CS 6474/CS 4803 Social Computing: Sociological Foundations III

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Example Class Projects

Data and Behavioral Characterization

- Comparison of public and critics sentiment around movies (Twitter vs. Rotten Tomatoes + IMDB)
  - Focus on most watched and recent movies
  - Limited dataset
- Identifying hateful comments on YouTube
  - Mixed methods approach
  - Limited human annotations
  - Context matters
- Characterizing and understanding the tone and sentiment of politician and celebrity Twitter posts
  - Top politicians and celebrities

Community Studies

- Differences between reputation mechanisms of Quora and StackOverflow – what leads to better reputation?
  - Rich dataset

- Understanding the structure and dynamics of pro-eating disorder communities
  - Resulted in a publication (CSCW 2016)

- Identifying linguistic markers of relationship abuse in Reddit communities
  - Qualitative project
  - Rich insights

Prediction

- Predicting emotionality and loneliness of Flickr photos by analyzing visual features
  - Computer vision application
  - Loneliness is a complex construct

- Prediction of workplace stress by analyzing corporate email content (Enron)
  - Mixed method study
  - Interesting NLP application
  - Connection to real world events (stock market indices)

- Predicting factors that lead to persistent use or quitting of social media (Twitter)
  - Construct validity – not quitting but perhaps non-use?

Tools and Visualization

- Classification and exploration of political bias in blogs via a visualization
  - Left and right wing blogs shown in a network visualization

- Topic-aware personalized trends on Twitter via a web application

- Content summarization tool to provide positive social support to mental health help seekers on Reddit

Domain-Specific Exploration (1)

- Inferring a "health score" of the eating activities of college students by analyzing content of Yelp reviews

- Assessing citizens' affect from tweets in different urban settings

- "Social listening" – using social media sentiment to infer stock market trends

Domain-Specific Exploration (2)

- Discovering the grievances, emotional expression, and topics shared in an online community of incarcerated individuals

- Employing Facebook pages as a platform for community policing (disappearances of individuals in Mexico)

- Analyzing and Predicting Student Success Based on Course Interaction in an Introductory Computer Science Class
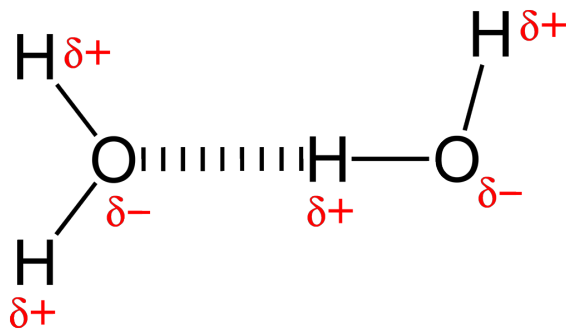
Sign up by Sep 10 if you don't have a team by then

The Strength of Weak Ties

Strength of weak ties: Mark Granovetter:

- "**It is the distant acquaintances who are actually to thank for crucial information leading to your new job, rather than your close friends!**"


- Mark Granovetter (born October 20, 1943): an American sociologist and professor at Stanford University.
- 1969: submitted his paper to the American Sociological Review—rejected!
- 1972, submitted a shortened version to the American Journal of Sociology—published in 1973 (Granovetter, 1973).
- According to Current Contents, by 1986, the Weak Ties paper had become a citation classic, being one of the most cited papers in sociology.

Summary

- Strong, weak and absent ties
- Triangle closure (theory of structural balance), unless forbidden triad
- The strength of a tie is defined in terms of four dimensions: amount of time, intimacy, intensity and reciprocal services
- Finding: even weak ties can be valuable
  - Weak ties can also act as bridges, and can help information diffuse faster
  - Generally weak ties have role in social cohesion and mobility, e.g., findings a job, geographic move, forming interest communities
- Strong ties are high maintenance; weak ties prevent small highly connected cliques from fragmenting

Are the gradations "strong", "weak" and "absent" sufficient for characterizing ties?

Tie strength in social network
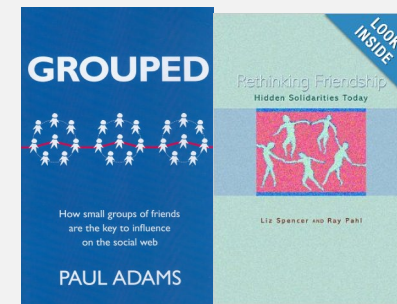
- According to [Rethinking Friendships: Hidden Solidarities Today (Princeton, 2006) by Liz Spencer and Ray Pahl], there are eight different types of relationships:
  - Associates: dont know each other well, and only share a common activity, such as a hobby or a sport.
  - Useful contacts: share information and advice, typically related to our work or career.
  - Fun friends: socialize together primarily for fun without a deep relationship to provide each other with emotional support.
  - Favor friends: help each other out in a functional manner but not in an emotional manner.
  - Helpmates: display characteristics of both favor friends and fun friends; socialize together for fun and also help each other out in a functional manner.
  - **Comforters: similar to helpmates but with a deeper level of emotional support.**
  - **Confidants: disclose personal information to each other, enjoy each others company, but aren't always in a position to offer practical help.**
  - **Soulmates: display all of these elements and are the people were closest to.**
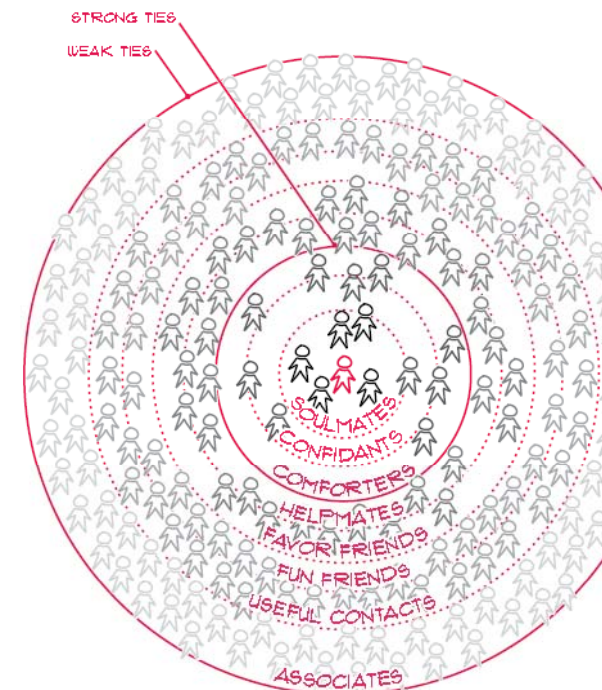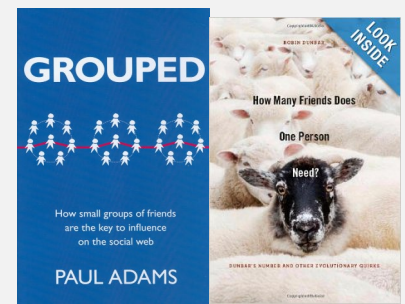- We have a much smaller number of strong ties than weak ties.

Figure: Credit: (Adams, 2011)

Tie strength: the 5-15-50-150-500 rule

- According to [How Many Friends Does One Person Need?: Dunbar's Number and Other Evolutionary Quirks, Robin Dunbar, Harvard University Press (November 1, 2010)]:
  - Most peoples social networks have a common pattern, unchanged for thousands of years.
  - There are clear boundaries based on the number of connections we have; it starts at five and goes up by a factor of three.
    - Inner circle: 5
    - sympathy group: 12-15
    - Semi-regular group: 50
    - stable social group: **150** (the Dunbar number)
    - friends of friends group (weak ties): 500

  - Robin Ian MacDonald Dunbar (born 28 June 1947): a British anthropologist and evolutionary psychologist and a specialist in primate behavior at University of Oxford.
  - Best known for his Dunbar's number: a measurement of the "cognitive limit to the number of individuals with whom any one person can maintain stable relationships".
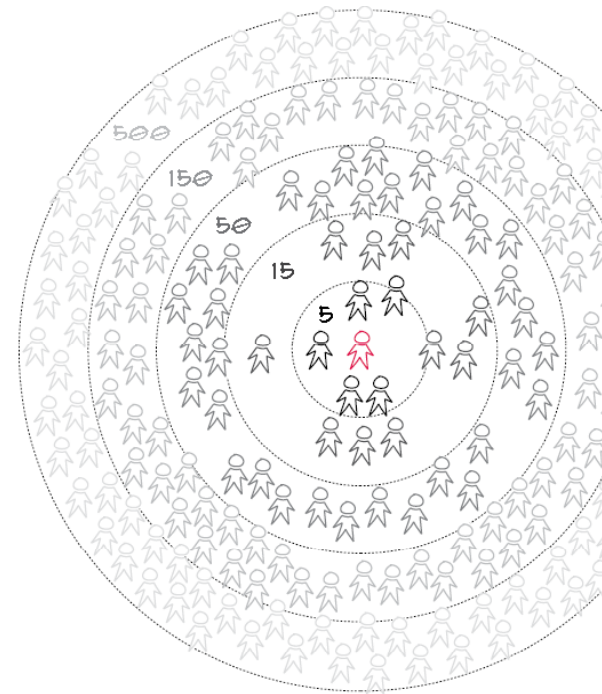

Figure: Credit: (Adams, 2011)

Content of ties not considered; theory not validated with data!

Predicting Tie Strength With Social Media

Summary

- First study to quantitatively measure social tie strength.
- Based on Facebook data of 35 participants, they define 74 predictor variables of tie strength
- Seven different categories of the predictor variables:
- 85% predictive accuracy based on an OLS regression model; findings supplemented with interviews
- Findings:
  - Intimacy strongest feature; structural balance i.e., number of overlapping networks least
  - Strong ties provide emotional support, weak ties are great for accessing new kinds of information

Facebook mockup (top left)

facebook — John Doe — Friends — Applications — Inbox — Home — Settings

John Doe

Wall | Info | Photos

How strong is your relationship with this person?
barely know them — we are very close

How would you feel asking this friend to loan you $100 or more?
would never ask — very comfortable

How helpful would this person be if you were looking for a job?
no help at all — very helpful

How upset would you be if this person unfriended you?
not upset at all — very upset

If you left Facebook for another social site, how important would it be to bring this friend along?
would not matter — must bring them!

Write | Post Photo | Record Video | Share Link | Give Gift

Write something...

View Photos of John (107)

Send John a Message
Poke John

Networks:
CUNY Hunter Grad Student '09
UIllinois Alum
New York, NY

Relationship Status:
Married to
Jane Doe

Birthday:
May 19

Current City:
Brooklyn, NY

Mutual Friends

Survey questions (top right)

How strong is your relationship with this person?
barely know them — we are very close

How would you feel asking this friend to loan you $100 or more?
would never ask — very comfortable

How helpful would this person be if you were looking for a job?
no help at all — very helpful

How upset would you be if this person unfriended you?
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If you left Facebook for another social site, how important would it be to bring this friend along?
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Tables

Predictive Intensity Variables	Distribution	Max
Wall words exchanged		9549
Participant-initiated wall posts		55
Friend-initiated wall posts		47
Inbox messages exchanged		9
Inbox thread depth		31
Participant's status updates		80
Friend's status updates		200
Friend's photo comments		1352

Intimacy Variables	Distribution	Max
Participant's number of friends		729
Friend's number of friends		2050
Days since last communication		1115
Wall intimacy words		148
Inbox intimacy words		137
Appearances together in photo		73
Participant's appearances in photo		897
Distance between hometowns (mi)		8182
Friend's relationship status	6% engaged, 30% single, 32% married, 30% in relationship	

Duration Variable	Distribution	Max
Days since first communication		1328

Reciprocal Services Variables	Distribution	Max
Links exchanged by wall post		688
Applications in common		18

Structural Variables	Distribution	Max
Number of mutual friends		206
Groups in common		12
Norm. TF-IDF of *interests* and *about*		73

Emotional Support Variables	Distribution	Max
Wall & inbox positive emotion words		197
Wall & inbox negative emotion words		51

Social Distance Variables	Distribution	Max
Age difference (days)		5995
Number of occupations difference		8
Educational difference (degrees)		3
Overlapping words in *religion*		2
Political difference (scale)		4

Class Discussion

Why should we care about measuring tie strength on social media? How does it impact our studies of social media? How does it impact design?

Implications of strong ties online – should we always prefer weaker ties?

Using Facebook after Losing a Job: Differential Benefits of Strong and Weak Ties

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ABSTRACT

Among those who have recently lost a job, social networks in general and online ones in particular may be useful to cope with stress and find new employment. This study focuses on the psychological and practical consequences of Facebook use following job loss. By pairing longitudinal surveys of Facebook users with logs of their online behavior, we examine how communication with different kinds of ties predicts improvements in stress, social support, bridging social capital, and whether they find new jobs. Losing a job is associated with increases in stress,

benefits they would not otherwise have, a phenomenon known as social capital [6,16,36,44]. Social capital derives from one's position in a social network and the number and character of the ties one maintains [12,48]. One's connections differ in tie strength or closeness, from lovers to near-strangers. Granovetter defined tie strength as a "combination of the amount of time, the emotional intensity, the intimacy (mutual confiding), and the reciprocal services which characterize the tie" [23].

There is strong theoretical rationale and empirical evidence

Burke, M., and Kraut, R. 2014. "Using Facebook after Losing a Job: Differential Benefits of Strong and Weak Ties". CSCW 2013.

- Losing a job is associated with increases in stress, while talking with strong ties is generally associated with improvements in stress and social support.

- Weak ties do not provide these benefits.

- Bridging social capital comes from both strong and weak ties.

- Contrary to the "strength of weak ties" hypothesis, communication with strong ties is more predictive of finding employment within three months

"Felt a little better with supporting comments about losing my job. My friends gave me a better outlook on the situation."

"Been able to share my worries, get help on Cvs, job hunting and general chit chat about whats happening to others."

"Much better it is way easier to stay connected when looking for employment t see what others found. If someone finds a lead they cannot use they pass it on in case anyone else can use it. We are finding jobs"

"Yes, [I] am able to commiserate with other colleagues on losing our jobs (due to Bank failure) and getting prospects for new opportunities."

Implications of strong ties online – can strong ties be damaging?

The Social Structure of Political Echo Chambers: Variation in Ideological Homophily in Online Networks

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We predict that people with different political orientations will exhibit systematically different levels of political homophily, the tendency to associate with others similar to oneself in political ideology. Research on personality differences across the political spectrum finds that both more conservative and more politically extreme individuals tend to exhibit greater orientations towards cognitive stability, clarity, and familiarity. We reason that such a "preference for certainty" may make these individuals more inclined to seek out the company of those who reaffirm, rather than challenge, their views. Since survey studies of political homophily

Implications of strong ties online – beyond strong and weak ties

Signed Networks in Social Media

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ABSTRACT

Relations between users on social media sites often reflect a mixture of positive (friendly) and negative (antagonistic) interactions. In contrast to the bulk of research on social networks that has focused almost exclusively on positive interpretations of links between people, we study how the interplay between positive and negative relationships affects the structure of on-line social networks. We connect our analyses to theories of signed networks from social psychology. We find that the classical theory of structural balance tends to capture certain common patterns of interaction, but that it is also at odds with some of the fundamental phenomena we

duce these complex relationship to the existence of simple pairwise links. It is a fundamental research problem to bridge the gap between the richness of the existing relationships and the stylized nature of network representations of these relationships.

The main focus of our work here is to examine the interplay between positive and negative links in social media — a dimension of on-line social network analysis that has been largely unexplored. With relatively few exceptions (e.g., [1, 15, 16]), research in on-line social networks has focused on contexts in which the interactions have largely only positive

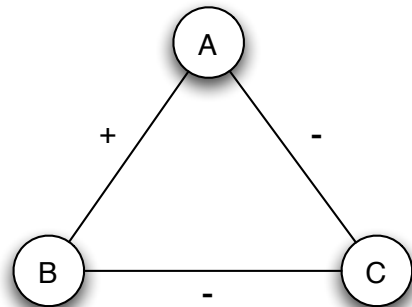# Signed Ties and Structural Balance

- In many online and offline contexts, ties can be signed.
- Reasons could span from trust/mistrust to voting and positive/negative perceptions of feedback and interaction
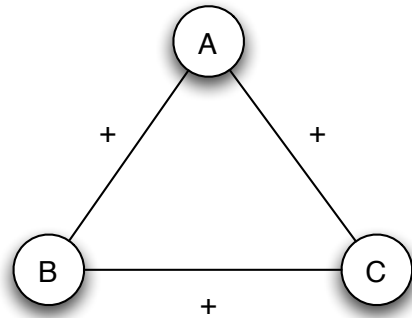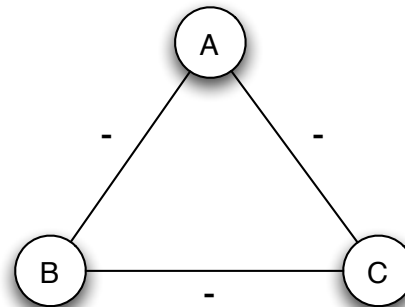

(a) A, B, and C are mutual friends: balanced.
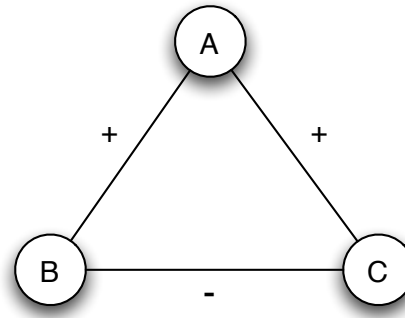
(b) A is friends with B and C, but they don't get along with each other: not balanced.

(c) A and B are friends with C as a mutual enemy: balanced.

(d) A, B, and C are mutual enemies: not balanced.

What does it mean to have "social interaction" in a tie-less system like Yik Yak?

Multiple platform use

Today we use more and more types of networks, and our contacts are spread across them. Social ties depend on the content of our interactions on these platforms. What does therefore a strong (or weak) tie on one platform mean for the other?

Algorithmic Influence

After all, in online context, interface design/ algorithmic manipulation may hugely impact whether a social tie eventually grows to be a strong or a weak tie. What do you think is the impact?

The case of social mobility, weak ties, and social media

- *"Wilson's (1978, 1987) theory of the underclass suggests that as poor African Americans have come increasingly to live in high-poverty neighborhoods, they have lost connections to people who provide ties to the labor market. Their social isolation contributes to difficulties in finding work, and it hinders social mobility"*

- Internet and social media should have made it better?

Class Exercise I

Extras

How can you generalize Gilbert and Karahalios' tie strength prediction model beyond Facebook? Online communities?