



UNIVERSITÀ
DEGLI STUDI
DI PADOVA

Social Network Analysis

A.Y. 26/27

Communication Strategies

Course overview

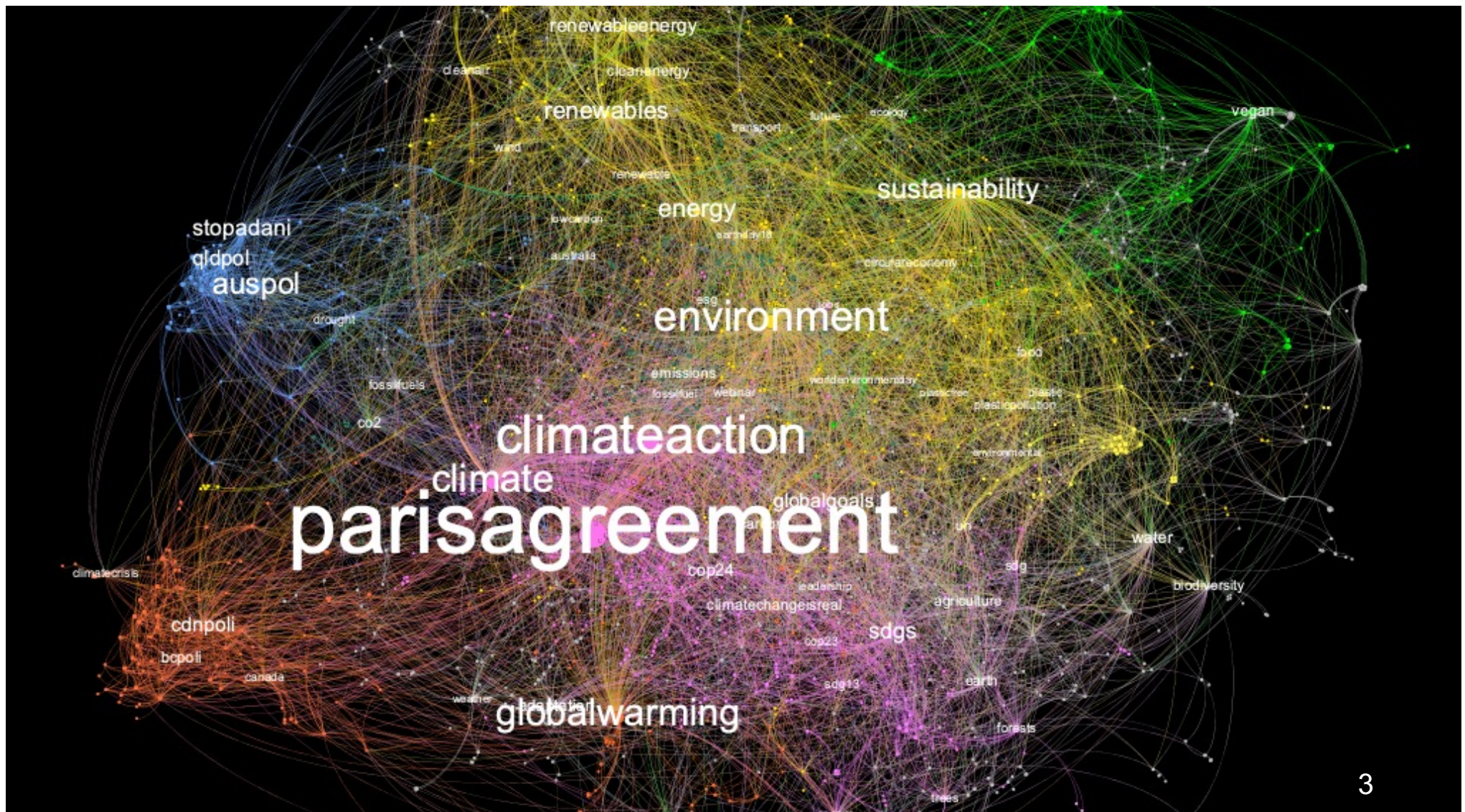
SNA 26/27



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Social network analysys

2018 hashtag network - #climatechange tweets before Greta Thunberg
(by Matteo Migliorini)





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Lecturers



Caterina Suitner

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office hours: see [my page](#)

<https://didattica.unipd.it/off/docente/55C3F2D5E9400D02D6F95ED6B1978BAC>



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room 217, via Gradenigo 6/b
office hours: contact me by email



Tomaso Erseghe



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In this course you'll also meet





☐ Useful Knowledge



Statistics / Statistical analysis

Socio psychological processes of communication

Techniques for social inquiry

☐ Further useful competencies

Networking processes in sociology,
semantics, etc ...

Coding





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What about you?



Why did you pick the course?



Which is your background?



Do you know about
coding? And statistics?



What do you expect
from this course?



Do you have a laptop?



Are you interested in an
interdisciplinary work?



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Lectures

- ☐ Thu 8:30-10:00
- ☐ Fri 8:30-10:00

Room 11
Complesso Beato Pellegrino
Via Beato Pellegrino, 32
Padova





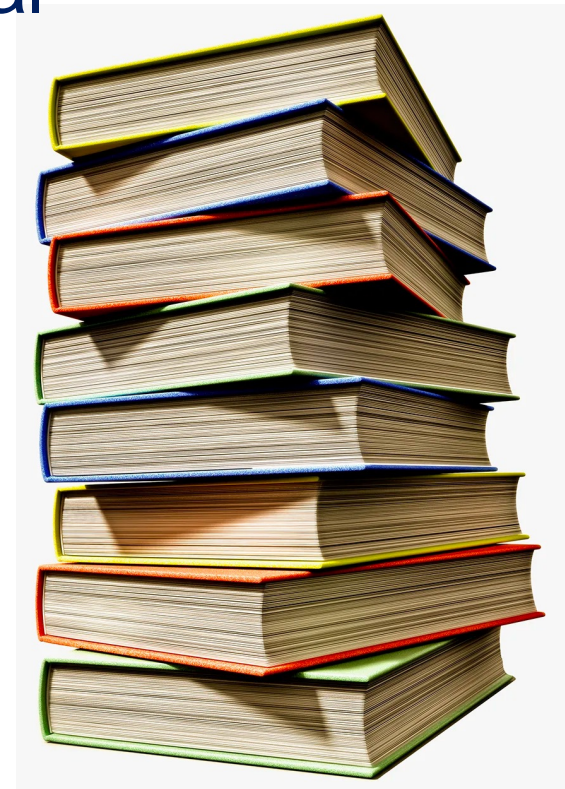
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Textbooks?

No textbook! 😊

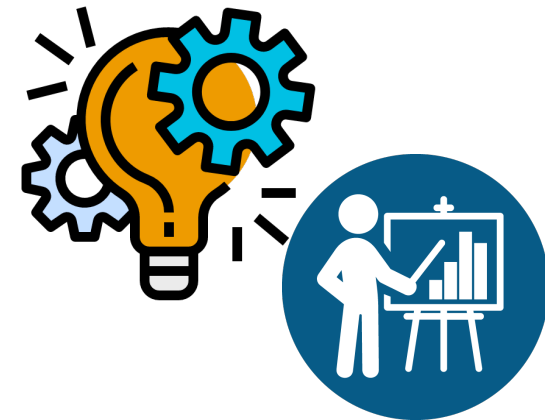
Slides/videos & additional material
available

@ ssu.elearning.unipd.it





- ❑ Written test
for verifying the students'
understanding of the course
- ❑ Group Project
Short essay
10 min presentation (slides)
5 min for questions
- ❑ Final grade: 40% test, 60% project
+2 **bonus** if completed by 1st session/IP day





Written exam:

☐ *tbd*

Oral session for interdisciplinary projects:

☐ IP day Feb 12, 2027 (Fri) - 9:00, *tbc*

PS: You will be asked to enrol in

www.uniweb.unipd.it

Contents

a brief overview



What is social network analysis?

Social network analysis

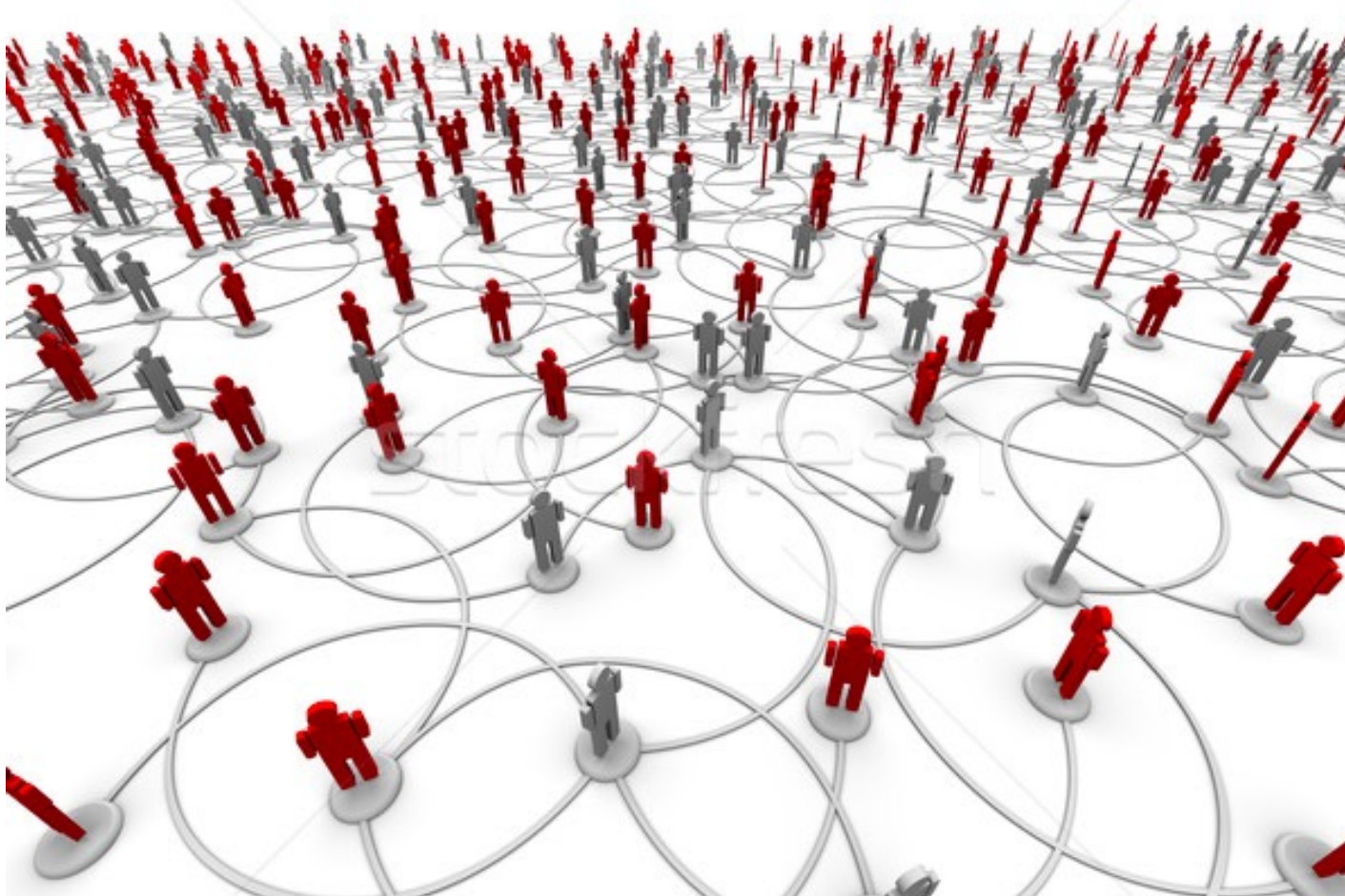
From Wikipedia, the free encyclopedia



Social network analysis (SNA) is the process of investigating social structures through the use of [networks](#) and [graph theory](#).^[1] It characterizes networked structures in terms of *nodes* (individual actors, people, or things within the network) and the *ties*, *edges*, or *links* (relationships or interactions) that connect them. Examples of [social structures](#) commonly visualized through social network analysis include [social media networks](#),^{[2][3]} [memes](#) spread,^[4] information circulation,^[5] [friendship and acquaintance networks](#), business networks, knowledge networks,^{[6][7]} difficult working relationships,^[8] social networks, [collaboration graphs](#), [kinship](#), [disease transmission](#), and [sexual relationships](#).^{[9][10]} These networks are often visualized through [sociograms](#) in which [nodes are represented as points and ties are represented as lines](#). These visualizations provide a means of qualitatively assessing networks by varying the visual representation of their nodes and edges to reflect attributes of interest.^[11]



What is a network?



Network = anything that interconnects
e.g., people sharing friendship in a social network platform



Social network analysis

From Wikipedia, the free encyclopedia



Social network analysis has emerged as a key technique in modern sociology. It has also gained a significant following in anthropology, biology,^[12] demography, communication studies^{[3][13]} economics, geography, history, information science, organizational studies,^{[6][8]} political science, public health,^{[14][7]} social psychology, development studies, sociolinguistics, and computer science^[15] and is now commonly available as a consumer tool (see the list of SNA software).^{[16][17][18][19]}



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Network of People - Politicians

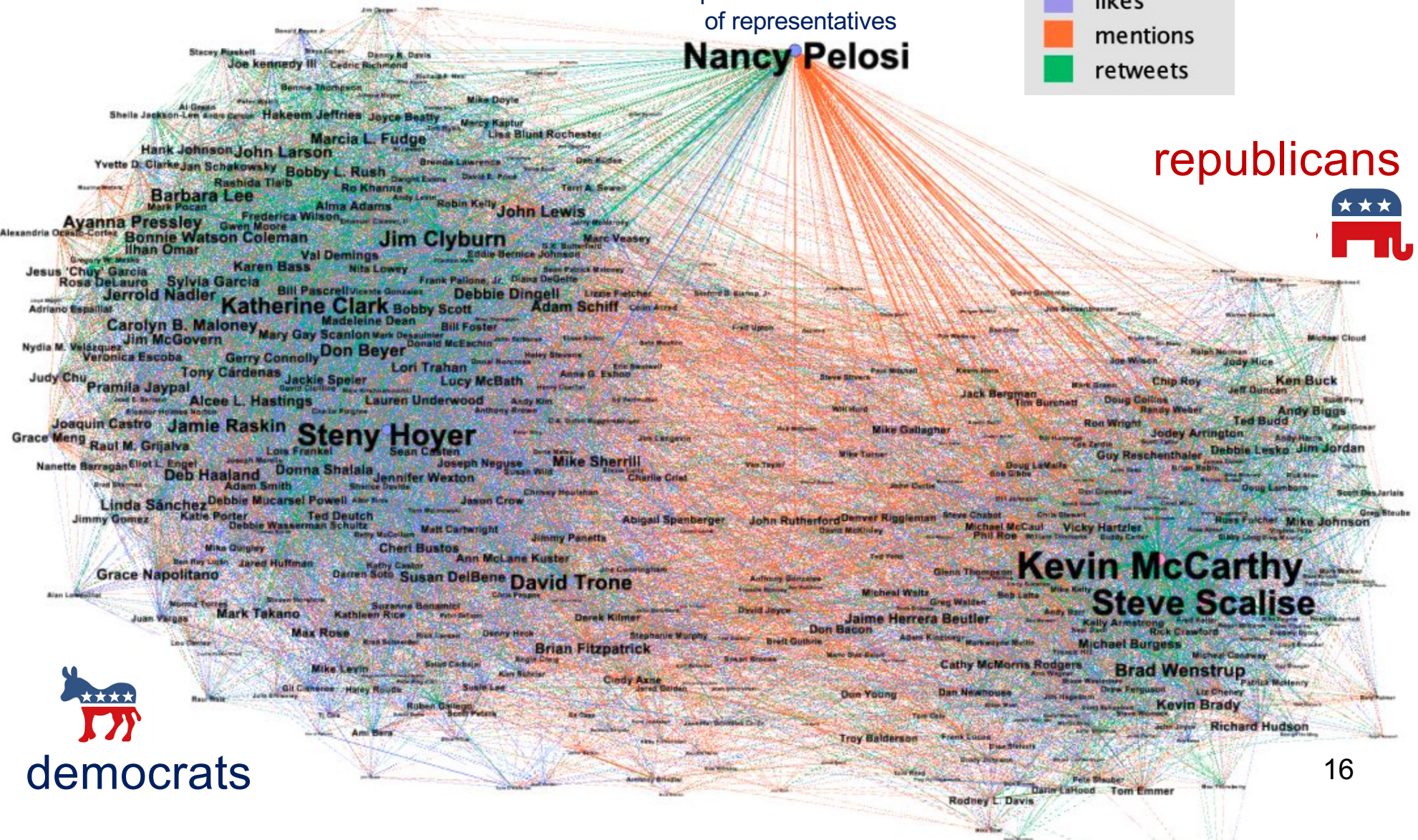
US republicans and democrats interactions on Twitter (2020)

speaker of US house
of representatives

Nancy Pelosi

- likes
- mentions
- retweets

republicans




democrats

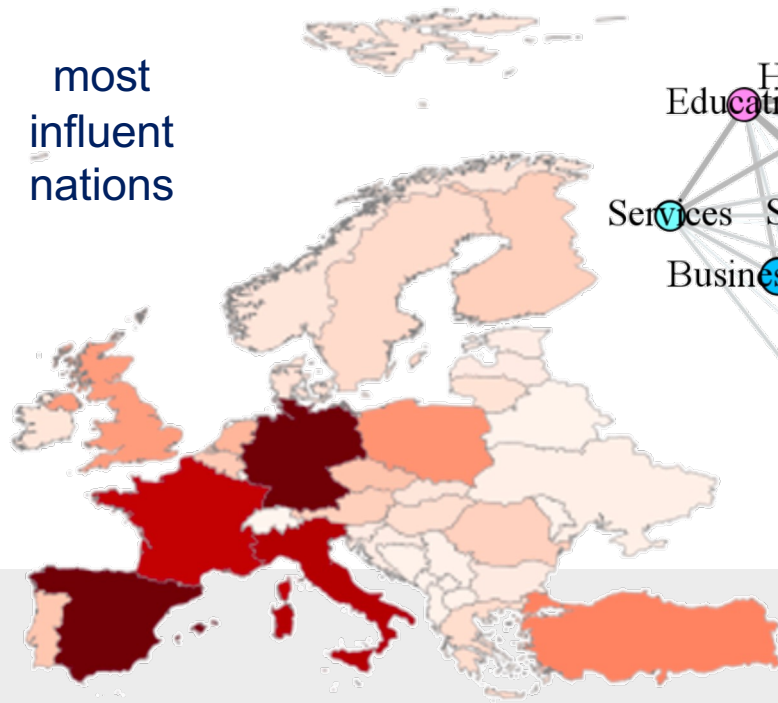


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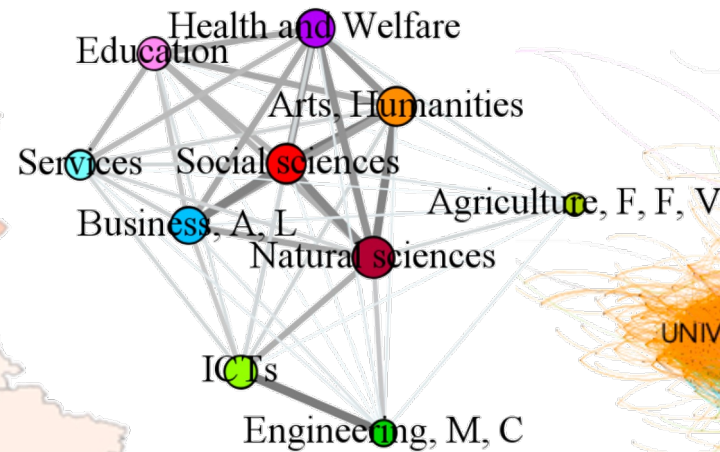
Network of People - Universities

Erasmus exchanges network 2019

most
influent
nations



fields of study



most influential
communities
and their top
universities

Which are the more connected
Italian institutions?

01



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA



**POLITECNICO
DI MILANO**



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SAPIENZA
UNIVERSITÀ DI ROMA



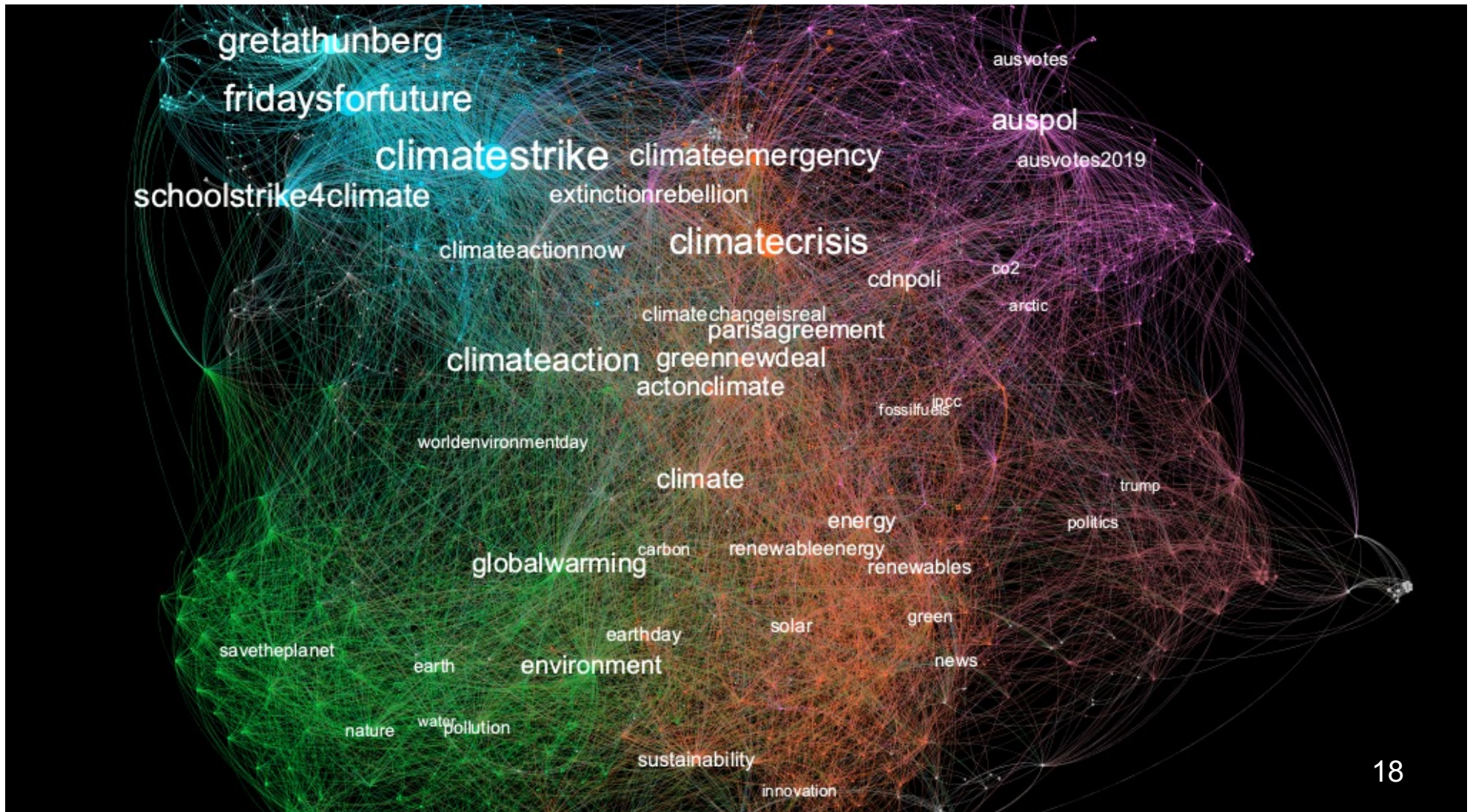
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Semantic Network

2019 hashtag network related to #climatechange
from Twitter, after #gretathunberg

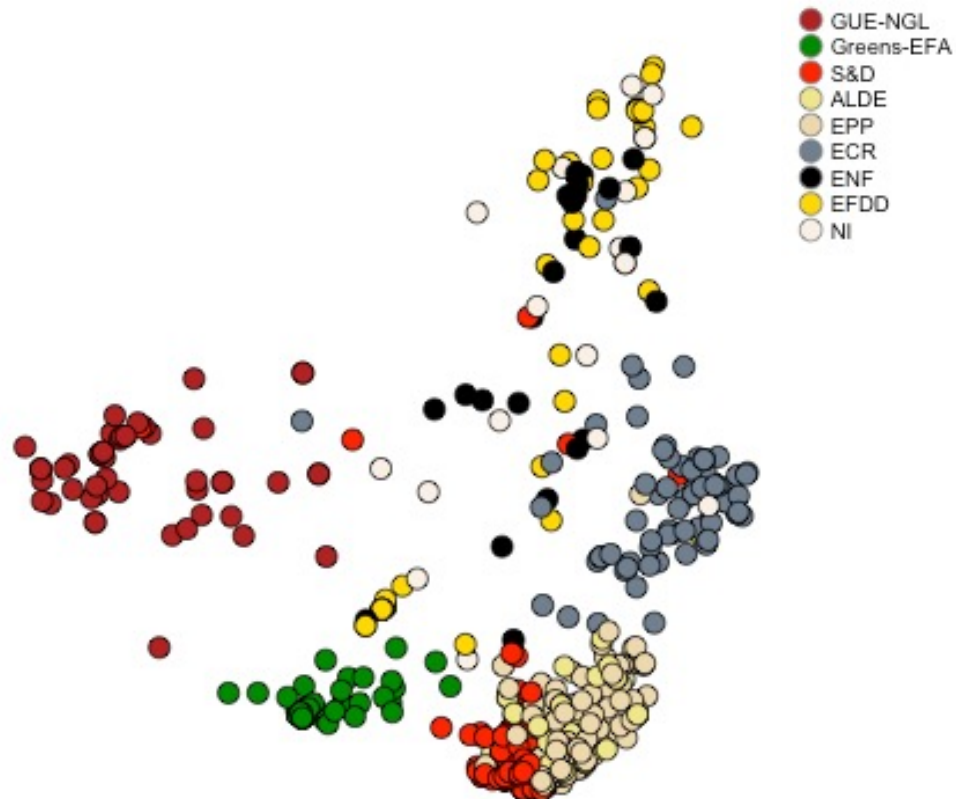




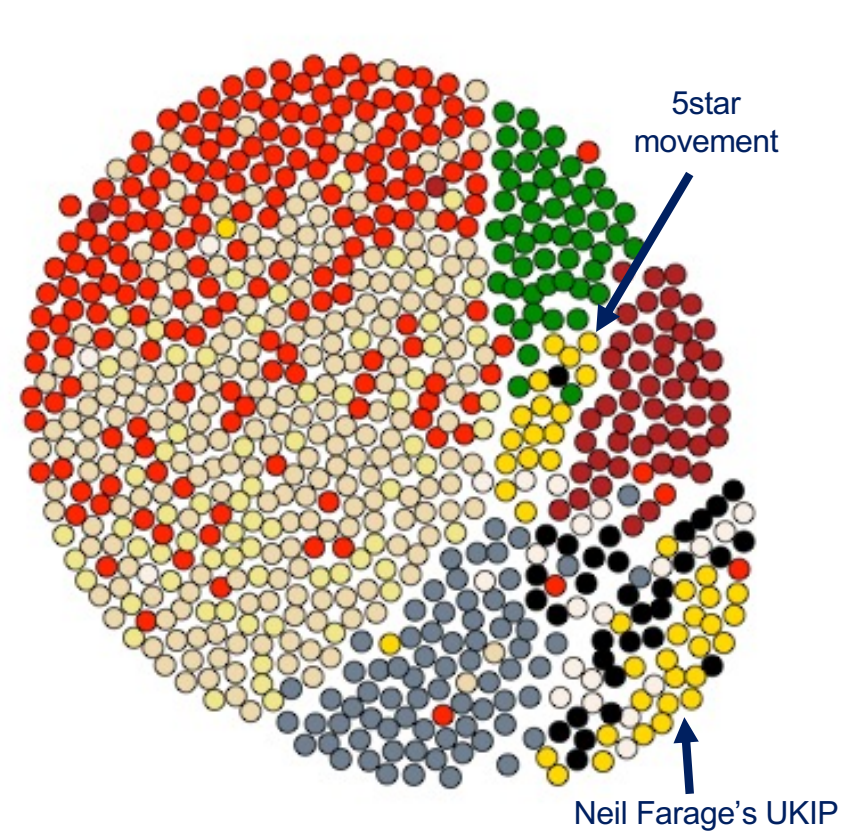
Correlation Network

April-May 2016 political network (votes at the EU parliament)

spectral clustering layout

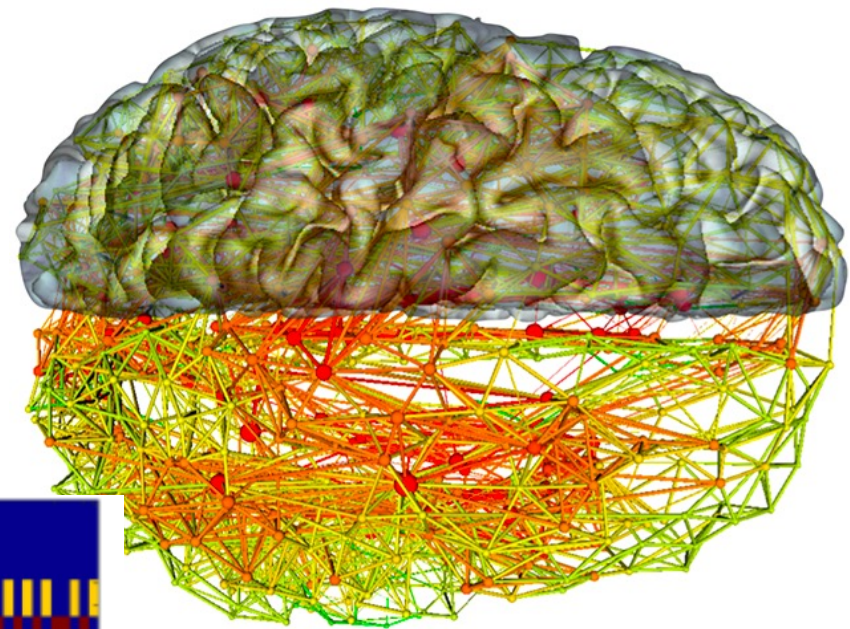
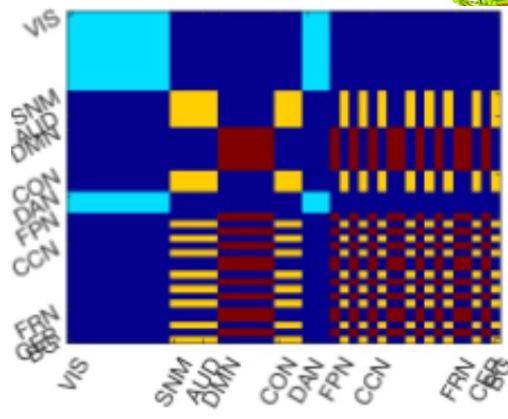
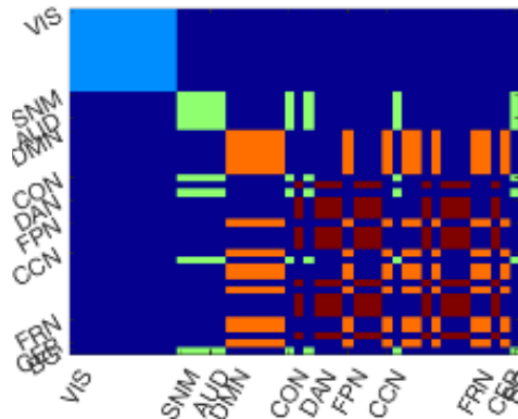
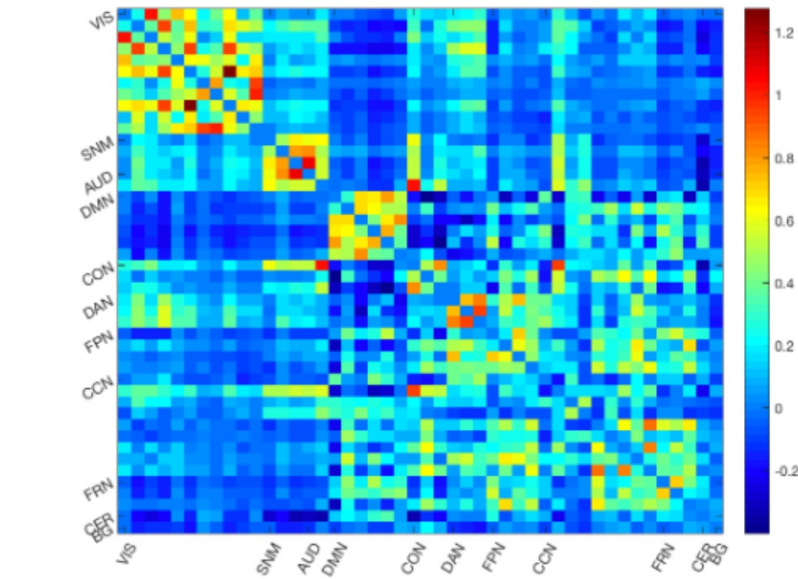


SimRank force directed layout



Correlation Network (cont'd)

the brain network – functional connectivity





And how do we study networks?

With a **holistic** character

(the whole is greater than the sum of its parts)

With **mathematical** rigour

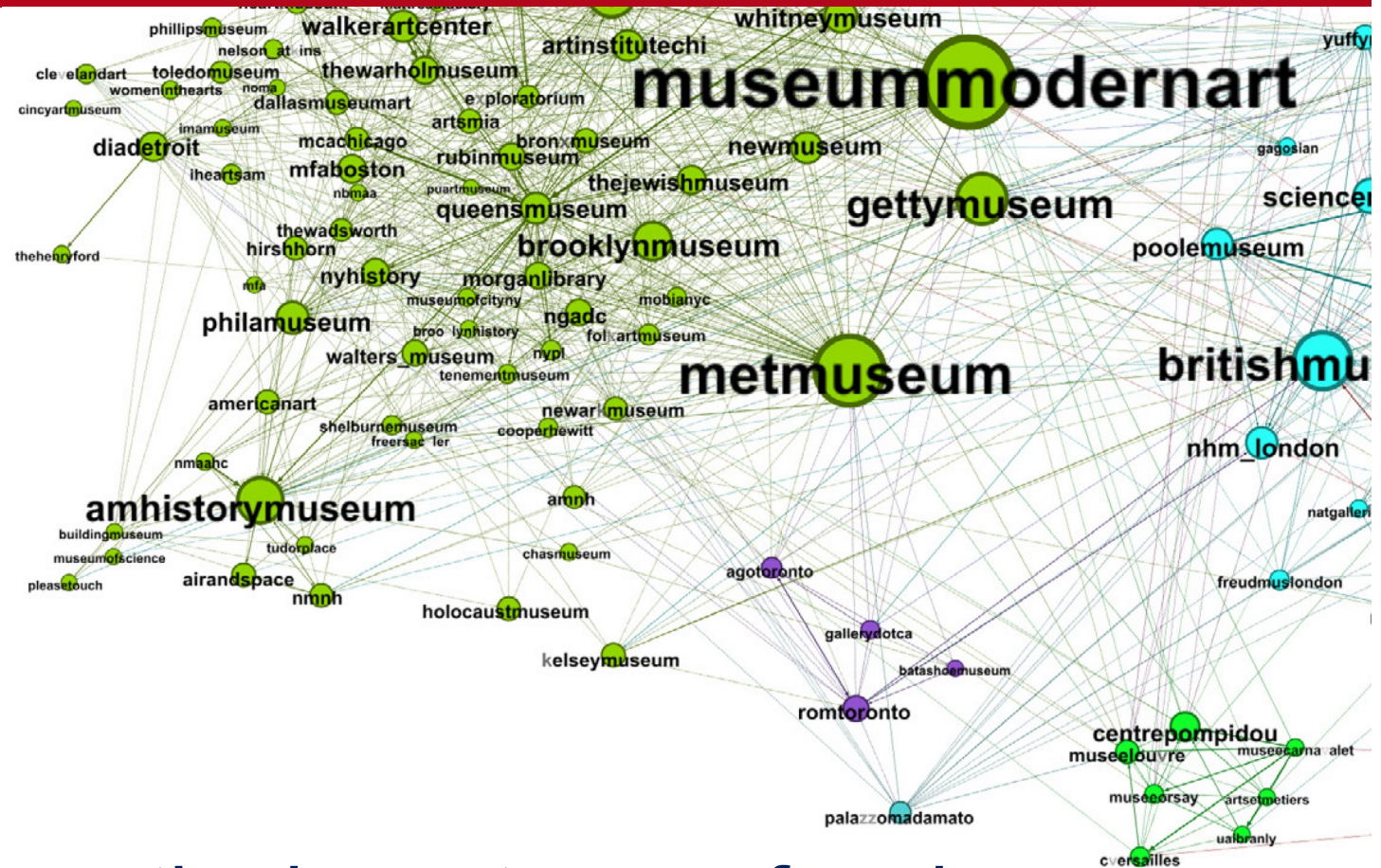
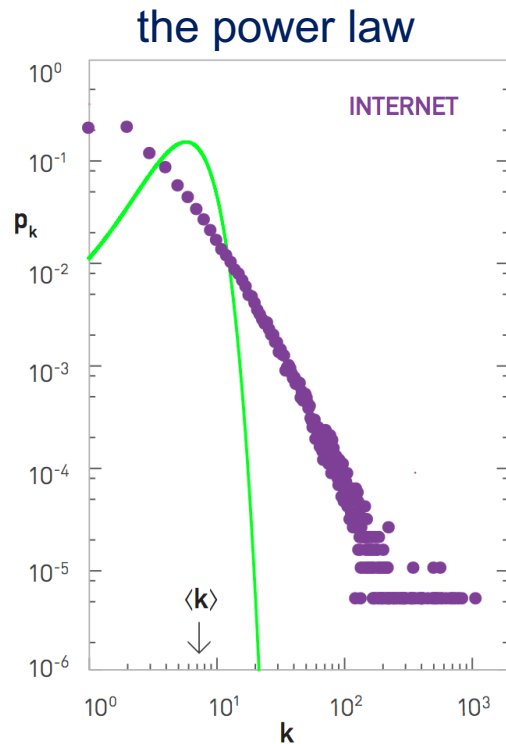
The approach is

empirical (driven by concrete data),
precise (requires a proper formalism),
interdisciplinary (can be applied to several fields), and
challenging (in data size and in objectives)

...and fun 😊



And what do we study?



how to measure the importance of nodes

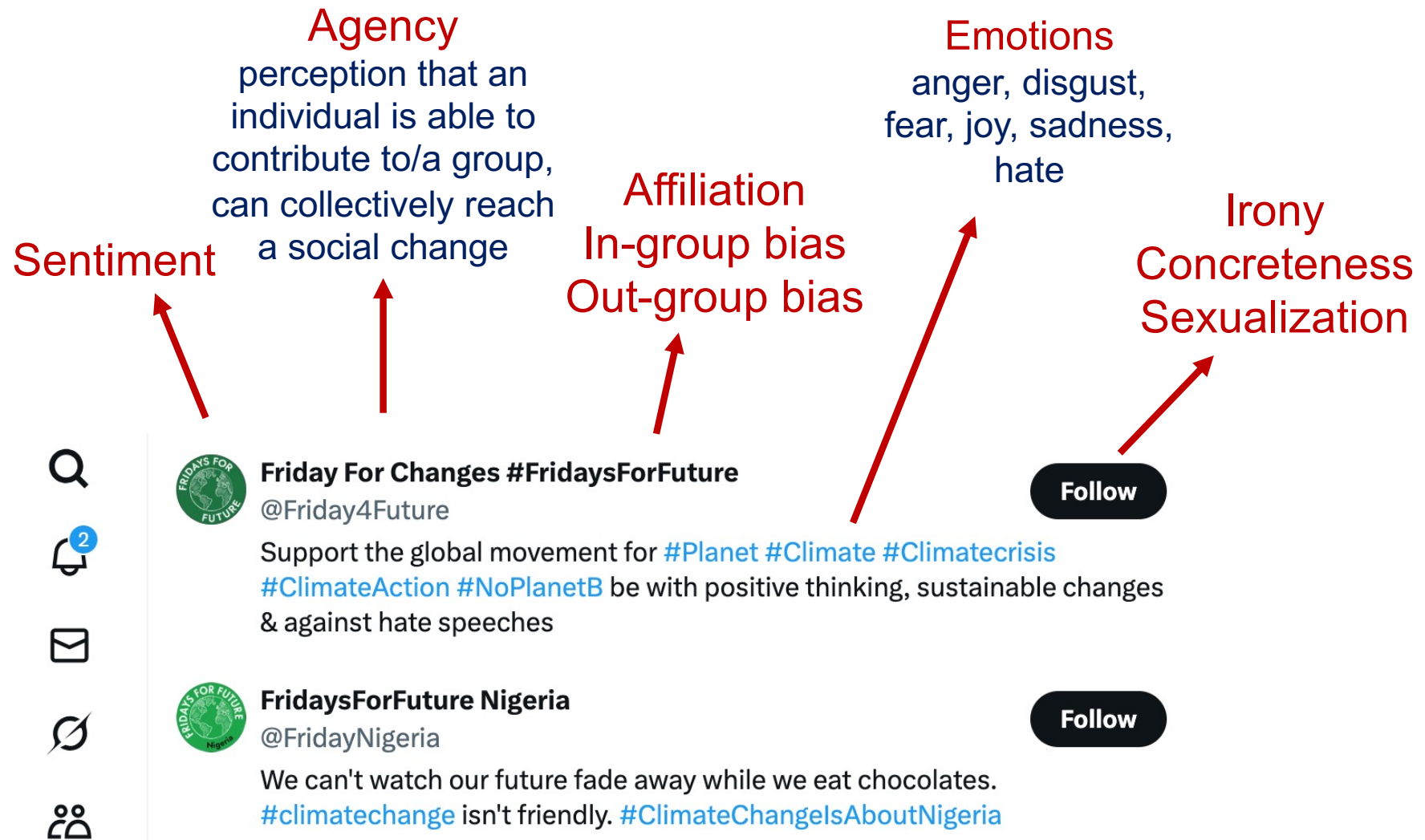
- degree, PageRank, betweenness, etc. and how this relates to the socio-psychological context





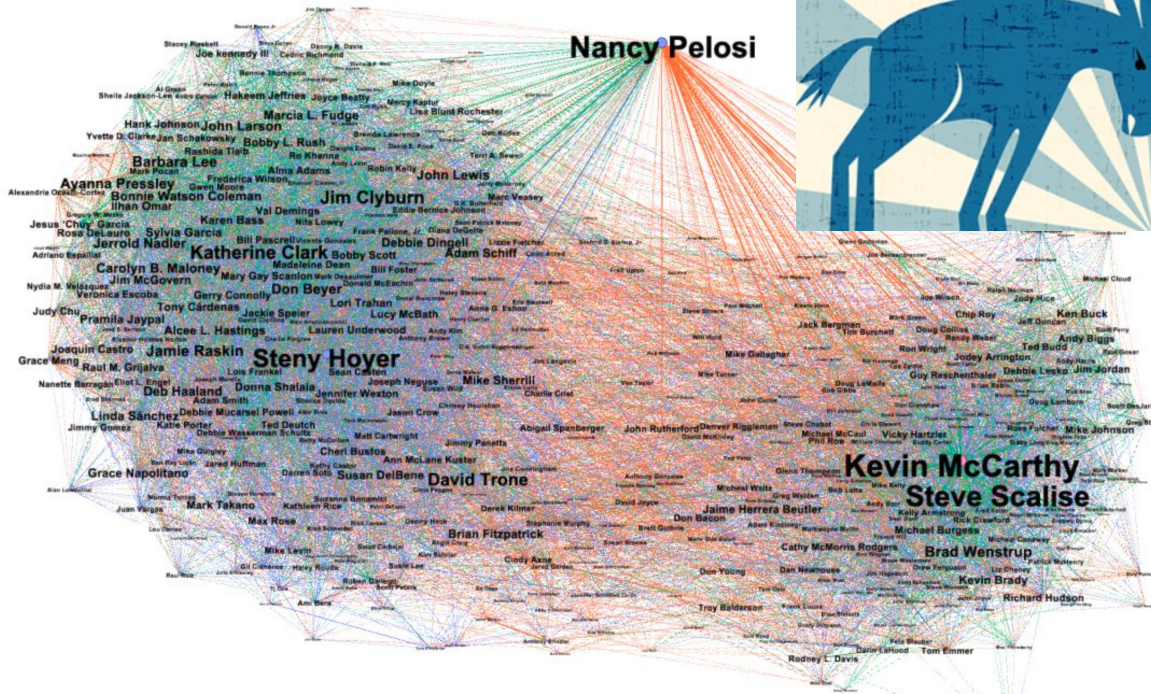
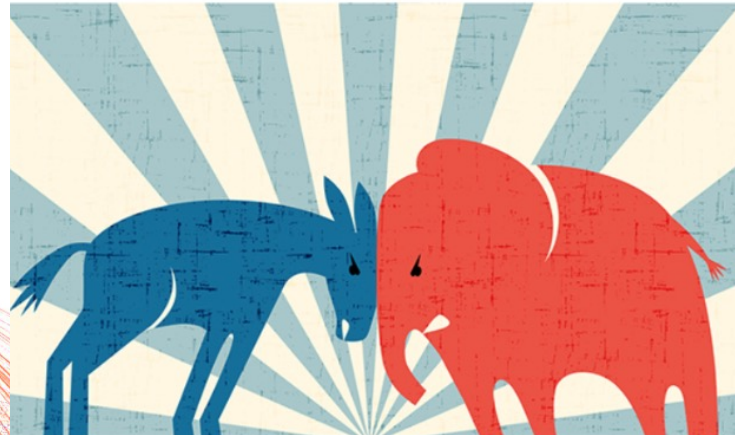
And what do we study? (cont'd)

Socio-psychological semantic markers

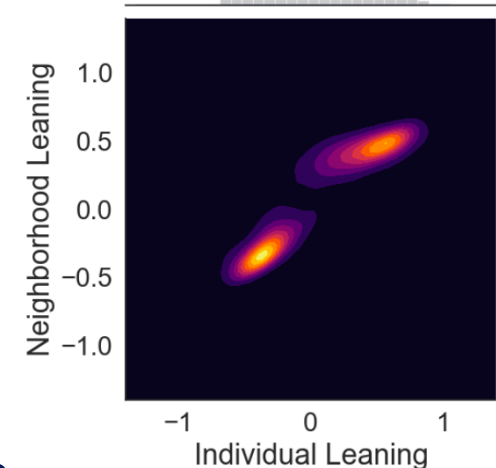


And what do we study? (cont'd)

Polarization



pro-life vs pro-choice
in Twitter



□ i.e., the extreme **segregation** of users into homogeneous communities based on their opinion on a controversial topic



Social media analytics

From Wikipedia, the free encyclopedia

This article is about the quantitative analysis of social media. For theoretical foundations, see [social network analysis](#).



Social media analytics is the process of gathering and analyzing data from [social networks](#) such as [Facebook](#), [Instagram](#), [LinkedIn](#) and [Twitter](#). It is commonly used by marketers to track online conversations about products and companies. One author defined it as "the art and science of extracting valuable hidden insights from vast amounts of semi-structured and unstructured social media data to enable informed and insightful decision making."^[1]

Interdisciplinary projects

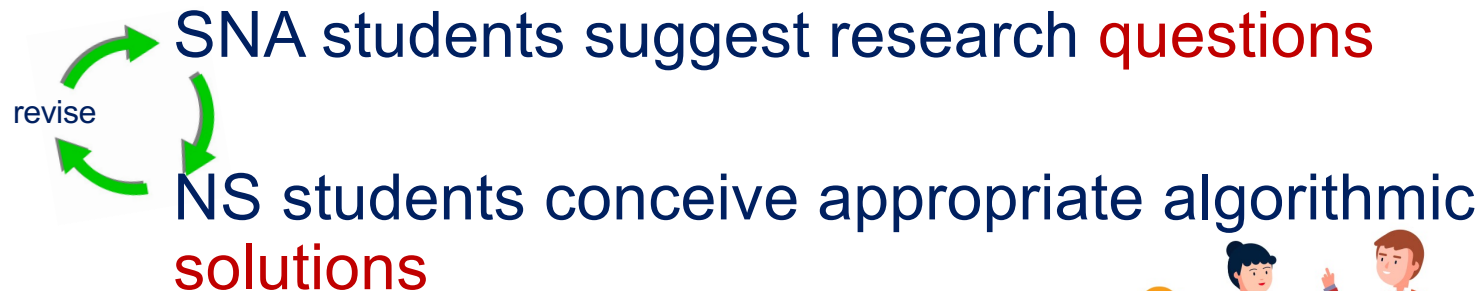
a brief overview



What about interdisciplinary projects?

mainly related to semantic networks

in collaboration with the twin course of
Network Science @ Data science + ICT for Internet
and Multimedia Engineering



in brainstorming sessions
the instructor will help/give feedback 😊





What is network science?

Network science

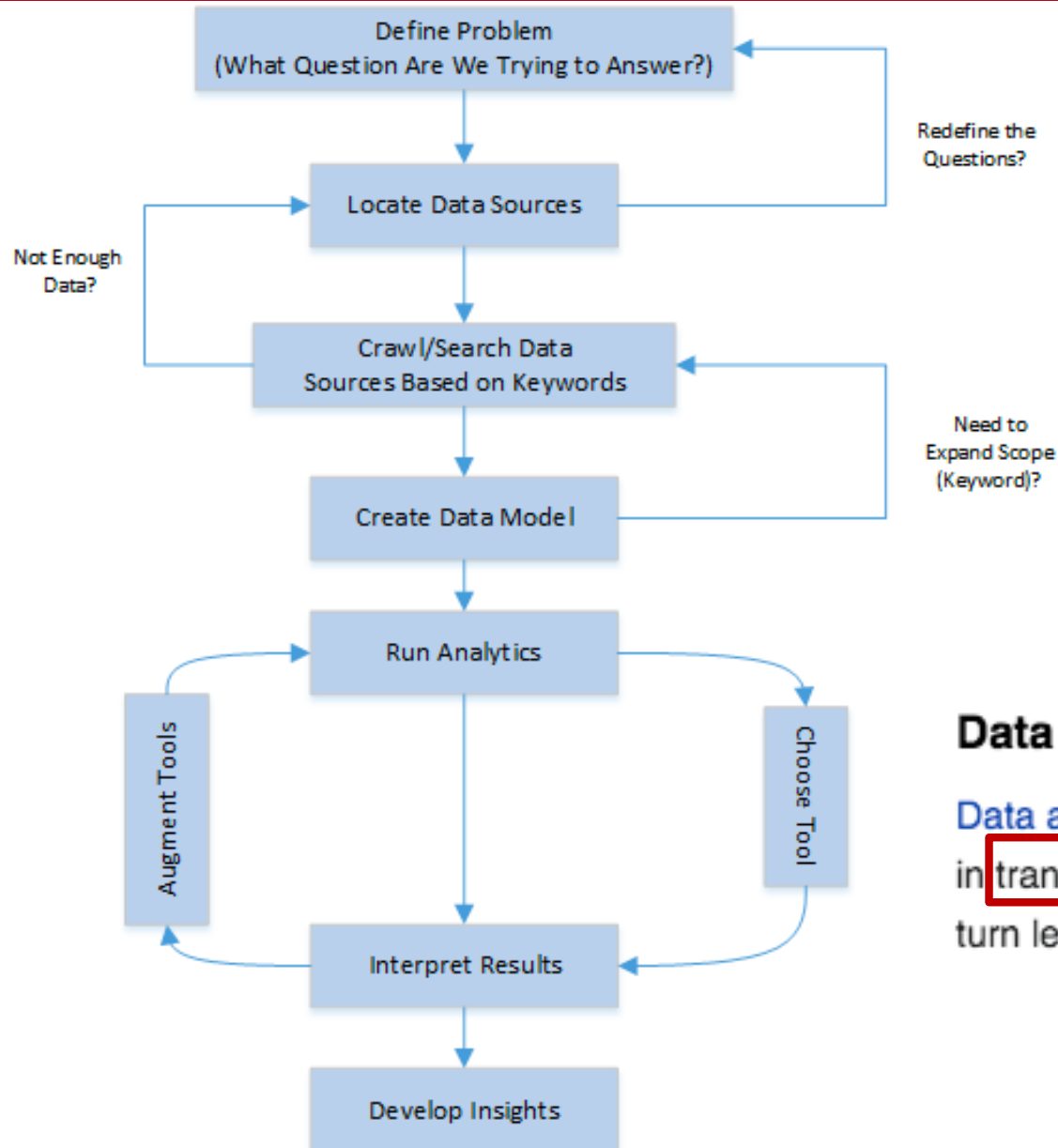
From Wikipedia, the free encyclopedia

For other uses, see [Network \(disambiguation\)](#).

Network science is an academic field which studies [complex networks](#) such as [telecommunication networks](#), [computer networks](#), [biological networks](#), cognitive and [semantic networks](#), and [social networks](#) considering distinct elements or actors represented by *nodes* (or *vertices*) and the connections between the elements or actors as *links* (or *edges*). The field draws on theories and methods including [graph theory](#) from mathematics, [statistical mechanics](#) from physics, [data mining](#) and [information visualization](#) from computer science, [inferential modeling](#) from statistics, and [social structure](#) from sociology. The [United States National Research Council](#) defines network science as "the study of network representations of physical, biological, and social phenomena leading to predictive models of these phenomena."^[1]



What is data analysis?



Data analysis [\[edit \]](#)

Data analysis is the set of activities that assist in **transforming raw data into insight** which in turn leads to a new base of knowledge and



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Interdisciplinary projects 23/24

MIME
Master's degree ICT Internet Multimedia Engineering

DI DIPARTIMENTO
DI INGEGNERIA
DELL'INFORMAZIONE

DSL DIPARTIMENTO DI STUDI
LINGUISTICI E LETTERARI

Dipartimento di
Psicologia dello Sviluppo
e della Socializzazione

INTERDISCIPLINARY PROJECTS PRESENTATION

Network Science &
Social Networks Analysis

AULA MAGNA LEPSCHY

DEI - VIA GRADENIGO 6 - PADOVA

Fri Feb, 12, 2027, 9:00





IP examples from past years

on Twitter

- ❑ 2019 – Evolution of Climate Change Perception on Twitter - Focusing on **Greta Thunberg** Impact
- ❑ 2019 – UN Women Twitter profile's reaction to the **MeToo** movement
- ❑ 2020 – NBA and Premier League players around **#blacklivesmatter** and the racial issue on Twitter
- ❑ 2020 – **Republicans vs Democrats** on Twitter
- ❑ 2020 – Haters gonna (make you) hate - Semantic analysis of **hate** during 2019 European elections
- ❑ 2021 – Sports brands and **eco-sustainability**
- ❑ 2022 – **Sexism** in Politics
- ❑ 2022 – What is the perception around the world in terms of **Menstruation Stigma** in 2021?
- ❑ 2022 – **Cancel culture** on social media - Social network analysis on famous cases of cancellation

on TikTok

- ❑ 2022 – PoliTok: How do **Italian politicians use TikTok** as tool to promote their political ideas and influence the young generation during the 2022 elections?

other

- ❑ 2019 – **Noodles and Spaghetti** - How people make pasta in eastern countries
- ❑ 2021 – **Erasmus+** Programme: a social network analysis study of the 2014-2019 exchanges
- ❑ 2021 – Nationality vs. **movie prestige**: from the Oscars to International Film Festivals



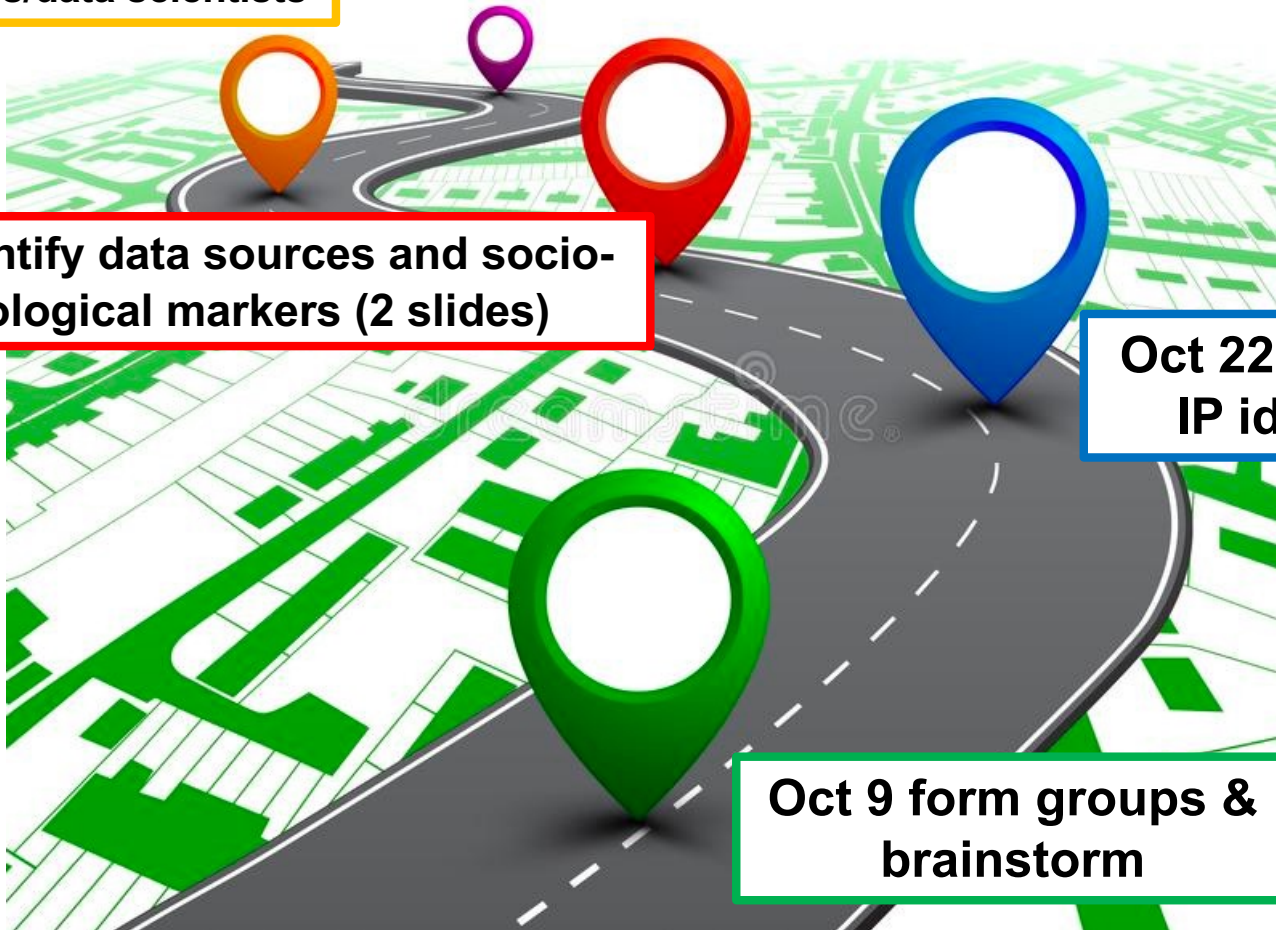
**Nov 13 present IPs to
engineers/data scientists**

**Feb 12 2027 IP final
presentation day**

**Nov 5 identify data sources and socio-
psychological markers (2 slides)**

**Oct 22 present rough
IP idea (2 slides)**

**Oct 9 form groups &
brainstorm**



Questions?