

# User Identities in a Social World

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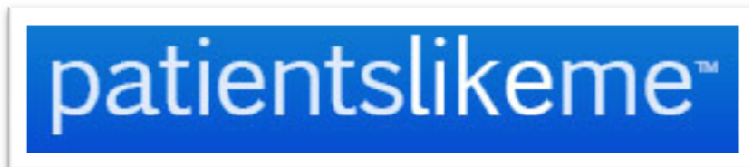
Web: <http://www.cs.mcgill.ca/~anrl>

Students in the project: Yijia Xu, Fugui Tang, and Bader Ali

# 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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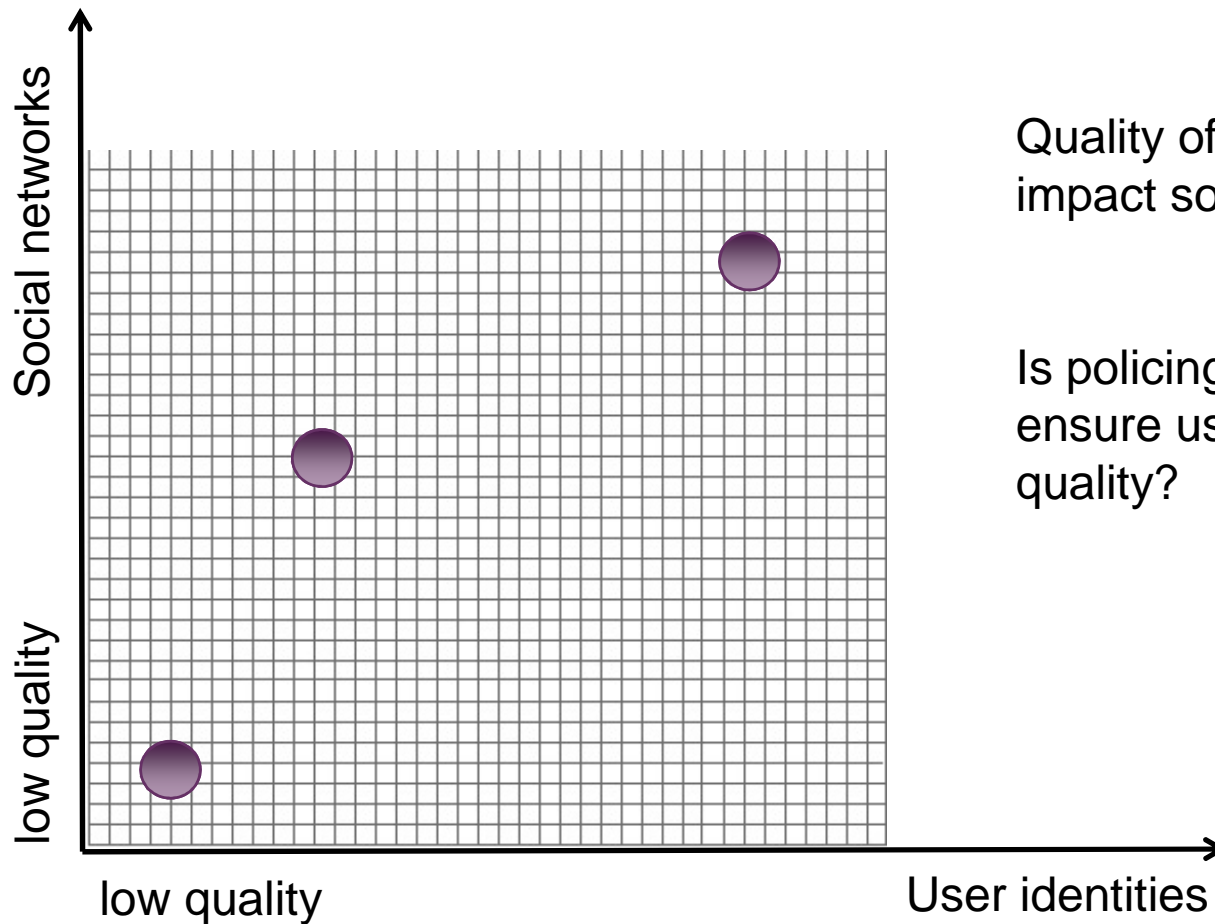
Geron Lang, CTV.ca News

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

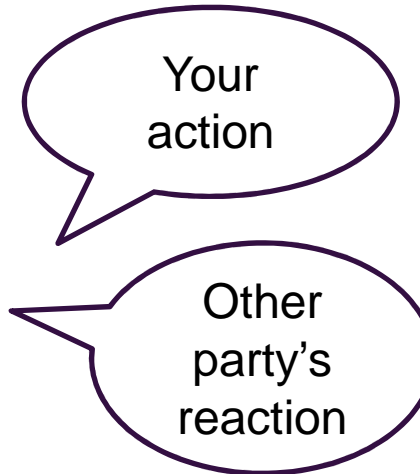
- Amount of **information released** by the identity
- Level of **cooperation garnered** by the identity

- Information released

- Attributes such as photos, address, and other markers
- Linkages with other identities
- Prior cooperation with other identities

- Cooperation garnered

- Context dependent signaling



# 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?

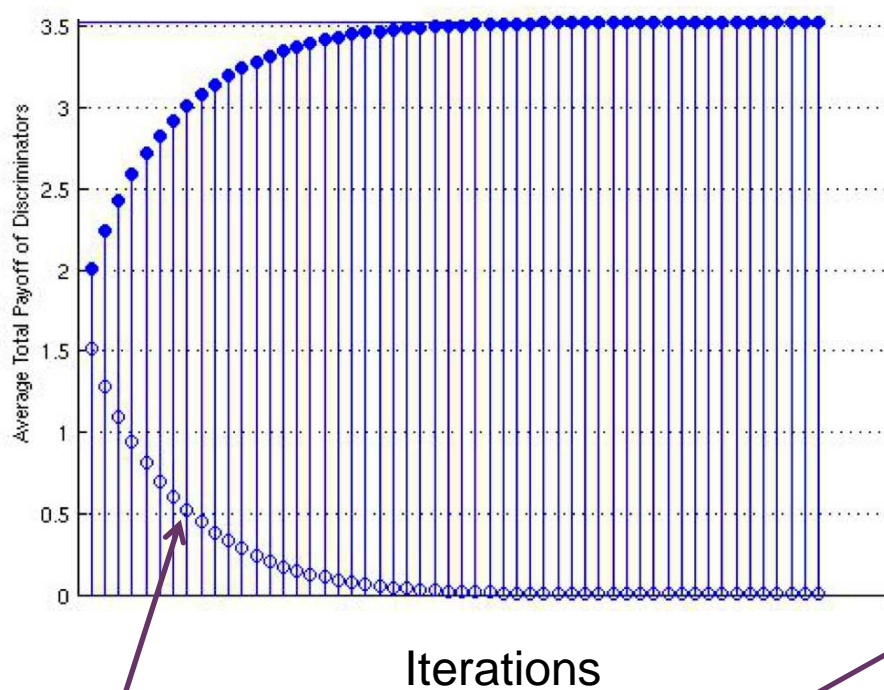
## ■ Social Pseudonym:

- Discriminators need to cooperate only when they have lot of information about other players
- Discriminators take less “risk”
- Characteristic of a tightly coupled society!

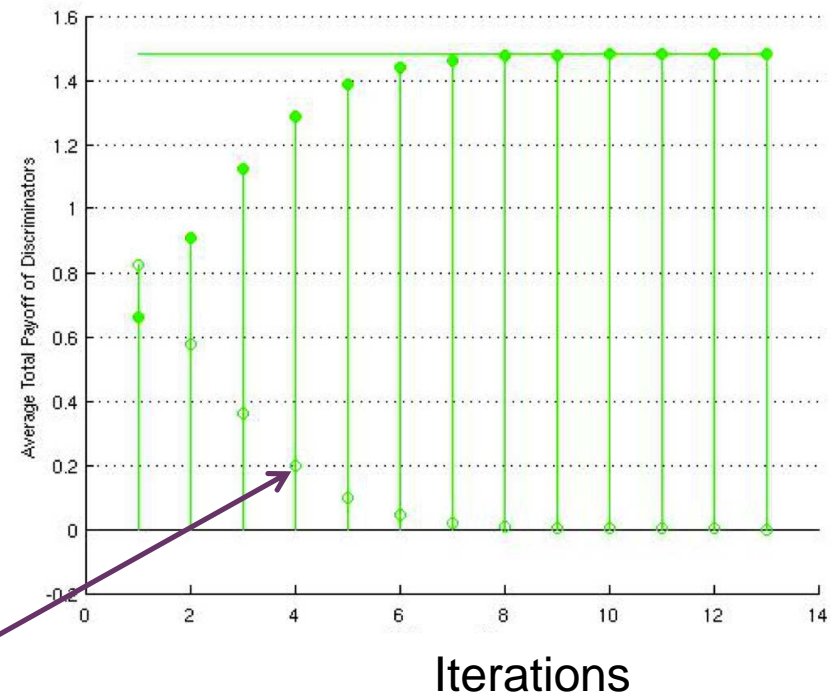
# Reputation (Image) Score



Social Pseudonyms: discriminators are able to evict whitewashers sooner



Payoff loss due to whitewashers

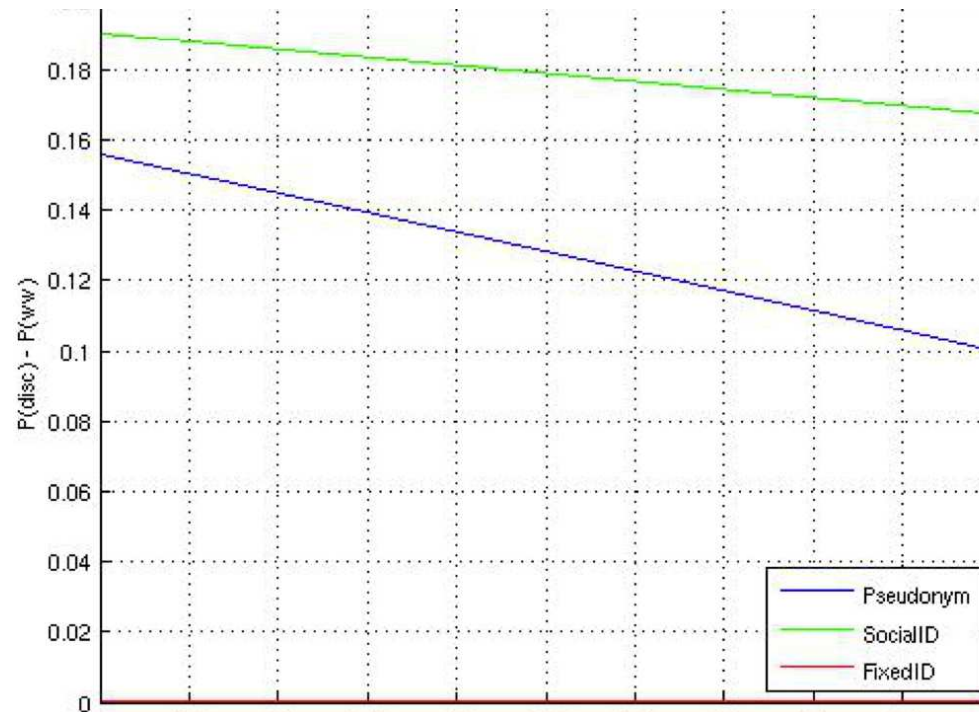




# PYD (Pay Your Dues)



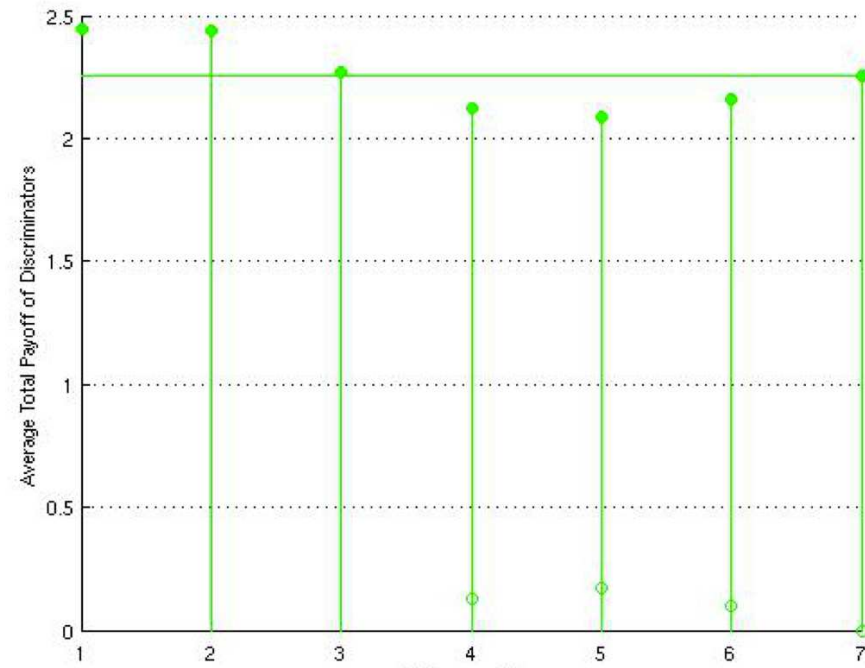
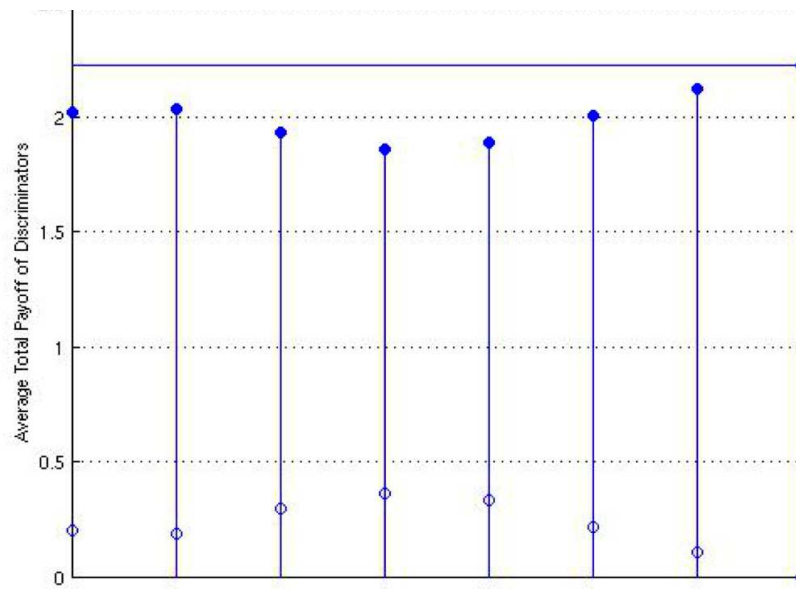
- Pseudonym and Social Pseudonym both have the same preference
  - Need more information about other player to cooperate



# PYD (Pay Your Dues)



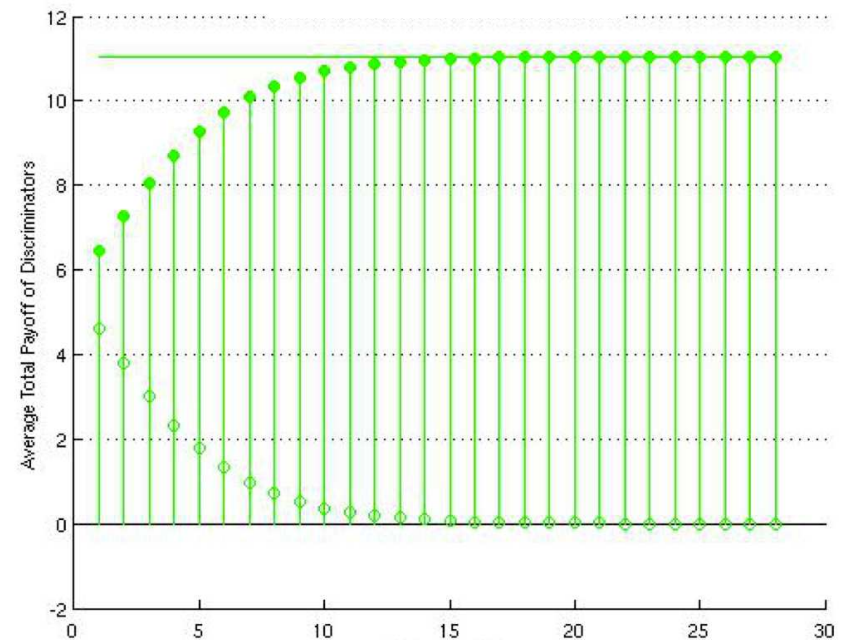
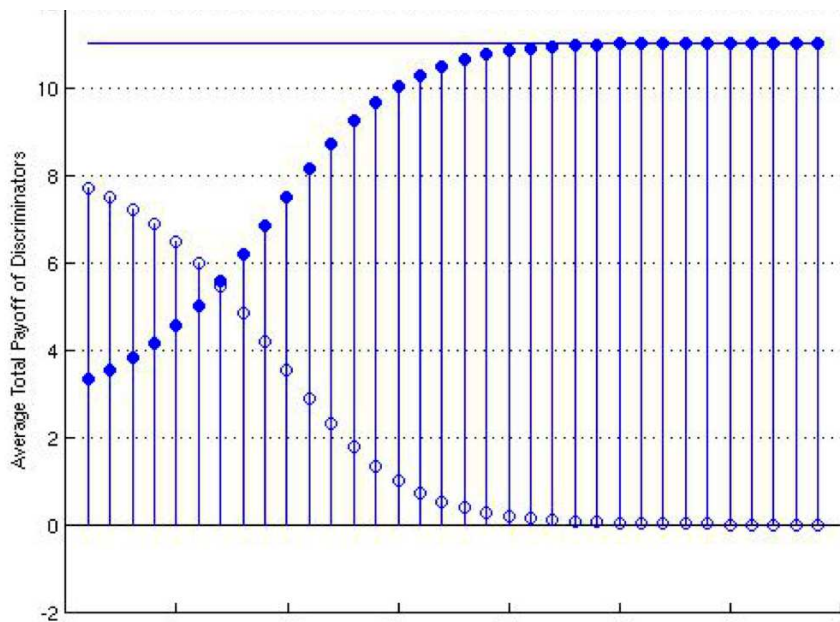
Social Pseudonym still evicts whitewashers faster than the normal pseudonym



# Tit-for-2-Tat



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



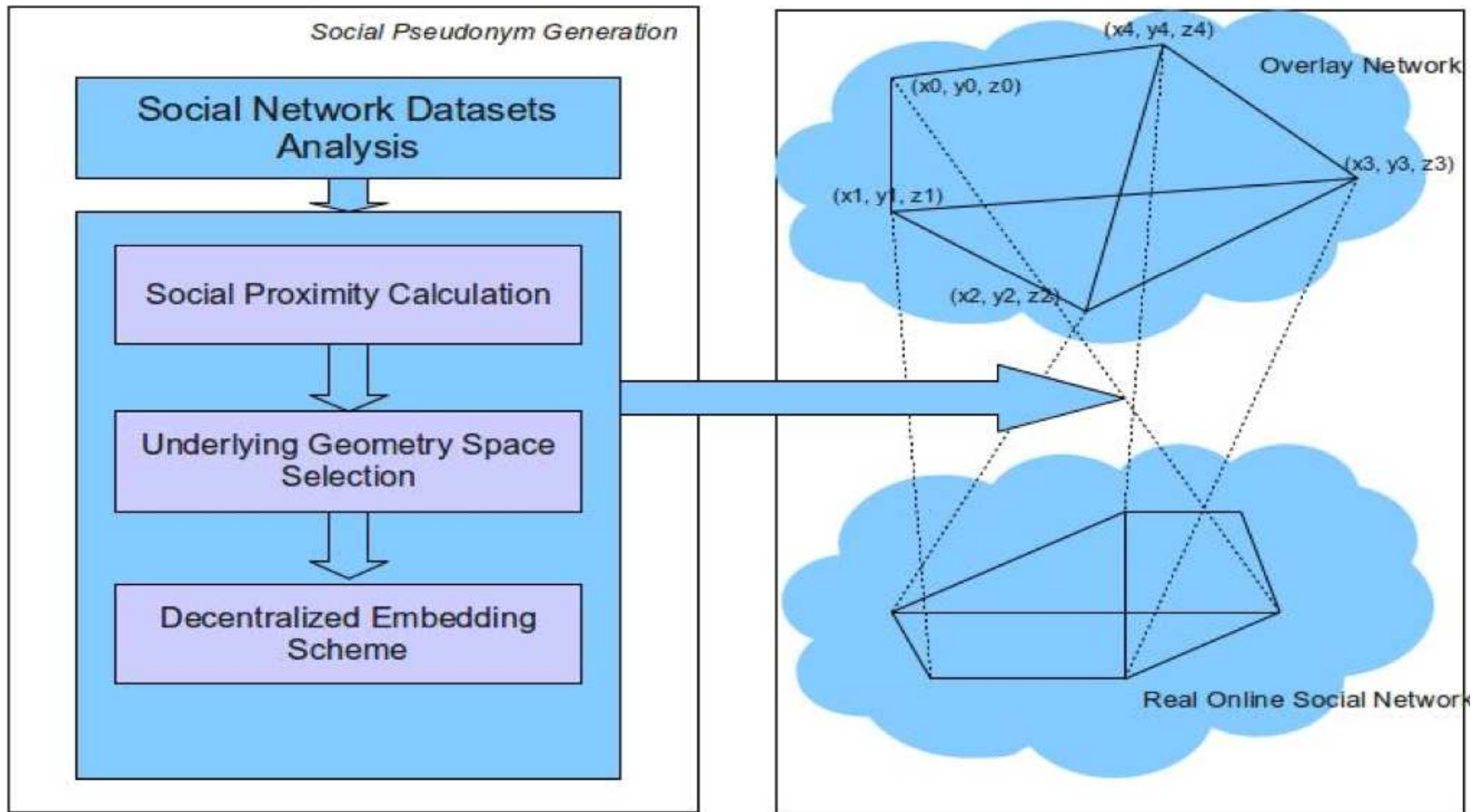
Social Pseudonym still evicts whitewashers faster than the normal pseudonym

# 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

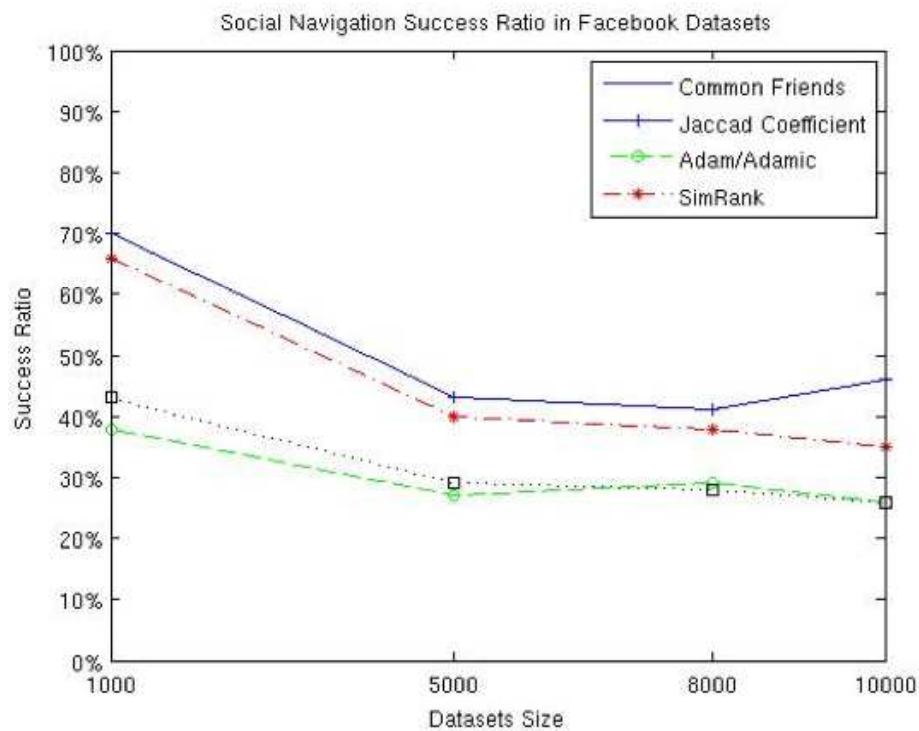
	Max. Degree	Avg. Degree	Avg. Shortest Path Len.	clustering coefficient	$\gamma$ (Pow Law Expo- nent)
Facebook	107	15.24	3.54	0.44	2.10
Flickr	427	45.21	2.33	0.48	1.81
LiveJournal	183	15.3	3.68	0.58	1.83
Orkut	345	27.37	3.36	0.64	1.34

**Table 5.4** Datasets characteristics for size 10,000

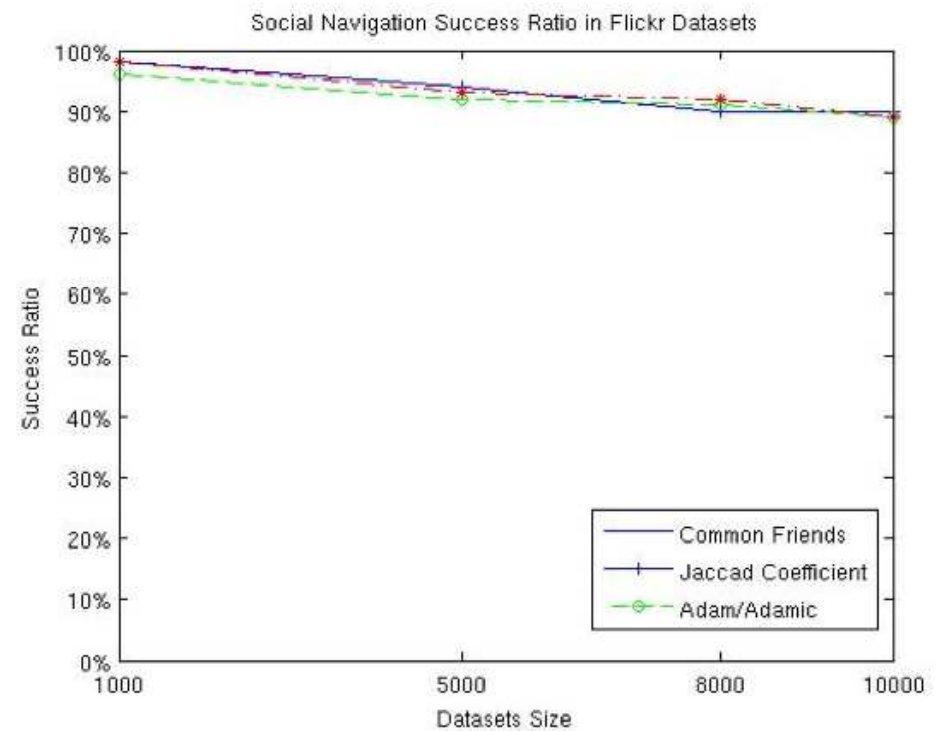
	Max. Degree	Avg. Degree	Avg. Shortest Path Len.	clustering coefficient	$\gamma$ (Pow Law Expo- nent)
Facebook	521	29.2	3.39	0.26	2.44
Flickr	3789	144.05	2.42	0.3	2.23
LiveJournal	501	16.21	4.21	0.42	2.26
Orkut	439	25.27	3.91	0.47	2.81



# 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

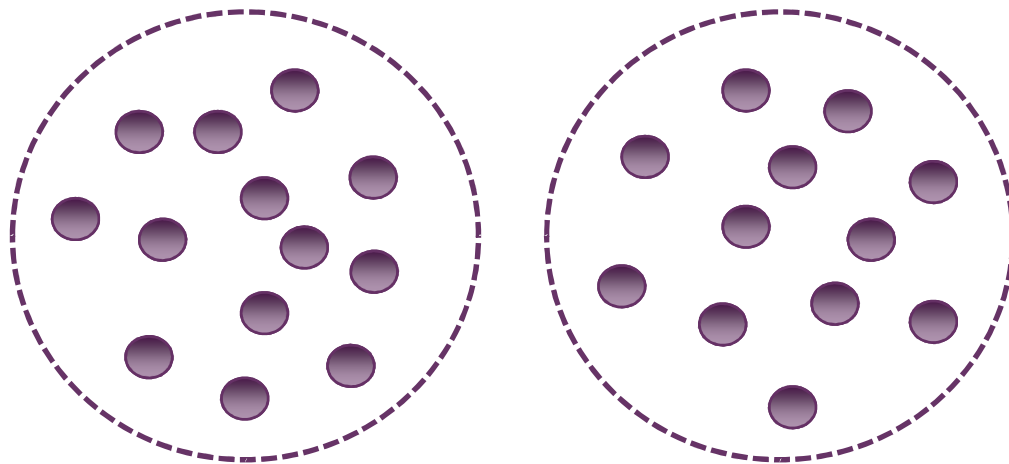


# How to create TriballIDs?



## ■ 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

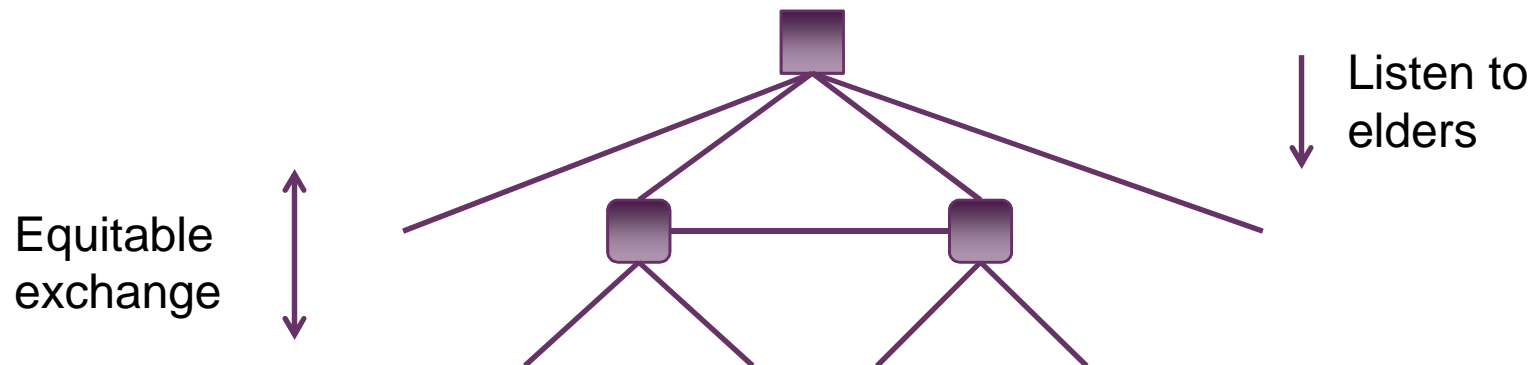
## Familiar strangers

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

# How to create Tribes?



- 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 TribalIDs?



- 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 TribalIDs?



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

# Summary

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

