An Introduction to Social Network Analysis With Gephi

February 2, 2022

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Do More With Digital Scholarship Series

Lewis & Ruth Sherman Centre for Digital Scholarship
scds.ca

McMaster University Library

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We're here to help!

Use **TH:** [query] in chat to let the facilitators know that you're having technical issues

By the end of this workshop…

You'll be able to:

- Define key concepts in social network analysis
- Explain what phenomena can be observed through social network analysis
- Create a network visualization in Gephi

Have you downloaded Gephi?

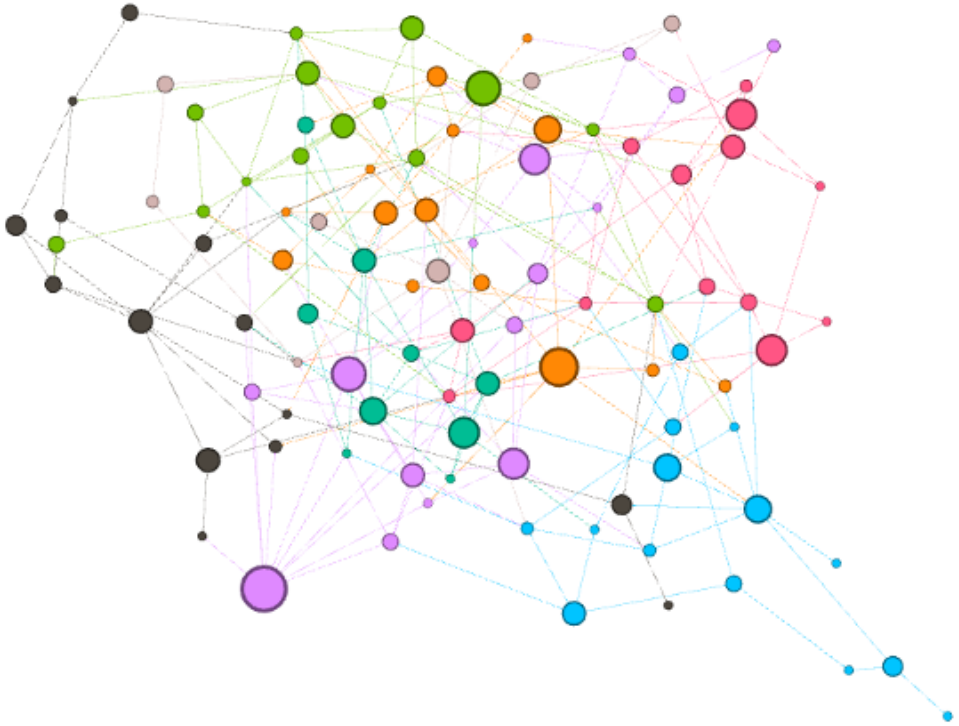
- Go right to the source: https://gephi.org

On Social Network Analysis

This is not a comprehensive course on social network analysis

Social network analysis is a methodological approach to representing the shape and characteristics of social structures.

- i.e. visualizing relationships between interdependent entities

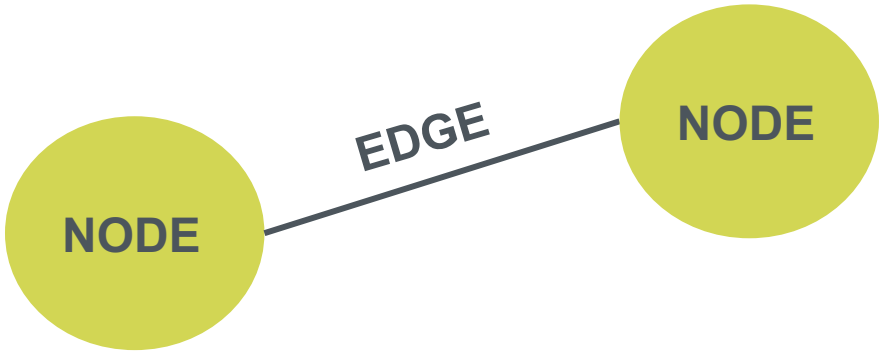


Describing Relationships

Node: the ‘actor’ in the network

Edge: the relationship connecting actors

Attribute: features of the node or edge



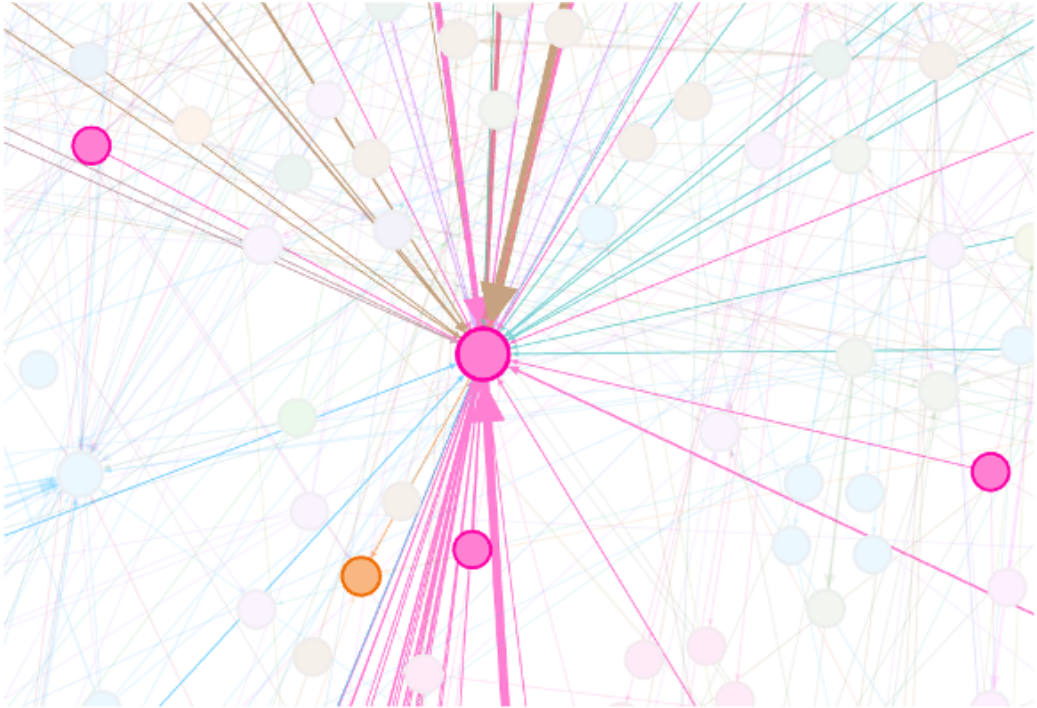
Other terminology

Edges can be **directed** or **undirected**.

Directed edges allow us to calculate **in-degree** and **out-degree**.

- In-degree: number of incoming directed edges
- Out-degree: number of outgoing directed edges

Directed edges can also have a relative **weight**.

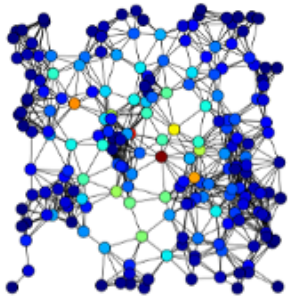


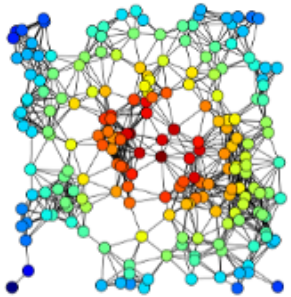
Network graph with weighted edges

Determining which nodes are the most important in the cluster or graph…

- **Degree**
  - nodes with the most connections (i.e. edges)
- **Closeness**
  - nodes closest to all other nodes (as a path)
- **Betweenness**
  - nodes which bridge the shortest paths
- **Eigenvector**
  - nodes that have a higher relative influence

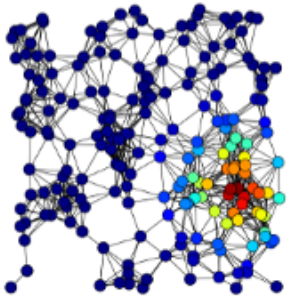
A. Betweenness

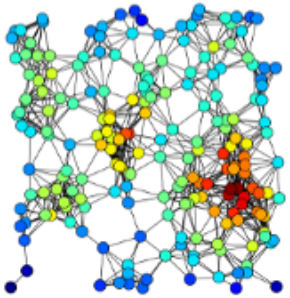




B. Closeness

C. Eigenvector





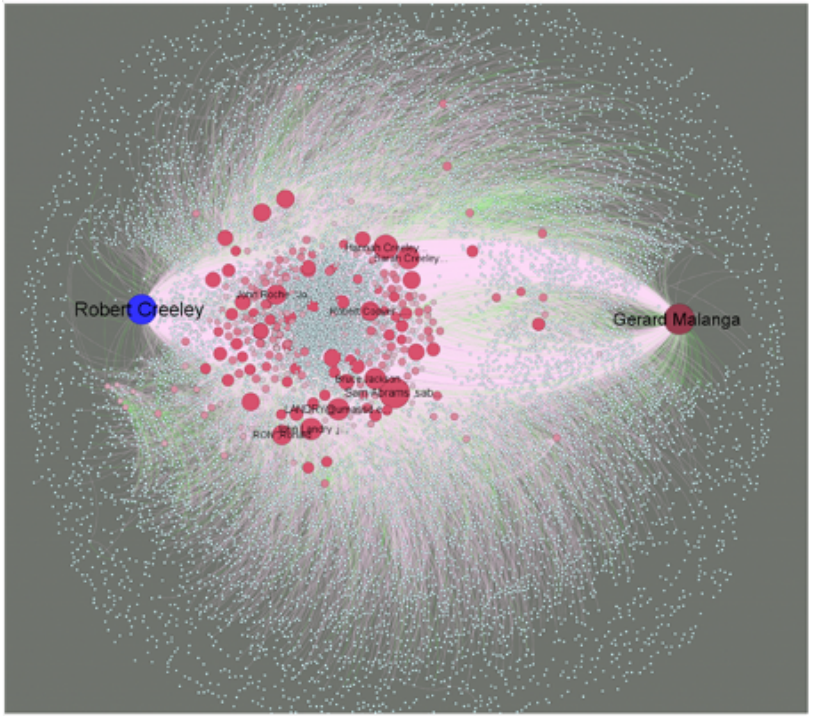
D. Degree

Image: Tapiocozzo (CC 4.0 BY-SA)

What Can SNA Be Used For?

Many applications in digital scholarship:

- Words that appear together often in a text (i.e. concordance)
- Correspondence between people (e.g. email or twitter)
- Communities in social networks (e.g. facebook friends)
- etc.



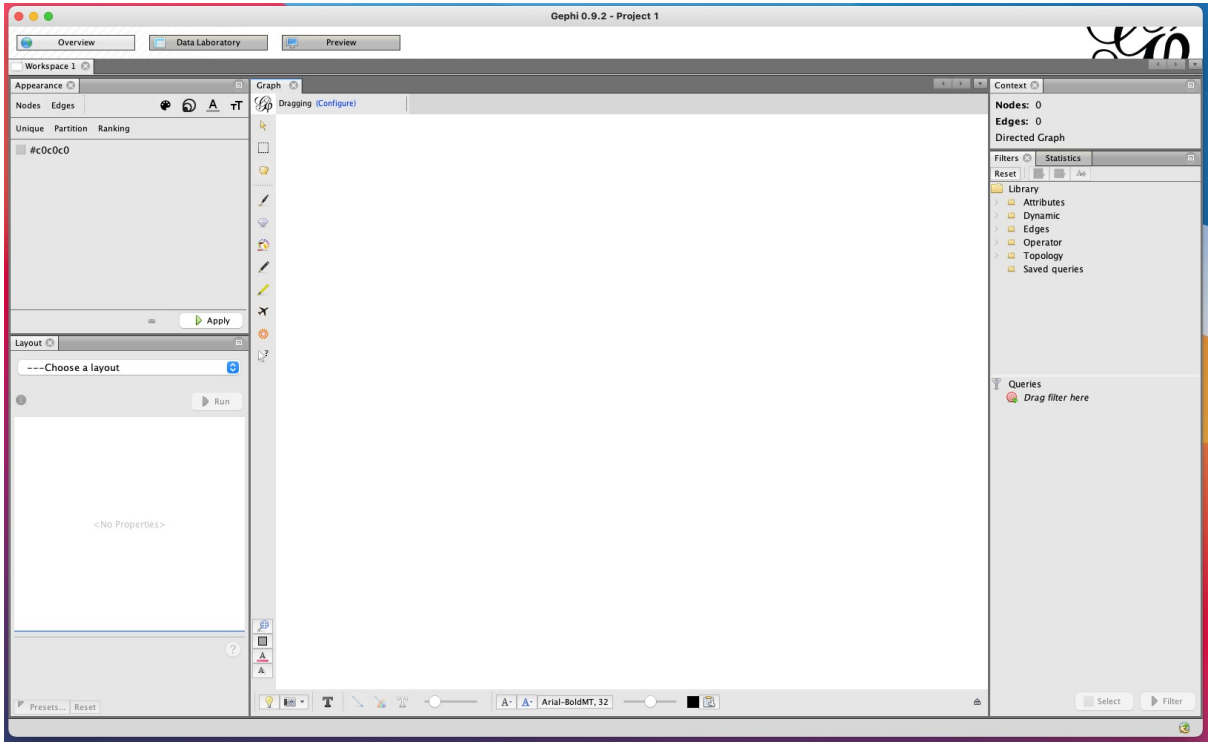
https://dhs.stanford.edu/visualization/robert-creeley-e-mail-correspodence-network/

Robert Creeley email archive (Standford U)

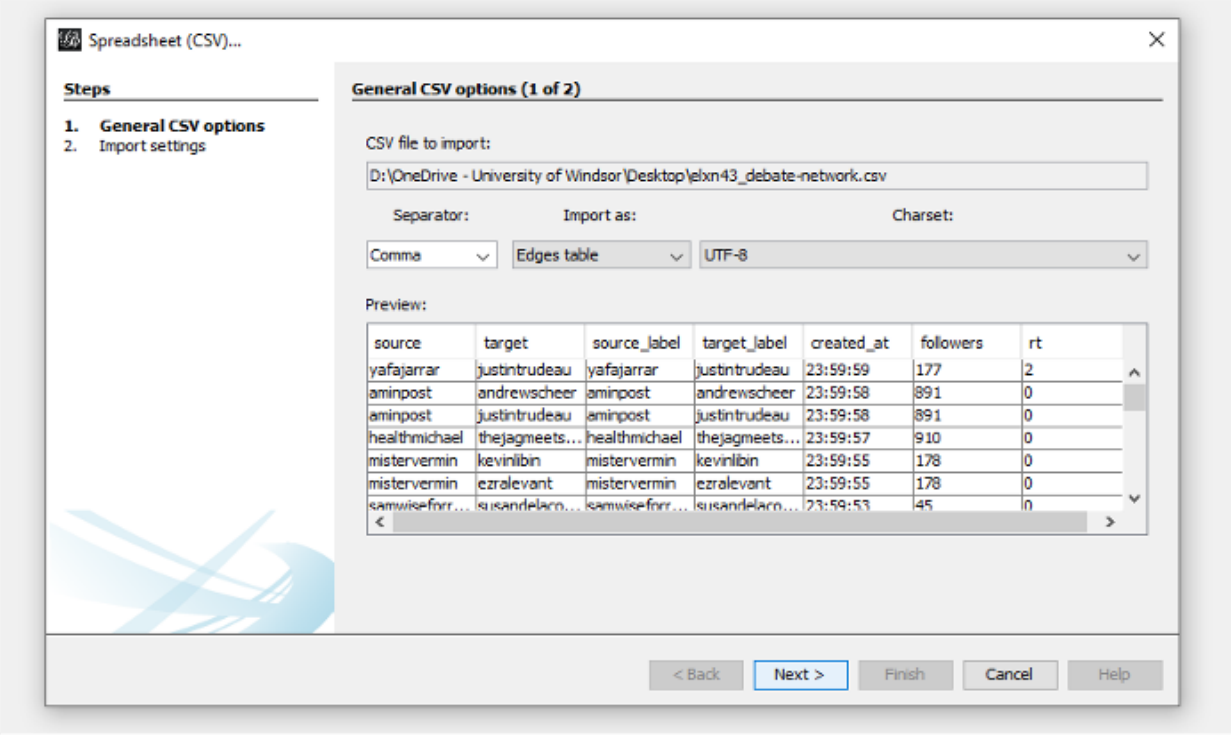
The dataset

Download the #elxn43 debate night dataset

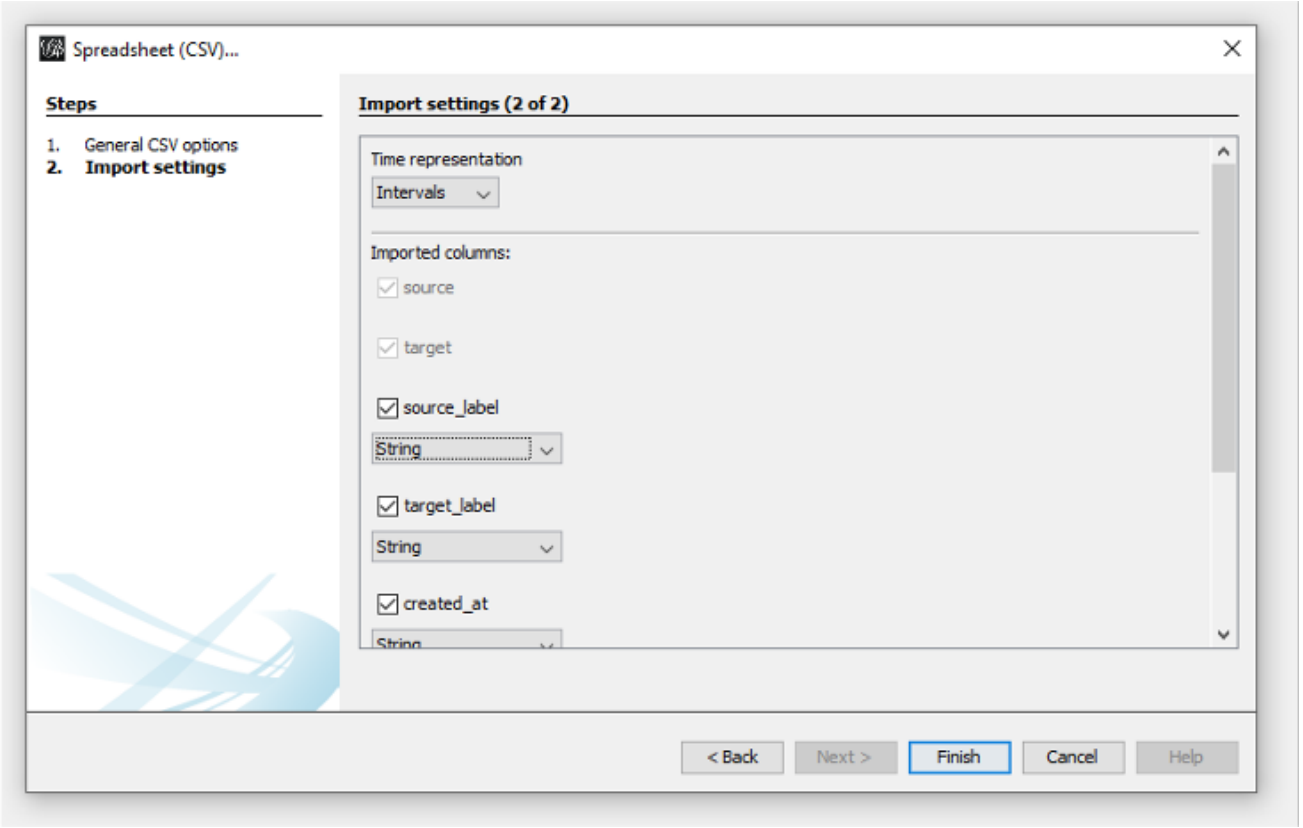
- Scraped from Twitter on Oct 7, 2019 → use of #elxn43 hashtag
- Pre-processed in OpenRefine
  - Isolated original tweets (excluded retweets)
  - Extracted mentions (@) from tweet text
  - Created source-target row for each mention



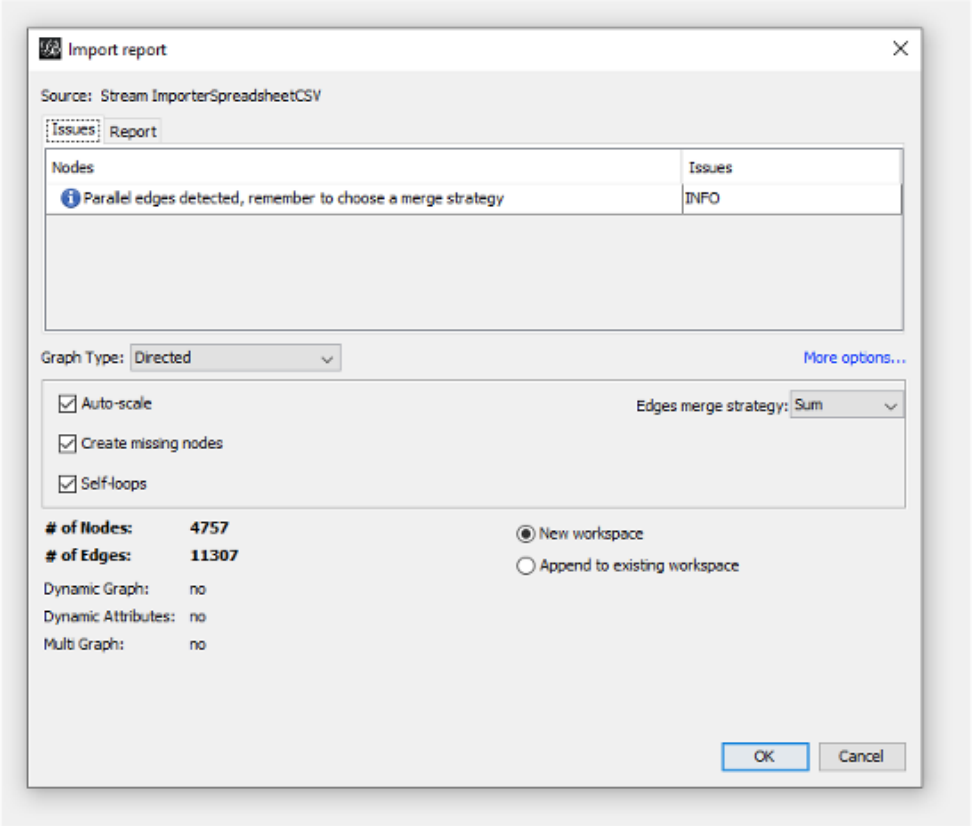
Gephi > New Project



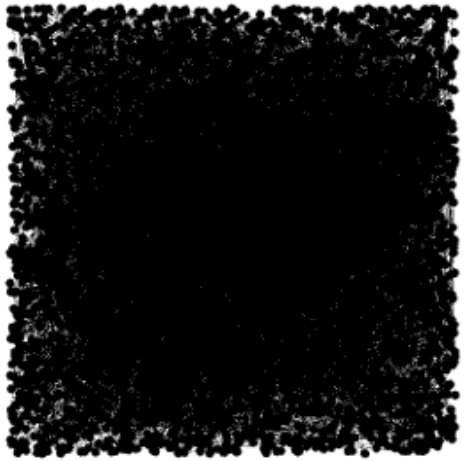
Import dataset (CSV) as: Edges table



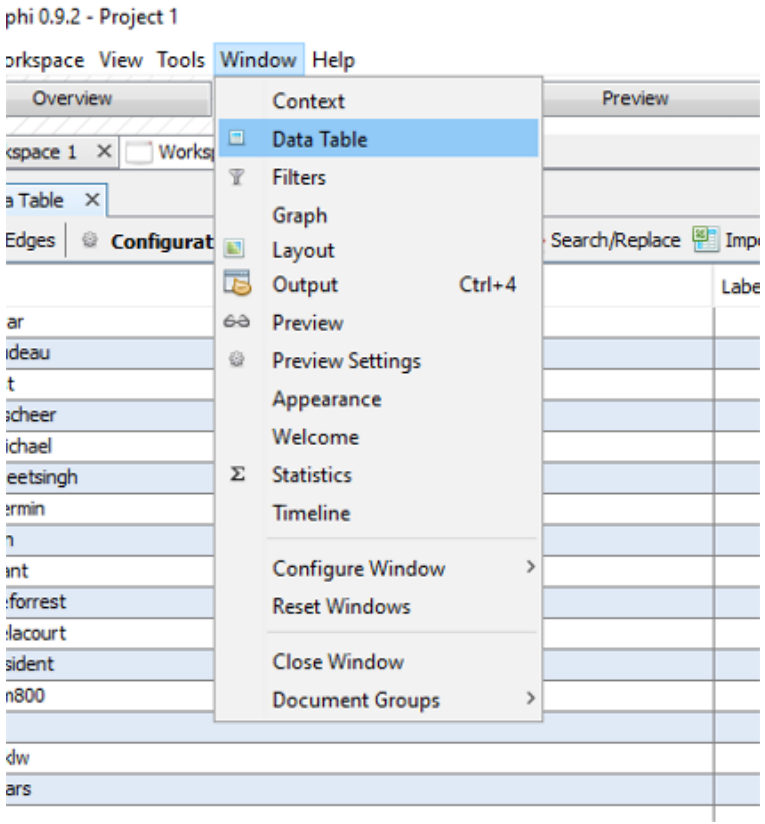
Note: name columns “source” and “target”



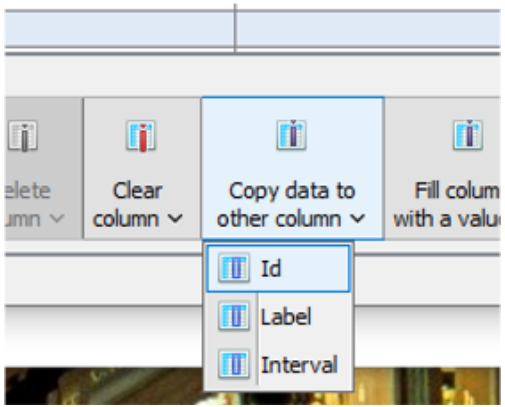
Almost there… directed graph?

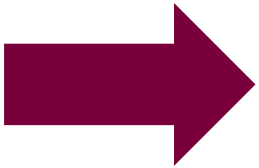


Overview → HAIRBALL!!!!



Data Laboratory > **Data Table** view



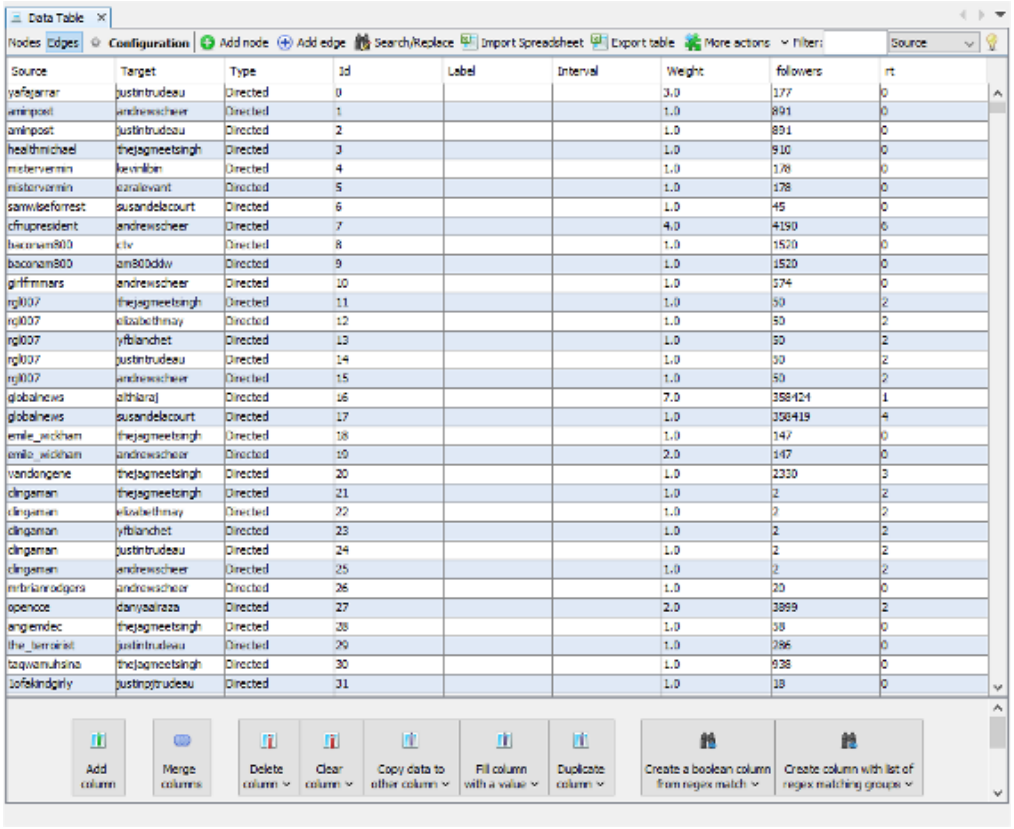


Data Table

Nodes | Edges | Configuration

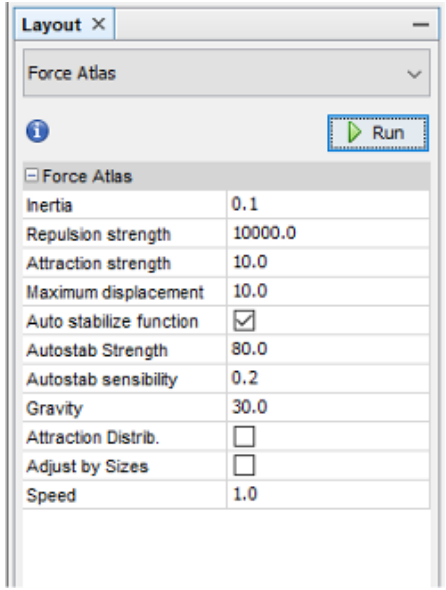
Id	Label	Inte
yafajarrar	yafajarrar	
justintrudeau	justintrudeau	
aminpost	aminpost	
andrewscheer	andrewscheer	
healthmichael	healthmichael	
thejagmeets...	thejagmeets...	
mistervermin	mistervermin	
kevinlibin	kevinlibin	
ezralevant	ezralevant	
samwiseforr...	samwiseforr...	
susandelaco...	susandelaco...	
cfnupresident	cfnupresident	
baconam800	baconam800	
ctv	ctv	
am800cklw	am800cklw	
girlfrmmars	girlfrmmars	
rgl007	rgl007	
elizabethmay	elizabethmay	
yfblanchet	yfblanchet	
globalnews	globalnews	

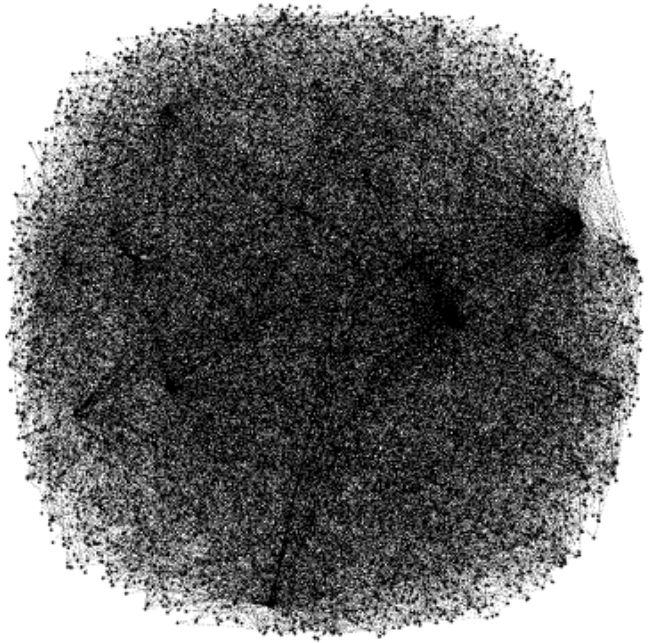
Copy data from Id to Label (in Node view)



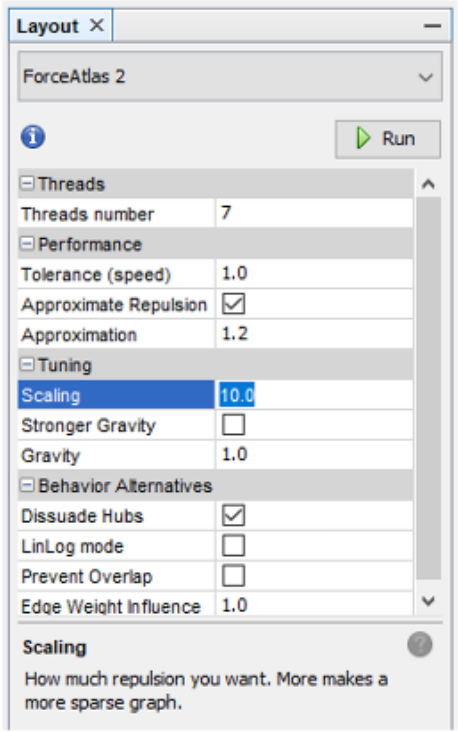
Source	Target	Type	Id	Label	Interval	Weight	followers	rt
yafejamar	justintrudeau	Directed	0			3.0	177	0
[illegible]	[illegible]	Directed	1			1.0	891	0
aminpost	justintrudeau	Directed	2			1.0	891	0
healthmicheel	thejagmeetsingh	Directed	3			1.0	910	0
mistervermin	kevinlibin	Directed	4			1.0	178	0
mistervermin	ezralevant	Directed	5			1.0	178	0
samwiseforrest	susandelacourt	Directed	6			1.0	45	0
cfnupresident	andrewscheer	Directed	7			4.0	4190	6
baconsam800	ctv	Directed	8			1.0	1520	0
baconsam800	sm800ddw	Directed	9			1.0	1520	0
girlfrmmars	andrewscheer	Directed	10			1.0	574	0
rgl007	thejagmeetsingh	Directed	11			1.0	50	2
rgl007	elizabethmay	Directed	12			1.0	50	2
rgl007	yfblanchet	Directed	13			1.0	50	2
rgl007	justintrudeau	Directed	14			1.0	50	2
rgl007	andrewscheer	Directed	15			1.0	50	2
globalnews	sthkiraj	Directed	16			7.0	358424	1
globalnews	susandelacourt	Directed	17			1.0	358419	4
emile_wickham	thejagmeetsingh	Directed	18			1.0	147	0
emile_wickham	andrewscheer	Directed	19			2.0	147	0
vandongene	thejagmeetsingh	Directed	20			1.0	2330	3
clingaman	thejagmeetsingh	Directed	21			1.0	2	2
clingaman	elizabethmay	Directed	22			1.0	2	2
clingaman	yfblanchet	Directed	23			1.0	2	2
clingaman	justintrudeau	Directed	24			1.0	2	2
clingaman	andrewscheer	Directed	25			1.0	2	2
mrbrianrodgers	andrewscheer	Directed	26			1.0	20	0
openoce	danyalraza	Directed	27			2.0	3899	2
angemdec	thejagmeetsingh	Directed	28			1.0	38	0
the_terrorist	justintrudeau	Directed	29			1.0	286	0
taqwamuhsina	thejagmeetsingh	Directed	30			1.0	638	0
lofekindgirly	justinpytrudeau	Directed	31			1.0	18	0

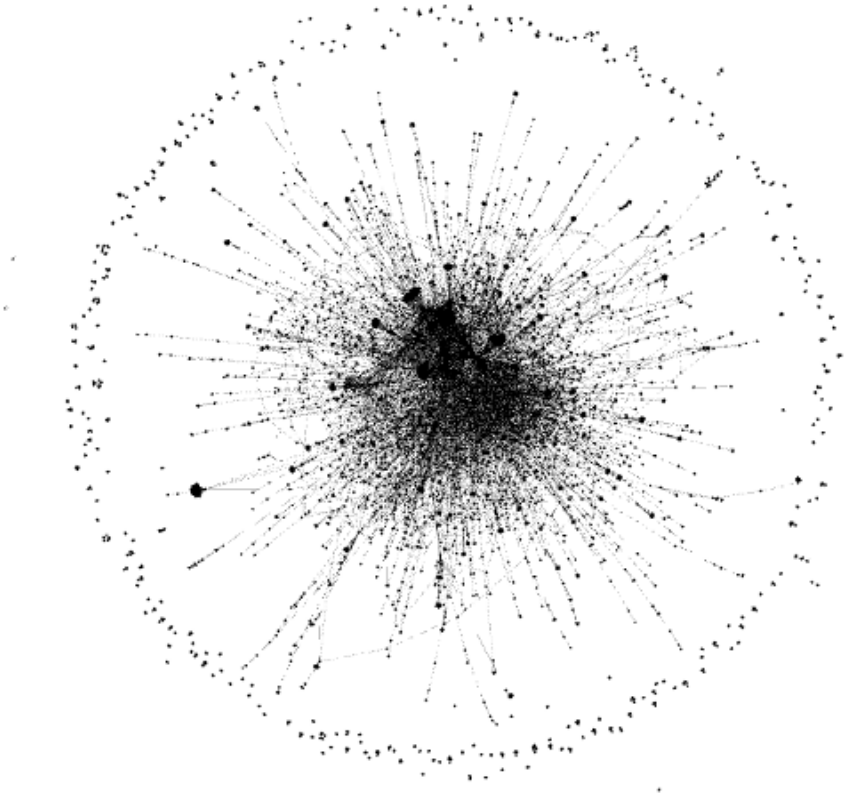
What does ‘weight’ refer to…?



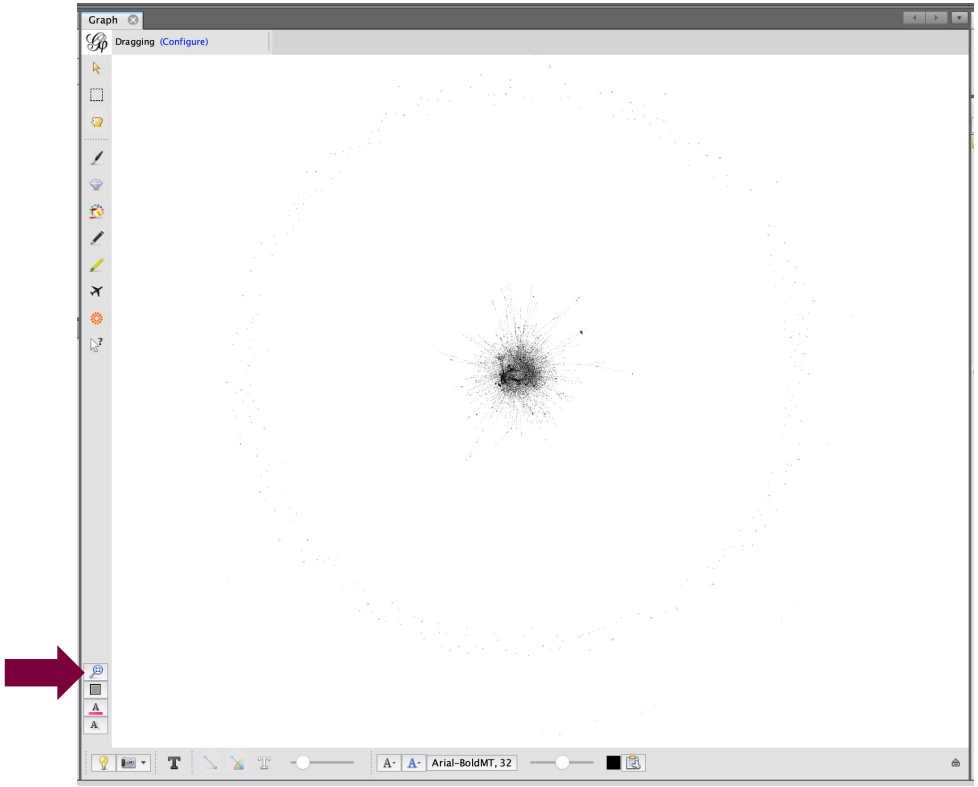


Layout (begin with **Force Atlas**)

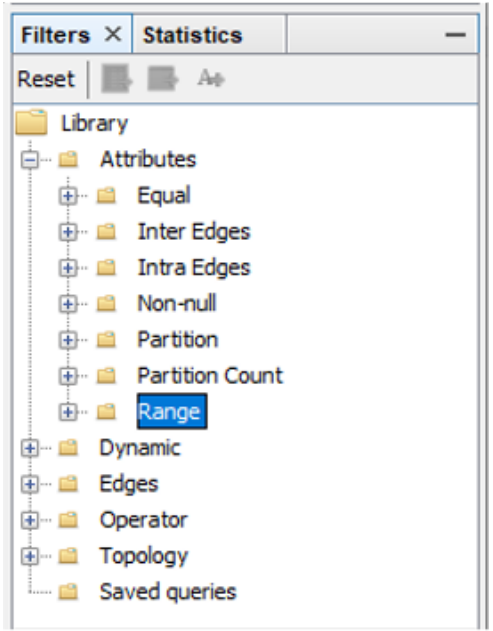


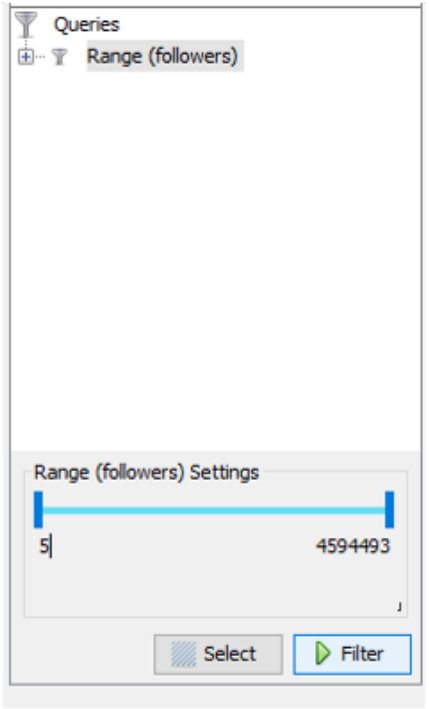


Try **ForceAtlas 2**...

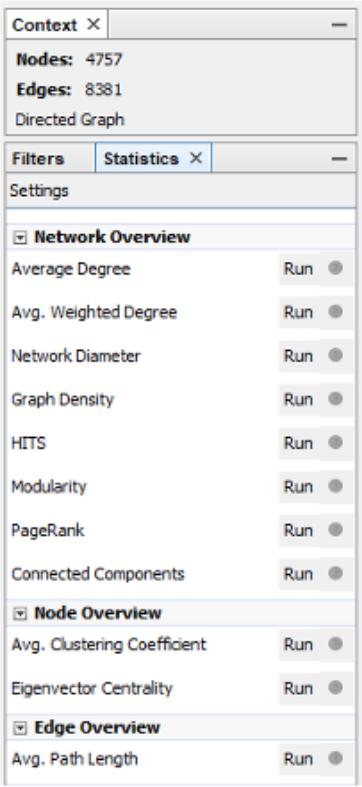


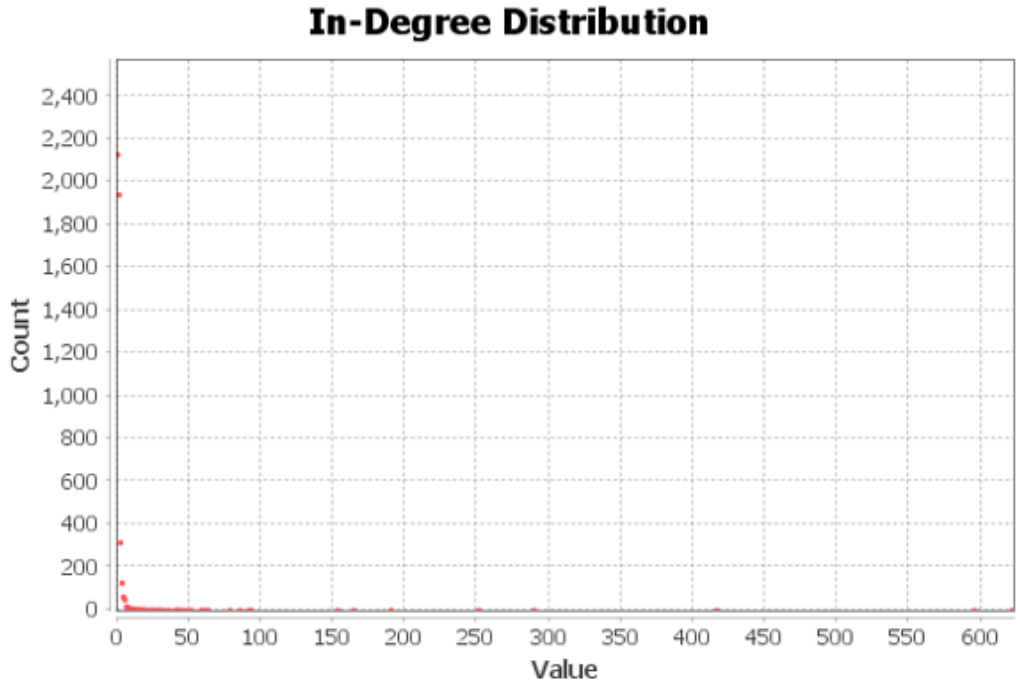
Getting around the canvas





Filters to omit nodes (e.g. bot accounts)

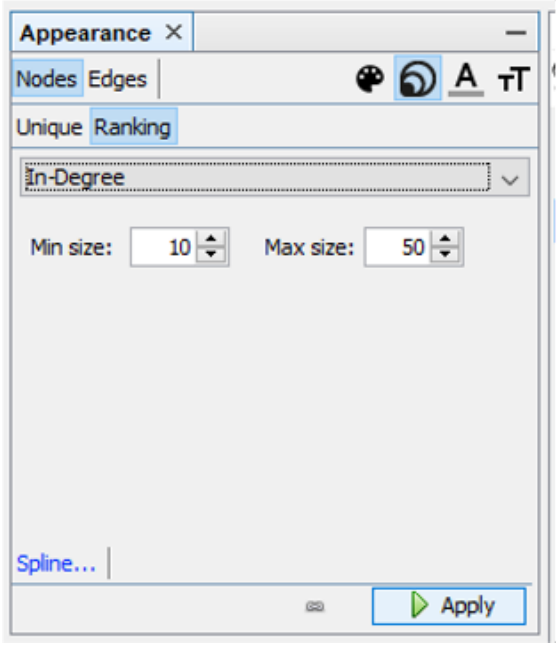


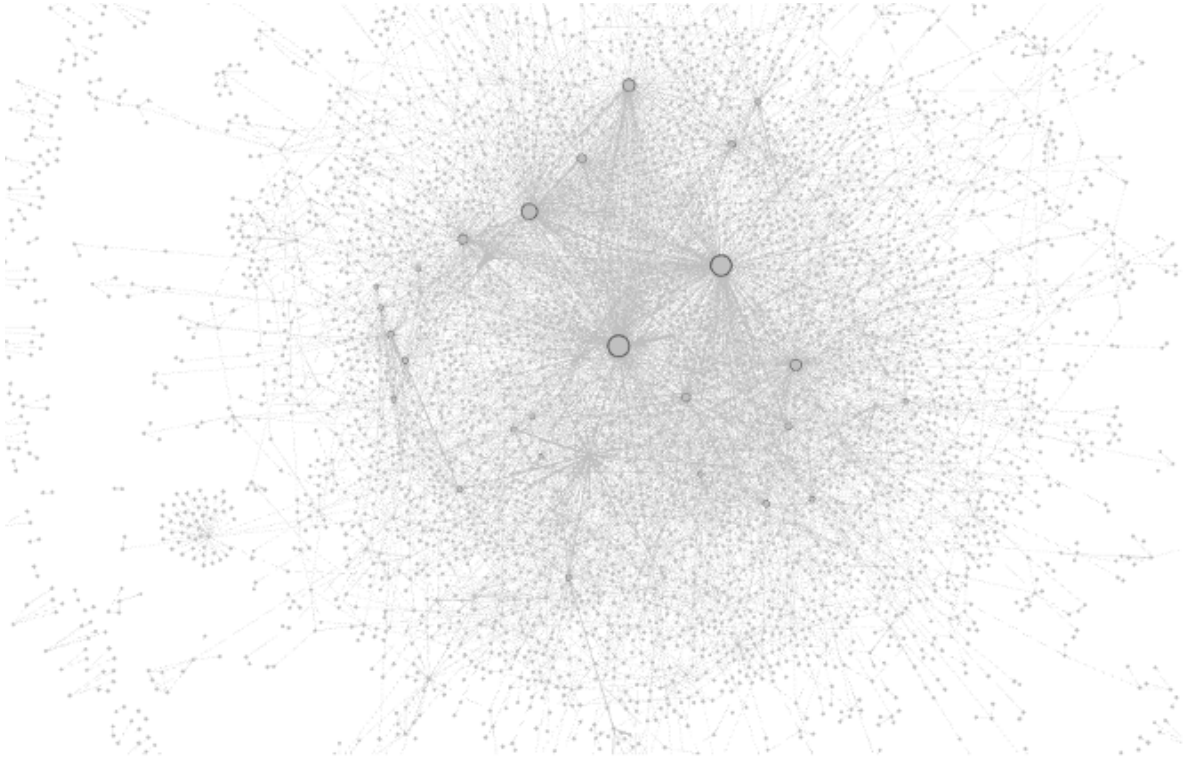


Run **Statistics** for more attributes…

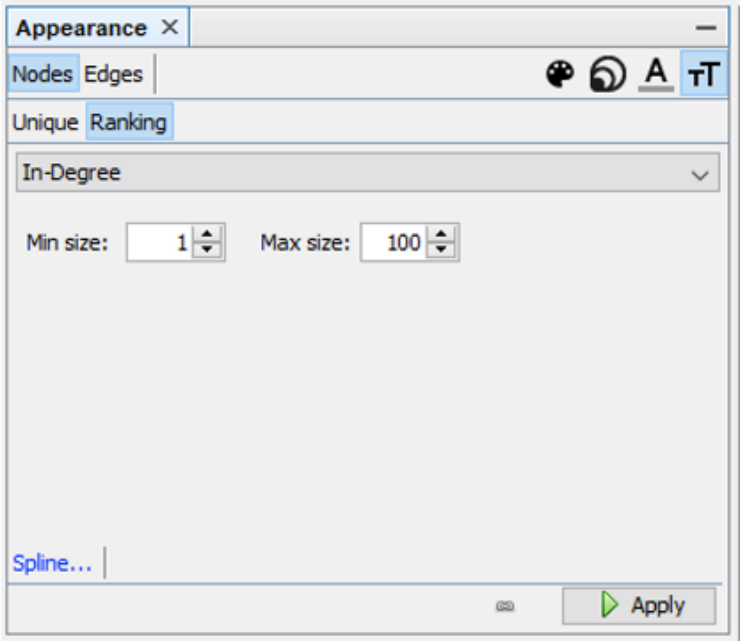
Id	Label	Interval	In-Degree	Out-Degree	Degree
justintrudeau	justintrudeau		621	1	622
andrewscheer	andrewscheer		595	0	595
thejagmeets...	thejagmeets...		416	0	416
elizabethmay	elizabethmay		289	0	289
cpc_hq	cpc_hq		251	3	254
maximebernier	maximebernier		190	0	190
yfblanchet	yfblanchet		164	0	164
liberal_party	liberal_party		153	1	154
althiaraj	althiaraj		93	0	93
ndp	ndp		91	1	92
gmbutts	gmbutts		85	4	89
fordnation	fordnation		78	0	78
canadiangre...	canadiangre...		63	1	64
cbcnews	cbcnews		62	1	63
lisalaflammectv	lisalaflammectv		61	0	61
susandelaco...	susandelaco...		59	2	61
rosiebarton	rosiebarton		58	0	58
torontostar	torontostar		51	0	51
jkenney	jkenney		51	0	51
globalnews	globalnews		47	5	52
davidakin	davidakin		45	10	55
ctvnews	ctvnews		43	7	50
peoplespca	peoplespca		42	0	42

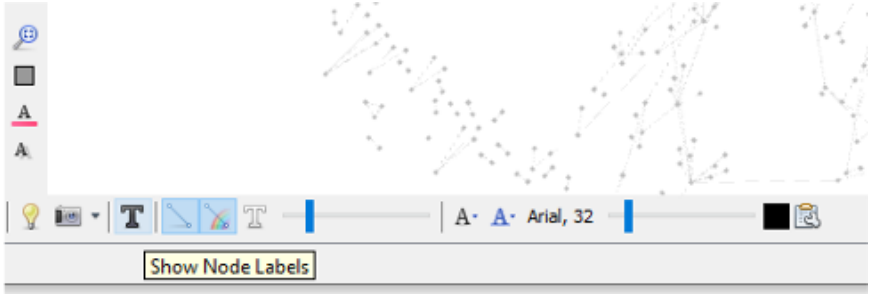
Statistics are also populated in the Data Table

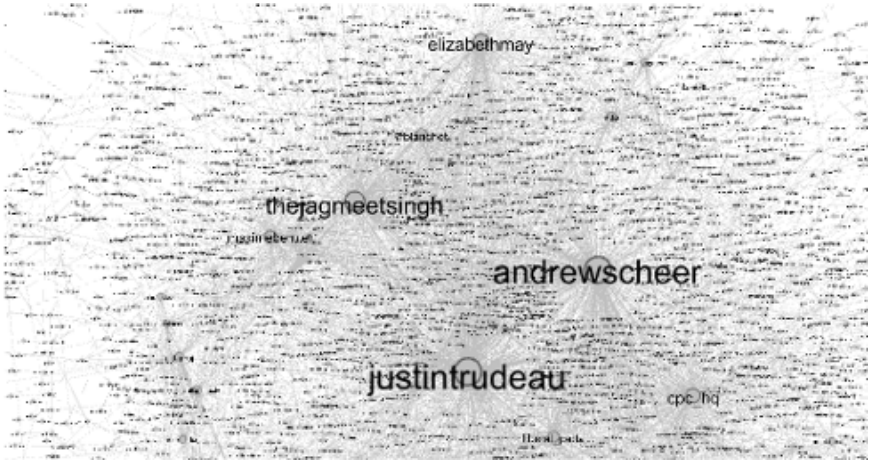




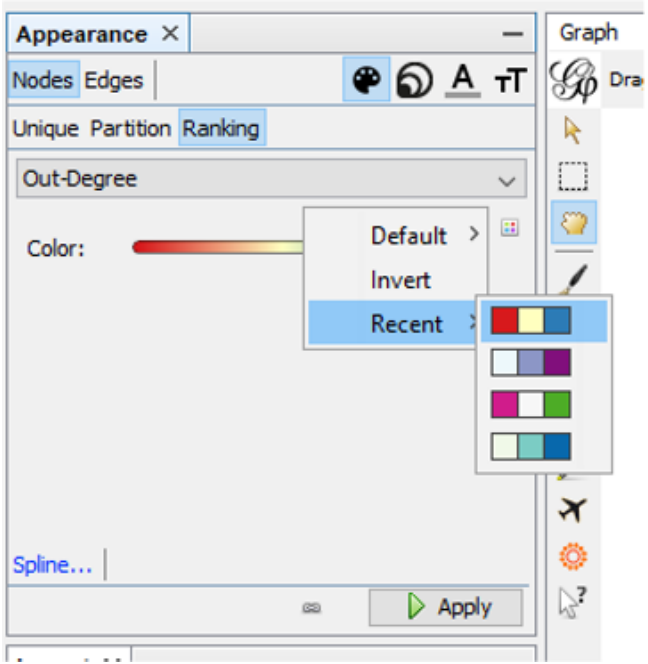
Who is being tweeted *at* the most?

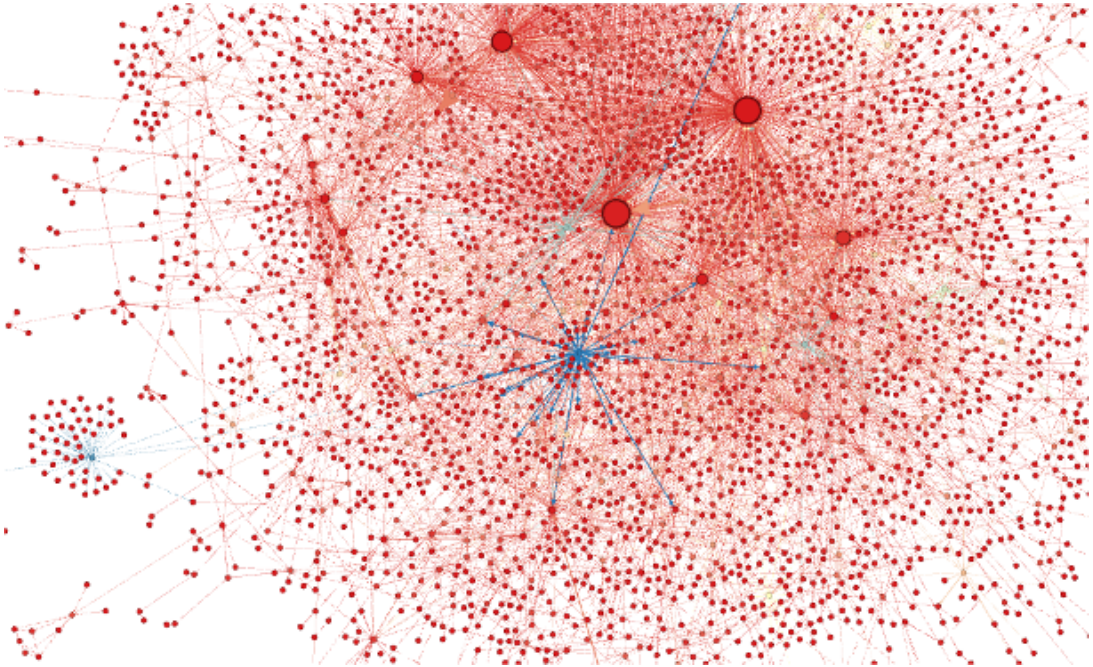




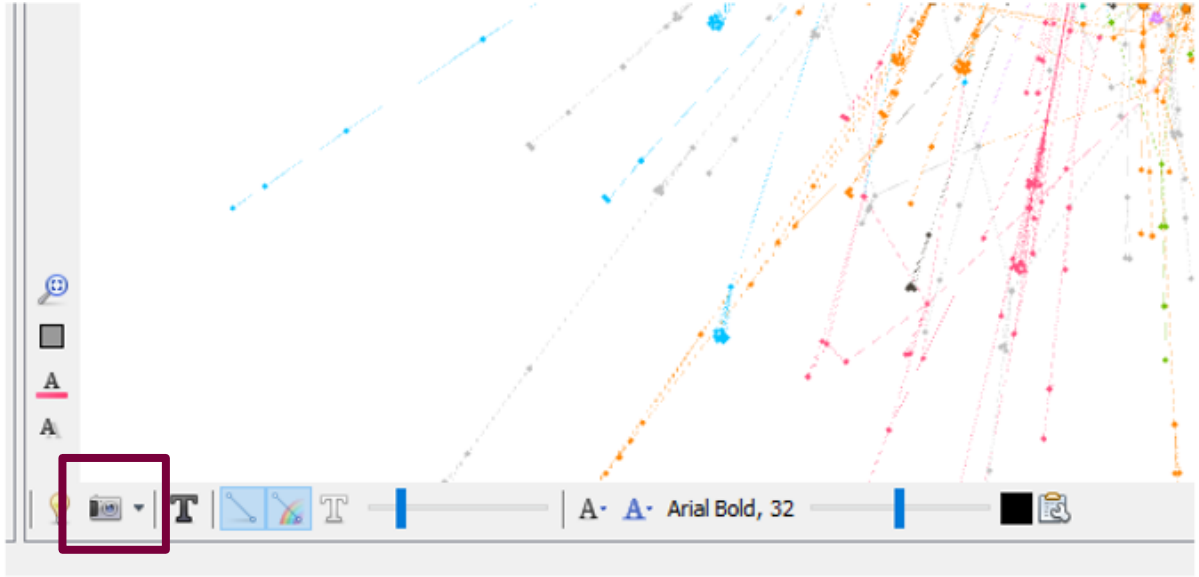


Adjust label size to identify account names





Who is doing most of the tweeting?

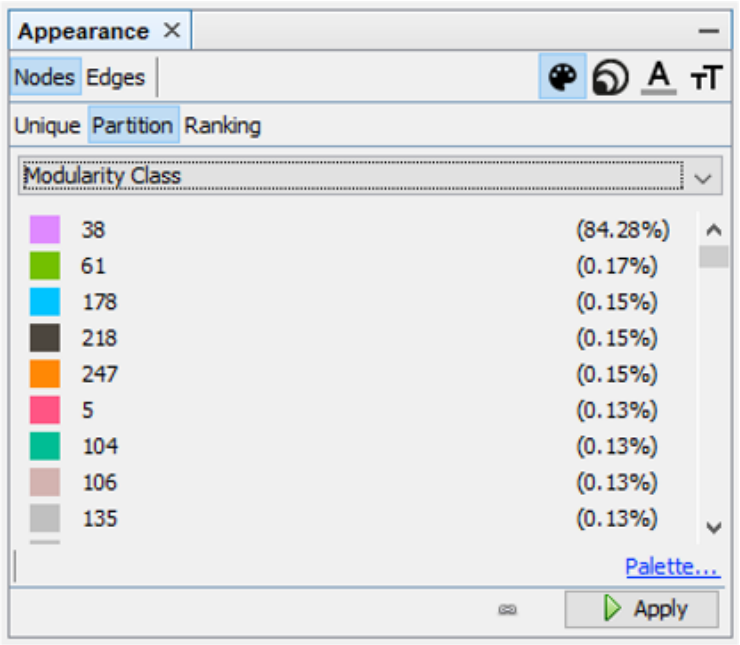


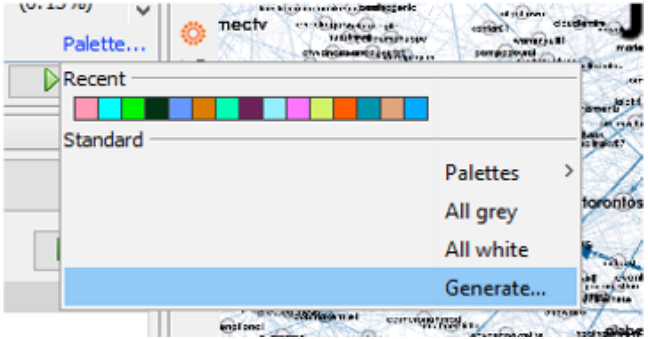
TAKE A SCREENSHOT… recall **provenance**

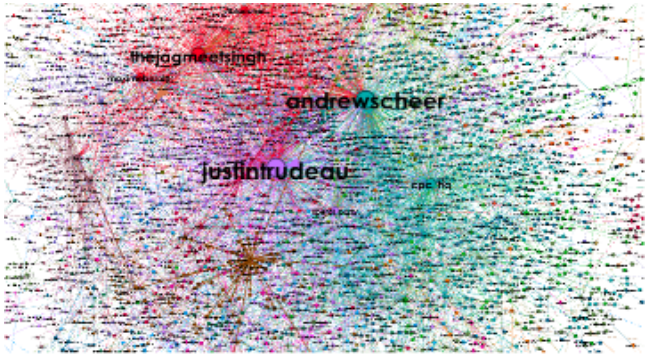
Your turn…

Start making sense of the data

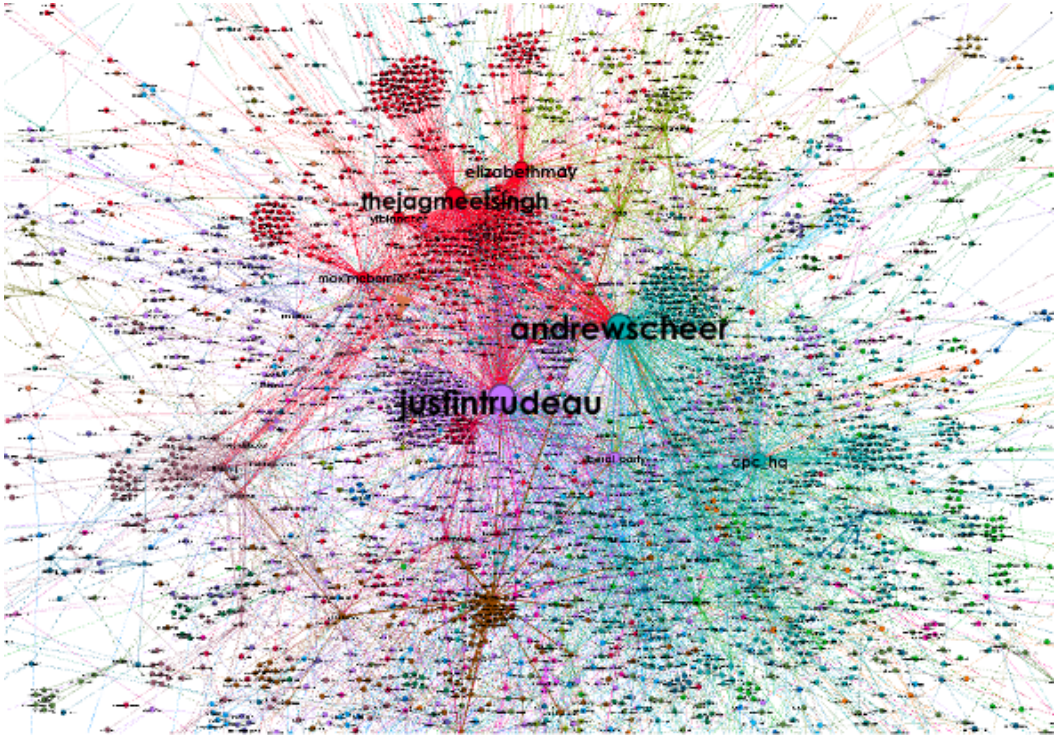
- Use attributes...
  - Calculated: In-degree, out-degree, modularity, etc.
  - Supplied: followers, retweets
- ...to modify:
  - Node & edge colour
  - Node size
  - Label size & colour







Community Detection → **Modularity Class**



Finesse: adjust layout, font, etc.

Show Off Your Viz…

Export as graphic to preserve layout (consider privacy, though!)

- PDF
- PNG
- SVG

Thanks for coming!

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