

# Characterizing User Behavior in Online Social Networks

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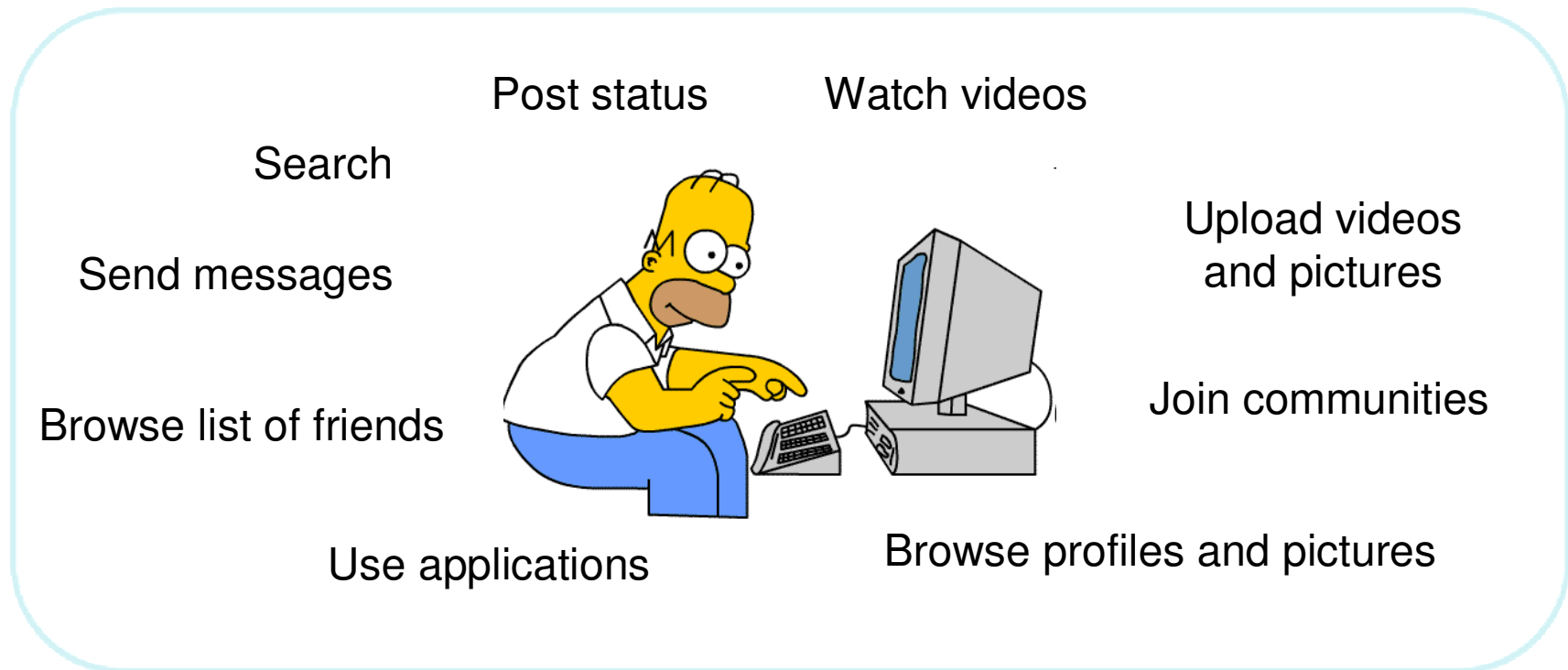
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# What do users do in OSNs?



Understanding user behaviors in OSNs is useful for better design of interface and content distribution

# Goals

- 1) Characterize user navigation patterns in OSN
  - ✓ Frequency, time spent, and sequence of activities
  
- 2) Understand social interaction patterns in OSN
  - ✓ Study patterns based on not one, but all activities



**Part1.**  
**Data and statistics**



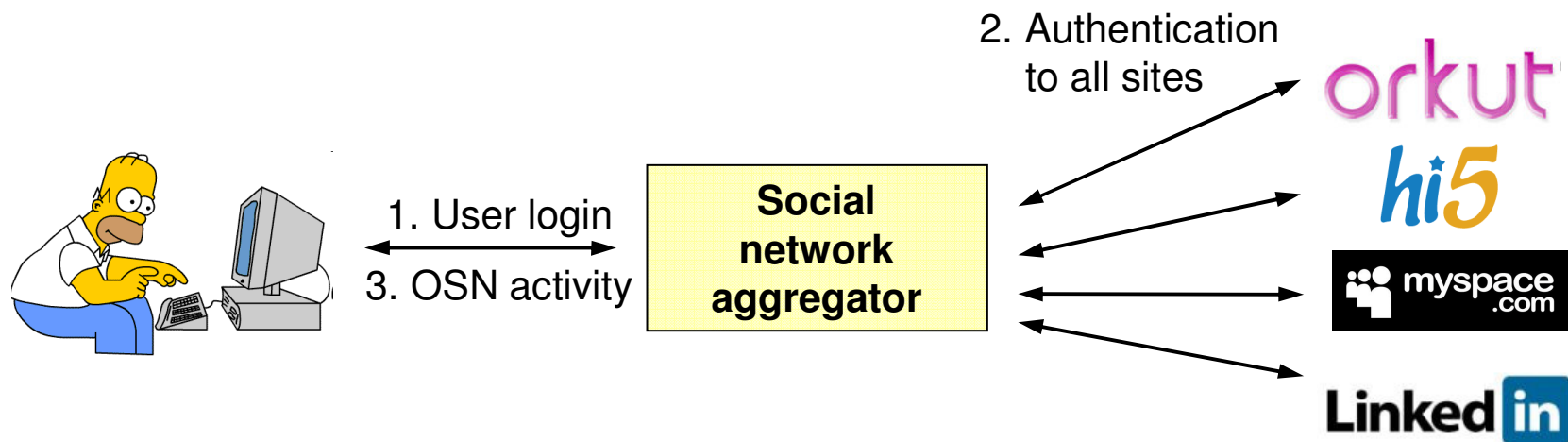
**Part2.**  
**Navigation patterns**



**Part3.**  
**Social interactions**

# Measurement methodology

We obtained **clickstream** data from a popular online social network aggregator



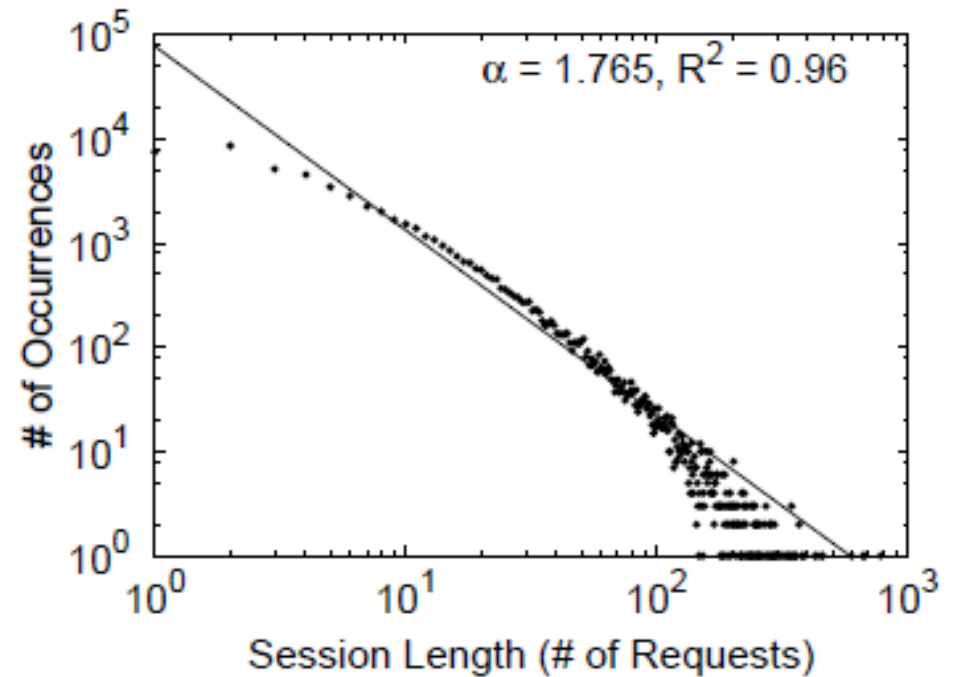
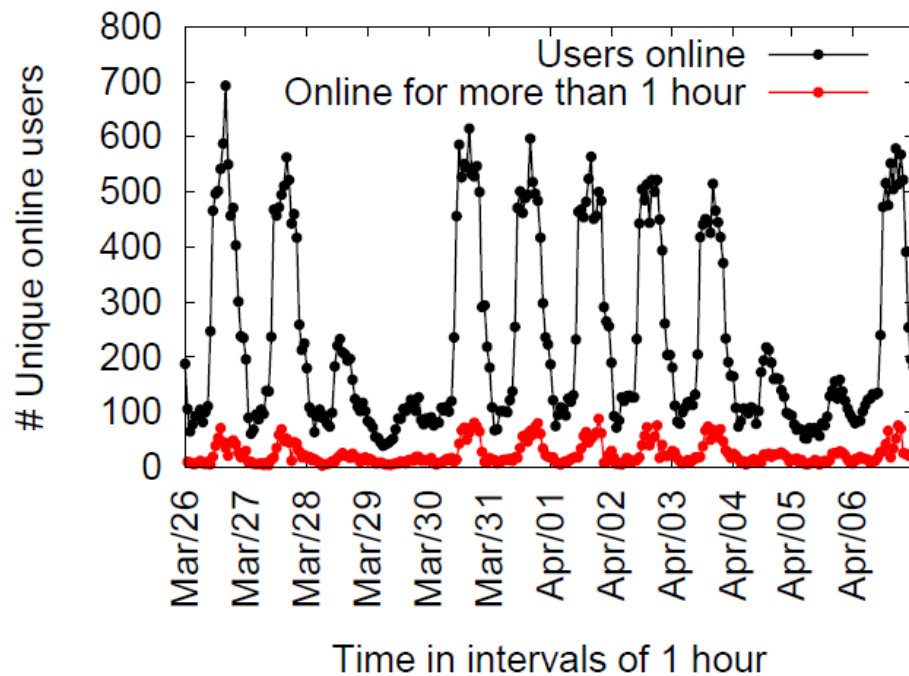
# Clickstream data

- 12 days (Mar 26–April 6, 2009)
- HTTP session summaries
  - User ID and session ID, URL, timestamp, IP address, traffic bytes

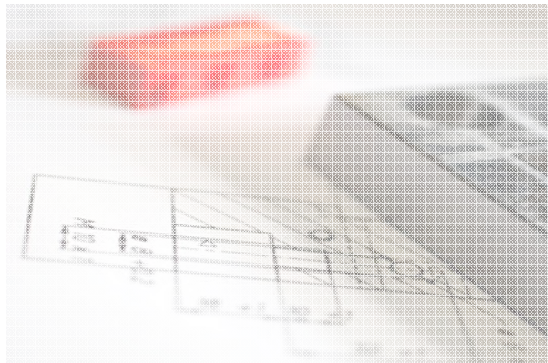
OSNs	# users	# sessions	# requests
Orkut	36,309	57,927	787,276
Hi5	515	723	14,532
MySpace	115	119	542
LinkedIn	85	91	224
Total	37,024	58,860	802,574

- We crawled the list of friends of Orkut users

# Session and access characteristics



- Session definition: 20 min timeout, close browser, or logoff
- Provide best fittings for other distributions:
  - inter-session time, inter-request time, session duration



**Part1.**  
Data and statistics



**Part2.**  
Navigation patterns



**Part3.**  
Social interactions



# Profiling activities

The image shows a screenshot of a user's profile on the Orkut social network. The profile is for Fabricio Benevenuto, who is 28 years old, born on November 20, and lives in Belo Horizonte, Brazil. He is married and has 566 scraps, 72 photos, and 5 videos. The page is divided into several sections: a left sidebar with navigation links, a main profile area, a 'my recent photos' section, a 'my recent videos' section, a 'my friends' list, and a 'my communities' list. Three callouts are present: 'Scrap' points to the 'scrap' tab in the profile header; 'Photos' points to the 'my recent photos' section; and 'Communities' points to the 'my communities' section.

**orkut** BETA Home Profile Scrapbook Friends Communities fabricio@dcc.ufmg.br Logout search orkut

## Fabricio Benevenuto

Home > My profile

Set your status here [edit](#)

This is how my profile will look to **myself**

scrap photos photos of me videos fa **Scrap** sexy

566 72

[edit](#)

age: 28  
birthday: November 20  
location: Belo Horizonte, Brazil  
relationship status: married

[view full profile >>](#)

### my recent photos (72)

Photos

### my recent videos (5)

espera na janela celso e roger 02 Atlético, Atlético, Dublando Celso & Roger 01

[view all videos >>](#)

### my friends (330)

search friends

Rud Érica Matheus  
Cristiano Arbex Gisele Geisy  
Frederico Thiago Luiz Henrique

[view all >>](#) [manage](#) [find more friends >>](#)

### my communities (68)

Anatomia da Dança (139) Grad001 (28) Falo italiano! Parlo italiano! (2,713)  
UFMG

- Neighborhood
- Sokobox - Puz ...
- more >>
- add apps
- lists
- messages
- updates
- settings
- spam

# User Activities in Orkut

## Profile & Friends

Browse profile, homepage,  
list of friends, friend  
updates, members of  
communities, fans, etc.

## Scrapbook

write  
browse

## Photos

Edit/Organize photos  
browse photos, albums,  
photos, list of albums,  
comments in photos,  
photos tagged

## Messages

write  
browse

## Communities

join/leave  
post in topics  
browse communities,  
topics, list of communities,  
etc.

## Search

## Testimonials

write  
browse written  
and received

## Others

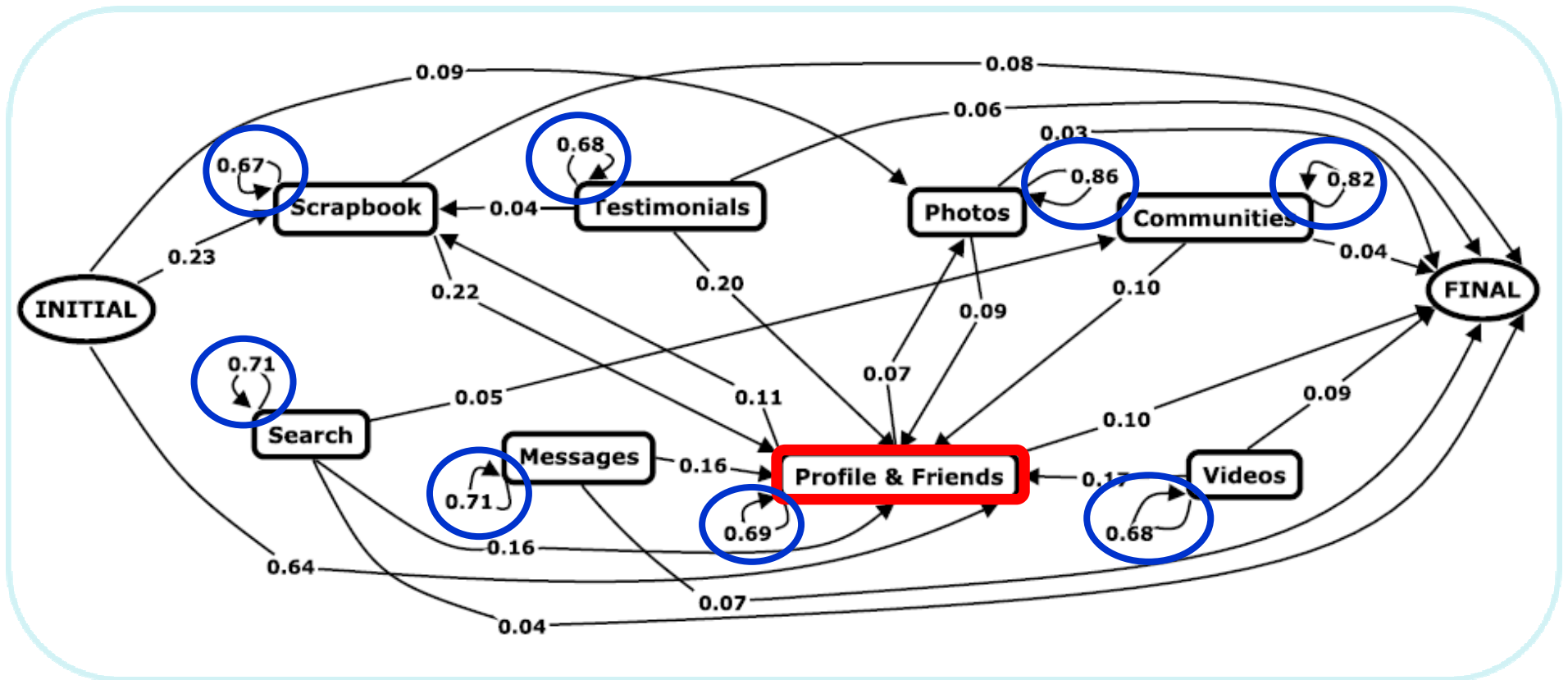
Applications  
user settings

## Videos

browse list of  
favorites  
watch a video

**Browsing accounts for 92% of all activities!**

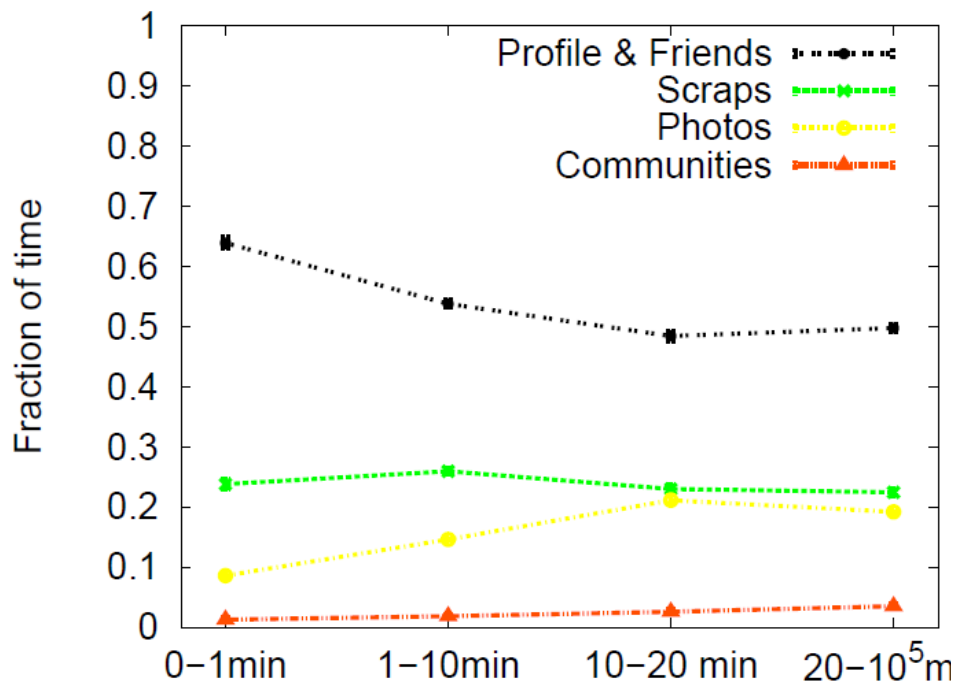
# Sequence of activities



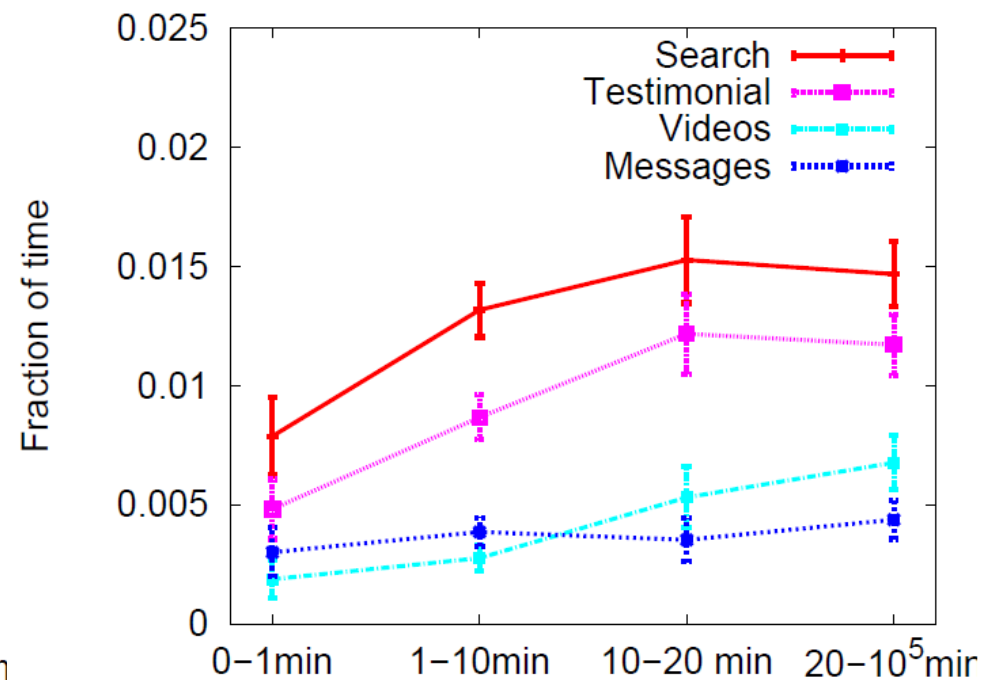
- Profile & Friends plays a central role
- Self-loops are dominant in all categories

# Activities and session duration

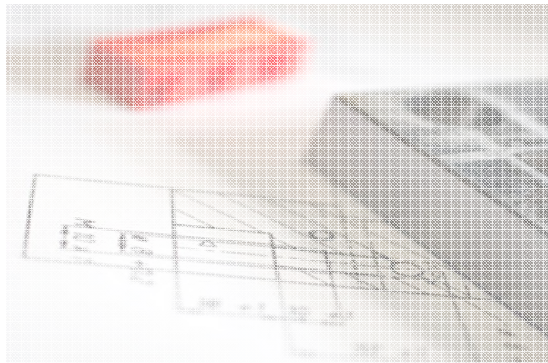
## Top-4 activities



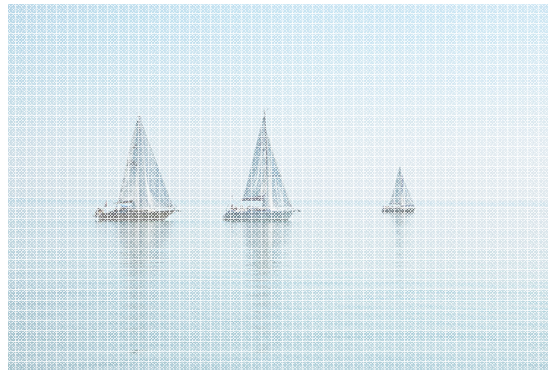
## Bottom-4 activities



- Longer sessions usually involve diverse activities
- Profile, scrapbook, and photos are the most popular activities, regardless of the session duration



**Part1.**  
**Data and statistics**



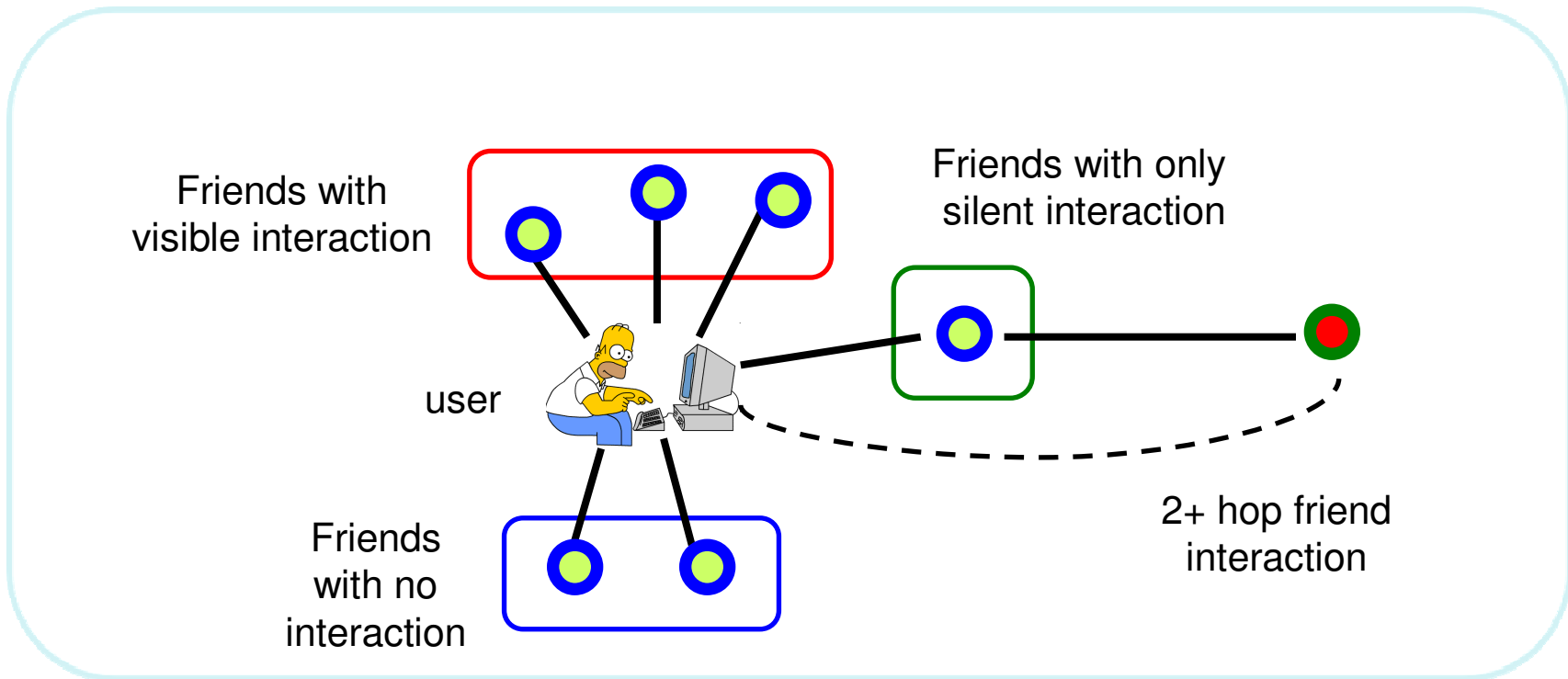
**Part2.**  
**Navigation patterns**



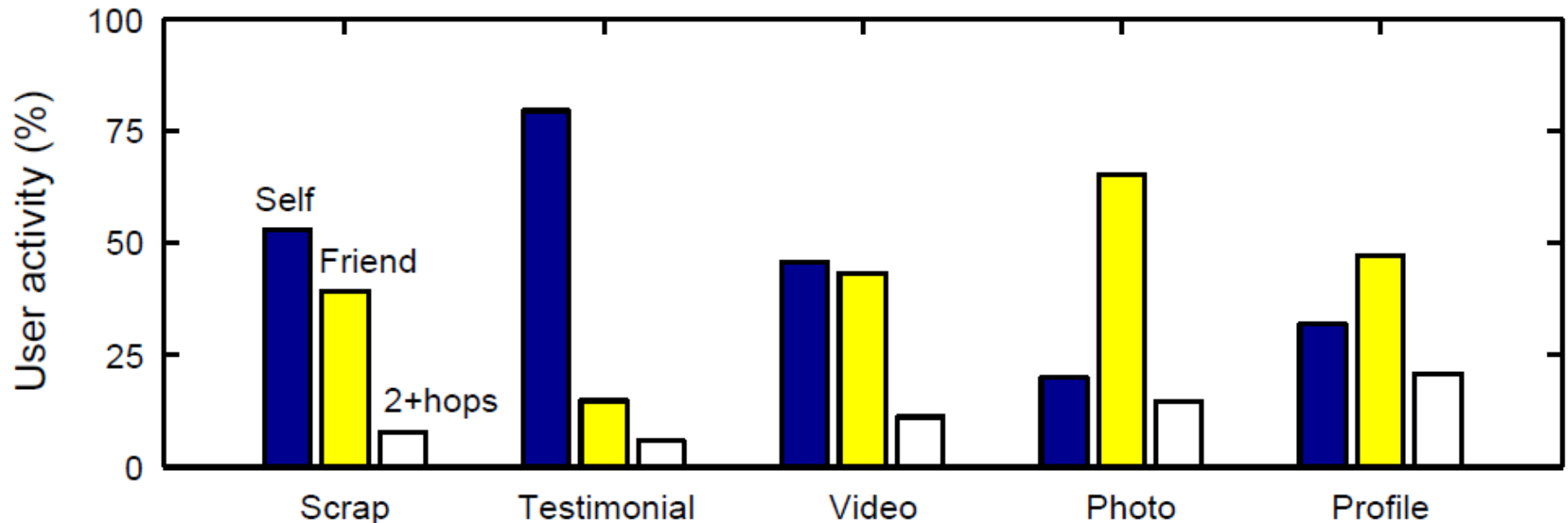
**Part3.**  
**Social interactions**

# Social interactions

- **Visible interactions:** Write messages, scraps, testimonials
- **Silent interactions:** Browse profiles, pictures, etc.

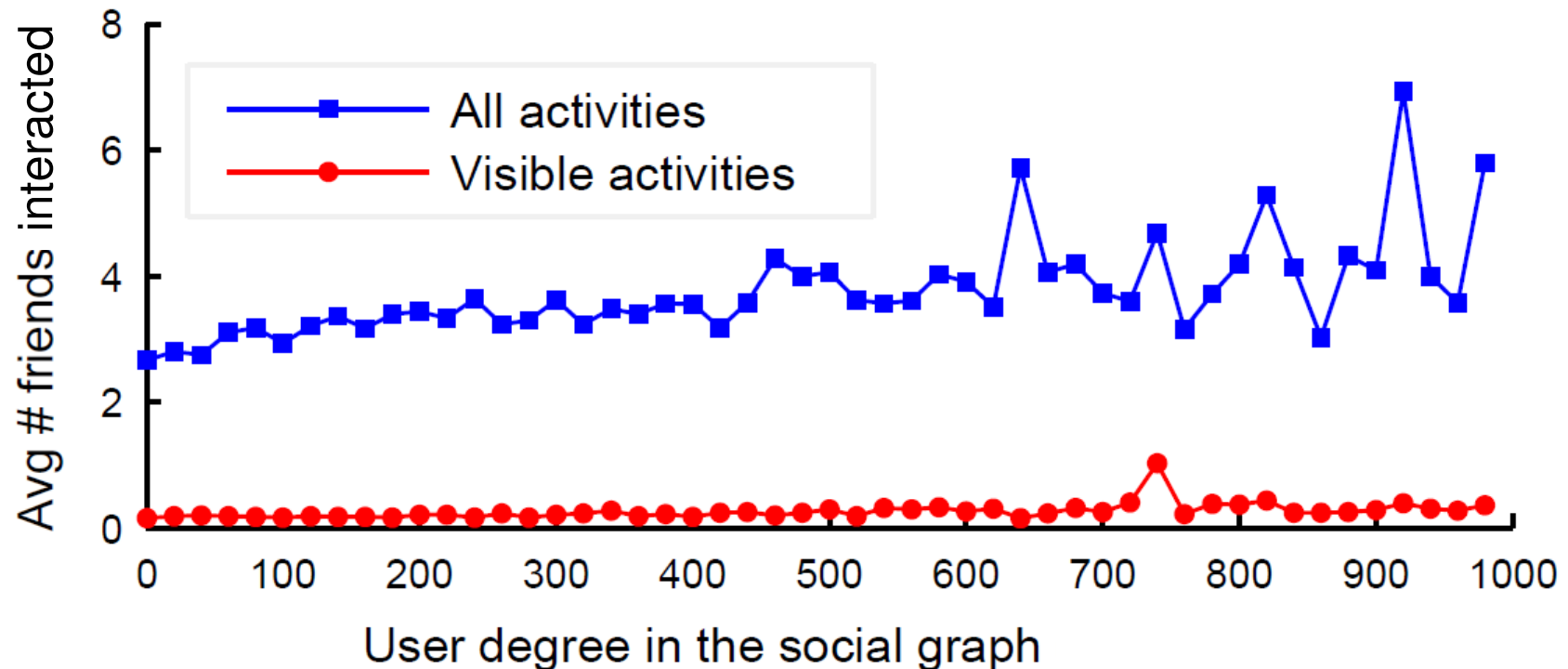


# Interaction along the social distance



- Users access their 1-hop friends' pages most frequently
- Interaction with 2+ hops friends is not negligible
  - Usually associated with content discovery through social links

# Number of friends a user interacts with



- Degree of interaction increases by an **order of magnitude** when incorporating silent interactions
- 85% of the active users showed **only silent interactions!**



# Conclusions

- First study of OSN workload considering both visible and silent social interactions
- Clickstream-based analysis highlighted new insights on user behaviors in OSNs
- Statistics and best fitting distributions of user sessions can be used to generate synthetic workloads

# Questions?

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