

User Identities in a Social World

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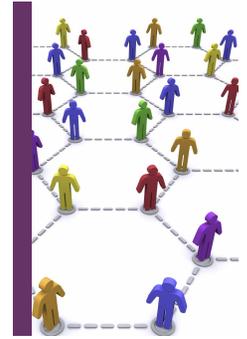
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What is the Problem?



- Social media is rapidly gaining importance
- Social media depends heavily on quality of “user identities”



Fake IDs: Can we trust the social media battlefield?



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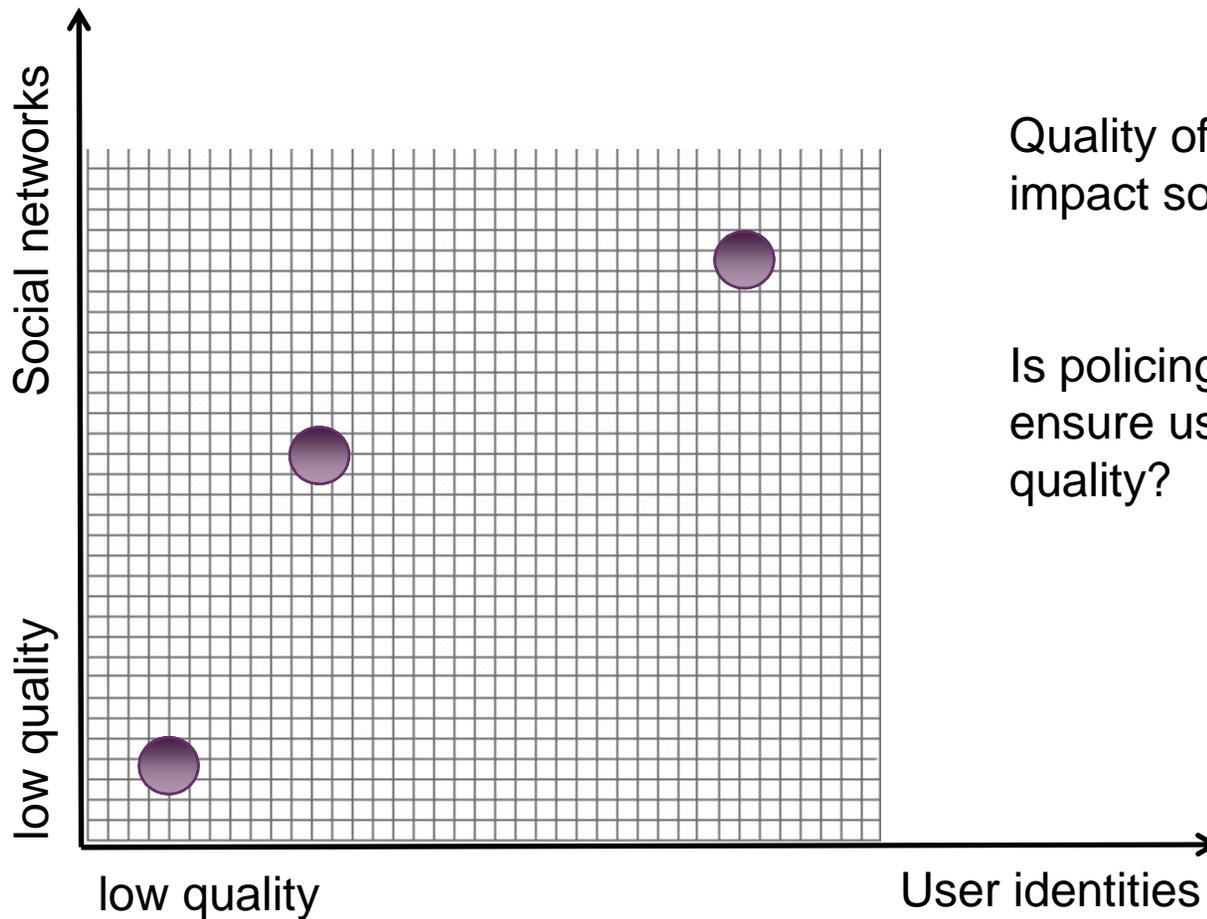
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Geron Lang, CTV.ca News
Date: Saturday Mar. 12, 2011 6:07 AM ET

Regular people organizing themselves through social media are credited with propelling the wave of anti-government protests across North Africa and the Mideast in recent weeks.

- **Forums:** We start new threads and embed our videos. Sometimes, this means kickstarting the conversations by setting up multiple accounts on each forum and posting back and forth between a few different users. Yes, it's tedious and time-consuming, but if we get enough people working on it, it can have a tremendous effect.

User Identities & Social Networks



Quality of user identities
impact social networking

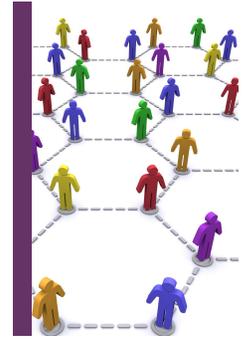
Is policing the only way to
ensure user identity
quality?

User Identities

- User identity
 - Amount of **information released** by the identity
 - Level of **cooperation garnered** by the identity
- Information released
 - Attributes such as photos, address, and other markers
 - Linkages with other identities
 - Prior cooperation with other identities
- Cooperation garnered
 - Context dependent signaling

Your
action

Other
party's
reaction



User Identity Types



- Fixed Identities

- Owner: costly to change
- Others: easy to discover & cooperate

- Pseudonyms

- Owner: easy to change
- Others: costly to discover & cooperate

- **Social Pseudonyms**

- Owner: costlier than pseudonyms
- Others: easier than pseudonyms

Social Pseudonyms

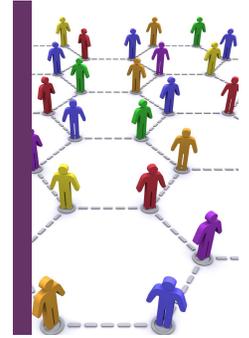
Is a collection of pseudonyms that are connected to each other by social links

Advantages of Social Pseudonyms?



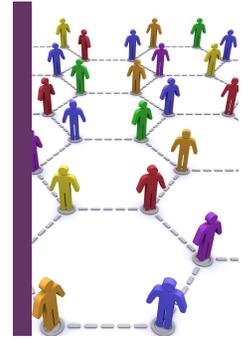
- Compare fixed, pseudonyms, and social pseudonyms using evolutionary games
- Strategies available for the players:
 - Image score (reputation score)
 - Pay your dues (PYD)
 - Pavlov (cooperate when both players using the same strategy)
 - Tit-for-2-Tat (defect after two consecutive defections from others)
- Two classes of players:
 - Whitewashers (always defect and change ID afterwards)
 - Discriminators (play using the strategy)
- Cost used in evaluation:
 - Effort to evict whitewashers

Reputation (Image) Score

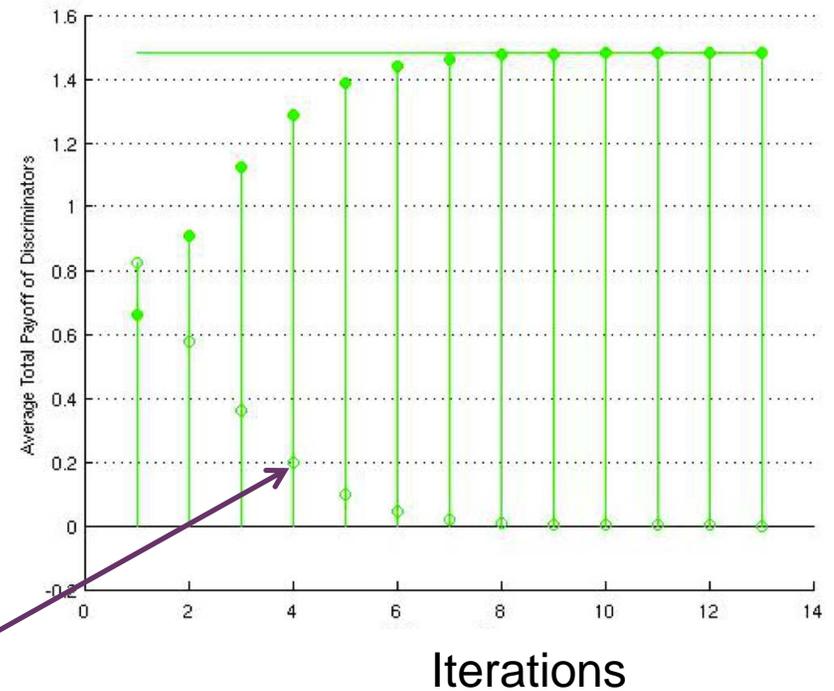
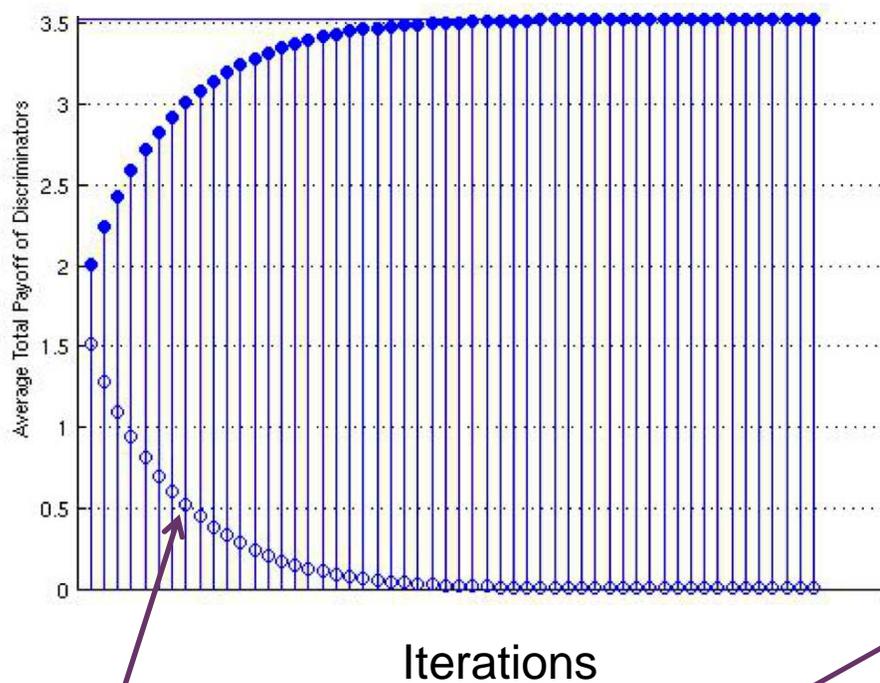


- Pseudonym:
 - Discriminators have to cooperate proactively without knowing lot of information about other players
 - Discriminators take more “risk” to evict whitewashers
 - StackExchange sites might be an example of this behavior?
- Social Pseudonym:
 - Discriminators need to cooperate only when they have lot of information about other players
 - Discriminators take less “risk”
 - Characteristic of a tightly coupled society!

Reputation (Image) Score



Social Pseudonyms: discriminators are able to evict whitewashers sooner

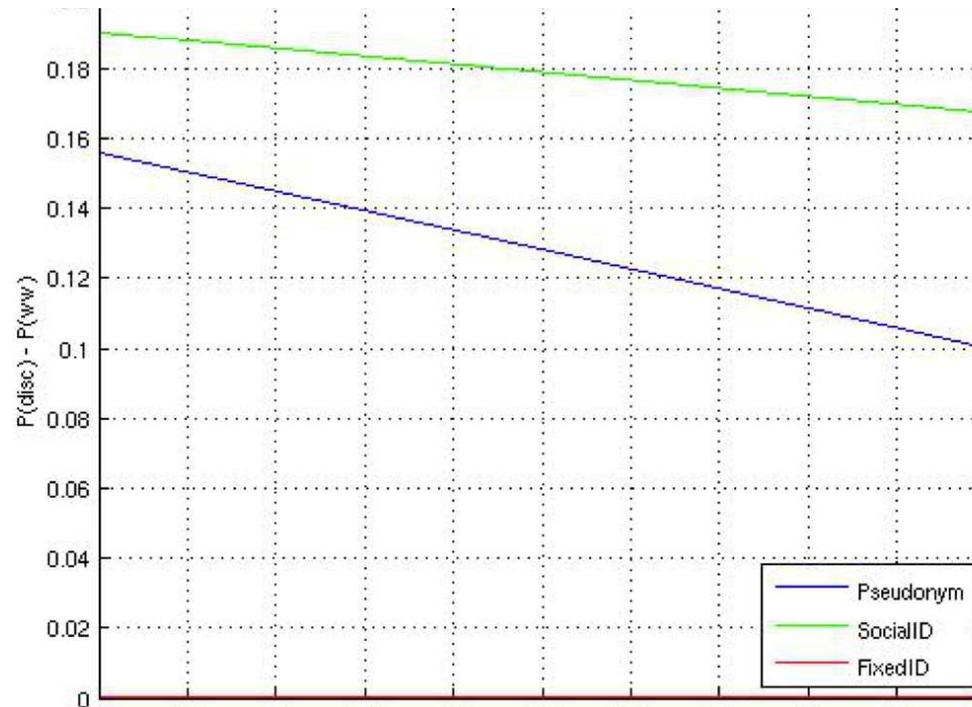


Payoff loss due to whitewashers

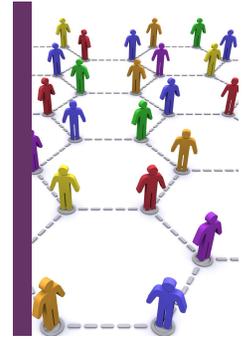
PYD (Pay Your Dues)



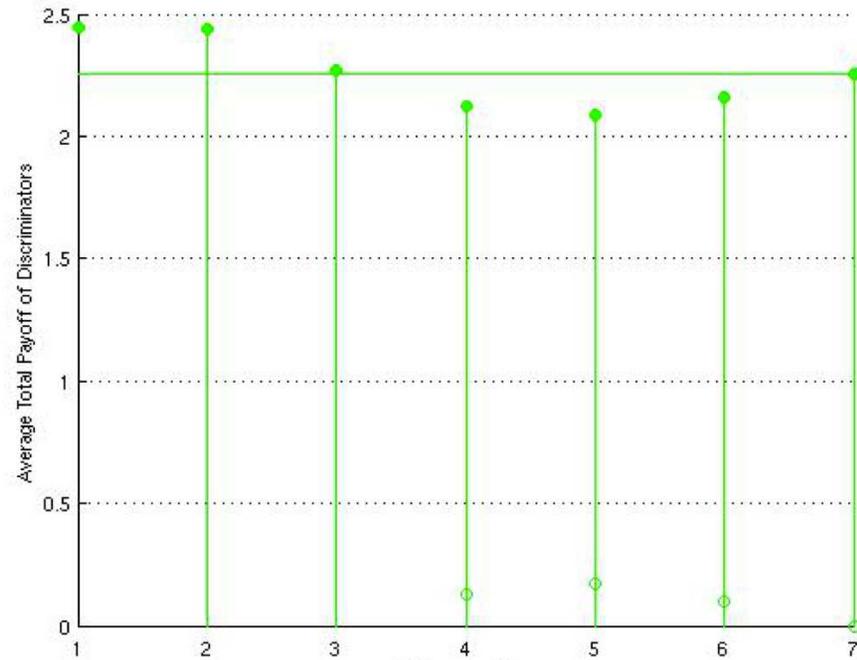
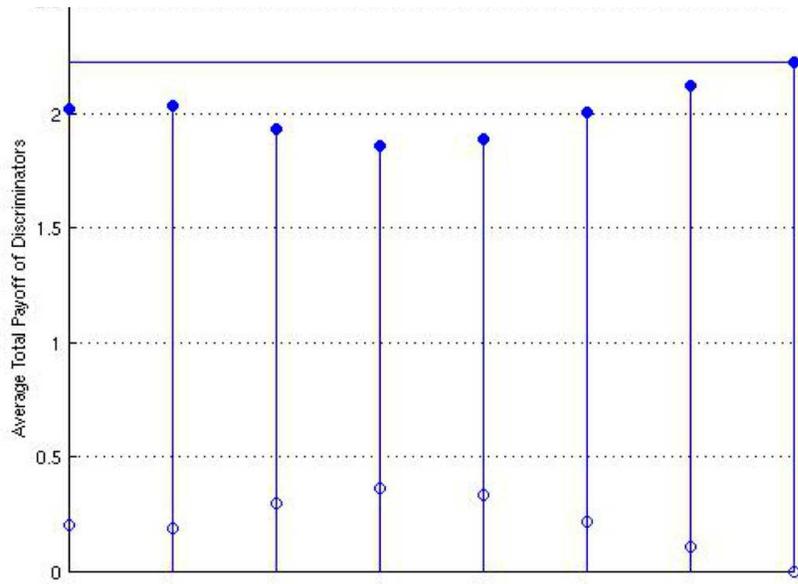
- Pseudonym and Social Pseudonym both have the same preference
 - Need more information about other player to cooperate



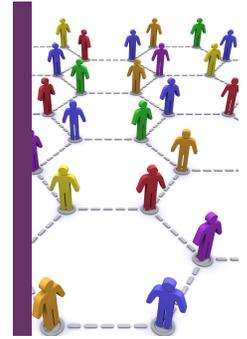
PYD (Pay Your Dues)



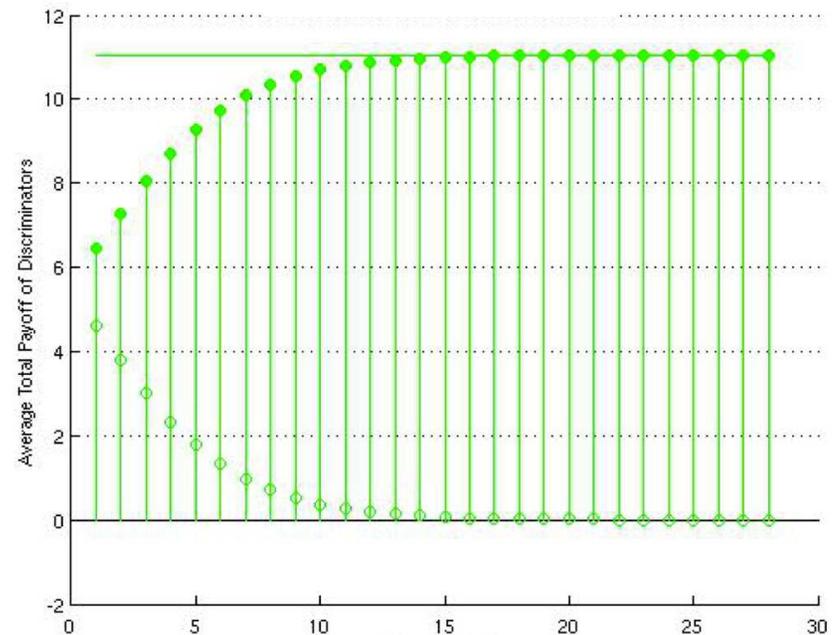
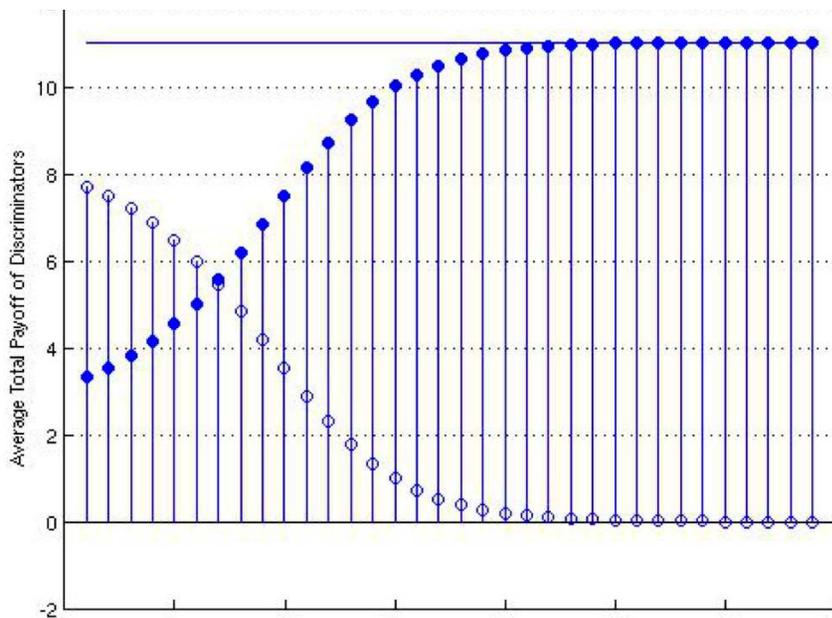
Social Pseudonym still evicts whitewashers faster than the normal pseudonym



Tit-for-2-Tat

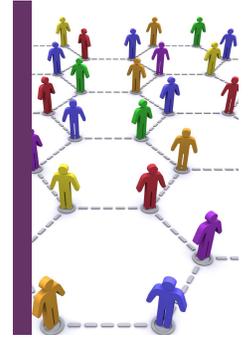


Very forgiving strategy. Both schemes suffer because whitewashers are not punished promptly



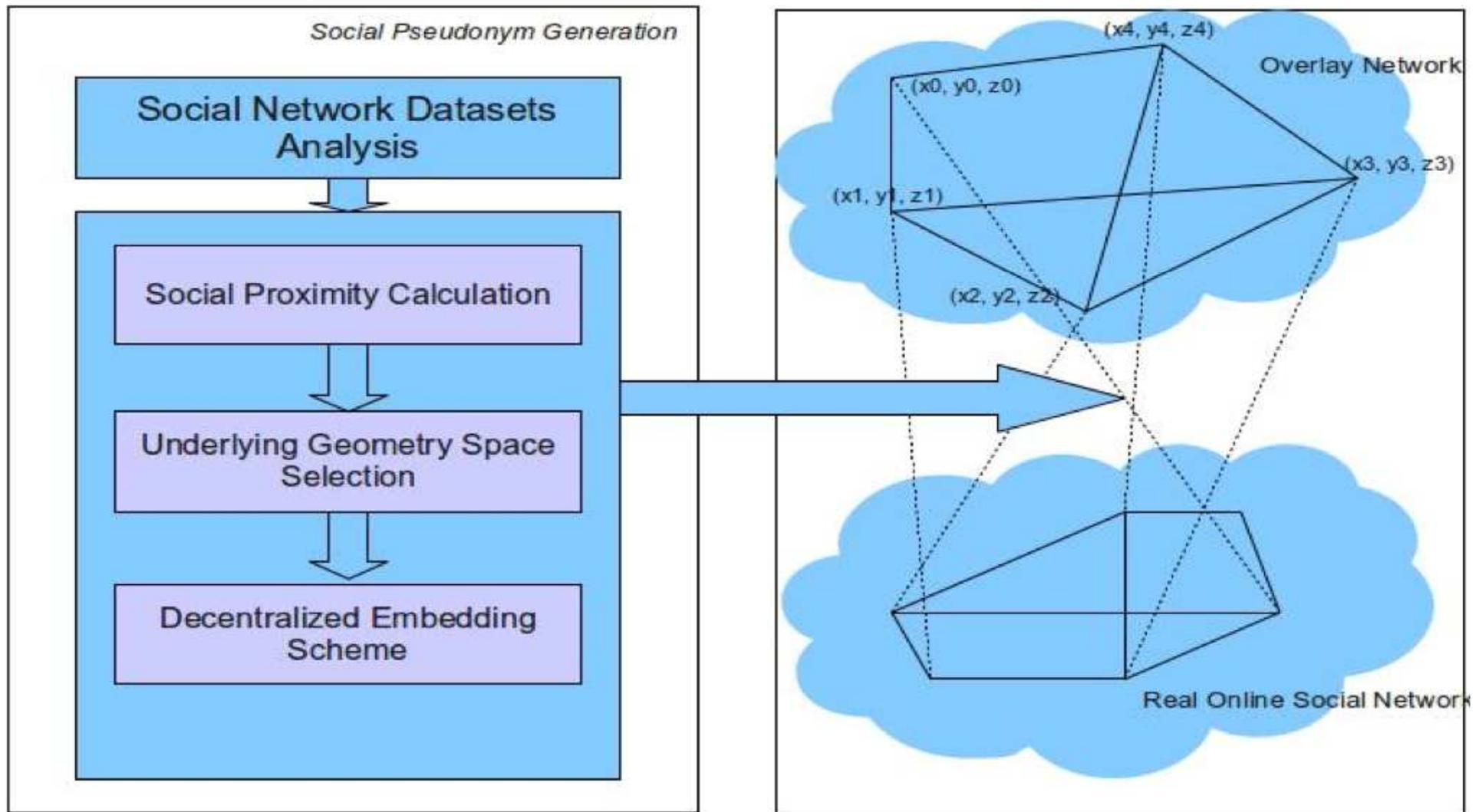
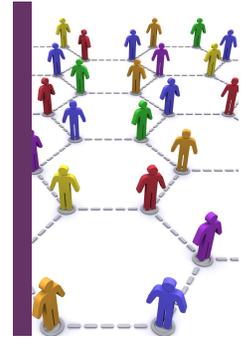
Social Pseudonym still evicts whitewashers faster than the normal pseudonym

How to use Social Pseudonyms?



- Privacy issues:
 - Node privacy: Social pseudonym does not create an issue here
 - Link privacy: major problem
- Data ownership problem: who owns the friendship links?

Centralized Social Pseudonym Construction



Centralized Social Pseudonym Construction



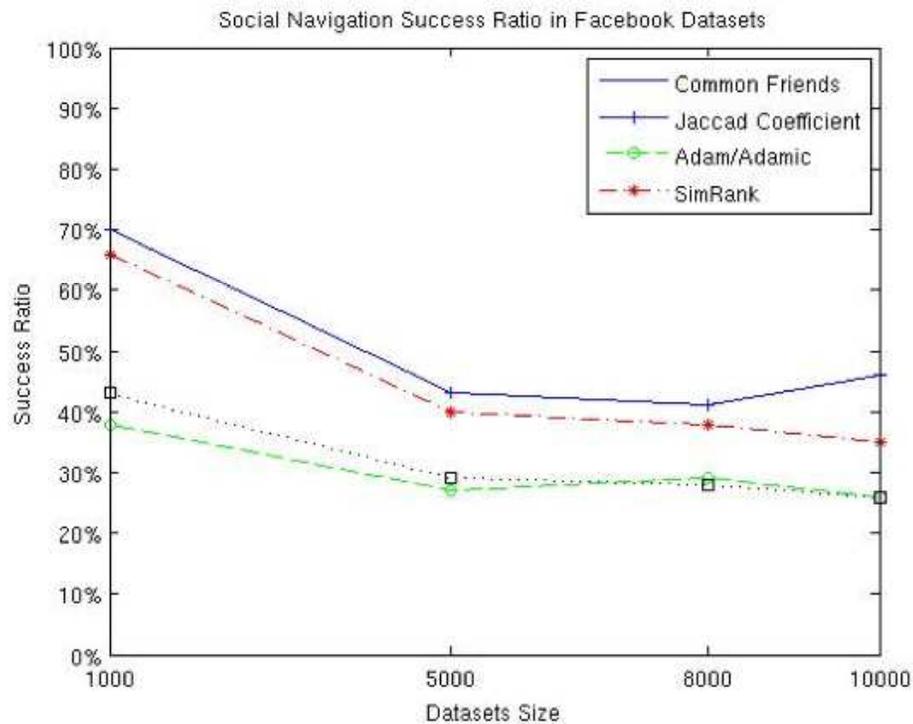
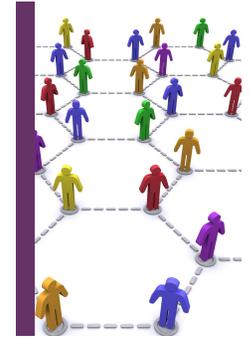
Table 5.1 Datasets characteristics for size 1000

	Max. Degree	Avg. Degree	Avg. Shortest Path Len.	clustering coefficient	γ (Pow Law Exponent)
Facebook	107	15.24	3.54	0.44	2.10
Flickr	427	45.21	2.33	0.48	1.81
LiveJournal	183	15.3	3.68	0.58	1.83
Orkut	345	27.37	3.36	0.64	1.34

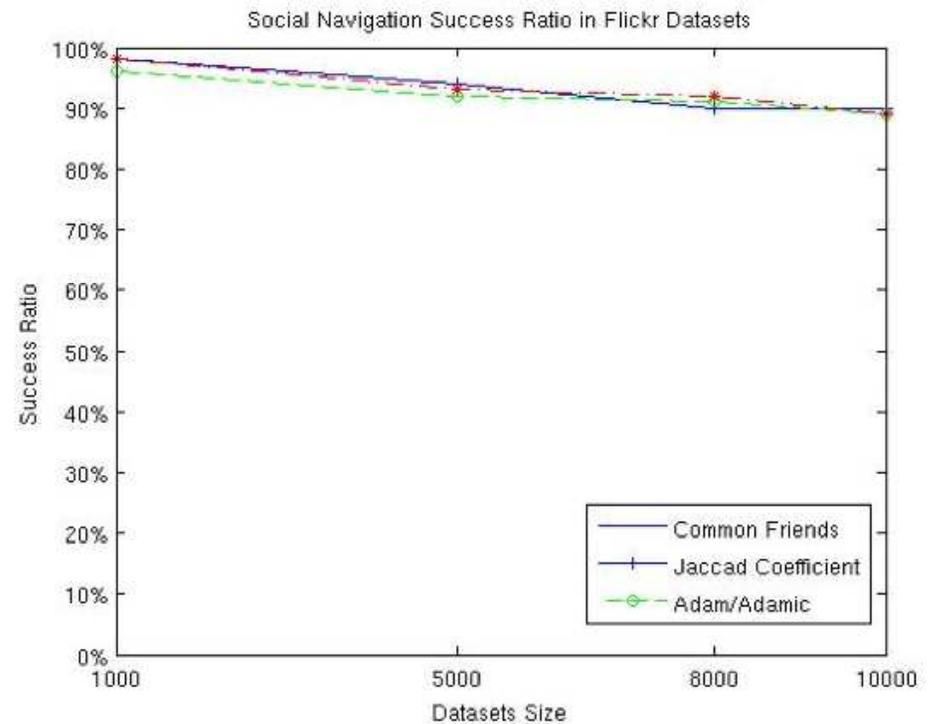
Table 5.4 Datasets characteristics for size 10,000

	Max. Degree	Avg. Degree	Avg. Shortest Path Len.	clustering coefficient	γ (Pow Law Exponent)
Facebook	521	29.2	3.39	0.26	2.44
Flickr	3789	144.05	2.42	0.3	2.23
LiveJournal	501	16.21	4.21	0.42	2.26
Orkut	439	25.27	3.91	0.47	2.81

Centralized Social Pseudonym Construction

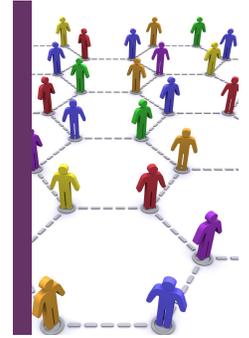


(a) Facebook



(b) Flickr

TribalID



- Goals:
 - Make identity independent of the service provider (e.g., Facebook like services)
 - Provide full control to the users
 - Belong or not belong
 - Disclose or not disclose
 - Use “crowds” to blend in

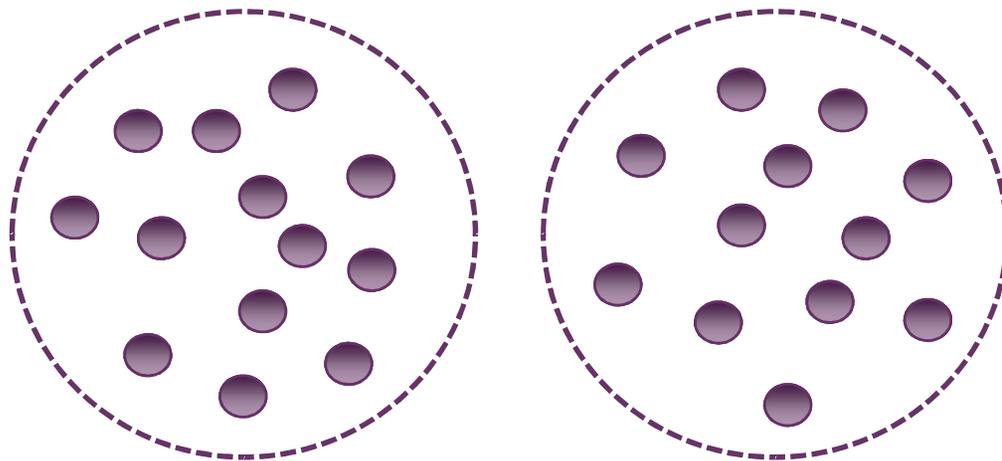
- Basic Idea:
 - Users create “tribes”
 - Others join one or more tribes
 - Tribes gain reputation or trust depending on member activity

How to create TriballIDs?



■ Familiar stranger:

- Not friend nor friend-of-friends
- Concept introduced by Stanley Milgram in a 1972 paper
- Denotes “weak links”

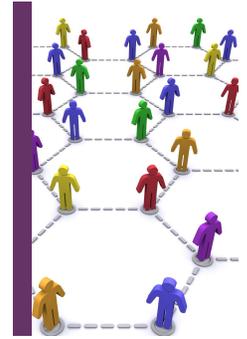


Issue keys so participants can identify other strangers at a later time

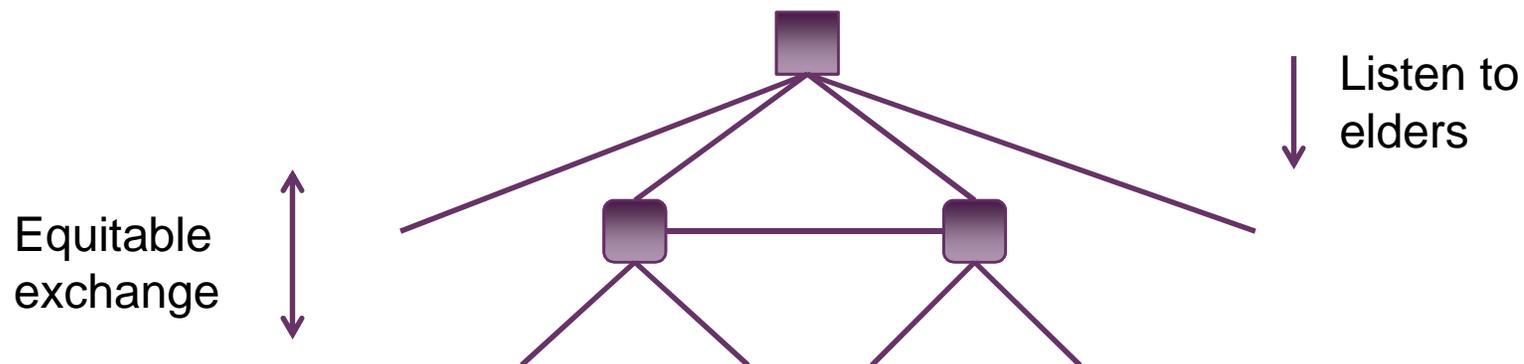
Familiar strangers

- People attached to a WiFi zone in a consistent manner
- Bloggers who are likely to have seen each others' activity

How to create TriballIDs?



- Users either create a tribe themselves or join an existing tribe
 - Information regarding familiar strangers can be shared with others in the tribe
 - A tribe has structure: founder, elders, juniors, and newcomers
 - Information dissemination policies can be different in different tribes
- Tribes “self select”



How to use TriballIDs?



- Primary purpose:
 - Recognize other users
 - Filter information created by other users



- Same tribe
- Trusted tribe
- Untrusted tribe
- Distrusted tribe

- Other applications:
 - Poll trusted neighborhood?

How to deploy TriballIDs?



- TriballID providers
 - Run by individuals via a cloud appliance
 - Use OpenID to deliver the TriballID to relying parties
 - Should be highly available
- Relying parties
 - Consuming service for TriballIDs
 - Get preferences or context from TriballID provider

Summary

- User identities in an important problem
- Many proposals already
- What is new here?

