

# The Rise of Social Bots



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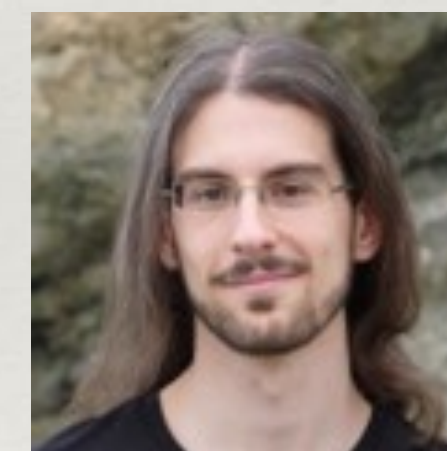
# Overview of the impact of bots

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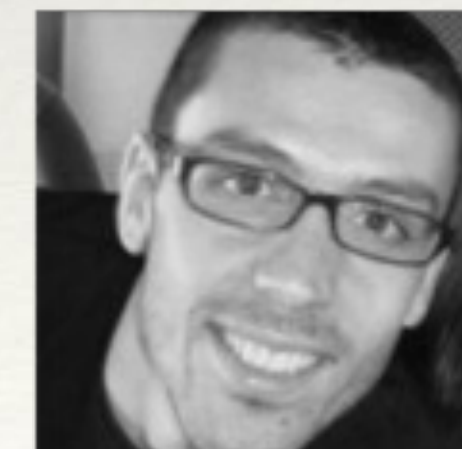
- ❖ The strange case of Iajello
- ❖ The path to botometer
- ❖ The impact of bots on disinformation diffusion
- ❖ Case study: the interplay between bots and low quality information diffusion in the Italian debate on immigration on Twitter



# The strange case of Lajello



LUCA  
AIELLO



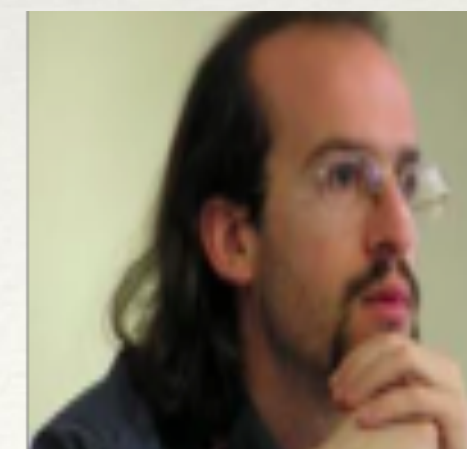
ROSSANO  
SCHIFANELLA



MARTINA  
DEPLANO



GIRO  
CATTUTO



ALAIN  
BARRAT



# Analyzing social network with a bot

- ❖ Anobii was a social networks for book lovers
- ❖ Scraping users' profiles from the Web was admitted
- ❖ Users' libraries and their links were collected periodically

A screenshot of an Anobii user profile for a user named "Claudia A.". The profile includes a profile picture, a bio ("Female, 38, Single. Torino, Italy"), and buttons for "Follow" and "Message". Below the bio, it shows "Taste compatibility: UNKNOWN" and "Add more books to match". There are navigation options: "By Progress", "By Authors", "By Languages", and "By Tags". A "Groups" section lists several groups with their member counts. A "Shoutbox" section is visible at the bottom. The main content area shows a "Books (126)" section with a search bar and a grid of book covers. On the right side, there are sections for "Friends" and "Neighbors", each listing several user names with their profile pictures.

**anobii**  
together we find better books

**ClauDia**  
Female, 38, Single. Torino, Italy

Follow Message

Taste compatibility:  
**UNKNOWN**  
Add more books to match

By Progress  
By Authors  
By Languages  
By Tags

**Groups**

- Wikicitazioni (Wikiquote) (1160)
- Sospesi tra cielo e terra (1099)
- Transpersonal Psychology and B... (20)
- Herr Professor Carl G. Jung (234)
- Dillo ad aNobii (Tell aNobii) (49)

Shoutbox See all  
Leave a comment

**Books (126)** Search this shelf

All books Added (Newest)

Books shown: Paths Beyond Ego, JOSEPH CAMPBELL, KAREN MILLER EMPRESS, KYRA, THE PORTABLE JUNG, Official Guide to the NEW TOEFL, INTEGRAL LIFE PRACTICE, Ken Wilber, UNFOLDING NOW, SPACE USER Inquiry, DIAMOND HEART, Brilliancy, Lisa Jewell, A.S. BYATT'S The Children's BOOK, The Girl with the Dragon Tattoo.

**Friends more**

- reyda
- Aglaja
- Walter
- bethulla
- zeromeno

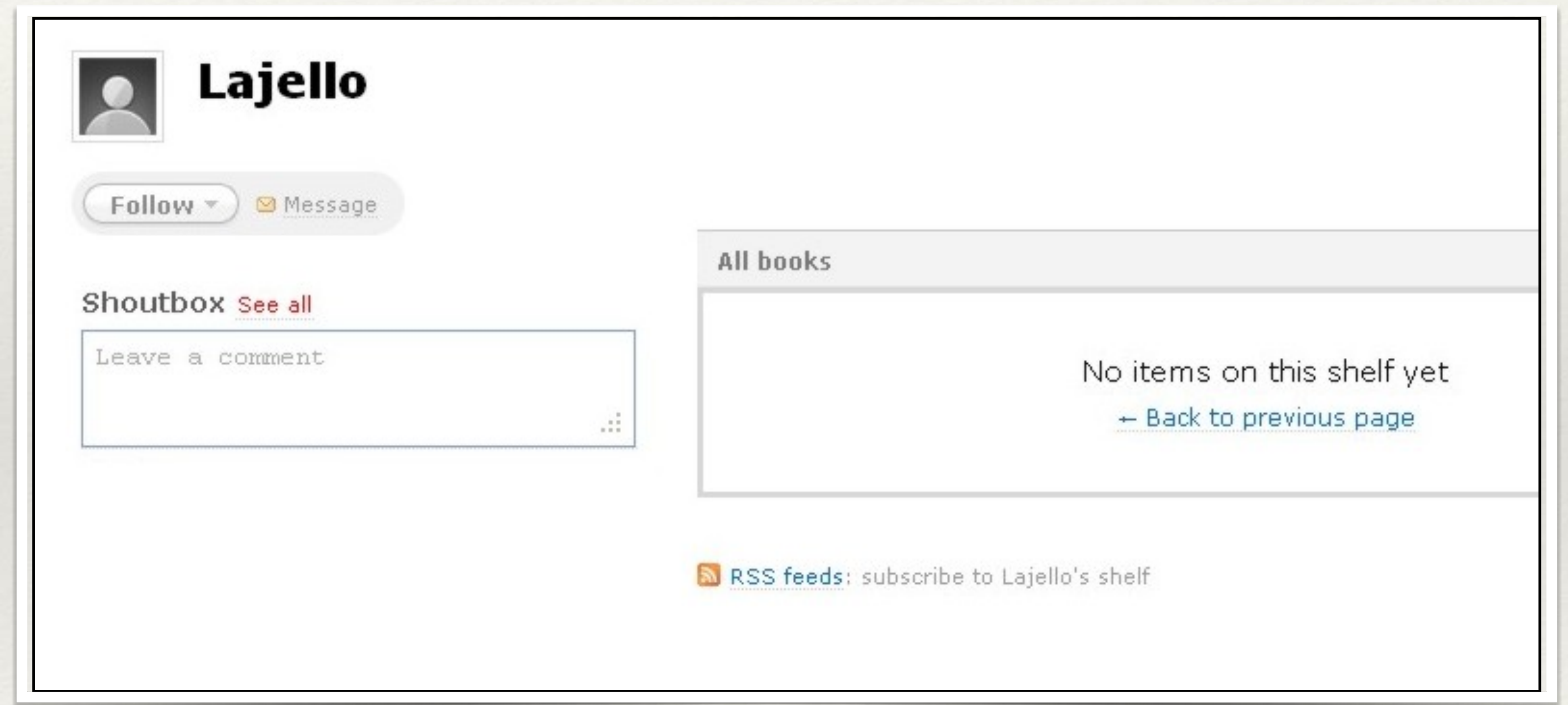
**Neighbors more**

- Simonetta
- \*MM\*
- Ste
- Moonray
- virinthesky



# Analyzing social network with a bot

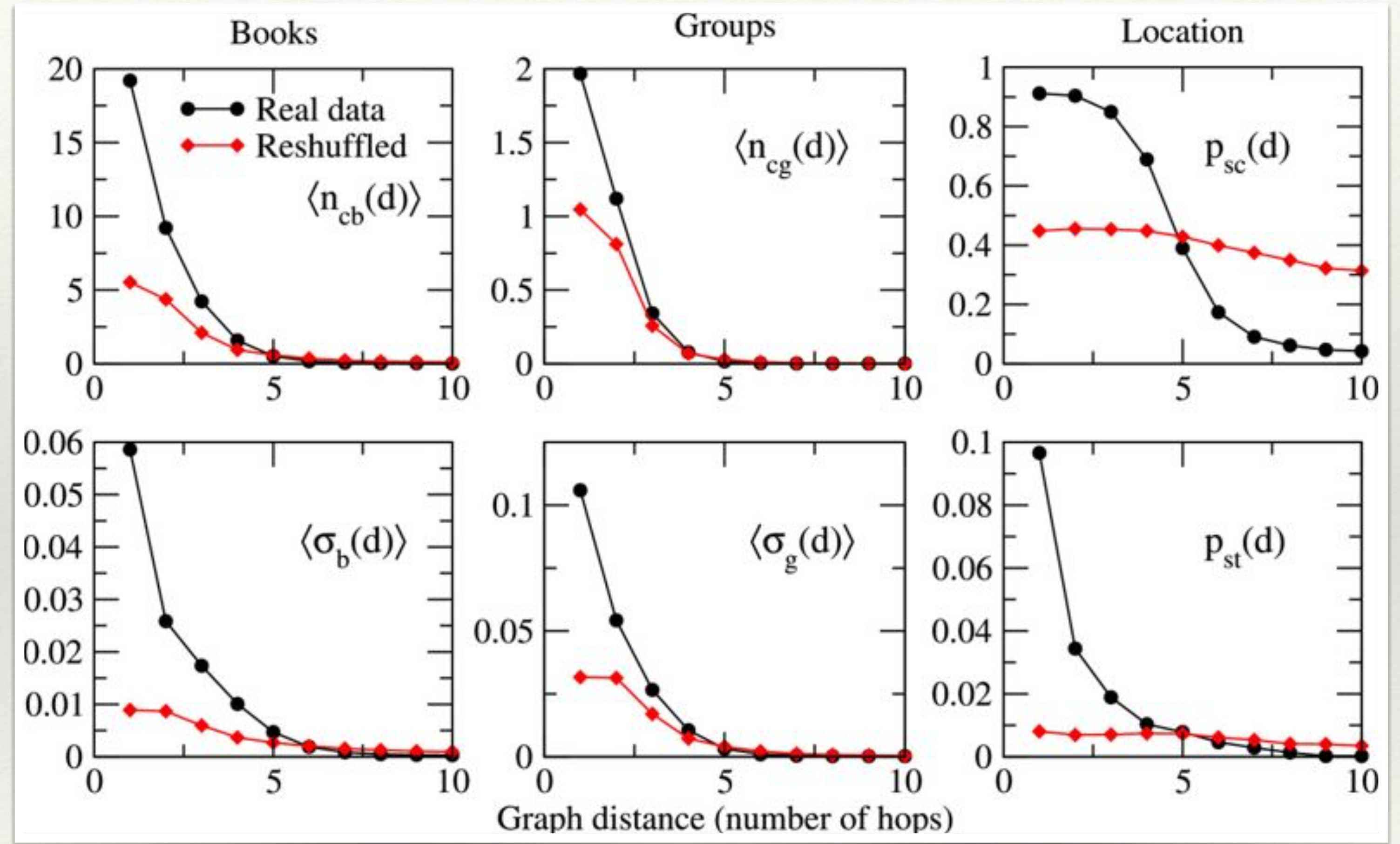
- ❖ Anobii was a social networks for book lovers
- ❖ Scraping users' profiles from the Web was admitted
- ❖ Users' libraries and their links were collected periodically
- ❖ The bot "Lajello" used to silently navigate Anobii twice a month for one year





# Analyzing social network with a bot

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- ❖ Scraping users' profiles from the Web was admitted
- ❖ Users' libraries and their links were collected periodically
- ❖ The bot "Lajello" used to silently navigate Anobii twice a month for one year
- ❖ **homophily by selection and by influence analysed**



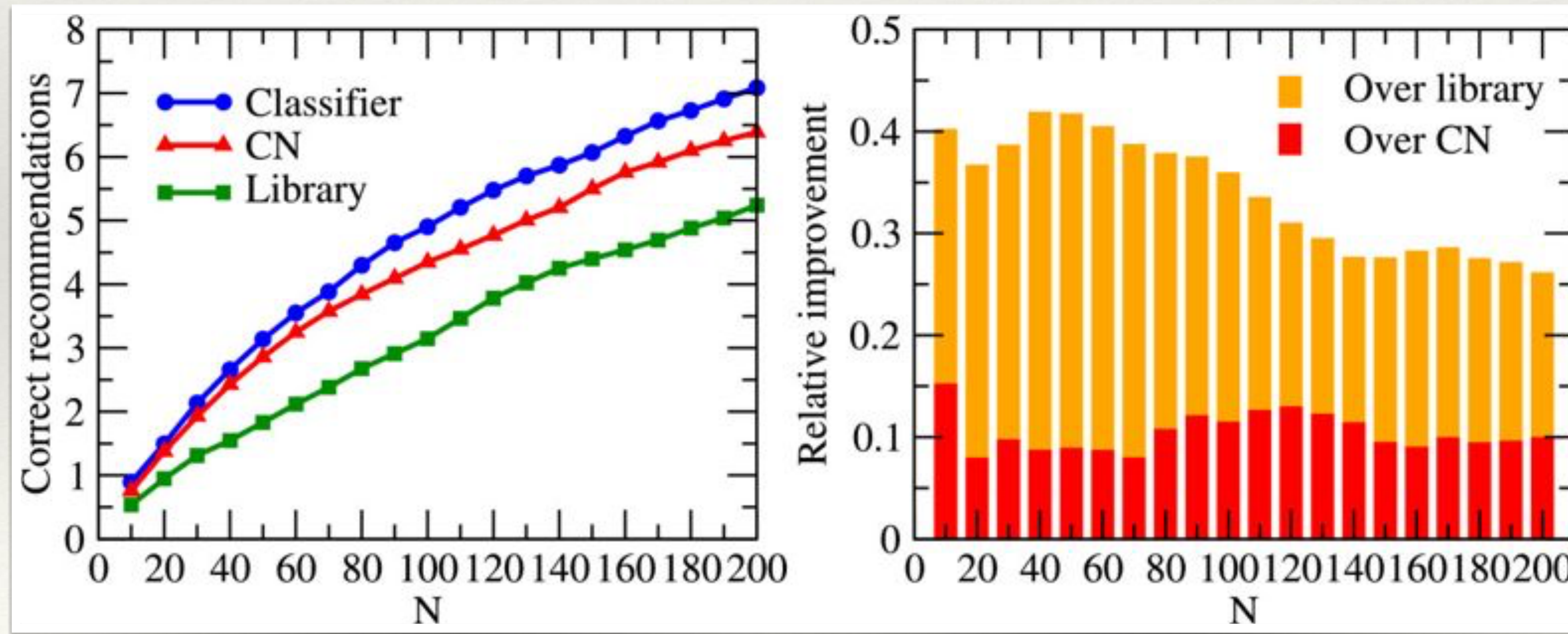
LM Aiello, A Barrat, C Cattuto, G Ruffo, R Schifanella, [Link creation and profile alignment in the aNobii social network](#), 2010 IEEE 2nd Int. Conf. on Social Computing, 249-256

LM Aiello, A Barrat, C Cattuto, G Ruffo, R Schifanella, [Link creation and information spreading over social and communication ties in interest based online social network](#), EPJ Data Science 1 (1), 12



# Application: a link recommendation algorithm

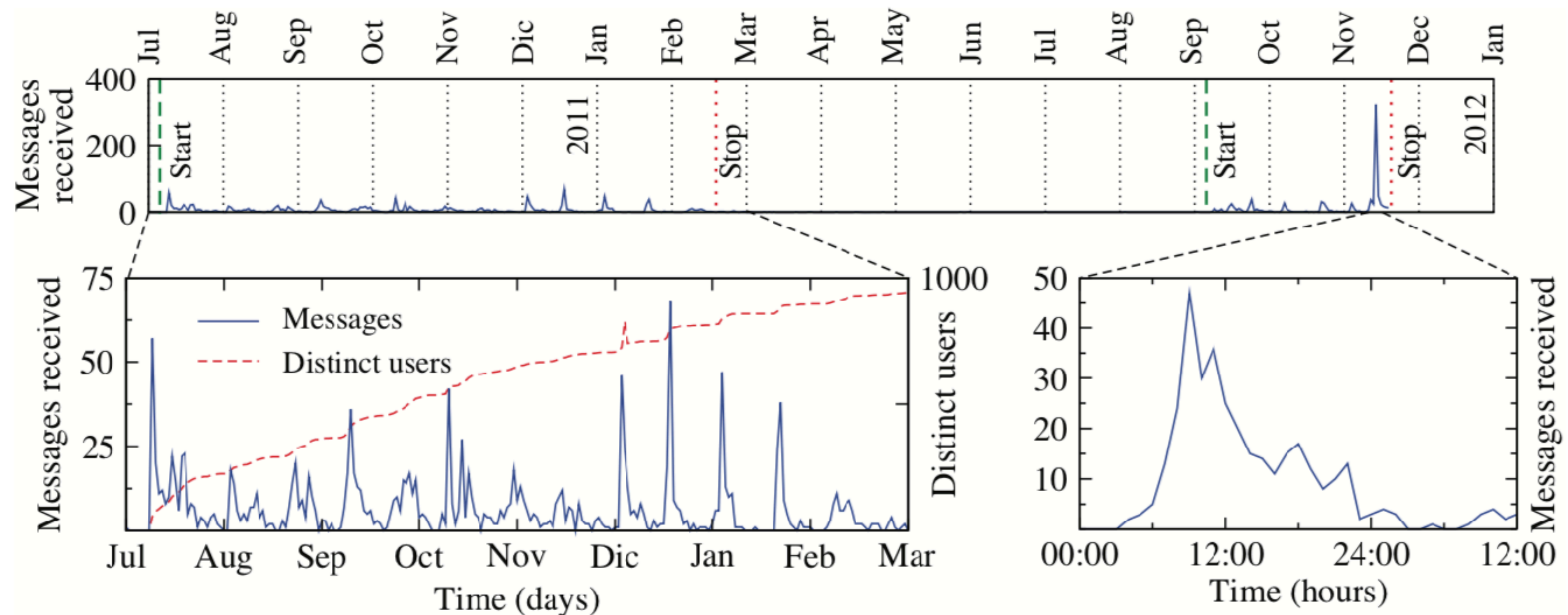
- ❖ A link recommendation algorithm based on prediction of profile similarities was proposed and tested
- ❖ Results showed an improvement w.r.t. the baselines





# What happened to Lajello?

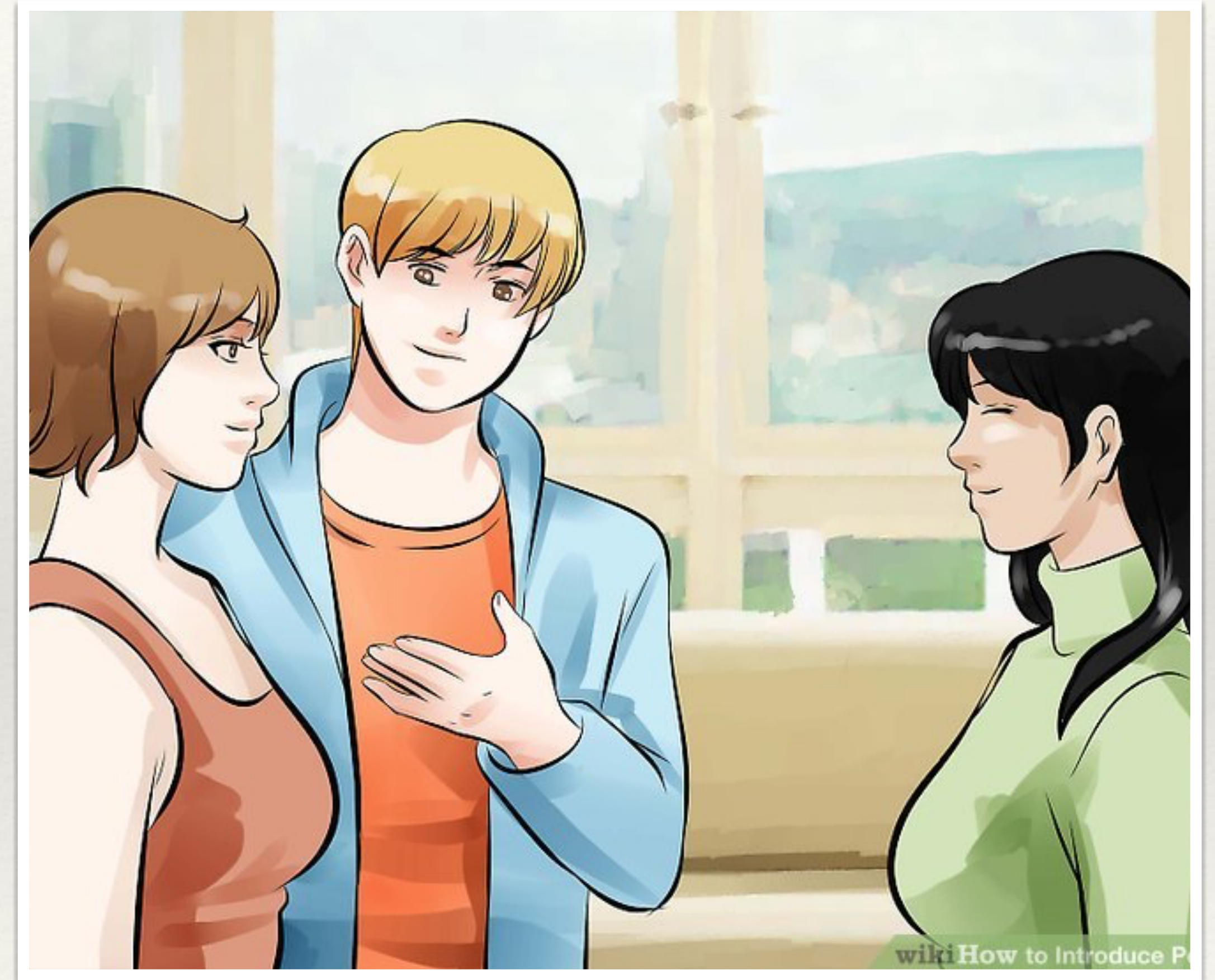
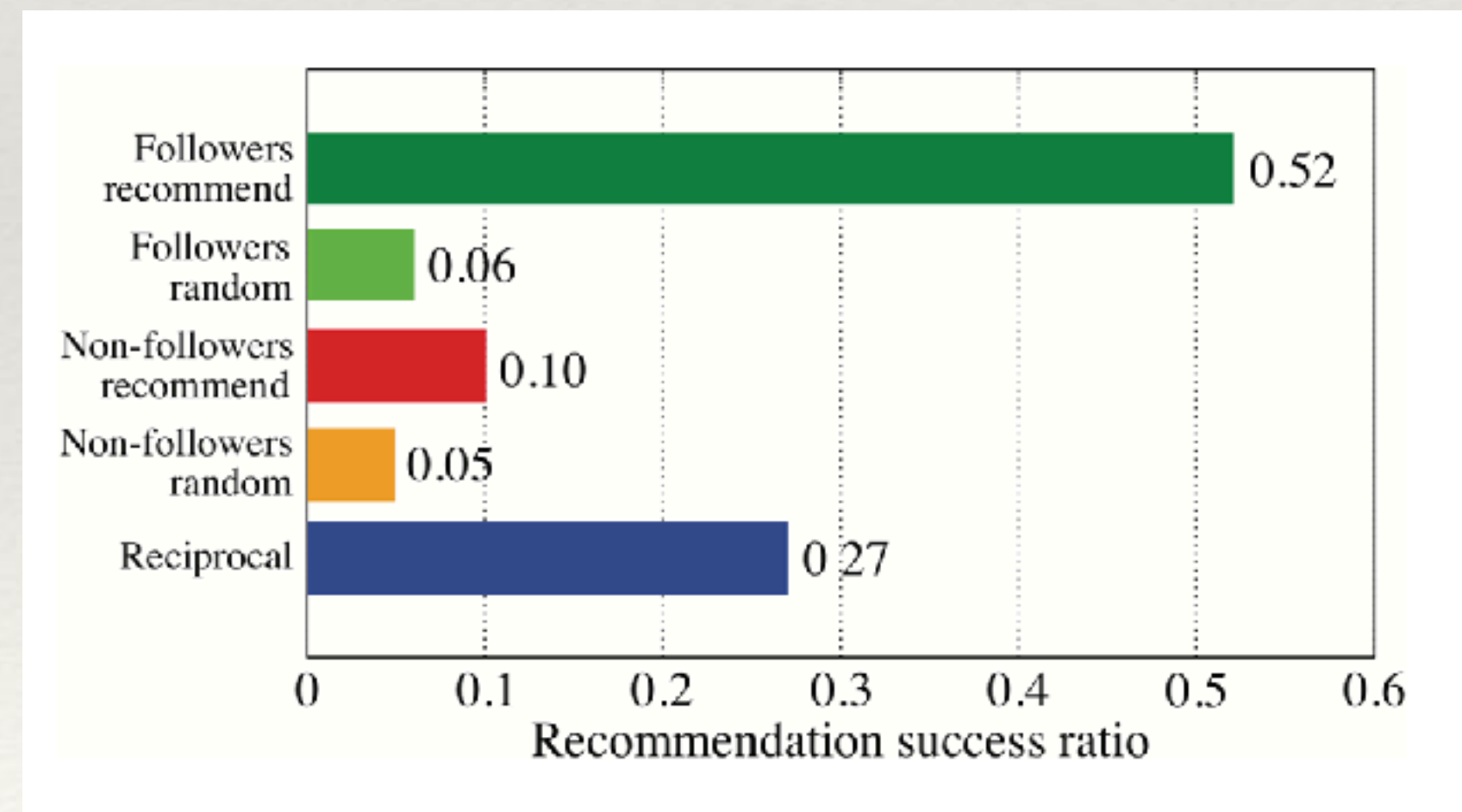
Lajello, incidentally, became the second most popular user in Anobii in terms of messages from distinct users





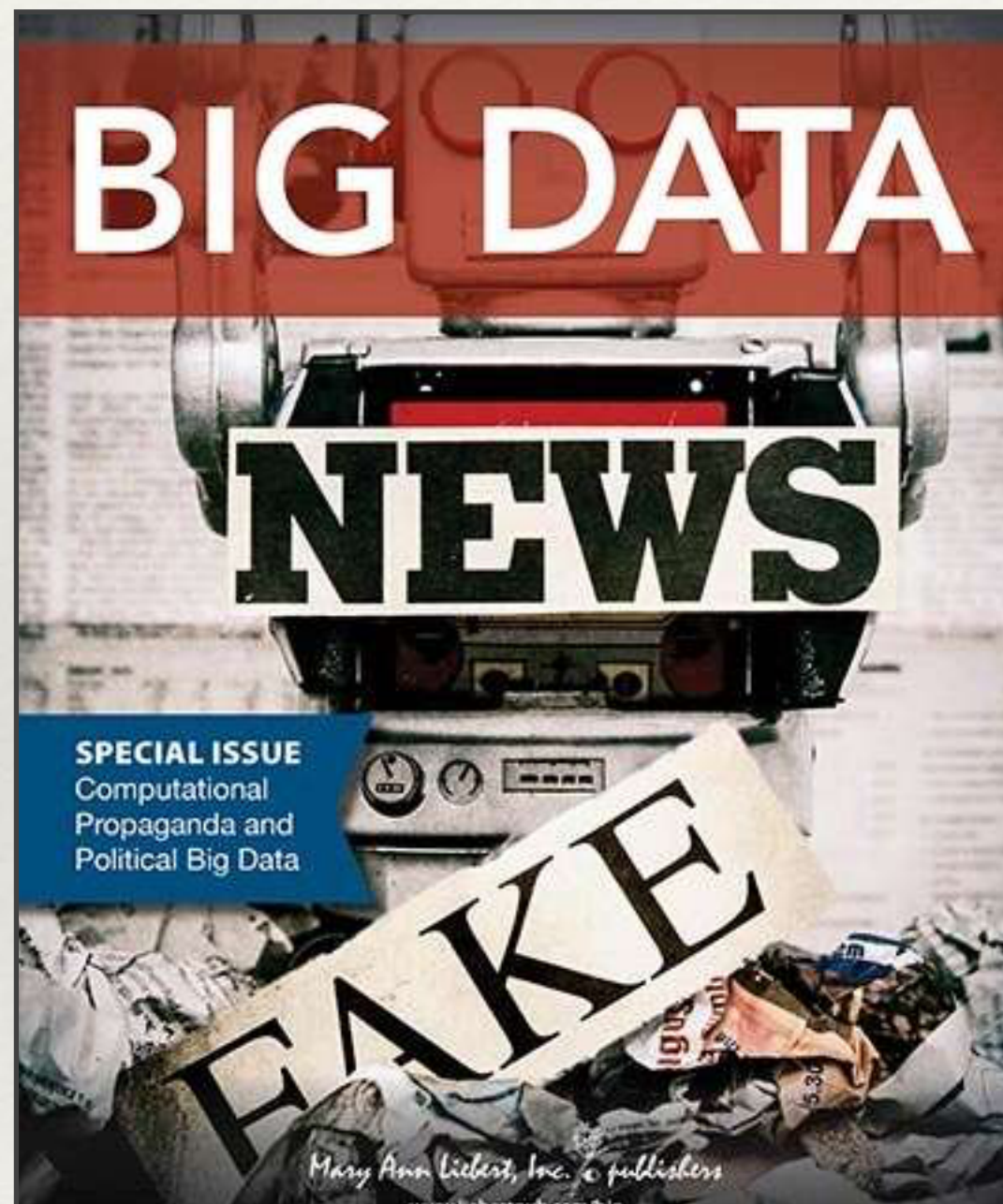
# Exploiting Lajello popularity

- ❖ Lajello started to introduce users to each other according our link recommendation algorithm
- ❖ First result: users acceptance of the recommendation skyrocketed if they previously wrote in Lajello's wall





# Influence of bots



## COMMUNICATIONS

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### REVIEW ARTICLES

## The Rise of Social Bots

By Emilio Ferrara, Onur Varol, Clayton Davis, Filippo Menczer, Alessandro Flammini

Communications of the ACM, Vol. 59 No. 7, Pages 96-104

10.1145/2818717

[Comments \(1\)](#)



nature  
COMMUNICATIONS

Article | [Open Access](#) | Published: 20 November 2018

## The spread of low-credibility content by social bots

Chengcheng Shao, Giovanni Luca Ciampaglia, Onur Varol, Kai-Cheng Yang, Alessandro Flammini & Filippo Menczer

*Nature Communications* **9**, Article number: 4787 (2018) | [Download Citation](#) ↓



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# Incidentally, we created an “egg war”

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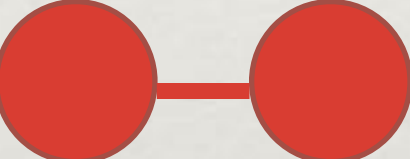
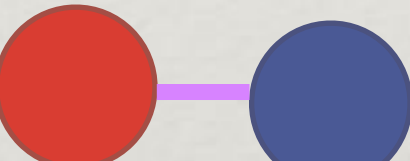
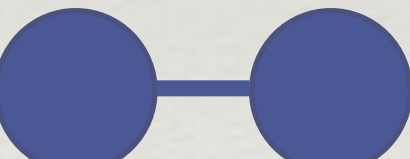
- After our initial experiment, Lajello remained silent for one year and then he “talked”. The recommendations changed the net structure and Lajello account was banned after 24 hours. This ignited a “war”
- Two polarized opinions emerged: Anobii users created immediately two thematic groups: “the (not requested) suggestions of Lajello” and “Hands-off Lajello”
- A large portion of users that were contacted by Lajello joined to one of these groups
- We observed a strong interplay between the existing relationships in the social network and the opinion that emerged from the users at the end of the links: “**echo chamber**” effect?



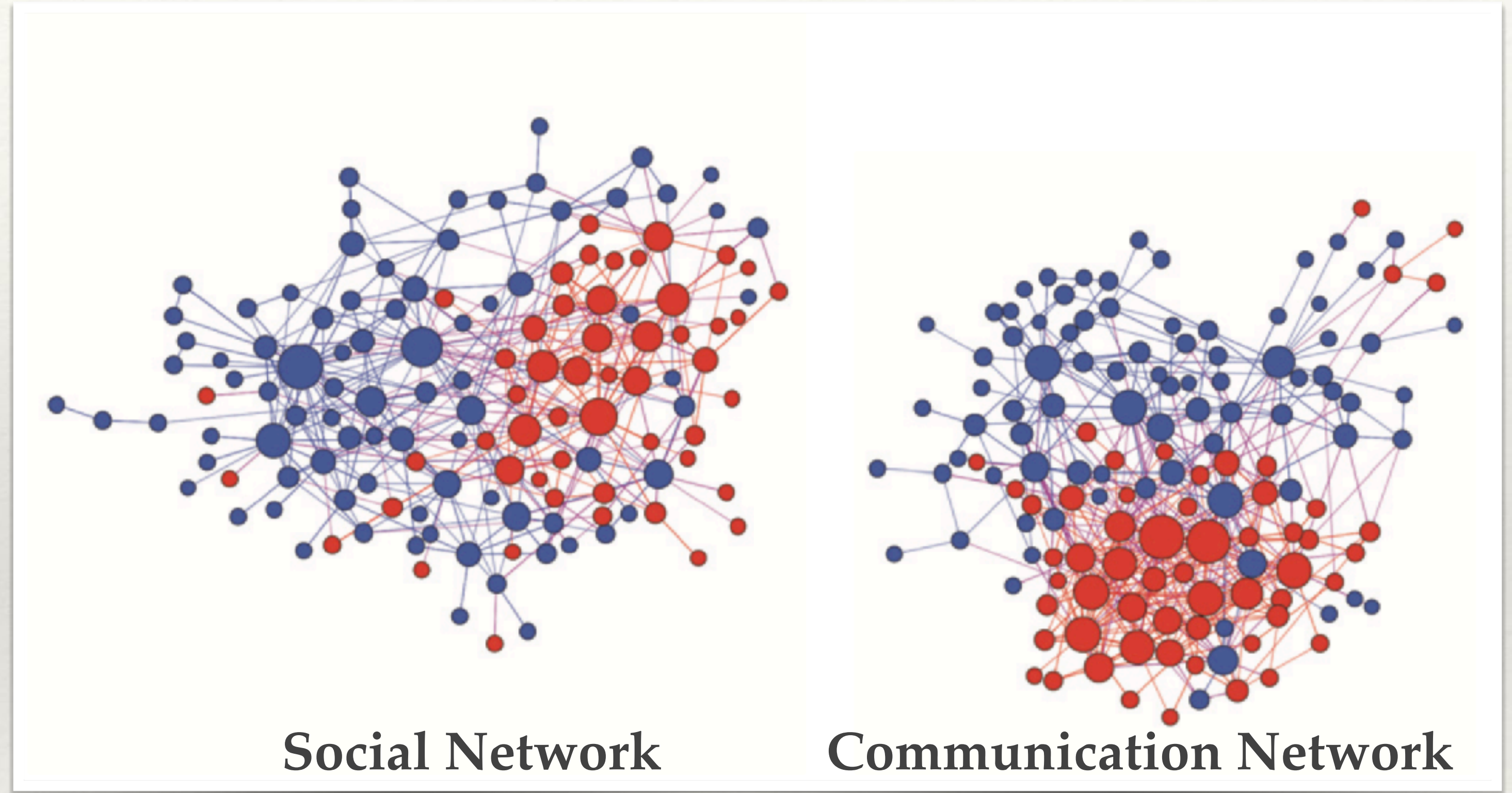
# Social polarization and emotional reaction

 red dots are lajello supporters

 blu dots are lajello haters

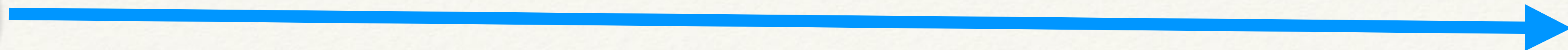
   links are existing social connections or direct messages (graph is directed)

 bigger dots are users with more links

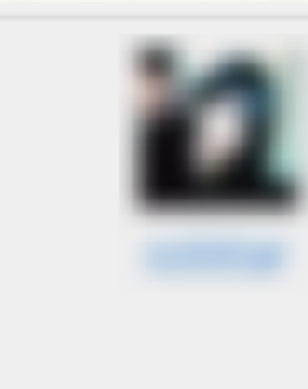



Automatic network-based [community detection](#) algorithm (OSLOM) accurately finds clusters (80% - Social network, 72% - Communication network), confirming a signal of **segregation** between the two groups before link recommendations

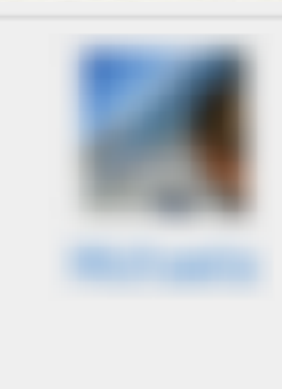



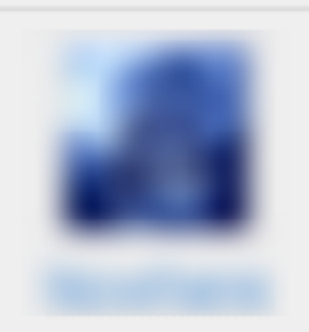



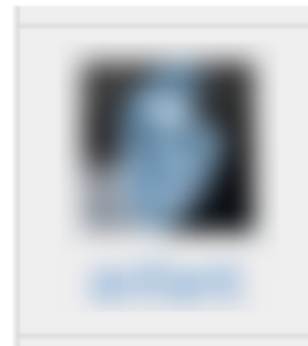
 LAJELLO... HAI STUFATO..NON SE NE PUO' PIU'...STA ATTENTO/A CHE SONO CAPACE DI ASSOLDARE UN HACKER PER VEDERE CHI SEI..E PO' SONO C...TUOI  
Tre settimane fa 

 ahahahhahahaha tu sei un genio!!!! sei davvero un genio!!! insomma ma quante visualizzazioni hai???? sei un grande!!!! riesci a farti visitare e a farti scrivere pur non avendo libri!!! ti adoro sei grandissimo :P  
Aug 13, 2010 

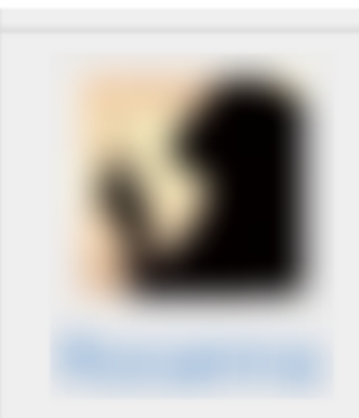
 chi sei?

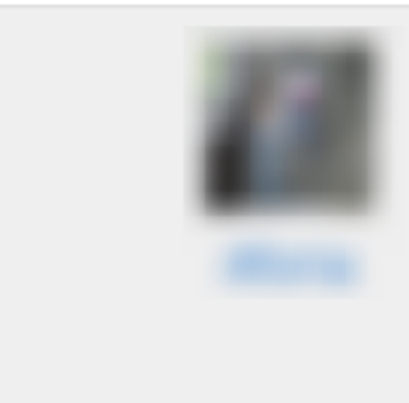

 un grande.  
continua così. Grazie delle visite, si vede che ti sto simpatica...  
P.S: propongo di aprire un gruppo the Lajellos fans...  
3 giorni fa 

 già che mi ritrovo qui mi faccio pubblicità! Venite a vedere la mia libreria è la più bella -del mondo-. (l'ultima parte andava sottolineata..)  
Due set 

 chapeau!!

 Le tue visite cominciano ad essere inquietanti....

 ahahahaahah tu sei un genio!!

 Grazie Lajello, mi sono divertita un sacco a leggere i commenti degli altri anobiani. Sembra un esperimento di psicologia sociale, se non ti dispiace ti aggiungo come vicino! e resisti eh...non pubblicare un libro! ;)  
Due settimane fa 



# Lessons learned and observations

- ❖ Handle **experiments in social media** with care :)
- ❖ A simple **spambot** can take power in a social network
- ❖ A seed of **polarization** found in pre-existing network structure
- ❖ ... also the structure changed after our experiment was run!
- ❖ What if the real identity and motivations of Lajello were fact-checked?

**il POST** ITALIA MONDO POLITICA TECNOLOGIA INTERNET SCIENZA CULTURA ECONOMIA SPORT MEDIA MODA LIBRI AUTO VIDEO

CARLO BLENGINO **BLOG** VENERDÌ 27 LUGLIO 2012

## Lo strano caso Lajello

Lajello compare in rete in una fredda mattina di fine 2009, su aNobii, il social

**MIT Technology Review**

**Connectivity**

### How a Simple Spambot Became the Second Most Powerful Member of an Italian Social Network

The surprising story of how an experiment to automate the creation of popularity and influence became successful beyond all expectation.

by **Emerging Technology from the arXiv** Aug 5, 2014

**Carlo Blengino**  
Avvocato penalista, affronta nelle aule giudiziarie il diritto delle nuove tecnologie, le questioni di copyright e di data protection. È fellow del NEXA Center for Internet & Society del Politecnico di Torino. @CBlengio su Twitter