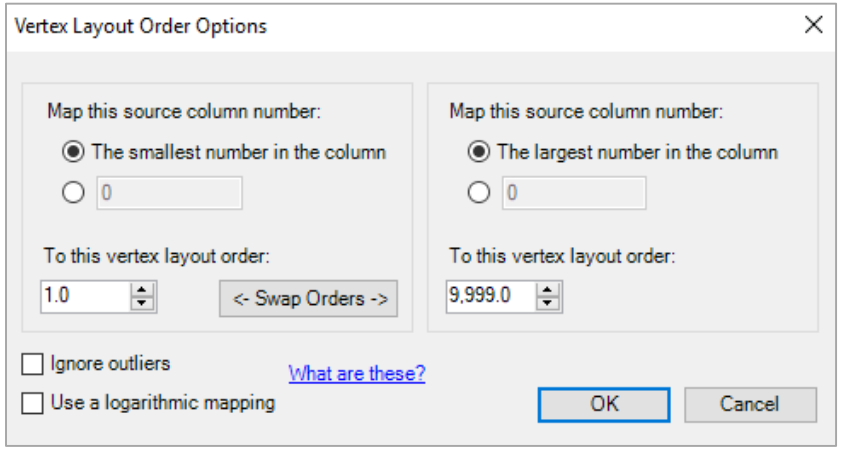

9. Autofill Columns: Groups

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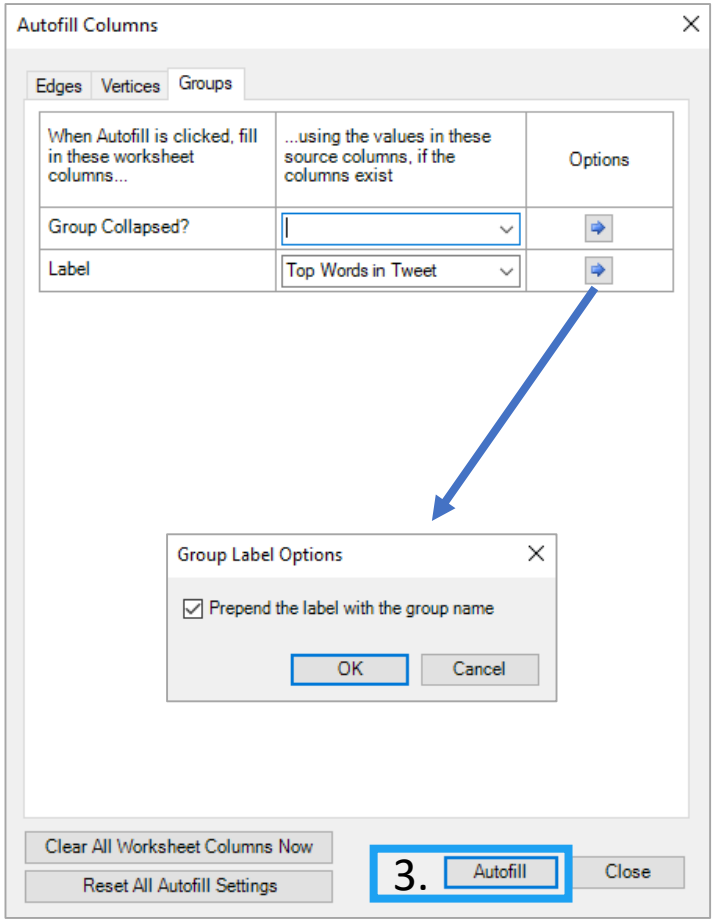
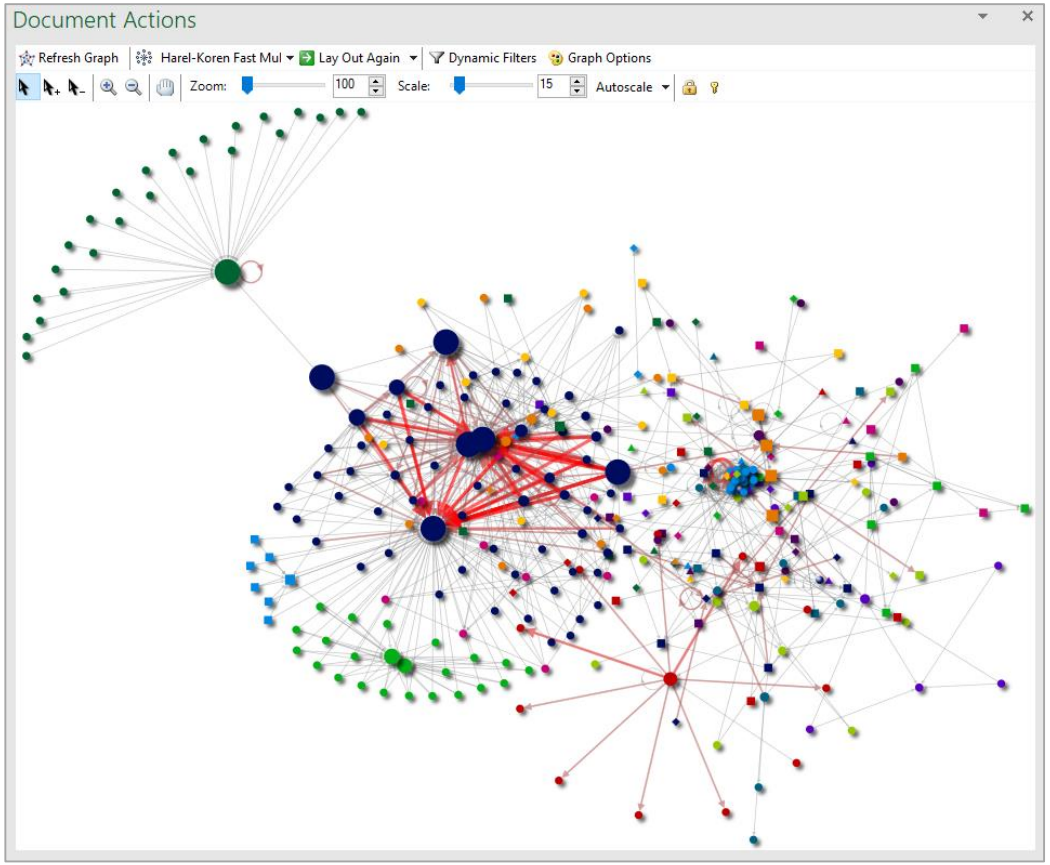


3. When all options are set, click **Autofill**.
4. Wait. This step may take up to a few minutes. The graph will automatically refresh.



10. Customize Graph: Layout Options

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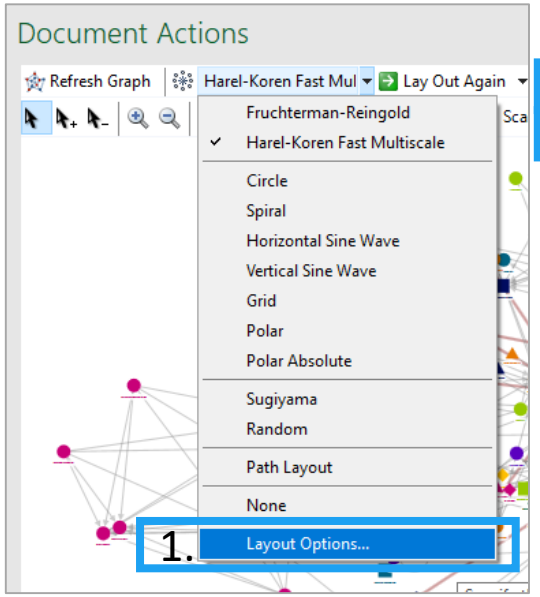
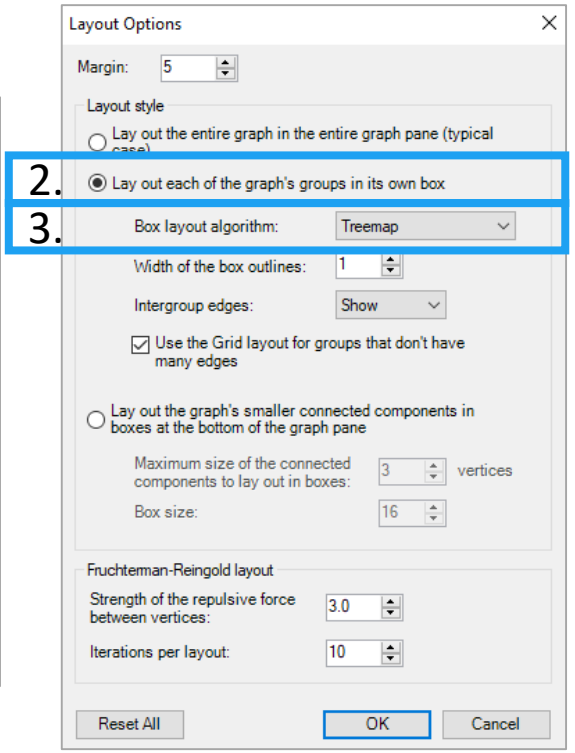
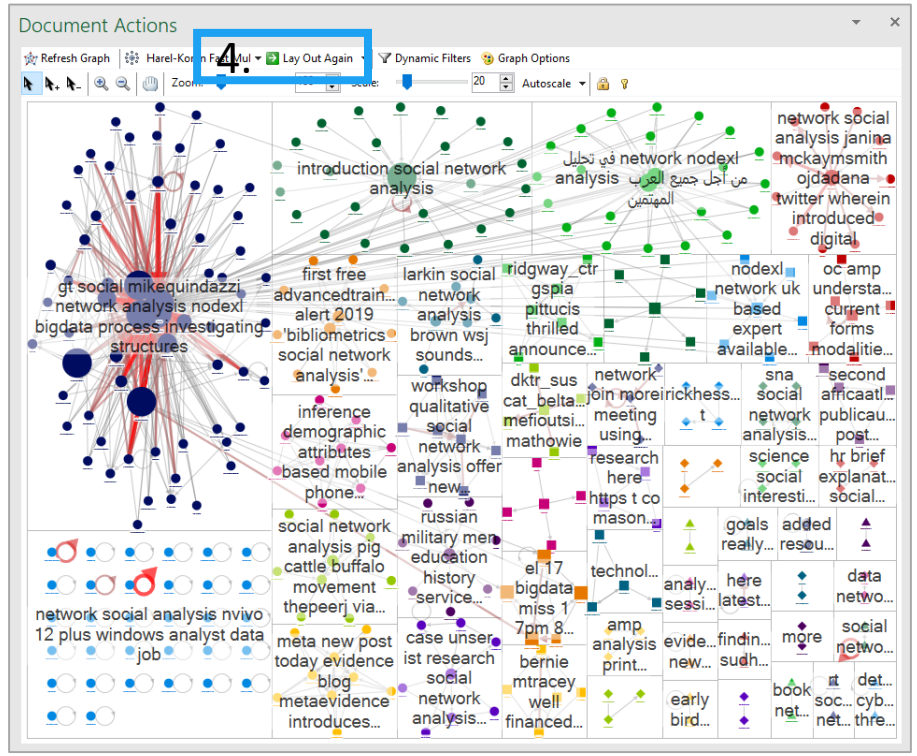
1. Open the **Layout Options** window: **Graph > Layout > Layout Options**
2. Set the **Layout style** to: **Lay out each of the graph‘s groups in ist own box**.
3. Set the **Box layout algorithm** to: **Treemap**.
4. Click **OK** and then **Lay Out Again**.







10. Customize Graph: Add Images to Vertices

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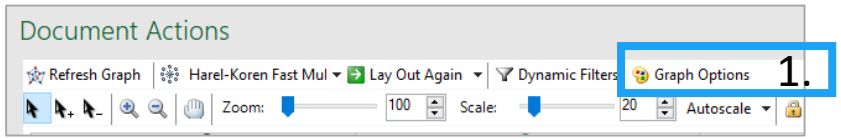
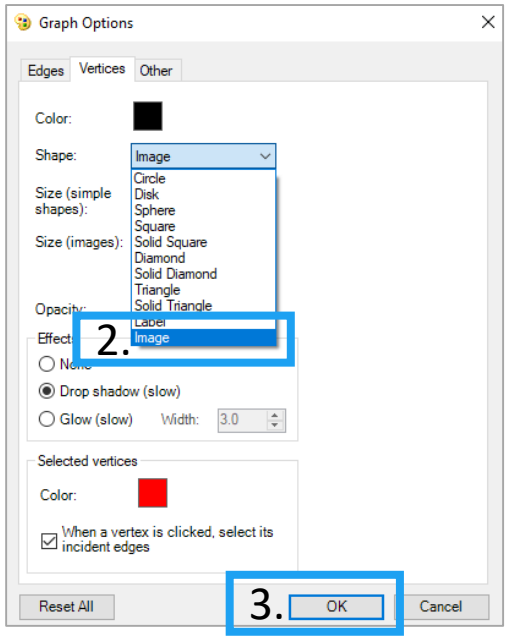
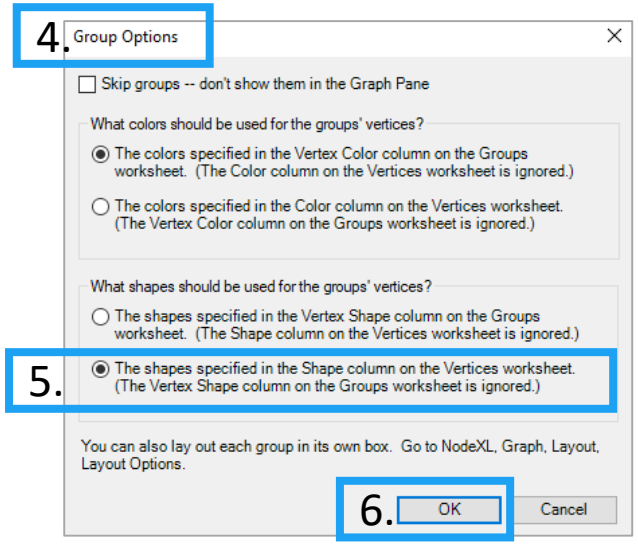
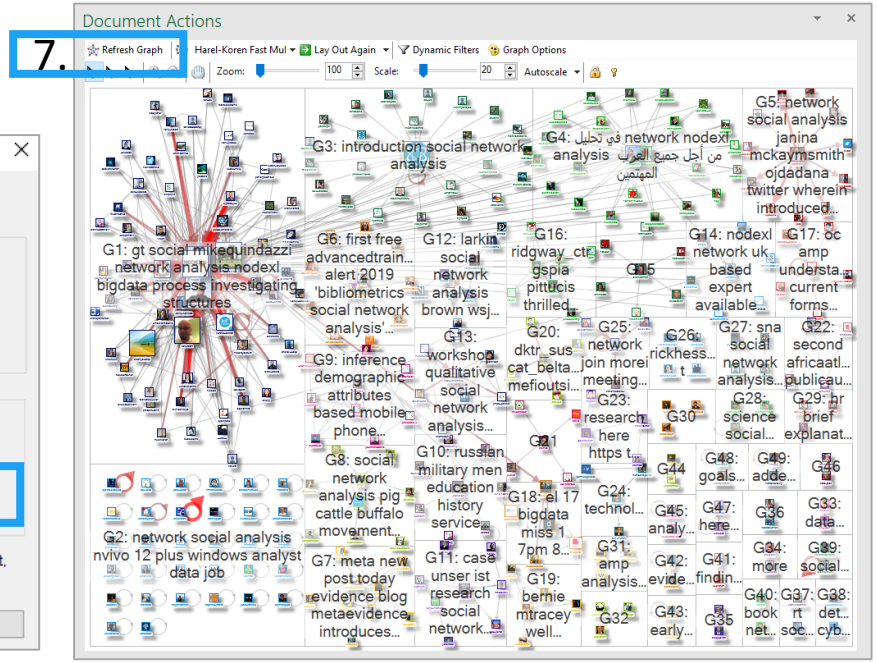
1. Open the **Graph Options** window.
2. Go to page **Vertices** and set the **Vertex Shape** to **Image**.
3. Click **OK**.
4. Open the Group Options window: **Analysis > Groups > Group Options**
5. Set the option: **The shapes specified in the Shape column on the Vertices worksheet**.
6. Click **OK**.
7. Click **Refresh Graph.**









10. Customize Graph: Label Options

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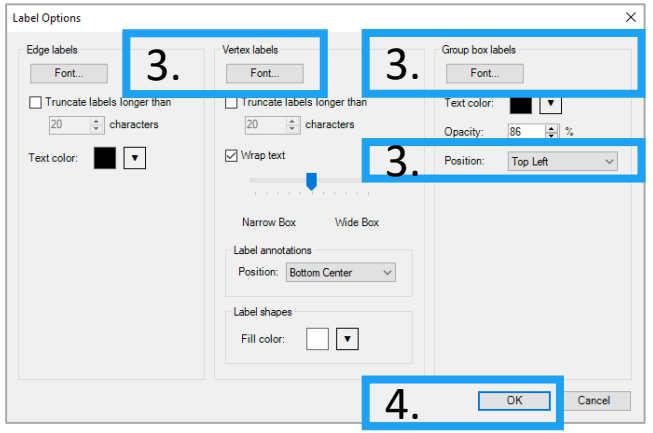
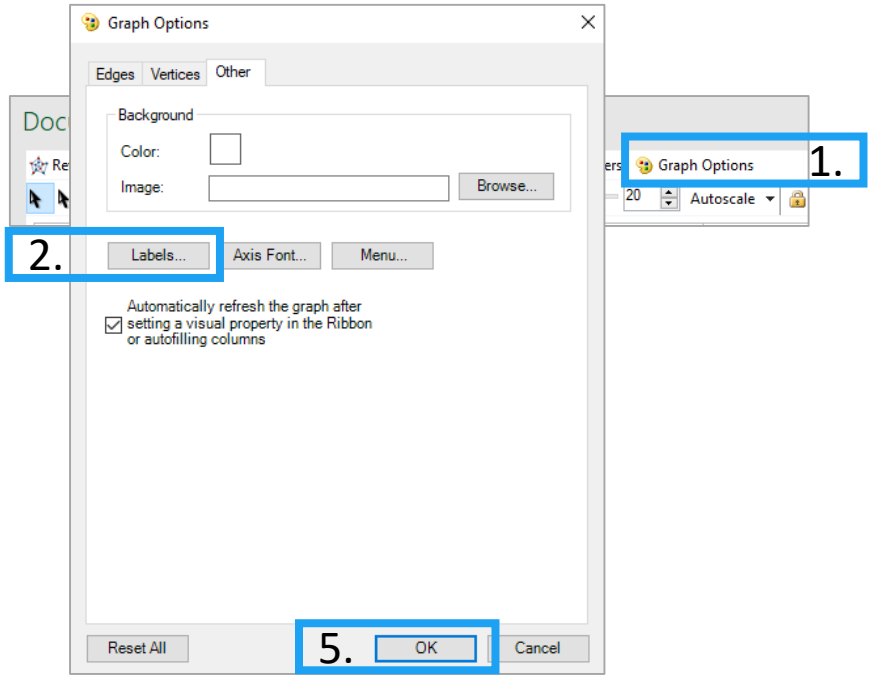
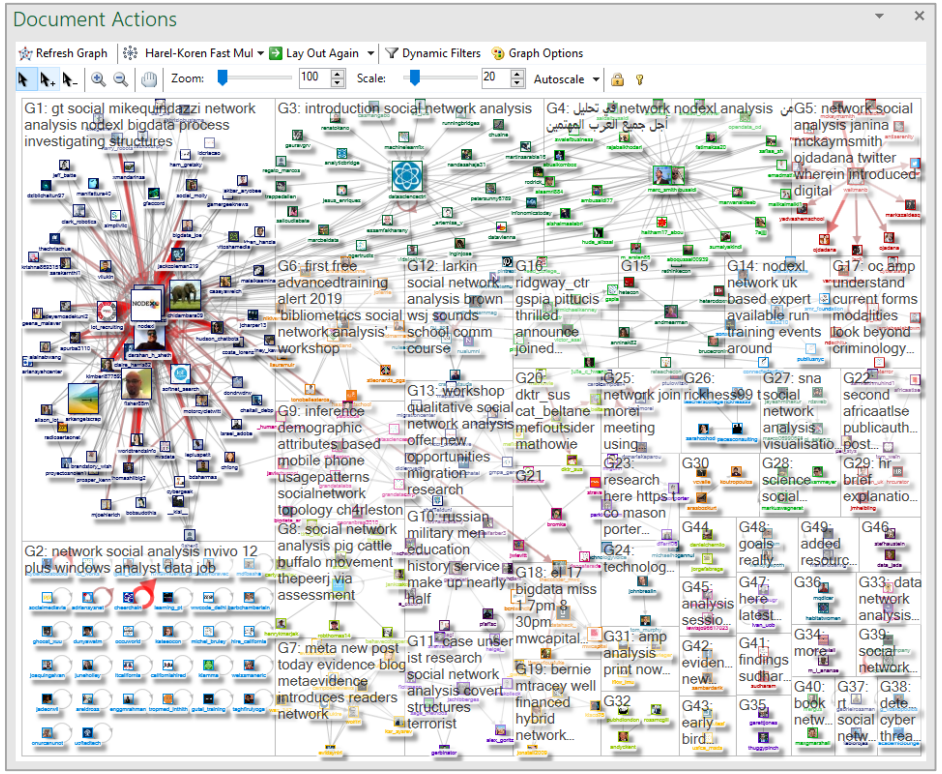
Literature/Links

1. Open the **Graph Options** window above the graph pane.
2. Go to page **Other** and click on **Labels to open the Label Options Window**.
3. Customize the position, font and size of vertex and group box labels.
4. Click **OK** to close the Label Options window.
5. Then click **OK** to close the graph options.







11. Save the Network Map as Image

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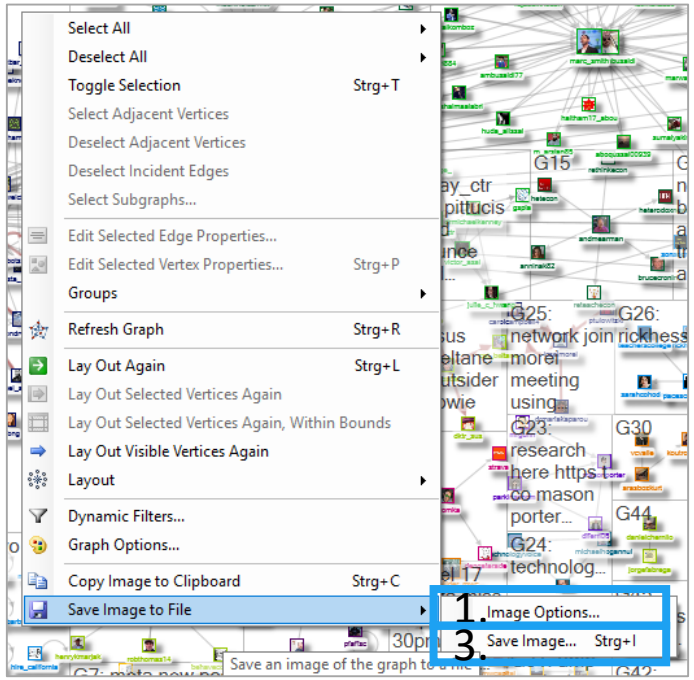
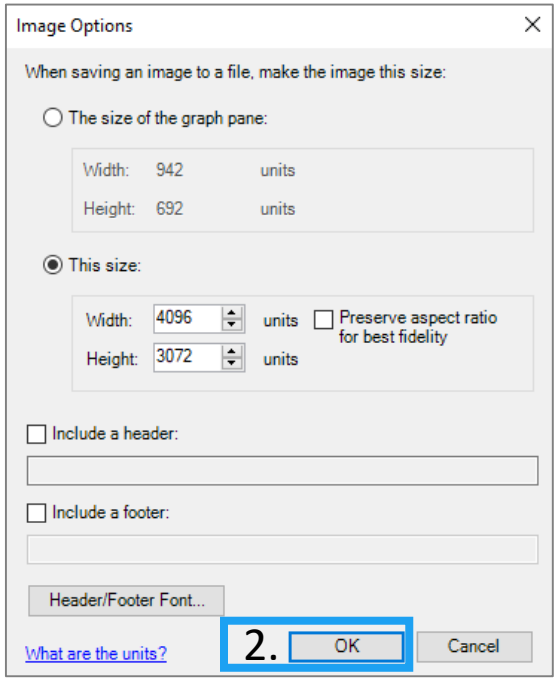
Literature/Links

1. To open the Image Options window, right-click in the graph window, then select **Image Options**…
2. Customize the options and click **OK**.
3. Right-click in the graph window and then select **Save Image…**





Congratulations! You have successfully analyzed and visualized Twitter network data.

12. Automation

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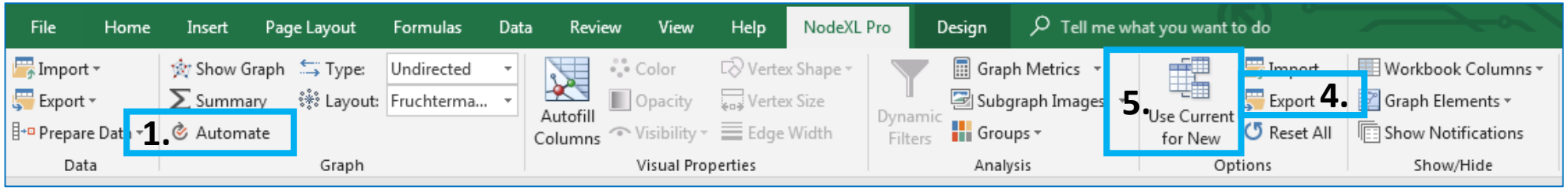
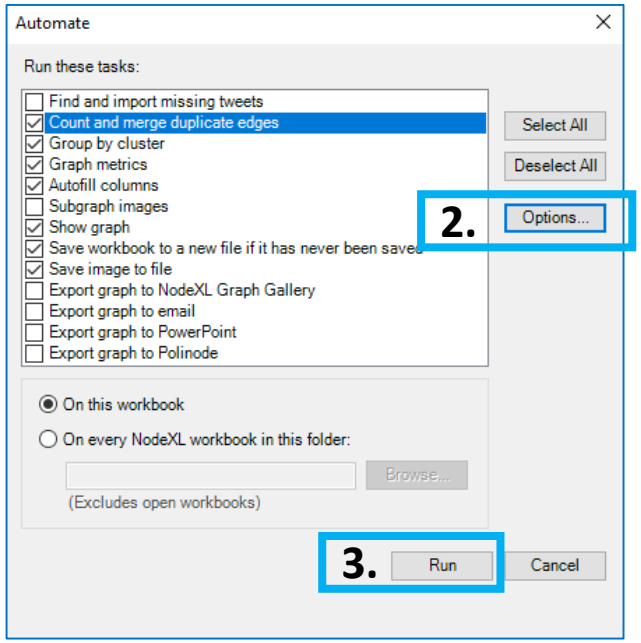
Literature/Links





You can automate all previous steps with the **Automation** feature:

1. Open the Automation window: **Graph > Automate**.
2. Set the **Options…** for each task.
3. Click **Run** and wait.
4. Click **Options > Export** to save your customized **Data Recipe**.

Learn more about automating NodeXL Pro:

NodeXL Pro Tutorial (pdf): How to automate NodeXL Pro

- https://www.smrfoundation.org/nodexl/tutorials

NodeXL Pro Video Tutorial on Automation

- https://www.youtube.com/watch?v=mjAq8eA7uOM

Links and Literature

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Literature/Links

Useful Links

Social Media Research Foundation: http://www.smrfoundation.org/

NodeXL Graph Gallery: https://nodexlgraphgallery.org/

Video: Marc Smith | Network Mapping the Ecosystem: https://www.youtube.com/watch?v=kDiGl-2m868

Viedo: How to Automate NodeXL Pro: https://www.youtube.com/watch?v=mjAq8eA7uOM

Twittter search operators: https://developer.twitter.com/en/docs/tweets/rules-and-filtering/overview/standard-operators

Literature

Derek Hansen, Ben Shneiderman and Marc Smith (2009): Analyzing Social Media Networks with NodeXL: https://www.elsevier.com/books/analyzing-social-media-networks-with-nodexl/hansen/978-0-12-382229-1

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Marc A. Smith, Lee Rainie, Ben Shneiderman and Itai Himelboim (2014): Mapping Twitter Topic Networks: From Polarized Crowds to Community Clusters. PEW Research Report: https://www.pewinternet.org/2014/02/20/mapping-twitter-topic-networks-from-polarized-crowds-to-community-clusters/

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Aaron Clauset, M. E. J. Newman, and Cristopher Moore (2004): Finding community structure in very large networks. In: Phys. Rev. E 70.