

# Spreading Phenomena

## Social Networks Analysis and Graph Algorithms

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# Sources

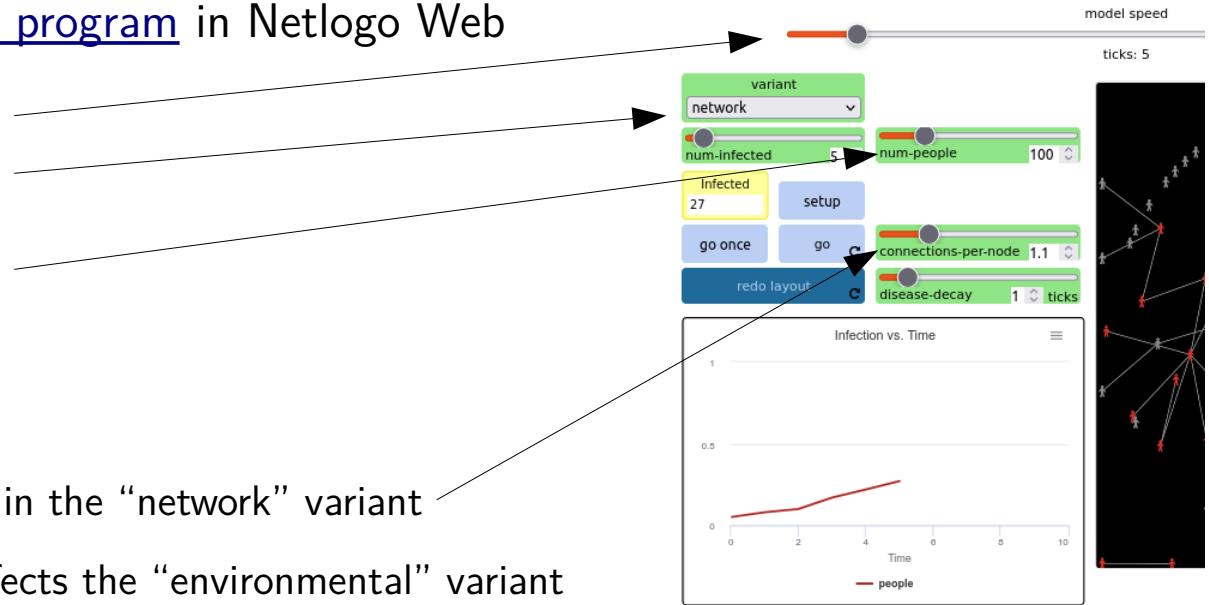
- D. Easley and J. Kleinberg (2010). Networks, Crowds, and Markets — [Chapter 19](#)
- C. Castillo, W. Chen, L. V. S. Lakshmanan (2012). Information and Influence Spread in Social Networks, [KDD Tutorial](#).
- F. Menczer, S. Fortunato, and C. A. Davis. A First Course in Network Science. Cambridge University Press, 2020 — Chapter 7.
- URLs cited in the footer of slides

# Exercise

## Spread of Disease

Go to [netlogoweb.org/launch](http://netlogoweb.org/launch) and select:  
“IABM Textbook / chapter 6 / Spread of Disease”

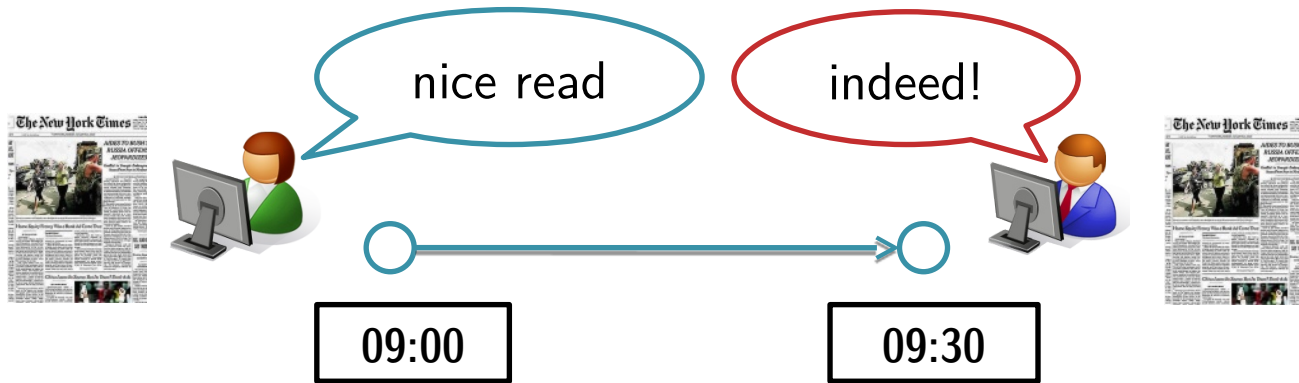
- Execute the [“Spread of Disease” program](#) in Netlogo Web
  - Slow down model speed
  - Choose one variant
  - Select num-people 100
  - Click “set-up”
  - Click “go”
  - Play with “connections-per-node” in the “network” variant
  - Note that “disease-decay” only affects the “environmental” variant
- Indicate what the three variants do (network, mobile, environmental)



Pin board: <https://upfbarcelona.padlet.org/chato/k5zn9l4itg3axw3s>



# Social influence on a network



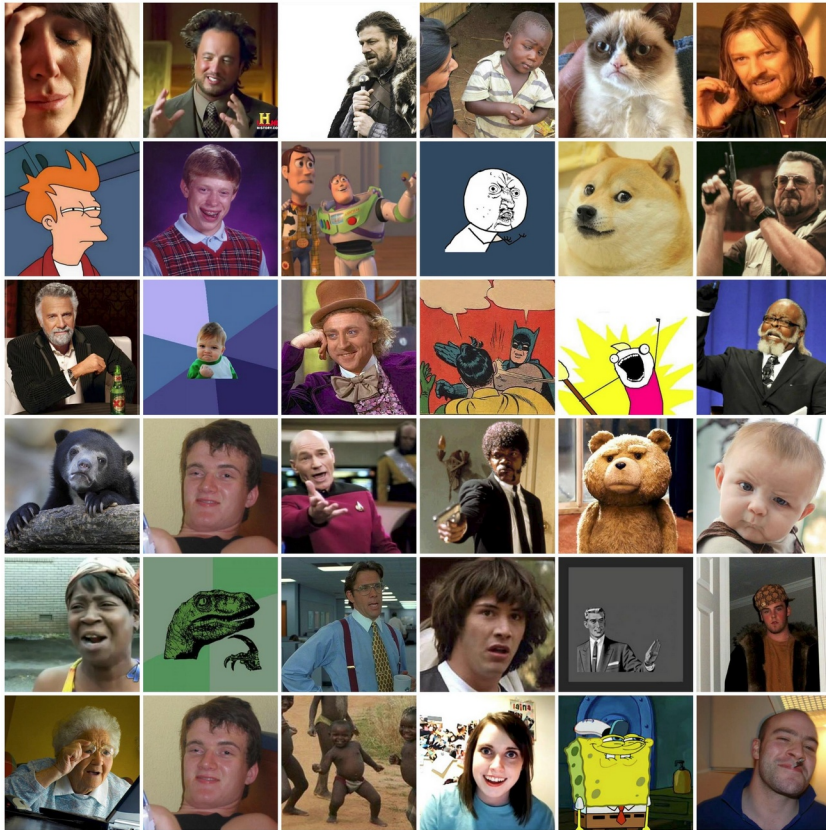
People are connected and perform actions

↓  
friends, fans,  
followers, ...

↓  
comment, link, like,  
share, stitch, duet, ...

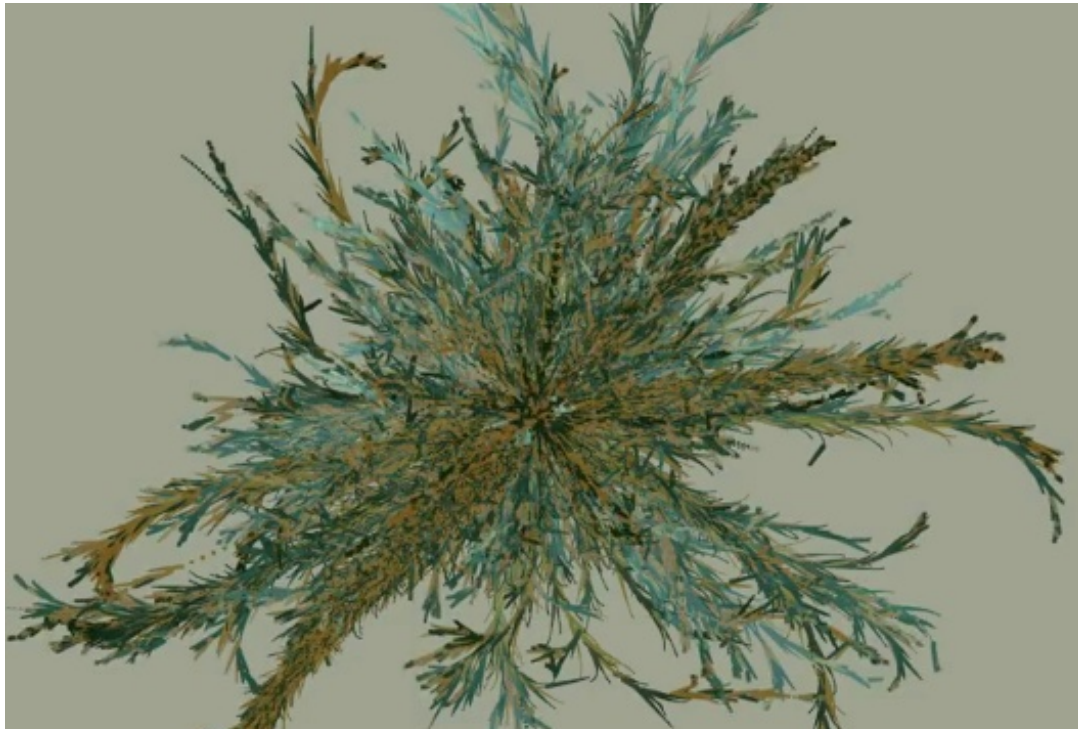
# “The Selfish Gene” by Richard Dawkins (1976)

## Chapter 11: “Memes: the new replicators”

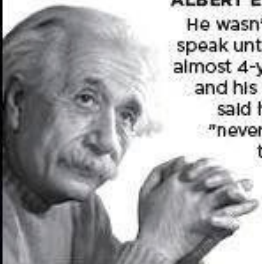
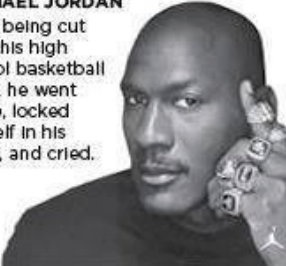

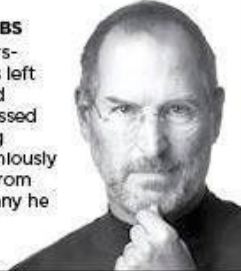




# Spread of a Meme

## ("Famous Failures")



<https://vimeo.com/50730795>

FAMOUS FAILURES	
 <p><b>ALBERT EINSTEIN</b> He wasn't able to speak until he was almost 4-years-old and his teachers said he would "never amount to much"</p>	 <p><b>MICHAEL JORDAN</b> After being cut from his high school basketball team, he went home, locked himself in his room, and cried.</p>
 <p><b>WALT DISNEY</b> Fired from a newspaper for "lacking imagination" and "having no original ideas."</p>	 <p><b>STEVE JOBS</b> At 30-years-old he was left devastated and depressed after being unceremoniously removed from the company he started.</p>
 <p><b>OPRAH WINFREY</b> Was demoted from her job as a news anchor because she "wasn't fit for television."</p>	 <p><b>THE BEATLES</b> Rejected by Decca Recording Studios, who said "We don't like their sound—they have no future in show business."</p>
<b>IF YOU'VE NEVER FAILED, YOU'VE NEVER TRIED ANYTHING NEW</b>	







## Top TikTok Songs This Week

LAST UPDATED 31/05/2023, 11:33:53

- |   |   |  |
|---|---|--|
| 1 | The King Khan & BBQ Show<br><b>Love You So</b><br>▲2 · 946.2M views · 990 popular videos                      |  |
| 2 | <br><b>money trees</b><br>▼1 · 478.8M views · 694 popular videos  |  |
| 3 | Kevin MacLeod & Kevin The Monkey<br><b>Monkeys Spinning Monkeys</b><br>▼1 · 421.8M views · 567 popular videos |  |
| 4 | Sadu<br><b>original sound - avantgarde055</b><br>— · 191M views · 314 popular videos                          |  |
| 5 | Tollan Kim<br><b>Aesthetic</b><br>▲1 · 184.4M views · 302 popular videos                                      |  |

<https://tokboard.com/>

Various forms of “trend”:  
music/audio that is re-  
used, stitches, side-by-  
side “duets”,  
actions/challenges, etc.







sydney\_copelandd • Follow  
Paid partnership with vitalproteins

sydney\_copelandd It's #matchamonday ❤️ Have you tried @vitalproteins new Matcha Collagen? It's delicious with 50mg of caffeine it's a great alternative to coffee! @tda0ey76 @comongriness you both need to try this!

#ad #vitalinfluencer #sponsored #stayvital #matchamonday #vitalproteins #healthylifestyle #delicious #collagen #caffeine #tryitout #amazing #vitalathlete

17m

brittanyanfield ok then miss influencer 🙄🙄🙄

35 likes  
17 MINUTES AGO

Add a comment... Post



gossmakeupartist • Follow

gossmakeupartist Who has tried the @sundayriley luna night oil? I try a LOT of skincare but this is one that I keep coming back to. It's a retinol in an oil form so is nourishing for the skin while doing renewal like a retinol – absolutely love this product!! Join the Waitlist – link in bio! @cultbeauty

#WayneGossXCultBeauty #ad

Load more comments

kelsey\_chronicbeauty @sundayriley Luna oil has been my holy grail night serum for 3 years now! 🥰

kal\_ho\_naa\_ho76 Also use this often. :)

callmeffiii It's so good. It removes my small wrinkles after one night's sleep

clareflintmakeupyork Just starting using this, is so lovely 🥰

6,217 likes  
APRIL 21

Log in to like or comment. ...



hilarityduff • Follow

120k likes

hilarityduff Summertime sippin' with some delicious @sparklingice. Show me how you #FlavorUp #ad bit.ly/1VkhEFC

view all 596 comments

daniel\_\_ferreira\_\_ @kealeyjo exploringwithaj 🥰🥰🥰

issabae Omg I love those 🥰💜

ehabseirafi 🥰🥰🥰

erikrichison "Hey Jesse, babe." @chambreezey

abbeyruby Lime is the best

mike\_nelly Pretty cool

natalie\_evenson333 @michellefafard @katb63

hippielovee @ratchetnasty\_

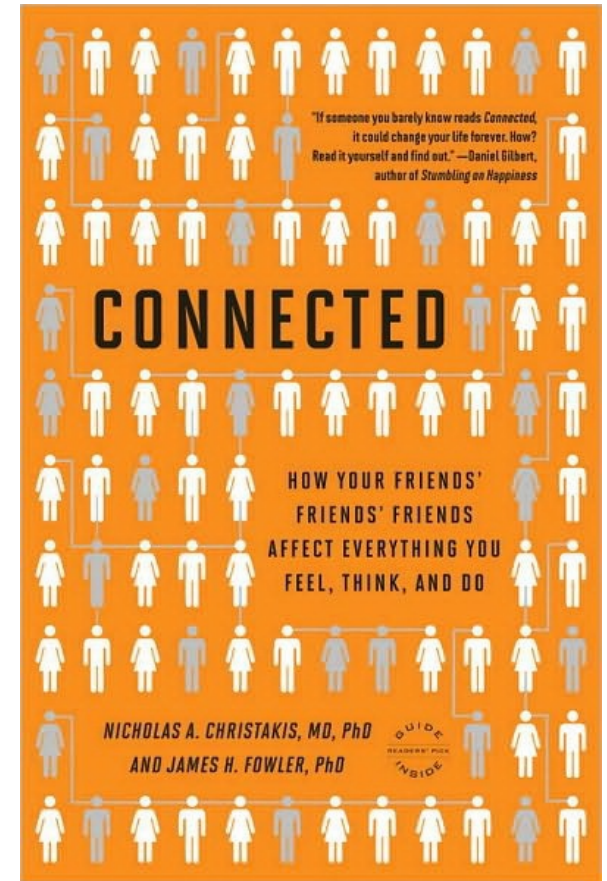
tombender191 @hilarityduff Hilary, it is my dream to be shrunk like in honey I shrunk the kids and fall into your cereal bowl!

👍 Add a comment... 🗨️

# “Influencers” and their sponsored posts

# Non-trivial examples

- **Back pain:** spread from West to East in Germany after fall of Berlin Wall
- **Suicide:** well known to spread throughout communities on occasion
- **Sexual “scripts”:** expected sequences of behaviors during intimate situations
- **Politics:** the denser your connections, the more intense your convictions



# Exercise

Find examples of spreading phenomena

What else propagates in a contagion-like manner?

Pin board: <https://upfbarcelona.padlet.org/chato/a0xnaoohsfc117nl>



# News, misinformation, and collective action



# Fake news

**Fake news** about an occult ritual to which the campaign chairman of US presidential candidate Hillary Clinton was invited.

This was posted four days before the 2016 election, which was won by her opponent, Donald Trump.

The screenshot shows the Infowars website with a dark blue header. The main article title is "SPIRIT COOKING: CLINTON CAMPAIGN CHAIRMAN PRACTICES BIZARRE OCCULT RITUAL". Below the title is a sub-headline: "Menstrual blood, semen and breast milk: Most bizarre WikiLeaks revelation yet". The author is listed as "Paul Joseph Watson | Infowars.com - NOVEMBER 4, 2016". The article features a central image of a woman in a red dress holding a horned animal head. To the left is a handwritten note on a whiteboard that reads: "WITH A SHARP KNIFE CUT DEEPLY INTO THE MIDDLE FINGER OF YOUR LEFT HAND EAT THE PAIN". To the right is a promotional banner for "50% OFF ALL SUPERBLUE PRODUCTS". Below the main image is a red banner for "The Washington Times" with navigation links for HOME, NEWS, OPINION, SPORTS, MARKET, and SUBSCRIBE. Below that is a section for "WINTER OLYMPICS 2018: LATEST NEWS FROM THE GAMES IN PYEONGCHANG". The main article text begins with "WikiLeaks: Podesta invited to 'Spirit' dinner; host's known 'recipes' demand breast milk, sperm". Below the text is a video player showing a close-up of a man with glasses speaking.

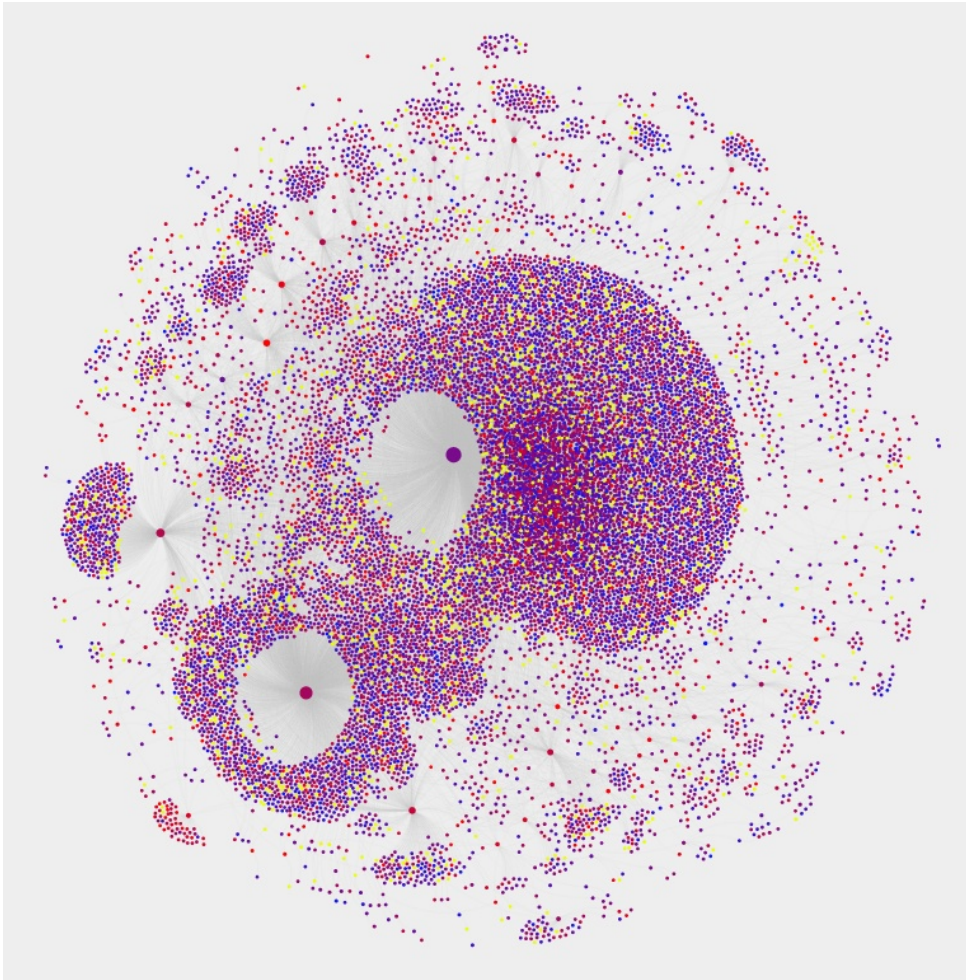
The screenshot shows a Twitter post from Sean Hannity (@seanhannity) dated 4 Nov 2016 at 11:50 AM. The tweet text is "LEAKED EMAIL appears to link Clinton Campaign Chairman to bizarre occult ritual bit.ly/2f2kyXP". It has 7,230 Retweets and 7,404 Likes. A reply from Barbara Ann Goehl (@GoehlAnn) is visible, dated 4 Nov 2016, with the text "SHE IS PURE EVIL". Below the tweet is a screenshot of a video player showing the same handwritten note from the Infowars article. The video player has a red header with "The SeanHannity SHOW" and navigation links for SHOWS, ARTICLES, and FORUMS. The video title is "LEAKED EMAIL APPEARS TO LINK CLINTON CAMPAIGN CHAIRMAN TO BIZARRE OCCULT..." and the date is "November 4, 2016". A caption below the video reads "This is by far the most bizarre email to date."

# Fake news spread

A combination of authentic (blue) and inauthentic (red) accounts, also known as bots. Yellow nodes were removed by Twitter and are probably also bots.

Interactive version:

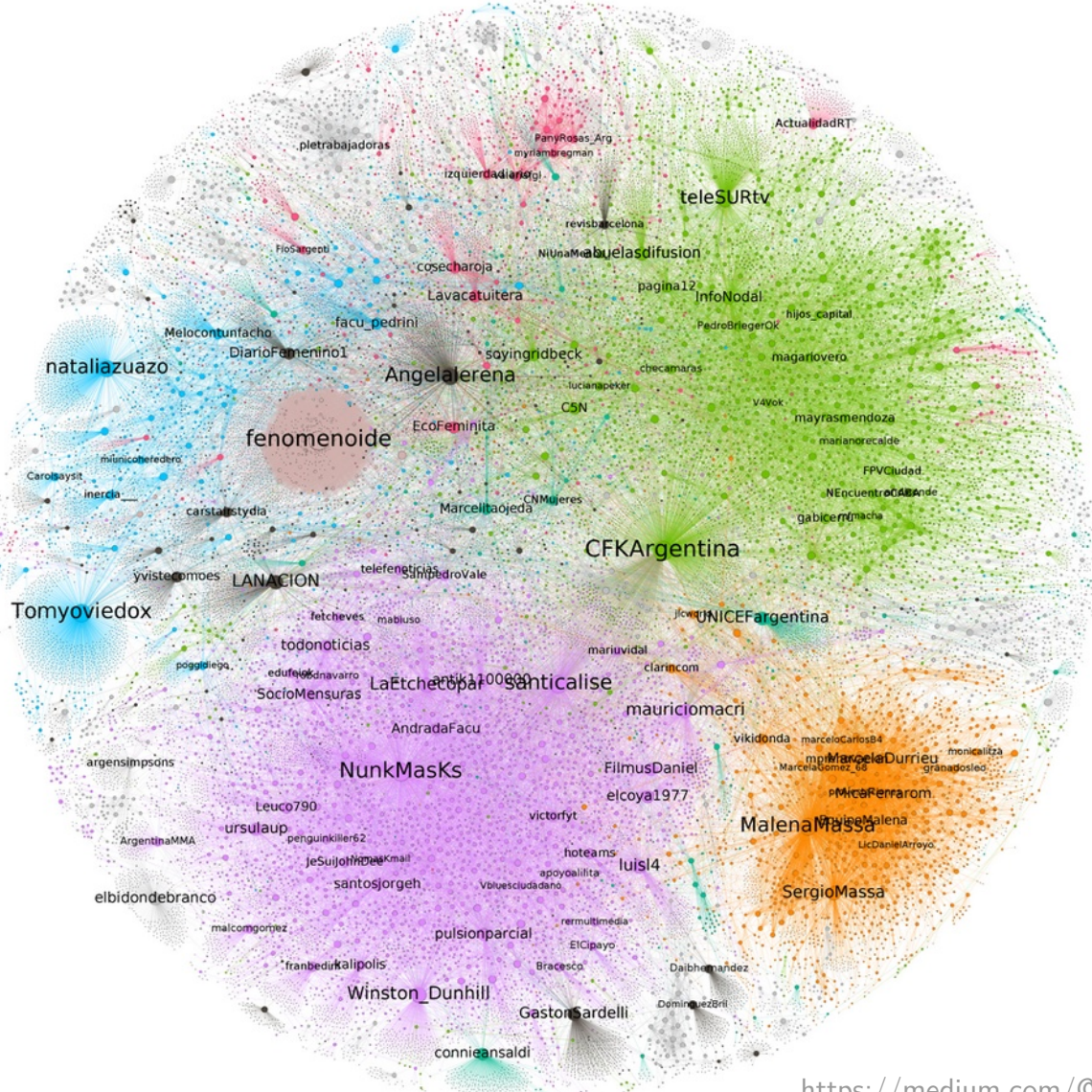
<https://iunetsci.github.io/HoaxyBots/>





# Collective action

Spread of the #NiUnaMenos hashtag: a movement against gender-based violence and femicide started in Argentina in 2015



Colors based on communities detected through modularization optimization

# Summary

# Things to remember

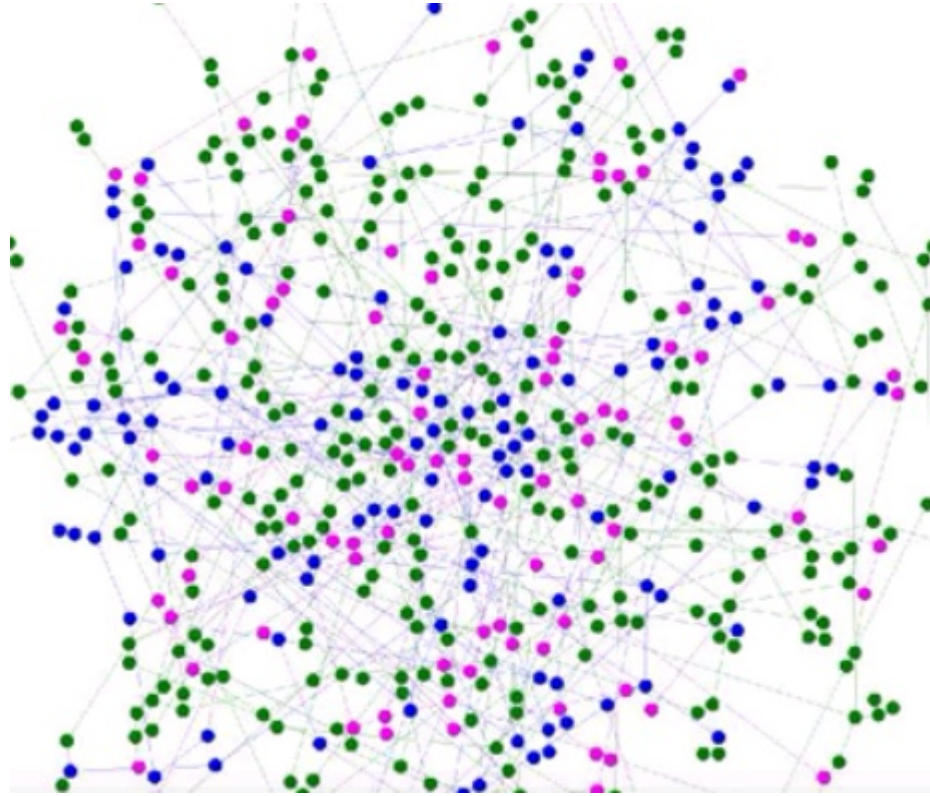
- Direct social influence is observed online when connected people perform an action in sequence
- A wide array of phenomena spread through networks, not only viruses and information

# Additional contents



**EXTRA**

# Simulated contagion in graph



<https://www.youtube.com/watch?v=WWTmRIDsydA>