CS 6474/CS 4803 Social Computing: Sociological Foundations III

Munmun De Choudhury

munmund@gatech.edu

Week 3 | January 25, 2023

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

Domain-Specific Exploration (3)

- What messages elicit less or more social support?
  - Reddit mental health communities
  - Up- and downvotes as a proxy for social support
  - NLP and psycholinguistic analysis

Domain-Specific Exploration (4)

- The project studied online community discussions about COVID-19 and their relation to offline COVID-19 diagnostic testing volume.

- Specifically, the students examined city subreddits, which are online communities that normally discuss geo-local topics.

- Research questions: (1) To what extent do online expressions about COVID indicate offline COVID testing behaviors? (2) Can COVID-related online conversations predict COVID testing behaviors on a city level?

Ethics and Equity

- Large language models are now the standard to develop state-of-the-art solutions for text detection and classification tasks.

- The adoption of large language models for building approaches for tasks aimed at detecting humanitarian information, fake news, and emotion can lead to systematically lower performance on non-English languages when compared against the performance on English.

- The project empirically showed that including images via multimodal learning bridges this performance gap.
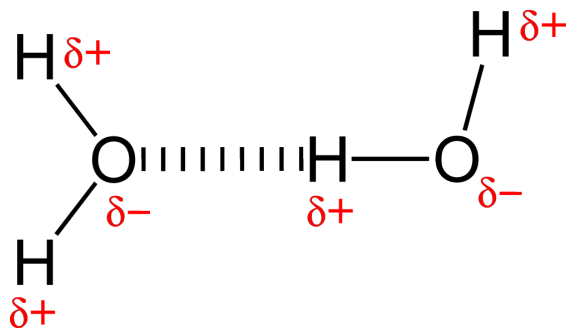
Start forming teams for term project

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.
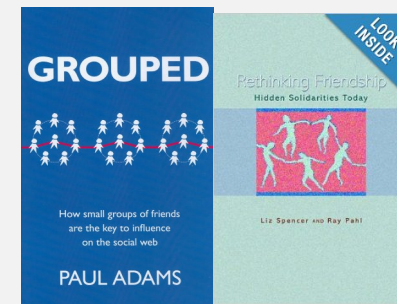
Summary

- Strong, weak and absent ties
- Triangle closure (theory of structural balance), unless forbidden triad

- Finding: even weak ties can be valuable
- 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.**
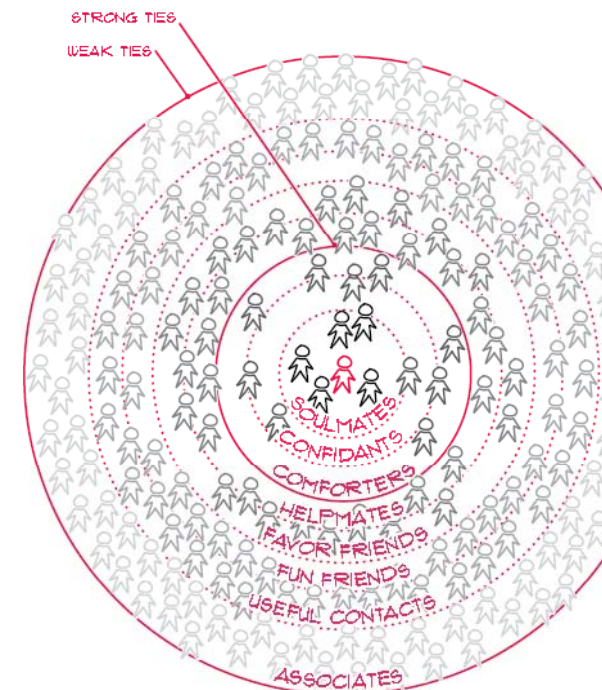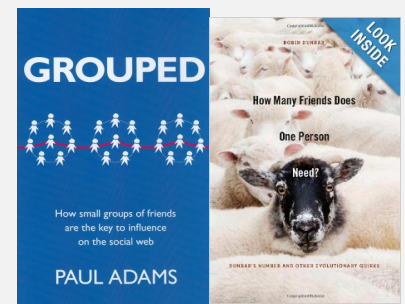- We have a much smaller number of strong ties than weak ties.

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".
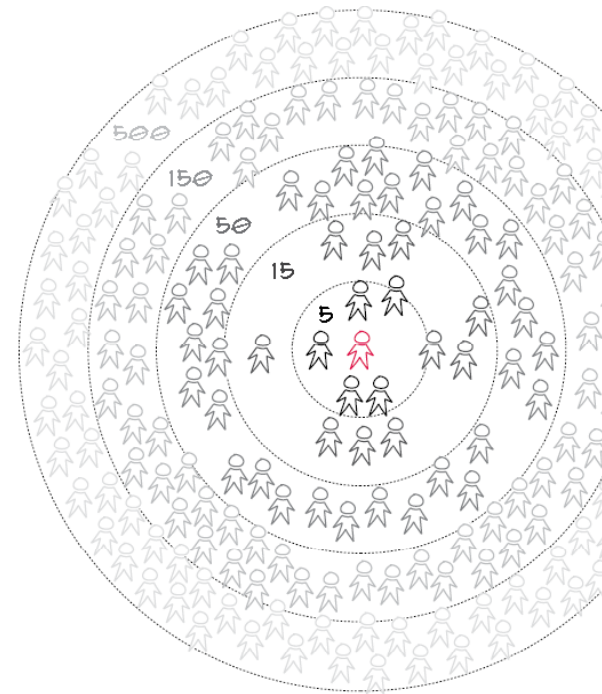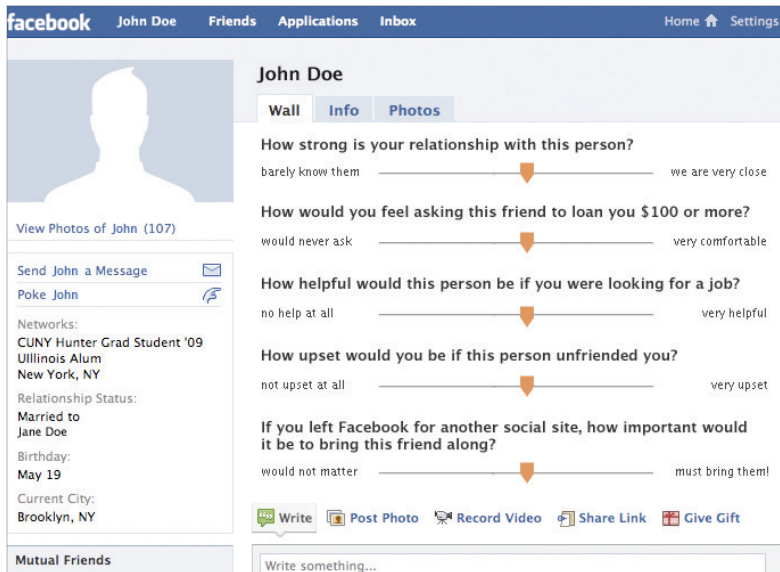
Figure: Credit: (Adams, 2011)

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

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

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

Moira Burke
Facebook
mburke@fb.com

Robert Kraut
Human-Computer Interaction Institute
Carnegie Mellon University
robert.kraut@cs.cmu.edu

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

"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

Andrei Boutyline
University of California, Berkeley

Robb Willer
Stanford University

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

Jure Leskovec
Stanford University
jure@cs.stanford.edu

Daniel Huttenlocher
Cornell University
dph@cs.cornell.edu

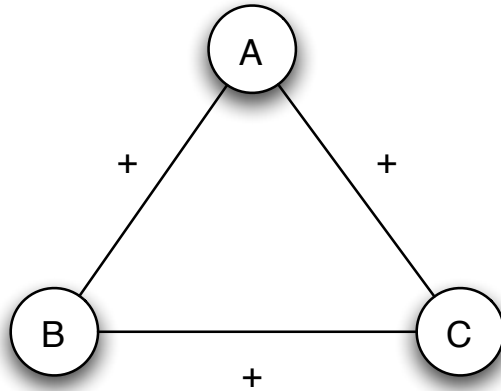**Jon Kleinberg**
Cornell University
kleinber@cs.cornell.edu

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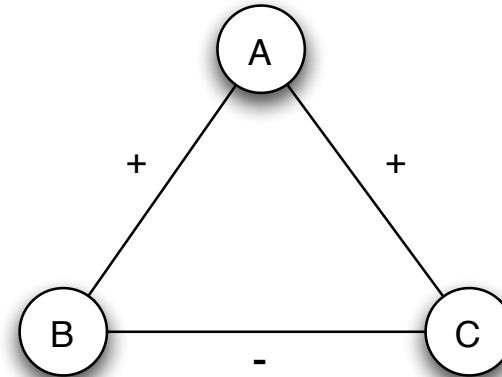
duce these complex relationship to the existence of simple pairwise links. It is a fundamental research problem to bridge the gap between the richness of the existing relationships and the stylized nature of network representations of these relationships.

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
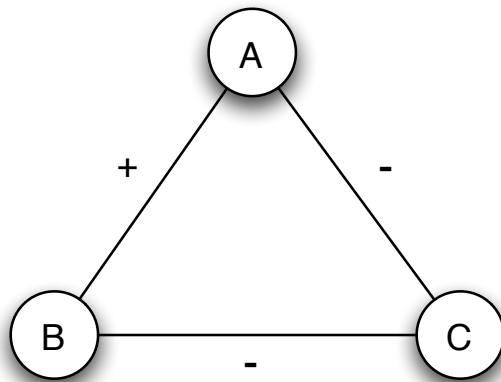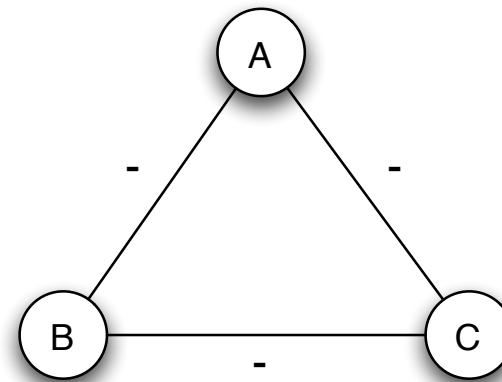
Signed Ties and Structural Balance

(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 Reddit/YouTube?

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

Scenario 1: You want to create an online community in campus for discussing how we can employ technology for social good, for instance, improving the experiences of individuals on campus. You want the community to involve various kinds of partners and stakeholders, ranging from undergraduates to graduate students to faculty, and with different kinds of expertise.

Strong ties are important: Yes No
Weak ties are important: Yes No
Both ties are important: Yes No

Because…

Class Exercise

Scenario 2: You want to create an online community that involves students and others in campus towards a social cause. The community members will come from different backgrounds, having leadership and collegial attributes, and will work with diverse populations across Atlanta to pursue the goals of the social cause. The community will engage in a variety of outreach work.

Strong ties are important: Yes   No
Weak ties are important: Yes   No
Both ties are important: Yes   No

Because…

Class Exercise

Scenario 3: You want to create an in-campus support community online (for instance, a closed/private Facebook group, or a private subreddit) where students can come and self-disclosure themselves, discuss about their academic, personal and social challenges, and obtain social and emotional support from others. The community will be a positive behavior reinforcement platform where people can confide in each other, build trust and feel safe.

Strong ties are important: Yes   No
Weak ties are important: Yes   No
Both ties are important: Yes   No

Because…