On Swiss multi-party political system and polarization in Politnetz

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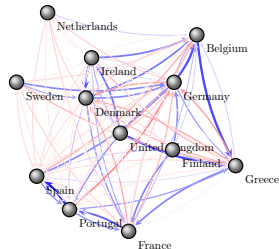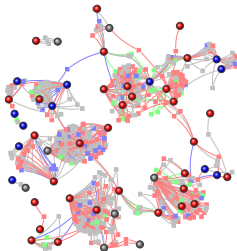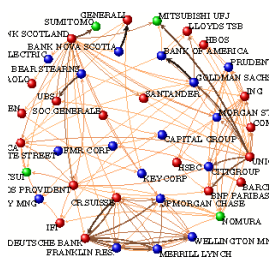# Outline

Chair of Systems Design at ETH Zurich

- **Main Research Areas**
  - **Economic Networks** & **Social Organizations**
    - e.g. ownership networks, R&D networks, financial networks, ...
    - e.g. online communities, OSS projects, animal societies, ...

- **Methodological Approach:** **Data Driven Modeling**
  - **economic databases**: Bloomberg, patent and ownership databases
  - **digital traces**: user interaction, OSN, activity volumes

The Politnetz community

- Online politics participatory community
- Representation of the parliament, with users as audience

politnetz.ch

- Open discussions between politicians and users
- Network of support and party affiliation

Dataset

- Jan 2011-Jan 2014
- More than 3200 politicians, 12000 users
- Focus on politician network:
    - 15000 support links, 11000 likes, 38000 comments
    - Multiplex network with three layers

Social interaction links in Politnetz
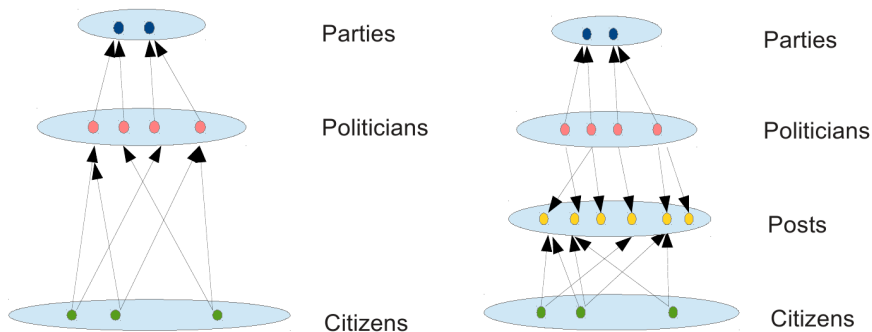
Support links: directed
unweighted network

Likes and Comments: directed
weighted networks

Polarization: definition

Esteban & Ray (1994)

Suppose that the population is grouped into significantly-sized "clusters", such that each cluster is very "similar" in terms of the attributes of its members, but different clusters have members with very "dissimilar" attributes. In that case, society is **"polarized"**.

Flache & Macy (2011)

Polarization of opinions is characterized by a division of the population into a smaller number of fractions with high internal consensus and sharp disagreement between them.
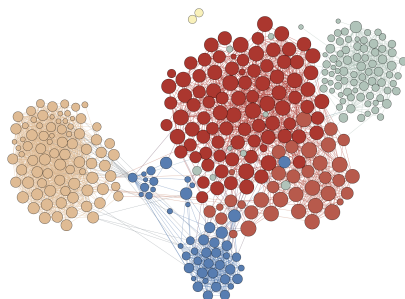
Network polarization: modularity

Q-Modularity

Probability that an edge connects two nodes in the same community c, compared to random graph

$$Q = \frac{1}{2m} \sum_{i,j} \left[A_{i,j} - \frac{k_i \cdot k_j}{2m} \right] \cdot \delta(c_i, c_j)$$

Two separations:

1. c_i = party affiliation of politician i: Modularity of parties Q_p
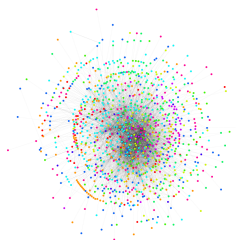2. Communities found with algorithms: Maximal modularity Q_{max}

Network polarization in Politnetz

- Supports
- $Q_p = 0.677$ (10)
- $Q_{max} = 0.742$ (12)

- Likes
- $Q_p = 0.299$ (10)
- $Q_{max} = 0.448$ (14)

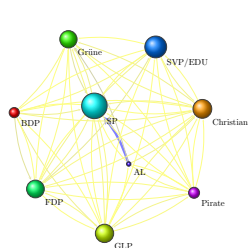- Comments
- $Q_p = -0.07$ (10)
- $Q_{max} = 0.354$ (15)

Q_p - modularity score of networks **with party labels**,
Q_{max} - maximum modularity score **without party tags**
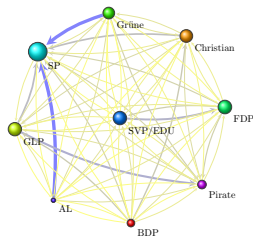Color corresponds to politicians' party

Modularities of Politnetz: per-party aggregation

- highly modular network
- support link acts as a signal for party membership

- likes links stay mostly within party
- number of cross-party links are higher than in support links
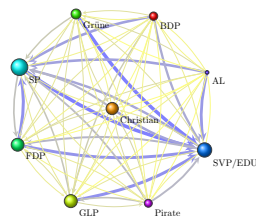
- comments reveal two attractors of conversation – major parties in Swiss politics: SP and SVP

Modularity of likes peaks at elections
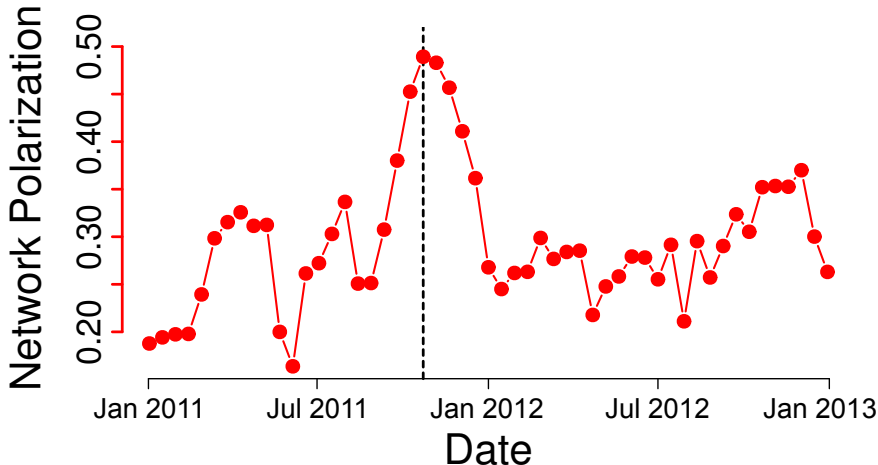
- Modularity of likes network over time windows of 2 months
- Before elections, politicians avoid liking posts from other parties

Network polarization: users
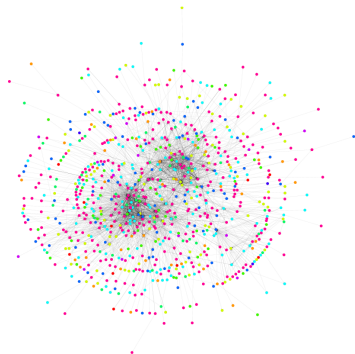
- Two clusters detected in the likes network **without** party labels
- Low modularity of **party-labeled** likes network shows lack of political mobilization among users

Likes network of users

Users are not aware of party labels and like posts based on content rather than party affiliation unlike among politicians

- $Q_p = -0.001$ (9)
- $Q_{max} = 0.519$ (22)

Q_p - modularity score of networks **with party labels**,
Q_{max} - maximum modularity score **without party tags**

Left vs. right party communities structure

Hypothesis

Compared to left-aligned communities, right-aligned communities are less influenced by content created by political campaigns, but have stronger social interaction regarding political topics.

Conover & Menczer (2011)

In the US, online social networks of right politicians are more dense and clustered than the networks of left politicians

Most frequent YouTube content shared by political user groups in Twitter

RANK	LEFT	RIGHT	APOLITICAL
1	Minecraft	Barack Obama	Minecraft
2	Call of Duty II	Alex Jones	Call of Duty II
…	…	…	…
6	Film	Ron Paul	Hip hop music
…	…	…	…
13	Album	Police	Call of Duty
14	Call	Mitt Romney	Video blog
15	Song	Russia Today	Episode
…	…	…	…
25	Heavy metal	Boston	NBA
…	…	…	…
27	Episode	US NSA	Super Junior
…	…	…	…
29	Justin Bieber	Bomb	Pokemon
30	Barack Obama	Train	Music

Right-aligned users share more politically charged content.
Left-leaning users are similar to **apolitical**.

Chair of Systems design | SKIN3 workshop
www.sg.ethz.ch | Adiya Abisheva
Social Networks of Parties
SKIN3 workshop Budapest, Hungary 22 May, 2014 | 13 / 17

Social networks of parties

Conover & Menczer (2011)

In the US, online social networks of right politicians are more dense and clustered than the networks of left politicians

We measured three aspects of the social network of a party

1 **In-degree centralization:** tendency towards a star-like structure, inequality of individual support in the party

2 **Average path length:** information efficiency, closeness of the community

3 **Maximum k-core:** presence of a rich-club, resilient core of leaders

Party political position and social structure
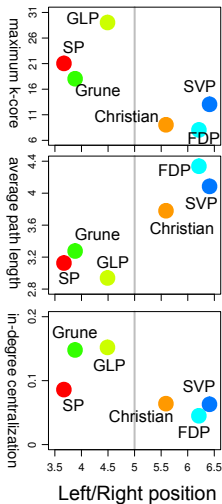
- We focus on the support network of parties with more than 150 politicians in Politnetz
- Party position coded in surveys
- Left parties have higher maximum k-core values
- Right parties have longer path lengths
- Green parties have higher centralization

Opposite of Conover & Menczer in Twitter US

- Right parties are not more closely connected
- Effect of status quo rather than political alignment

Summary

- We analyzed network polarization (modularity) in Politnetz
  - Support network stable and very polarized
  - Polarization in likes network increases when elections are close
- Parties show different network structures

Scientific importance and impact of research

1 Contribution towards local research communities of direct democracy and e-voting,

2 General approach can be applied towards international case studies,

3 Assessment of impact of political campaigns, effectivity of mobilization, and the impact of decision policy making.

Future research questions

- Detecting alignment on non-aligned political parties
- Bipolarization of the network
- Matching answers of politicians to smart-vote data
- Predict configuration of Swiss government and party coalition
- Popularity of politicians/career path of politicians
- Analyze users opinions and political activity from online newspapers (20min.ch)