Analysis of Social Information Networks

Thursday March 24th, Lecture 9: Briefing Discussion/Projects
Outline

* Next 4 lectures: Paper Discussion
  - Motivation, Organization
  - Overview of topics, tier-1 papers, and tier 2 lists

* Projects
  - Two examples
  - General advices

* After the break: Questions about practice
Now, after the first half of the class

- You can cite fundamental results of social networks (e.g. small world, epidemics, reinforcement)
- You know about algorithms exploiting social property (e.g. routing, optimize influence, gossip, ranking)
- You can even mathematically justify most of them

Now it’s time to

- Detail how real social networks look and behave
- Be able to present a perspective on them
Paper discussion: Organization

- Rationale: learning by doing & seeing how other do
- Two different skills to develop
  1. understand, reproduce, communicate a paper
  2. take some distance and present counterpoints
     - 1 is familiar; 2 less familiar, important, hard to train
- Each topic will be assigned two students
  - A presenter (to train skill 1, 25’ talk)
  - A discussant (to train skill 2, 10’ lead a discussion)
‐ 12 topics (list upcoming), each containing
  – a tier-1 paper,
  – one or several tier-2 papers

‐ Topics assigned by auctions using tokens
  – 12 tokens presenter, 12 tokens discussant
  – Send your tokens by Wednesday March 30th 12pm
  – Like PCs, we will satisfy preferences with best effort
  – Don’t worry too much about this stage, because you are able to do any of these
Once a topic assigned to presenter-discussant

**Presenter:**
- Goal: reproduce and communicate tier-1 paper
  - 25’ talk
  - slides (about ~12-14, one idea per slide) or handouts

**Discussant:**
- Goal: propose counterpoints, open ended discussion
  - 10’ (could be a talk (~5 slides), interactivity a plus)
  - tier-2 papers are here to help
Good sanity check

- Know how to read! The three levels of reading
  - *Efficient Reading of Papers in Science and Technology*, M. J. Hanson, D. J. McNamee (2000)

- For any paper, check very carefully
  - Is there the formulation of a computational problem?
  - Is there a proof of a theoretical results?
  - Is there a empirical result from experiment / data set?

These are the things you want to communicate first!
All accompanying materials should be sent by previous Wednesday 12pm

- Penalty: 20% taken from grading
- Rationale:
  1. meeting during previous office hours (or, if you are busy at 2-3:30 anytime Wednesday afternoon),
  2. allow others to be prepared.
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List of topics

* 3 topics on properties of online social networks
* 3 topics on online media popularity
* 3 topics on information propagation, cascades
* 3 topics on recommendation & influence
Topic #1: April 7th

Measurement and Evolution of Online Social Networks

Other papers:

Affiliation and Groups in Social Network

Other papers:

Topic #3: April 7th

User interaction in OSNs

Other papers:
Schneider et al. Understanding online social network usage from a network perspective. Proc. of IMC (2009)

List of topics

* 3 topics on properties of online social networks
* 3 topics on online media popularity
* 3 topics on information propagation, cascades
* 3 topics on recommendation & influence
Topic #4: April 14th

Popularity and its dynamics: You-tube

Other papers:

Cha et al. Analyzing the video popularity characteristics of large-scale user generated content systems. IEEE/ACM Transactions on Networking (TON (2009) vol. 17 (5)
Topic #5: April 14th

Popularity and its dynamics: Web

Other papers:

Szabo and Huberman. Predicting the popularity of online content. Communications of the ACM (2010) vol. 53 (8)
Topic #6: April 14th

Popularity and its dynamics:
Twitter

Other papers:
Huberman et al. Social networks that matter: Twitter under the microscope. First Monday (2009) vol. 14 (1) pp. 8

List of topics

* 3 topics on properties of online social networks
* 3 topics on online media popularity
* 3 topics on information propagation, cascades
* 3 topics on recommendation & influence
Topic #7: April 14th

Communication Patterns

Other papers:


Kossinets et al. The structure of information pathways in a social communication network. KDD '08: Proceeding of the 14th ACM SIGKDD international conference on Knowledge discovery and data mining (2008)
Topic #8: April 14th

Conversation

Other papers:
Chan and Daly.... Decomposing discussion forums and boards using user roles. AAAI Conference on Weblogs and Social ... (2010)

Kumar et al. Dynamics of conversations. KDD '10: Proceedings of the 16th ACM SIGKDD international conference on Knowledge discovery and data mining (2010)
Topic #9: April 14th

Information propagation
Cascades in flickr/blogs

Other papers:

Cha et al. A measurement-driven analysis of information propagation in the flickr social network. Proceedings of the 18th ... (2009)
List of topics

* 3 topics on properties of online social networks
* 3 topics on online media popularity
* 3 topics on information propagation, cascades
* 3 topics on recommendation & influence
Topic #10: April 28th

Properties of Blogosphere

Other papers:


Götz et al. Modeling blog dynamics. AAAI Conference on … (2009)


Topic #11: April 28th

Influence in the Blogosphere

Other papers:

Topic #12: April 28th

Empirical analysis of social recommendation systems

Other papers:
Richardson and Domingos. Mining knowledge-sharing sites for viral marketing. Proceedings of the eighth ACM SIGKDD international conference on Knowledge discovery and data mining (2002) pp. 70

Leskovec et al. The dynamics of viral marketing. ACM Transactions on the Web (2007)
Leskovec and Singh…. Patterns of influence in a recommendation network. Advances in Knowledge Discovery … (2006)
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Example 1:

Emergence of small world navigation
Thm: random mobility/forgetting creates small world network

Does the result extend to other mobility? Simulations

Example 2:

Dissemination of updates on a social networks

Proof: large conductance ensures that age remains small

Is conductance a necessary conditions? How would it perform in other context?


Dichotomy between epidemics and influence
- Conductance, expansion have opposite effects.
- In reality epidemics/influence are often combined
- Can we empirically characterize how they interact?

What characterize influence processes
- Reinforcement generally creates “critical mass”?
- How to justify diminishing return?
- Is that applicable to graph evolution?
Guidelines

* Be as much creative as you can!
  - A good starting point is the part of the course that inspires you the most and/or your discussant topic.
  - Ask me (email, office hours) as much as you need

* Rules:
  - Please mention a topic to me by April 3rd
  - Early proposal (2 pages) due on April 10th
  - Final report due on May 10th
  - You can be in pairs if the project has substantial goal