

Lecture 11

Network Visualization

- Brief Overview of Key Approached

Visualizing Network Structures of Controversial Topics in Wikipedia

NYTimes Network Visualization

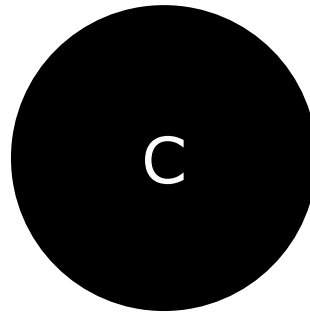
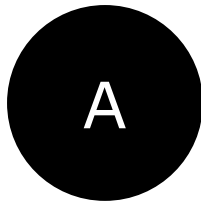
Network Data

Entities



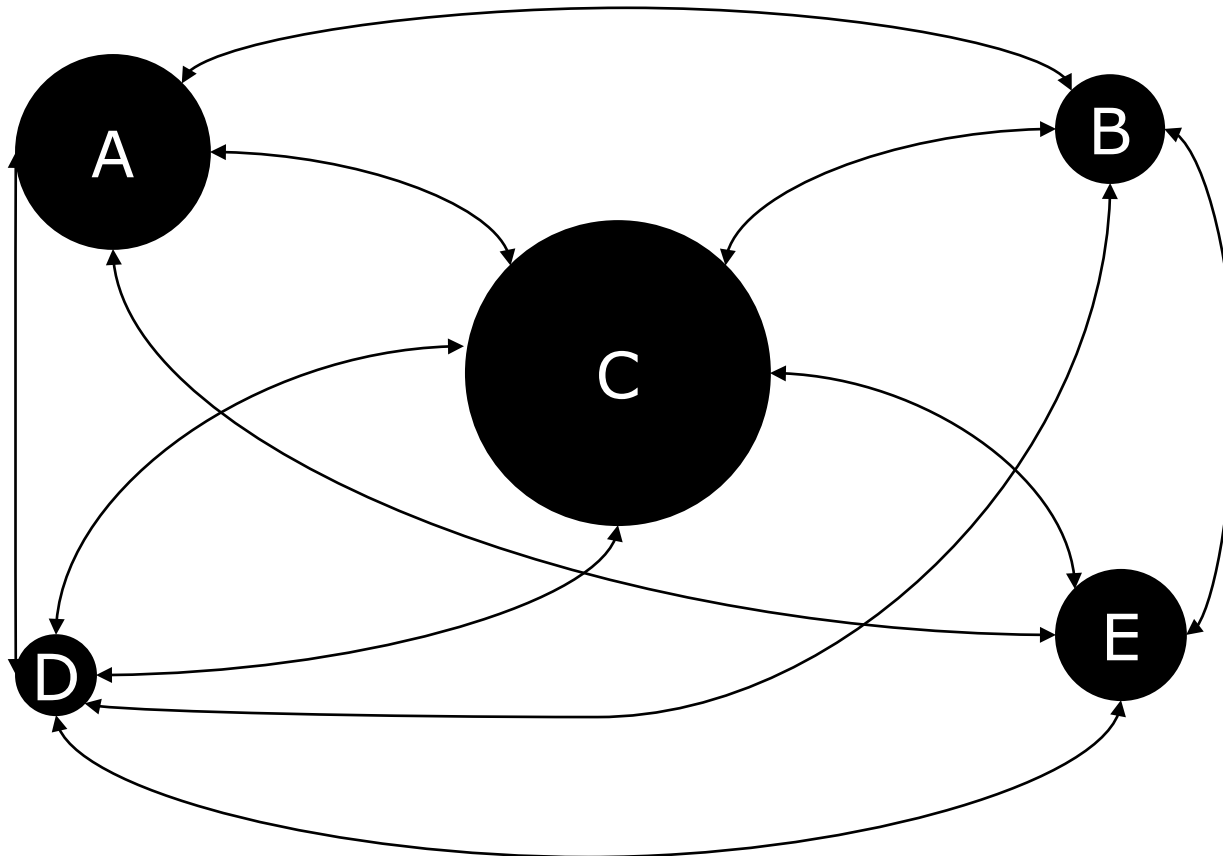
Network Data

Entities



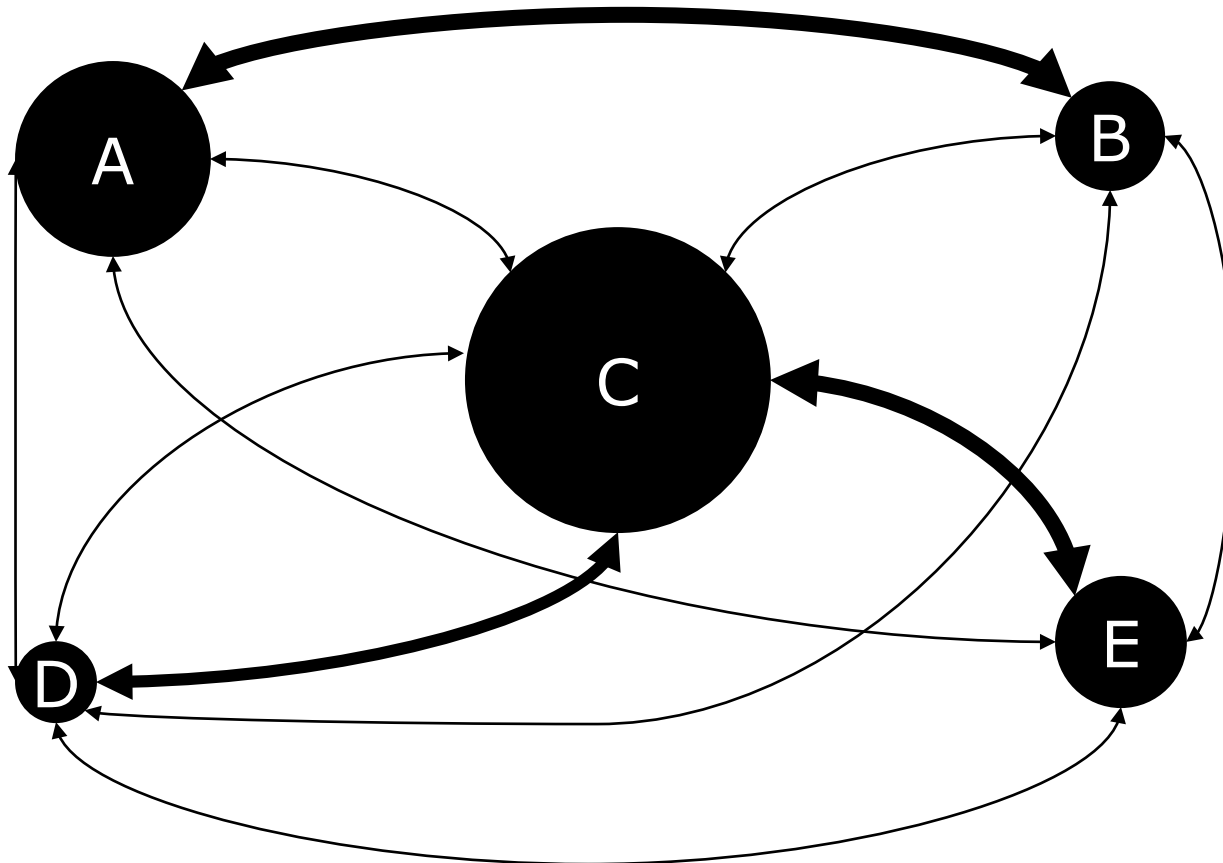
Network Data

Entities and Relationships



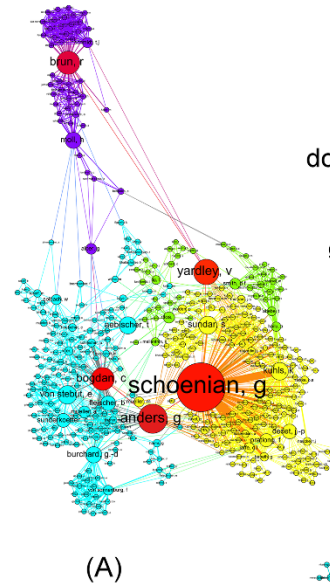
Network Data

Entities and Relationships

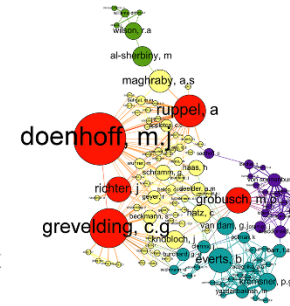


Network Data

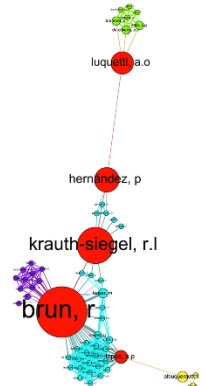
Visualization Approaches



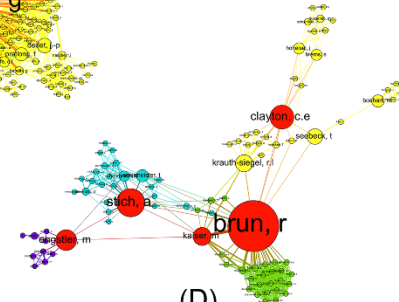
(A)



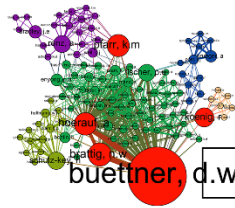
(B)



(C)



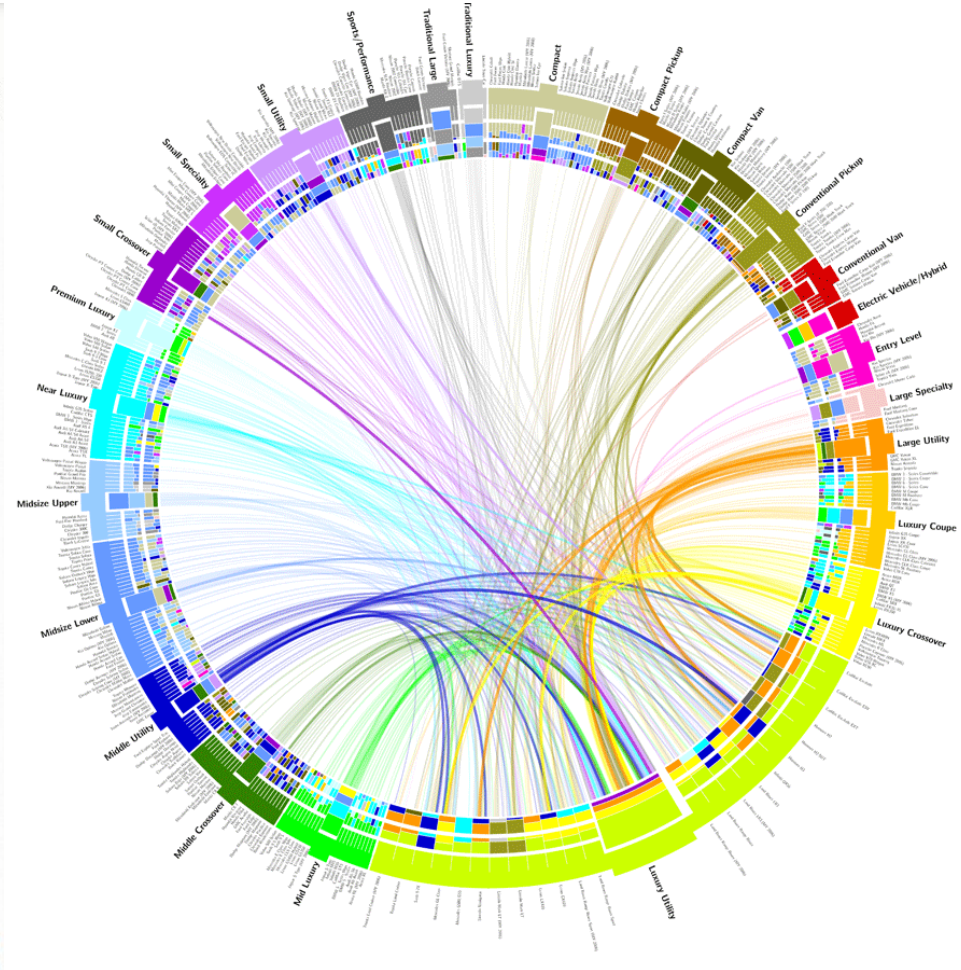
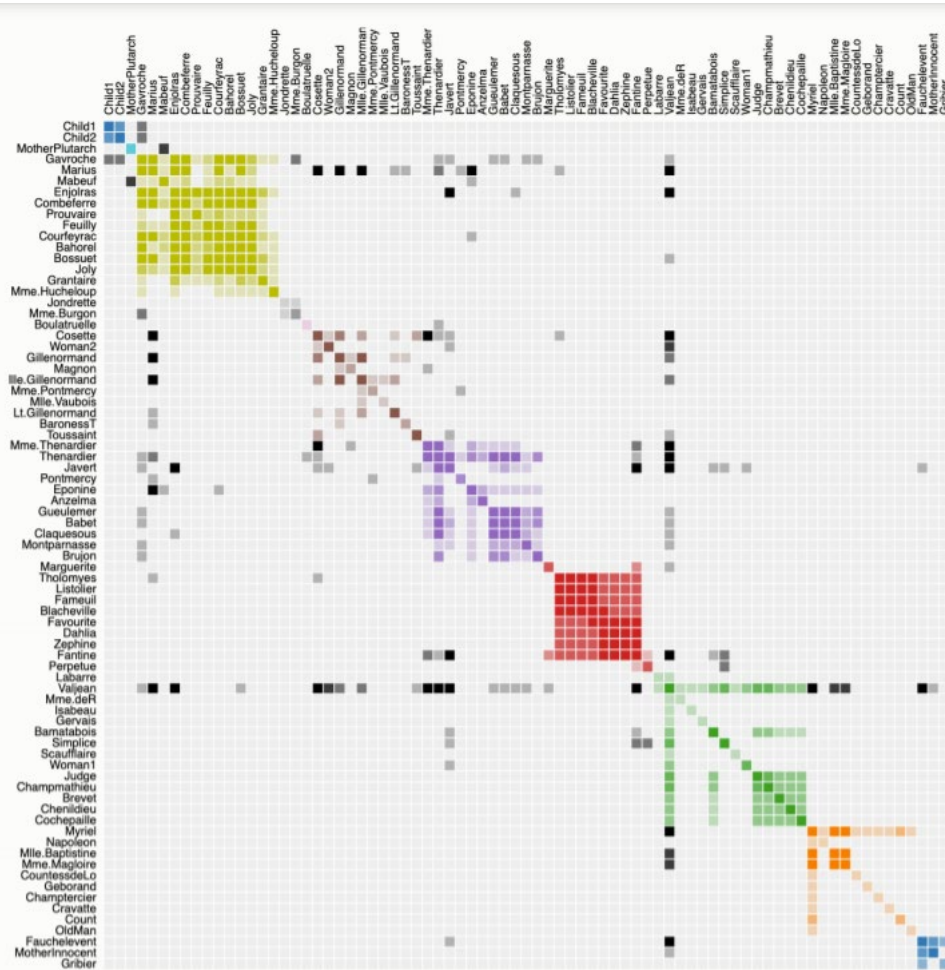
(D)



(E)

Network Data

Visualization Approaches



Network Data

Network Types



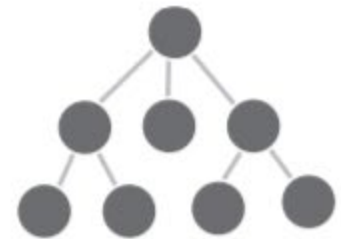
Sparse



Dense



Layered

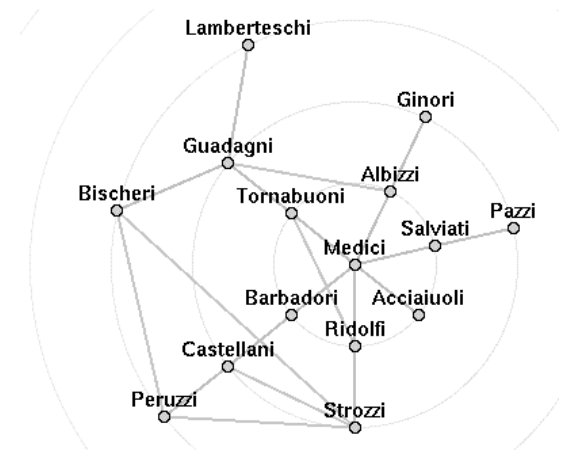


Trees

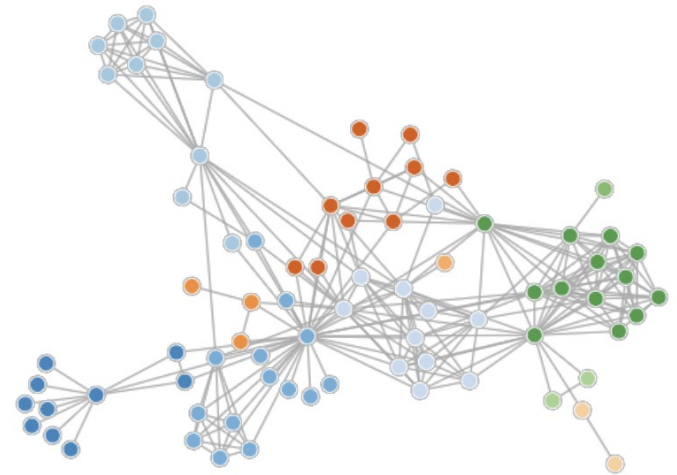
Network Data

Spatial Layout of Nodes and Edges

Connectivity – Spanning Tree



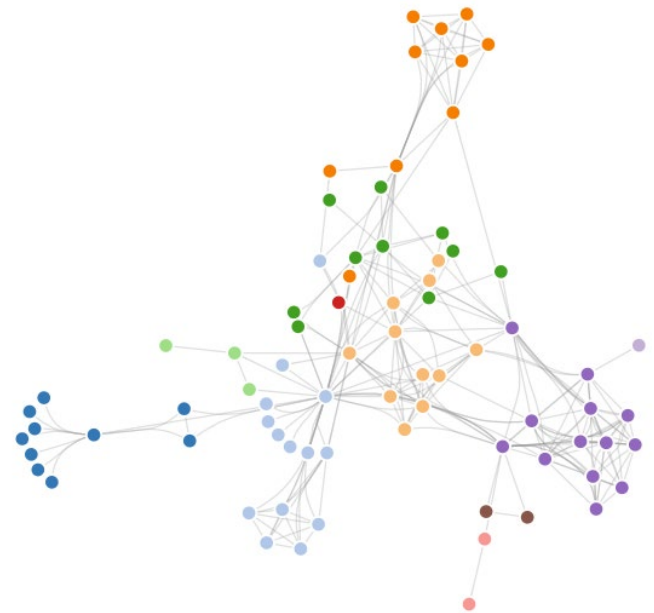
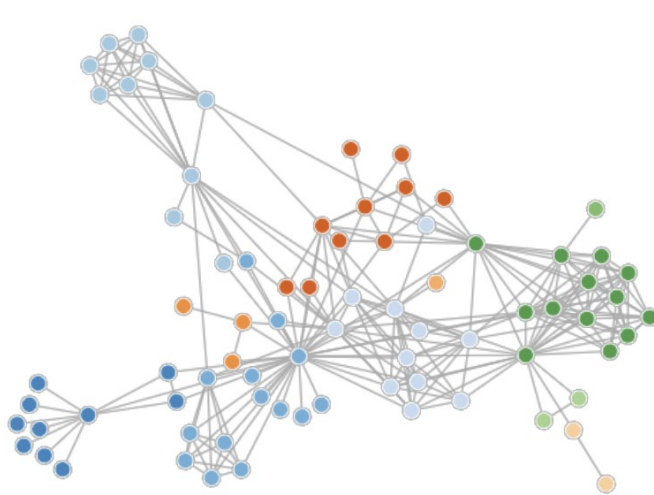
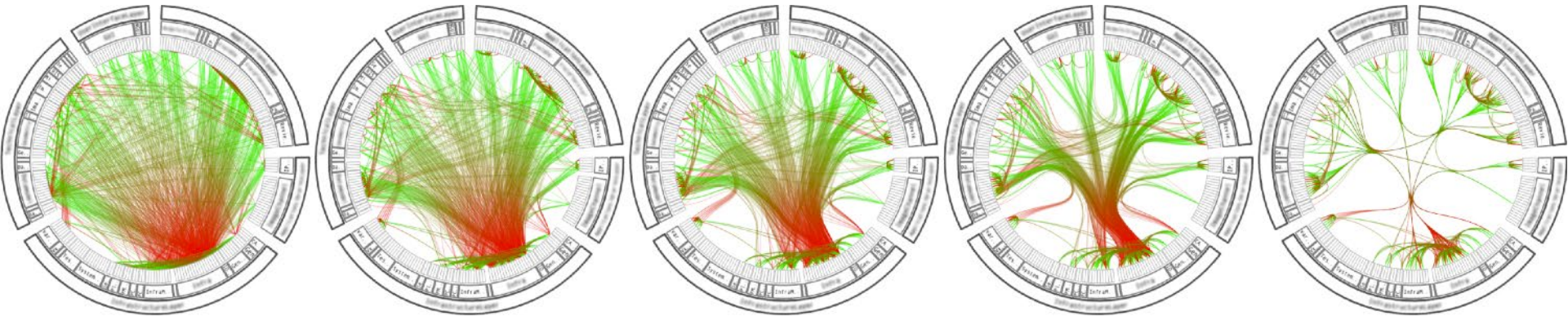
Clustering – Force-Directed



Network Data

Spatial Layout of Nodes and Edges

Limitations Edge-Crossings → **Edge Bundling**

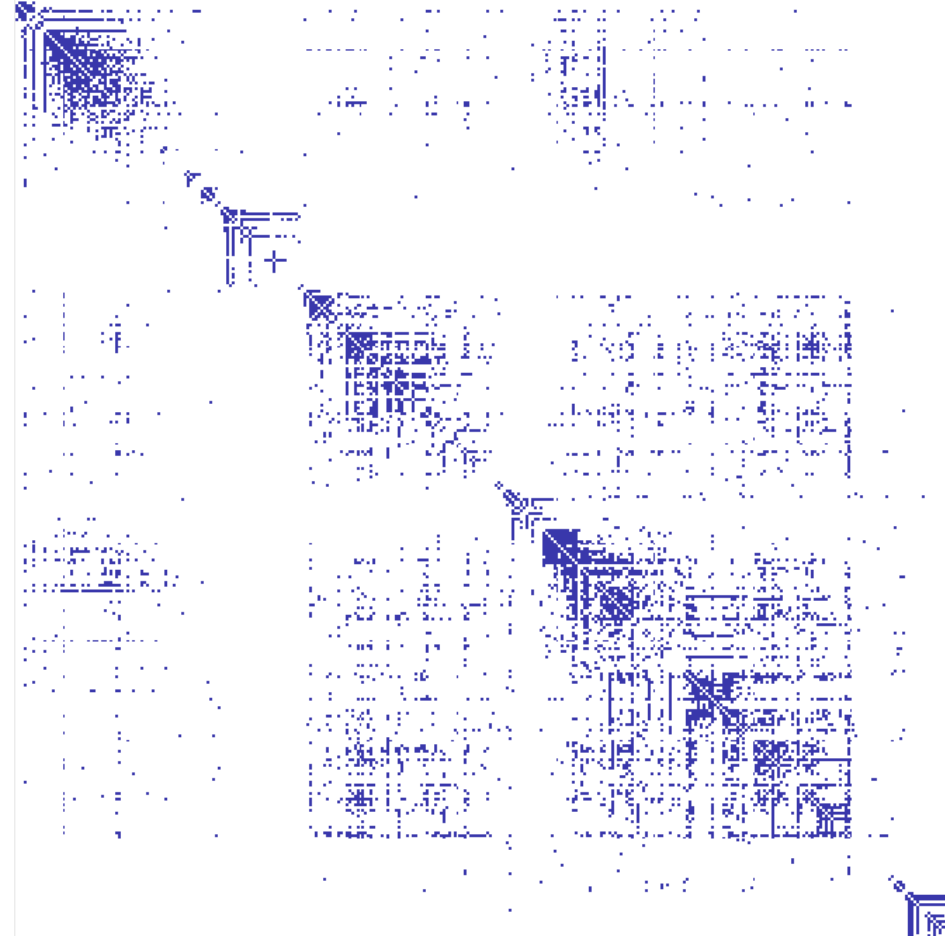
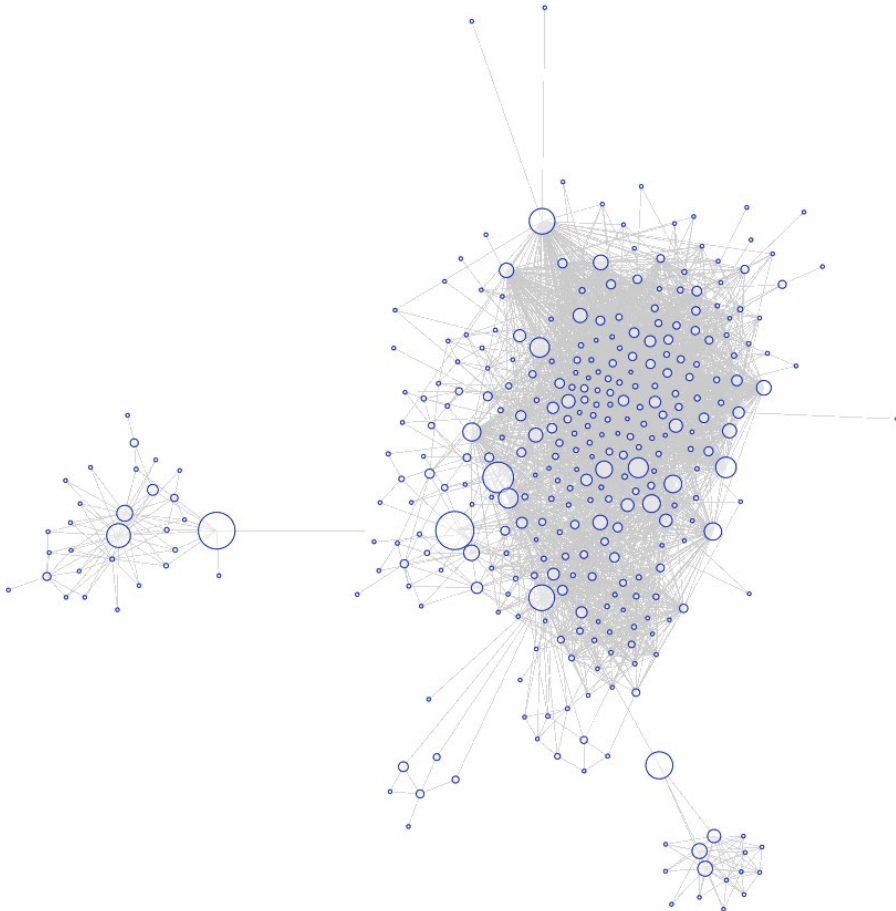


erri

Network Data

Spatial Layout of Nodes and Edges

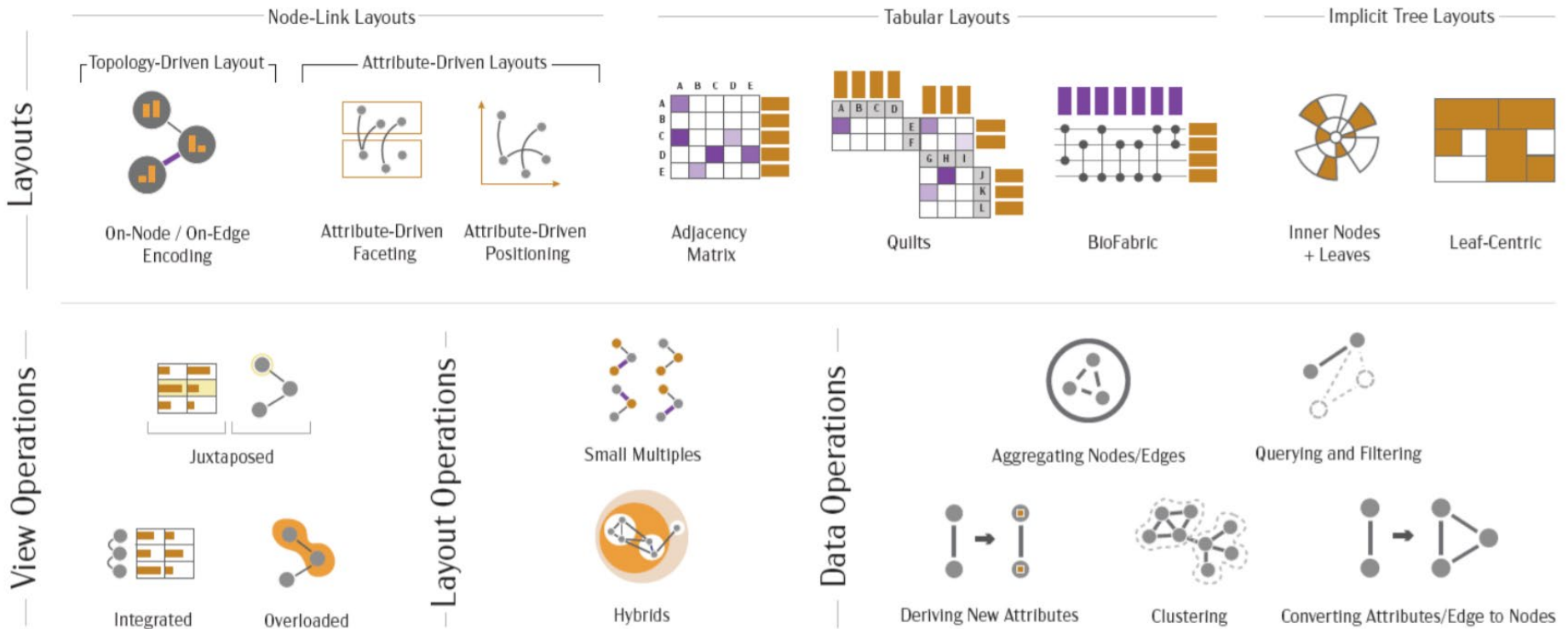
Limitations Edge-Crossings | **Occlusion** | Scaling Issues



Network Data

Tutorial on Visualizing Multivariate Networks – Nobre, Streit, Lex

http://sci.utah.edu/~vdl/talks/2019-10-20_tutorial_mvnv_slides.pdf



Edit Wars on Wikipedia

Conflicts occur in the peer-production process of Wikipedia and can culminate in “**edit wars**” for specific topics.

Present data about **most controversial topics** identified in **10+ different language** versions of Wikipedia.

Collaboration with and Data provided by:

- **Taha Yasseri** Oxford Internet Institute + Theoretical Physics, Budapest University of Technology and Economics
- **János Kertész** Theoretical Physics, Budapest University of Technology and Economics and Central European University (CEU)

“The Most Controversial Topics in Wikipedia: A Multilingual and Geographical Analysis” http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2269392

Edit Wars – How to Detect Controversial Topics

Controversiality = Number “Reverts”

Editor **completely undoes** another editor’s edit and brings it to version exactly the same as the version before the last version.

- **Weight of editor** = number of edits
- Weight of mutually reverting pair of editors = **minimum** of weights of the two editors

Controversiality M =

SUM of weights of all mutually reverting editor pairs

Multiplied by Number of editors for article

Compare Languages = Related English Page

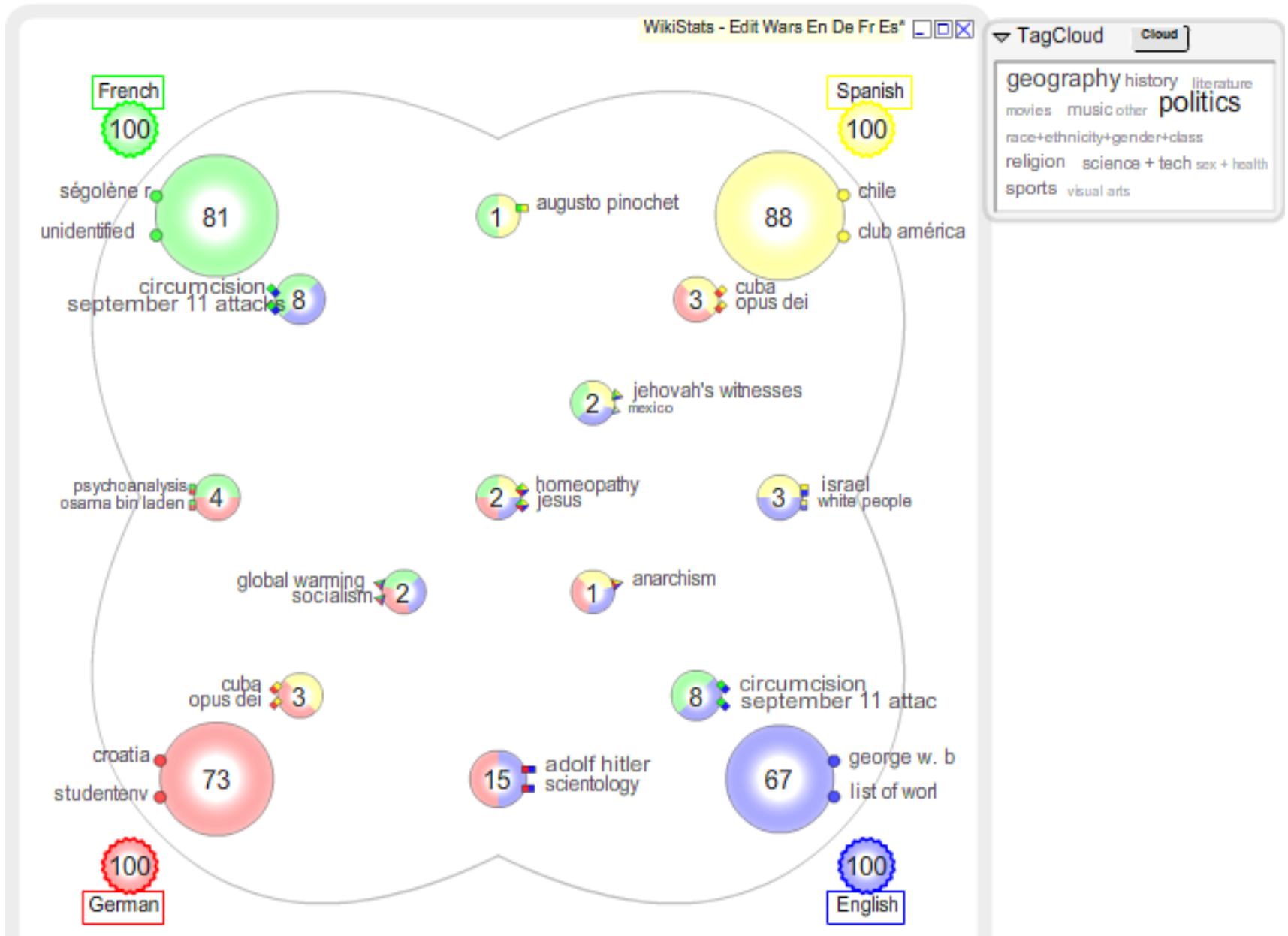
Top 10 Controversial Pages in **En** | **De** | **Fr** | **Es**

En
George W. Bush
Anarchism
Muhammad
LWWEe
Global warming
Circumcision
United States
Jesus
Race and intelligence
Christianity

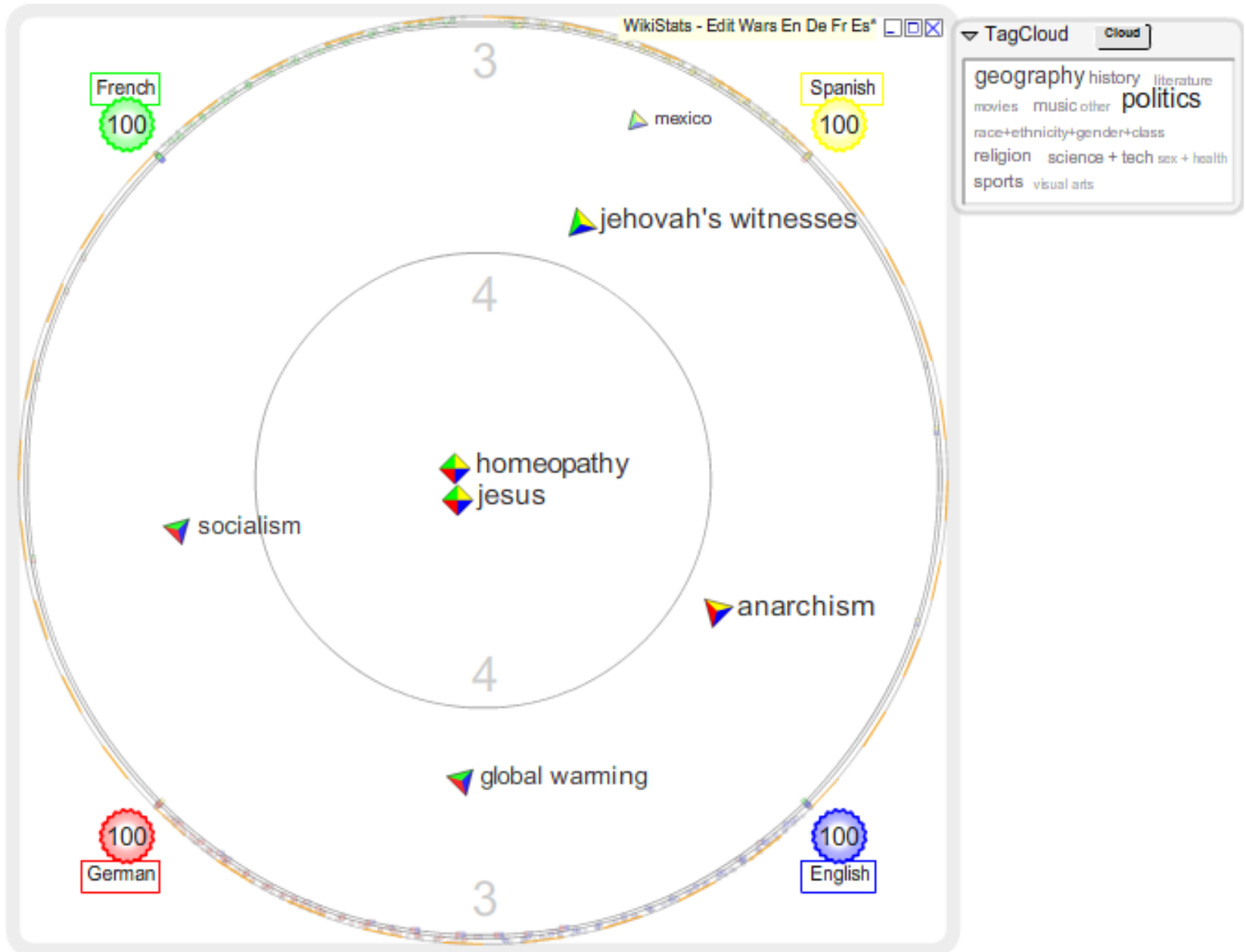
Top 10 Controversial Pages in **En** | **De** | **Fr** | **Es**

En	De	Fr	Es
George W. Bush	Croatia	Ségolène Royal	Chile
Anarchism	Scientology	Unidentified flying object	Club América
Muhammad	9/11 conspiracy theories	Jehovah's Witnesses	Opus Dei
LWWEe	Fraternities	Jesus	Athletic Bilbao
Global warming	Homeopathy	Sigmund Freud	Andrés Manuel López Obrador
Circumcision	Adolf Hitler	September 11 attacks	Newell's Old Boys
United States	Jesus	Muhammad al-Durrah incident	FC Barcelona
Jesus	Hugo Chávez	Islamophobia	Homeopathy
Race and intelligence	Minimum wage	God in Christianity	Augusto Pinochet
Christianity	Rudolf Steiner	Nuclear power debate	Alianza Lima

Overlap **Controversial** Pages in **En** | **De** | **Fr** | **Es**



Overlap **Controversial** Pages in **En** | **De** | **Fr** | **Es**

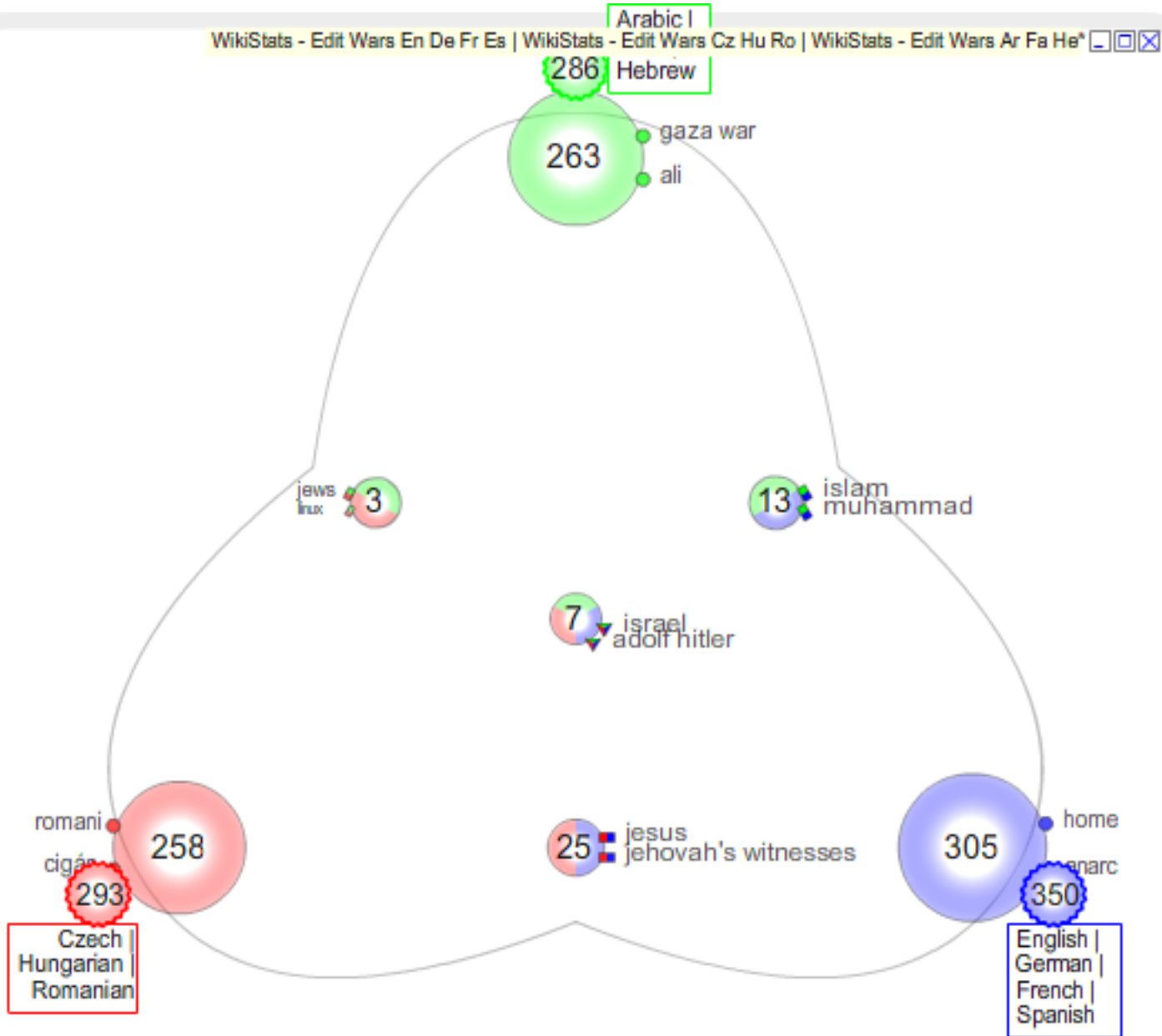


Overlap **Controversial** Pages in **En|De|Fr|Es** and **Cz|Hu|Ro** and **Ar|Fa|He**

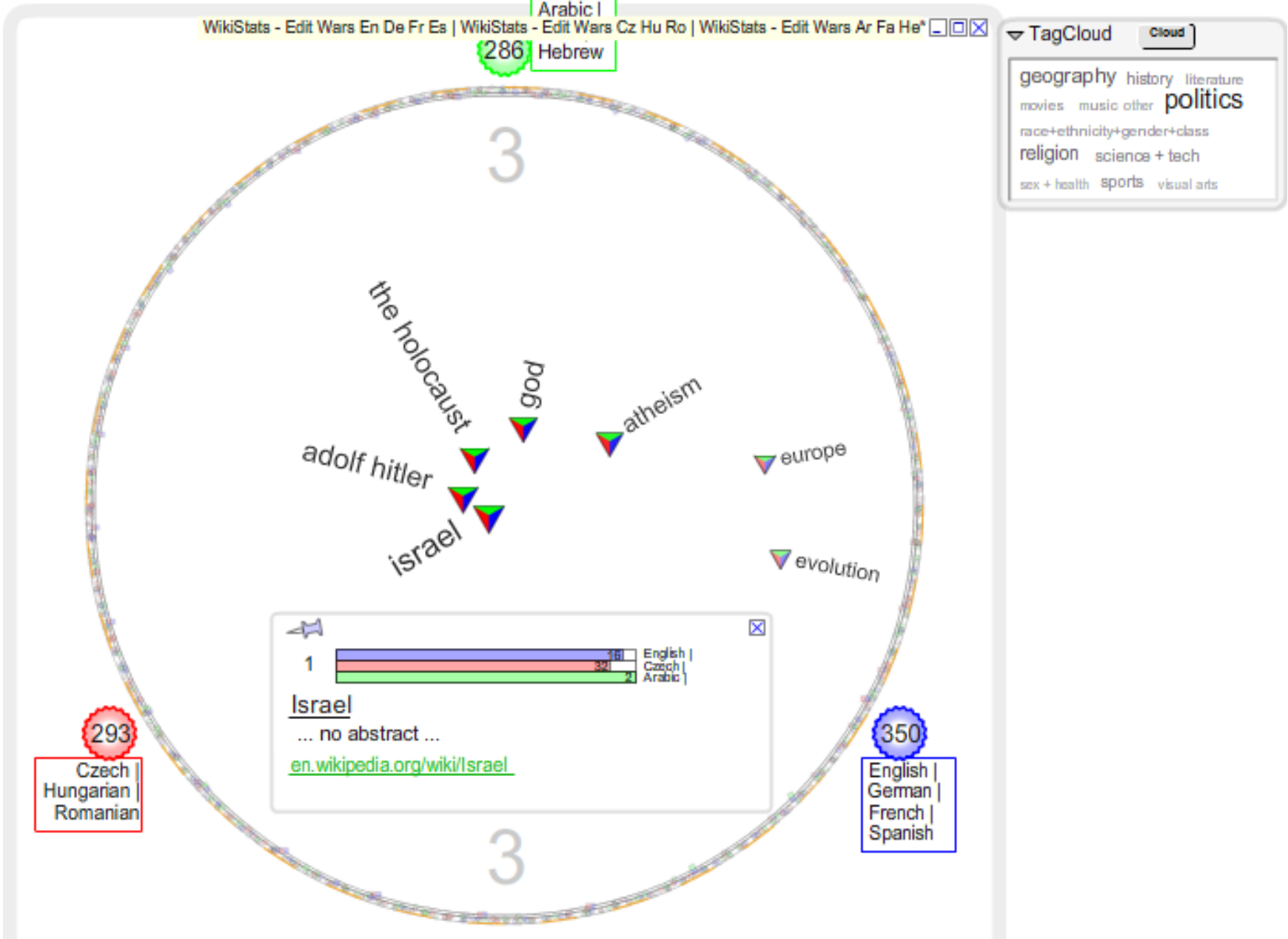
WikiStats - Edit Wars En De Fr Es | WikiStats - Edit Wars Cz Hu Ro | WikiStats - Edit Wars Ar Fa He*

TagCloud

geography history literature
movies music other **politics**
race+ethnicity+gender+class
religion science + tech
sex + health sports visual arts



Overlap **Controversial** Pages in **En|De|Fr|Es** and **Cz|Hu|Ro** and **Ar|Fa|He**



Network Structure of Editors of Most Controversial Wikipedia Pages

Compute **cosine similarity** between **Most Controversial** Wikipedia pages based on their **shared editors' contributions**.

Present **preliminary** findings about **similarity patterns** identified in **10+ different language** versions of Wikipedia.

Collaboration with and Data provided by:

- **Ann Samoilenko** GESIS - Leibniz-Institute for the Social Sciences, Cologne, Germany
- **Taha Yasseri** Oxford Internet Institute
- **János Kertész** Central European University (CEU)

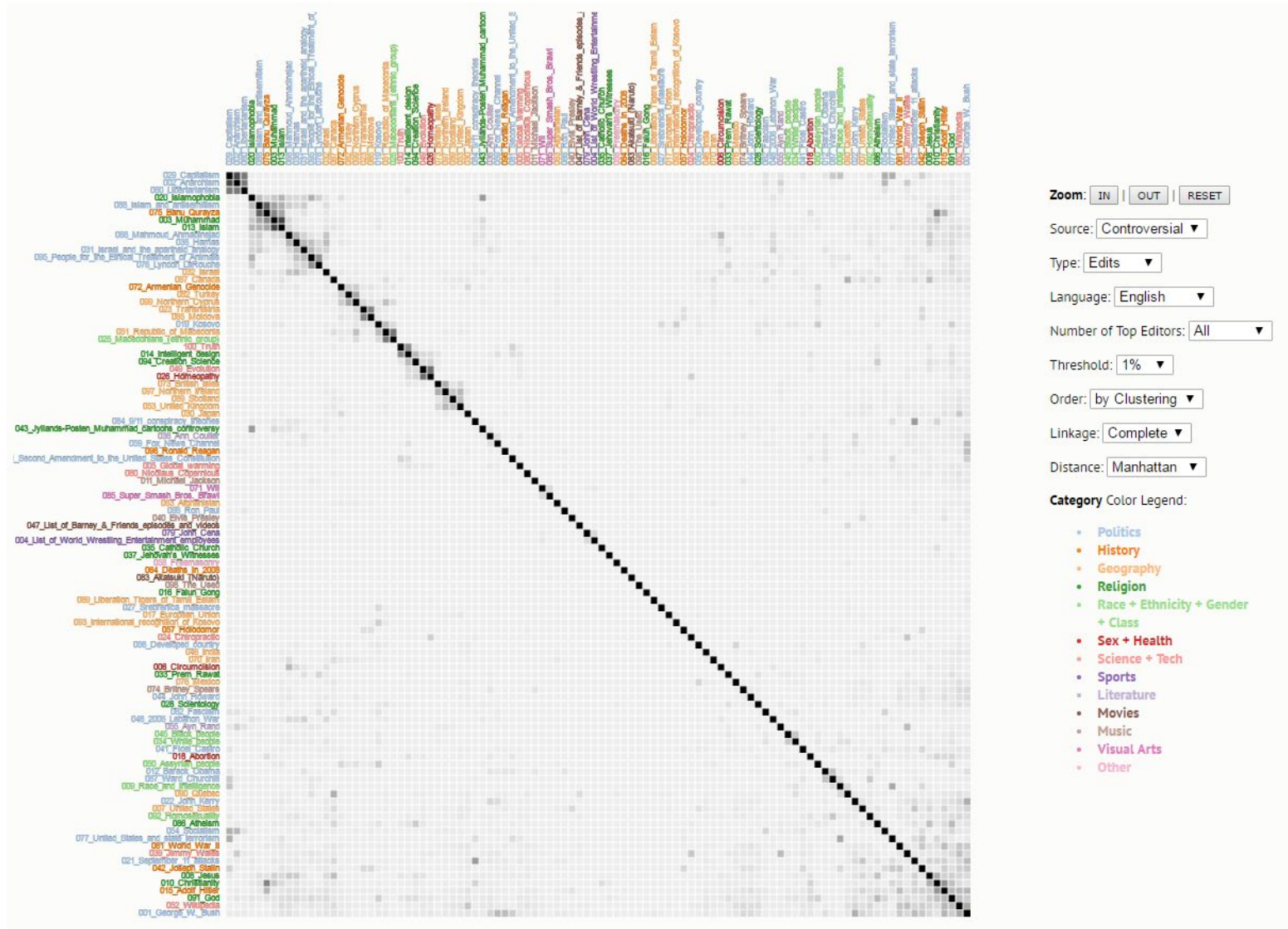
Relationship between Editors of Most Controversial Wikipedia Pages

To what degree do editors **edit similar pages** in a language



Relationship between Editors of Most Controversial Wikipedia Pages

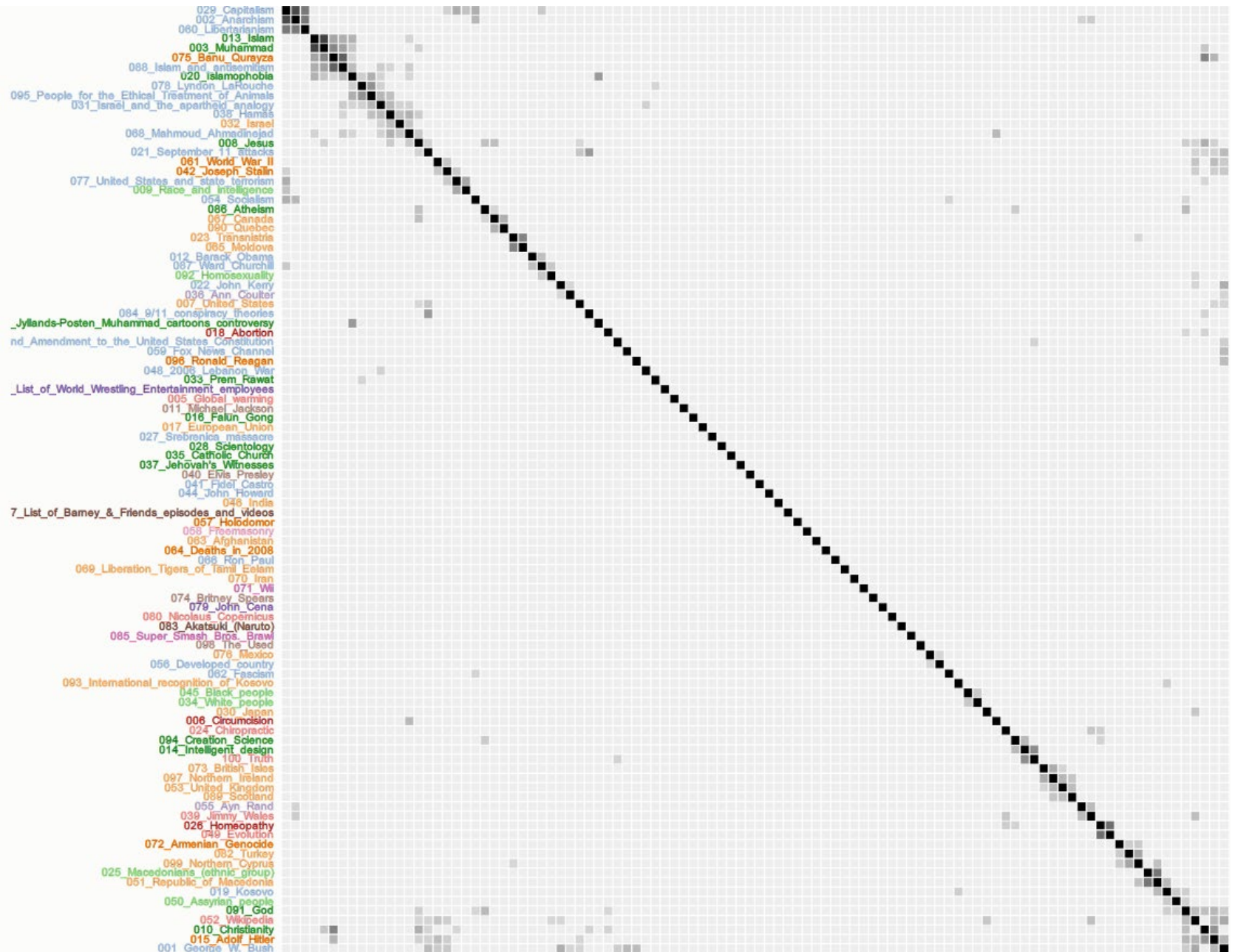
To what degree do editors **edit similar pages** in a language



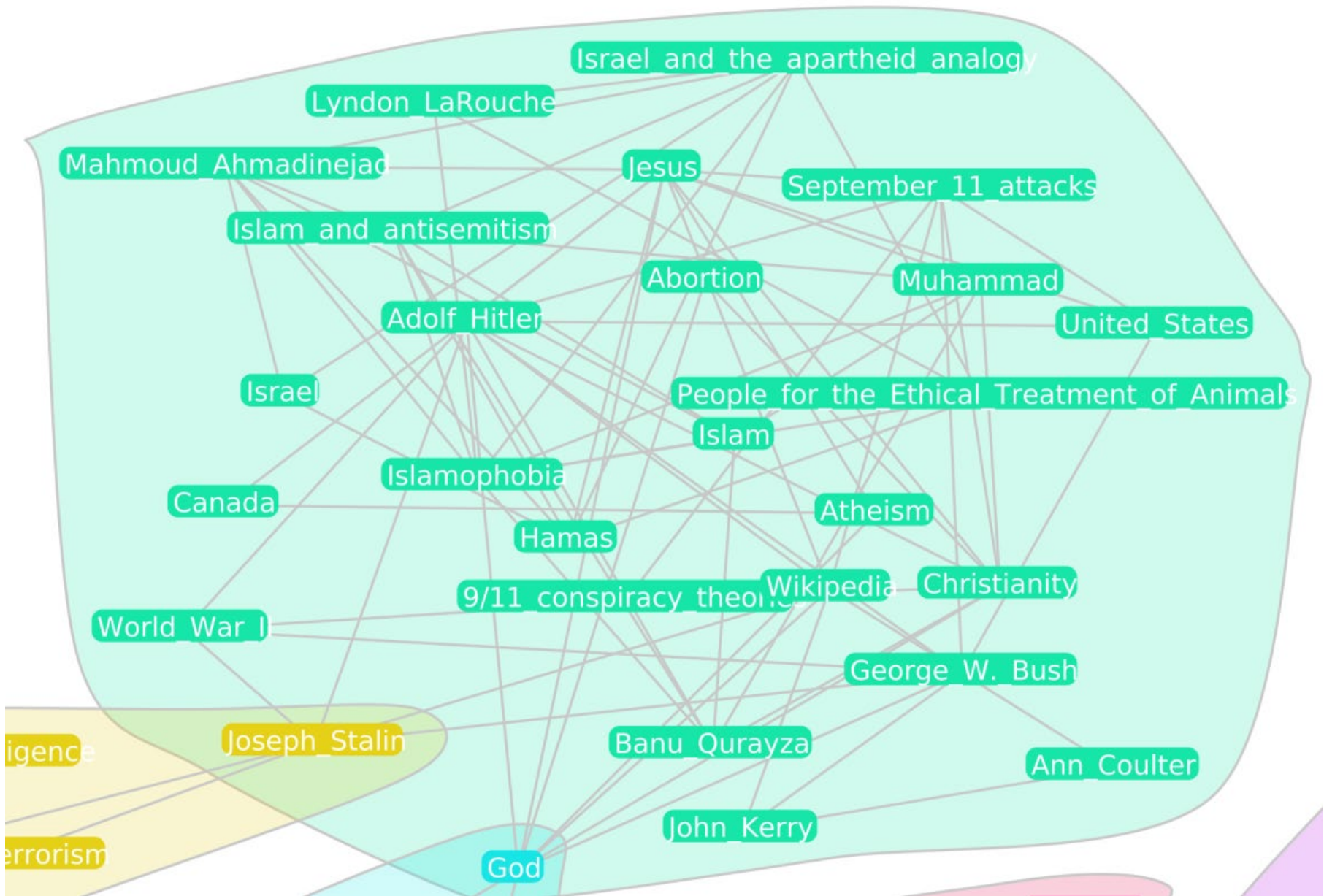
Network Structure of Editors of Most Controversial Wikipedia Pages

http://aspoerri.comminfo.rutgers.edu/Research/CoOccurrenceMatrix_reorder/examples/wikipedia/

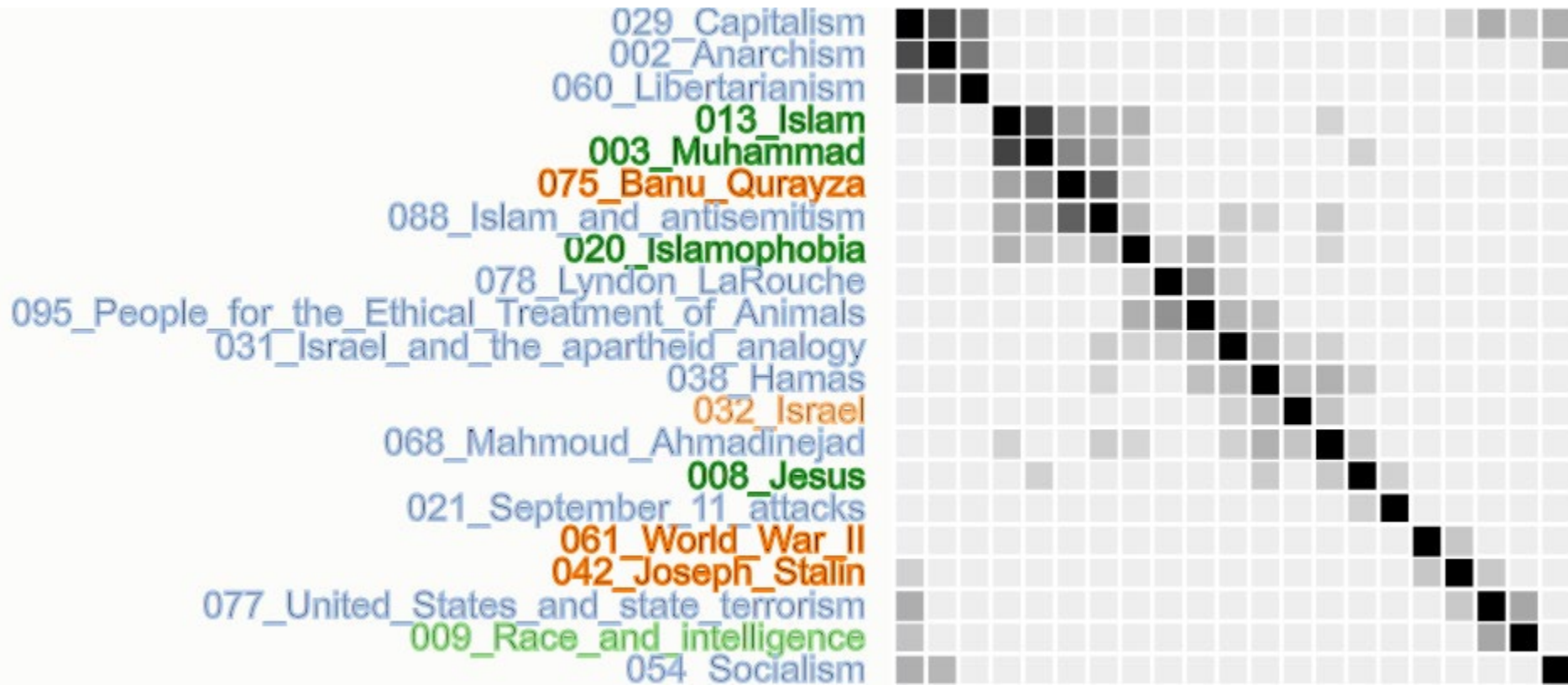
Relationship between **Editors** – **English** Wikipedia (10%)



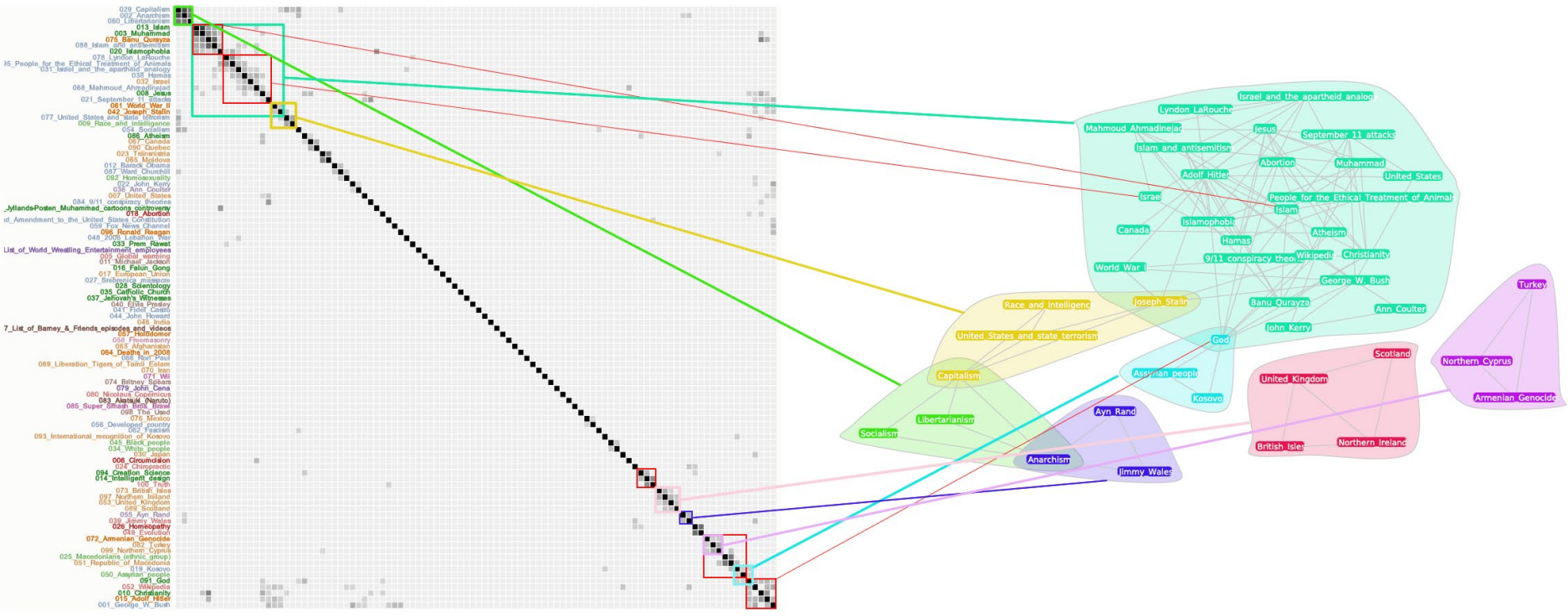
Relationship between **Editors** – **English** Wikipedia



Relationship between **Editors** – **English** Wikipedia



Relationship between **Editors** – **English** Wikipedia



NYTimes Visualizations – Network Visualization

The Clubs That Connect The World Cup

<https://www.nytimes.com/interactive/2014/06/20/sports/worldcup/how-world-cup-players-are-connected.html>

Find a Team

Why not look around for yourself?

Filter World Cup teams by:

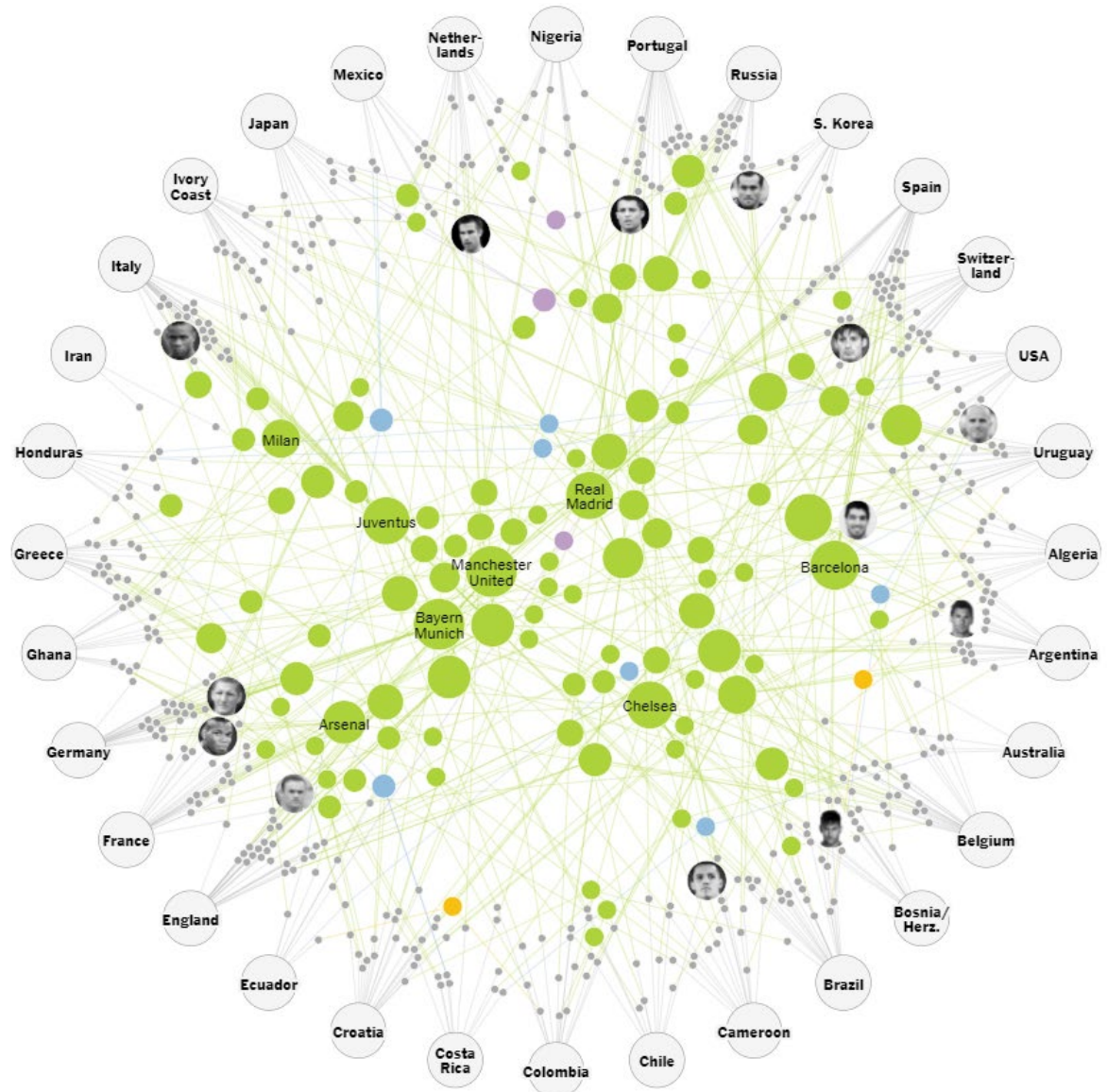
Region ▼
Group ▼
Stage ▼

Filter clubs by:

Region ▼
Rank ▼

Find player by name:

- Europe
- Africa
- Asia
- South America
- North America



NYTimes Visualizations – Network Visualization

Constellations of Directors and Their Stars

<https://www.nytimes.com/newsgraphics/2013/09/07/director-star-chart/index.html>

Francis Ford Coppola



AL PACINO



DIANE KEATON



ROBERT DUVALL

“The Godfather” minted its own mythology with its epic portrait of a crime family, embodied by its indelible lineup of actors: Marlon Brando, Al Pacino, John Cazale and Diane Keaton, to name a few, but ever lurking in the background was Robert Duvall as the vital consigliere. The actor entered Coppola’s orbit with 1969’s “Rain People,” cast at the last minute, but soon enough turned in swiftly sketched character work as the Corleones’ family fixer. Always a filmmaker who swung for the stands, Mr. Coppola would return to Mr. Duvall and his no-nonsense style for the equally unforgettable napalm enthusiast Lt. Col. Kilgore in “Apocalypse Now.”

Robert Altman



RENE AUBERJONOIS



HENRY GIBSON

Altman populated idiosyncratic panoramas — a gold-rush town in “McCabe and Mrs. Miller,” the bittersweet country scene of “Nashville” — with a stock company. For every Warren Beatty, there was a Rene Auberjonois or a Henry Gibson, a figure in the swirling background as Altman’s camera roved. “Altman’s most distinctive quality as a director,” wrote Pauline Kael, “is his gift for creating an atmosphere of living interrelationships and doing it so obliquely that the viewer can’t

