

# #Privacy #Security #OnlineSocialMedia

Introductory Lecture  
Jan 21, 2021

Ponnurangam Kumaraguru (“PK”)  
#ProfGiri CS, #DeanGiri Student Affairs IIIT Delhi  
ACM India Council Member  
TEDx & ACM Distinguished Speaker

A Course on

# Privacy & Security in Online Social Media

NEW CONTENT

DURATION

JAN- APR 2021

MODE OF INSTRUCTION

ONLINE

Powered by NPTEL

Register at

[precog.iiitd.edu.in/psosmonnpTEL](http://precog.iiitd.edu.in/psosmonnpTEL)

Instructed by

Ponnurangam Kumaraguru ("PK")

For any further questions or  
clarifications write to [pk@iiitd.ac.in](mailto:pk@iiitd.ac.in)

#PSOSMonNPTEL

Stay updated  @ponguru  @pkatiiitd



Top performers in the course can explore opportunities to work with PK



A COURSE ON  
**PRIVACY & SECURITY**  
IN  
**ONLINE SOCIAL MEDIA**

Registration in first week of May  
[onlinecourses.nptel.ac.in](http://onlinecourses.nptel.ac.in)

Watch the teaser video at  
<https://youtu.be/wsuTBfmV3bU>

Instructed by  
Ponnurangam K  
(PK)



Mode of Instruction  
**Online**

Duration  
**July-September 2016**

Physical interactions at  
**IIT-Delhi**

Learn from Anywhere in the World

#PSOSManNPTEL

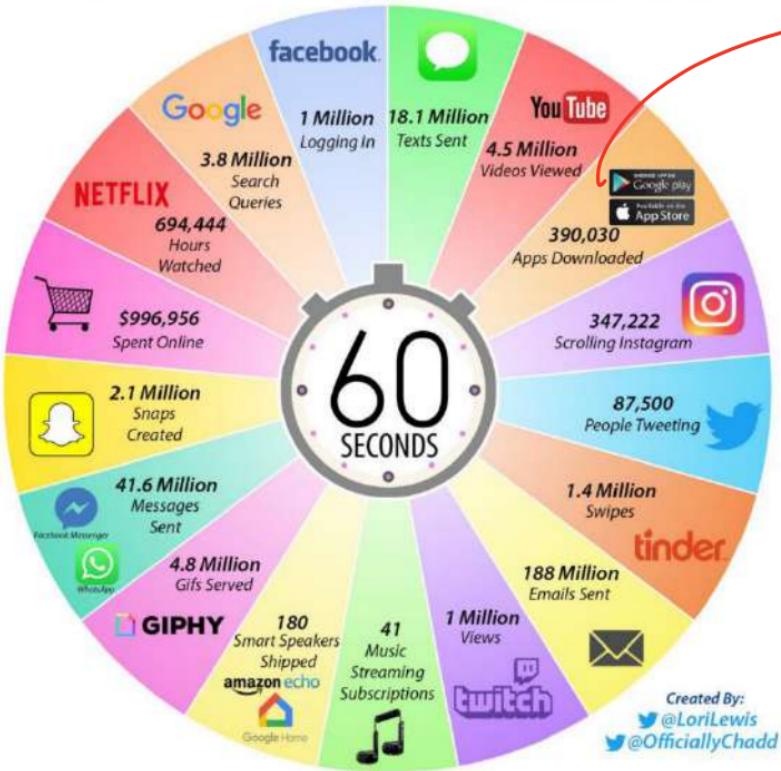
Powered by



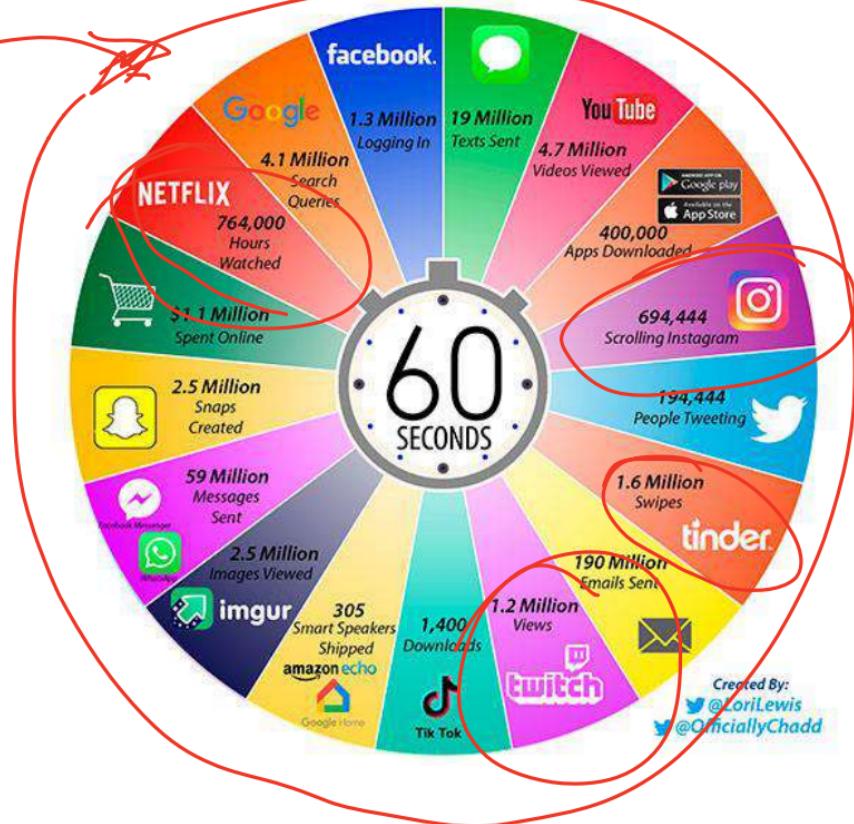
For more information, email:  
[pk@iitd.ac.in](mailto:pk@iitd.ac.in)

Stay updated by following PK  
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# 2019 This Is What Happens In An Internet Minute



# 2020 This Is What Happens In An Internet Minute





whisper

tumblr

tinder™



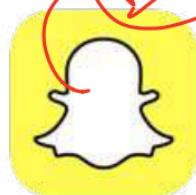
FOURSQUARE



Gab



Pinterest



Patreon

# Lets discuss this 3 words in the title of the course

- Privacy

Intosnation  
Physical  
watching me

# Lets discuss this 3 words in the title of the course

- Security

# Lets discuss this 3 words in the title of the course

- Online Social Media

# Now lets see

- Privacy + Security + Online Social Media

**TAs** → Teaching Assistant  
Nidhi  
Hitesh

Neha Kumari, PhD Student

Avinash Tulasi, PhD Student

Prashant Kodali, PhD Student

Live / Online Lecture tomorrow in the evening? If interested, please +1 to this email.

Thanks.

53 views



Ponnurangam Kumaraguru

To develop more excitement around the course, to show / discuss some interesting topics, I was

Jan 20, 2021, 10:16:52 PM (yesterday)



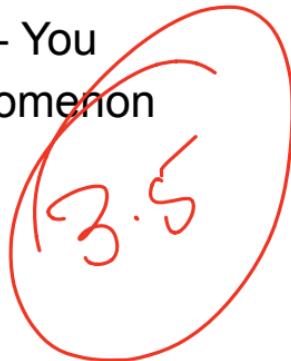
# Six degrees of separation

Network Science

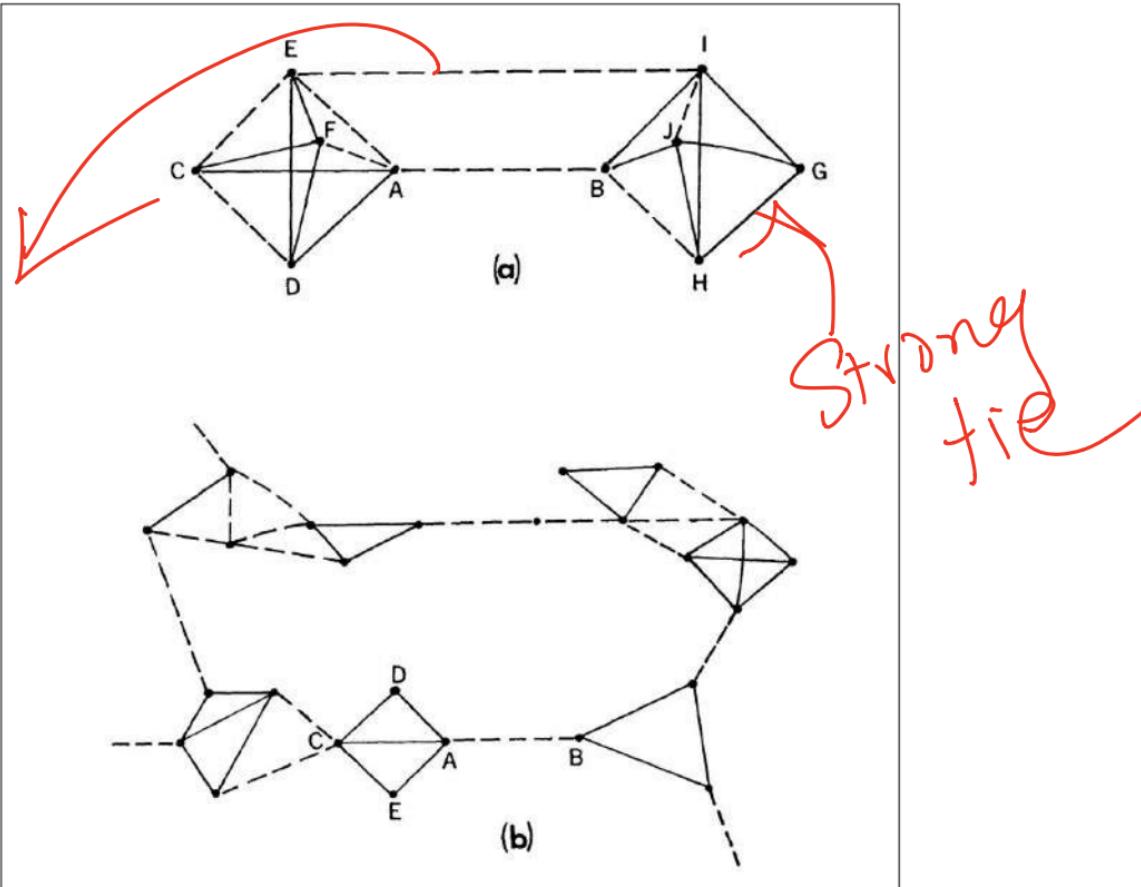


# Six degrees of separation

- Random person -- You
- Small world phenomenon
- Facebook?



3.5



# The Strength of Weak Ties<sup>1</sup>

Mark S. Granovetter

*Johns Hopkins University*

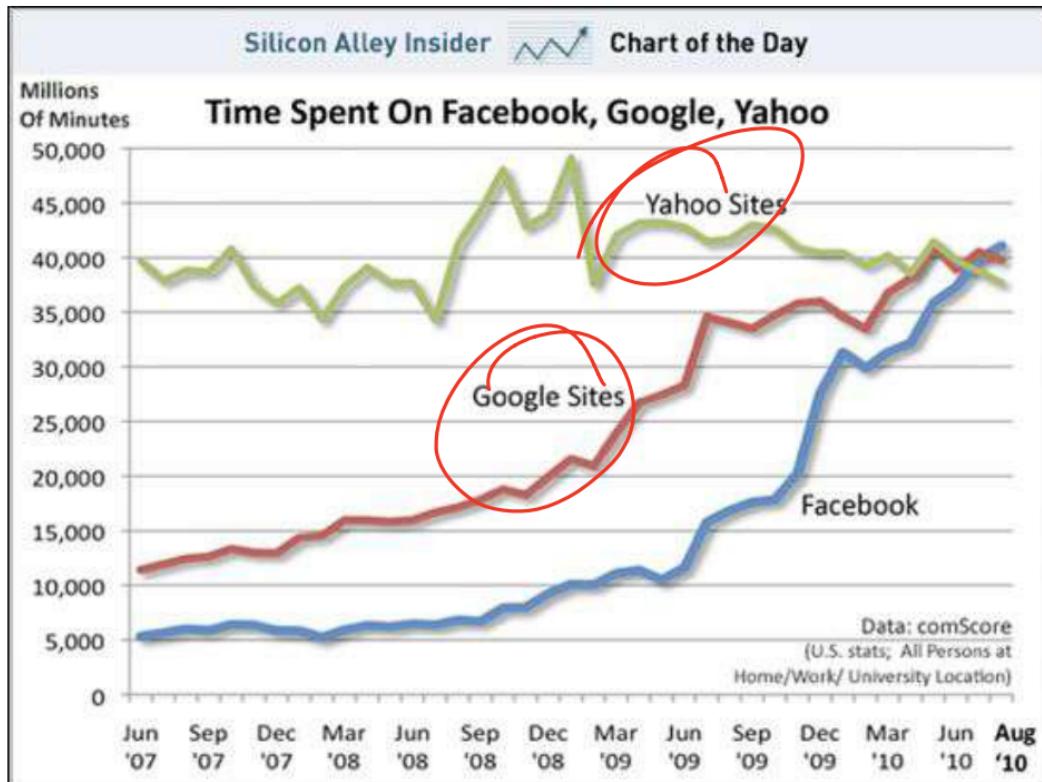
Analysis of social networks is suggested as a tool for linking micro and macro levels of sociological theory. The procedure is illustrated by elaboration of the macro implications of one aspect of small-scale interaction: the strength of dyadic ties. It is argued that the degree of overlap of two individuals' friendship networks varies directly with the strength of their tie to one another. The impact of this principle on diffusion of influence and information, mobility opportunity, and community organization is explored. Stress is laid on the cohesive power of weak ties. Most network models deal, implicitly, with strong ties, thus confining their applicability to small, well-defined groups. Emphasis on weak ties lends itself to discussion of relations *between* groups and to analysis of segments of social structure not easily defined in terms of primary groups.



Velocity  
Variety  
Volume  
Verbosity  
Value

## 4 (5) V's of Social Media?

# Growth of Social Media



# History of Social Media



 jkrums

[Follow](#)

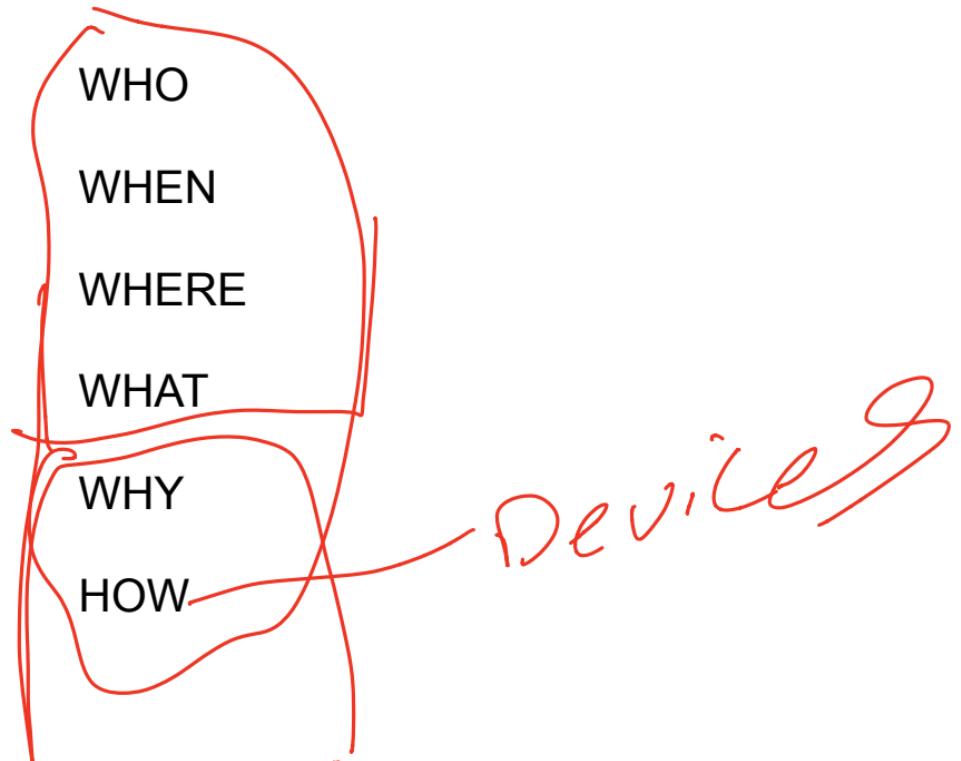
<http://twitpic.com/135xa> - There's a plane in the Hudson. I'm on the ferry going to pick up the people. Crazy.

# What is a #? Why use it?

SEO  
#BLQ Traffic

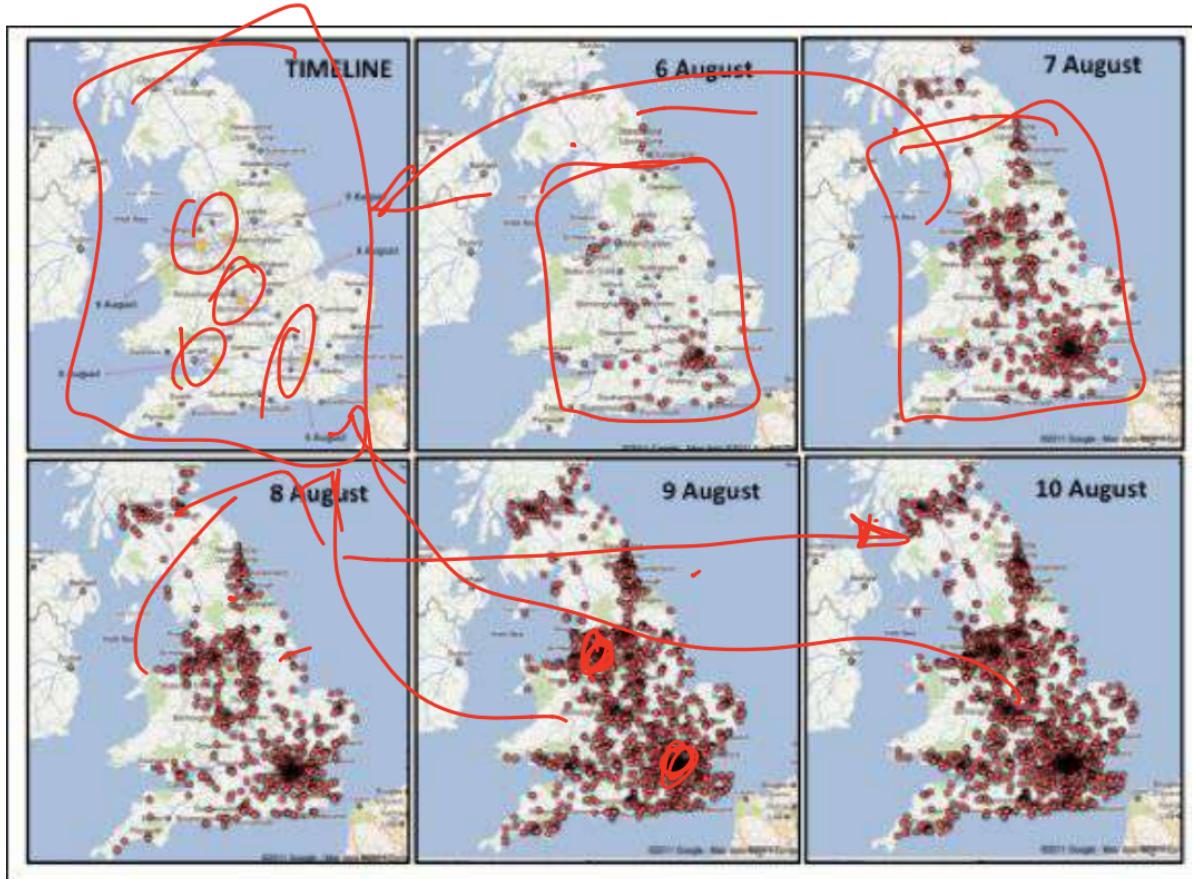
1. #love
2. #instagood
3. #photooftheday
4. #fashion
5. #beautiful
6. #happy
7. #cute
8. #tbt
9. #like4like
10. #followme
11. #picoftheday
12. #follow
13. #me
14. #selfie
15. #summer
16. #art
17. #instadaily
18. #friends
19. #repost
20. #nature
21. #girl
22. #fun
23. #style
24. #smile
25. #food

# From Social Media Data



# Potential Vision

~~Minor Hotel Report~~  
~~Accident Log~~



# Case Studies

## 2012 Delhi gang rape

From Wikipedia, the free encyclopedia

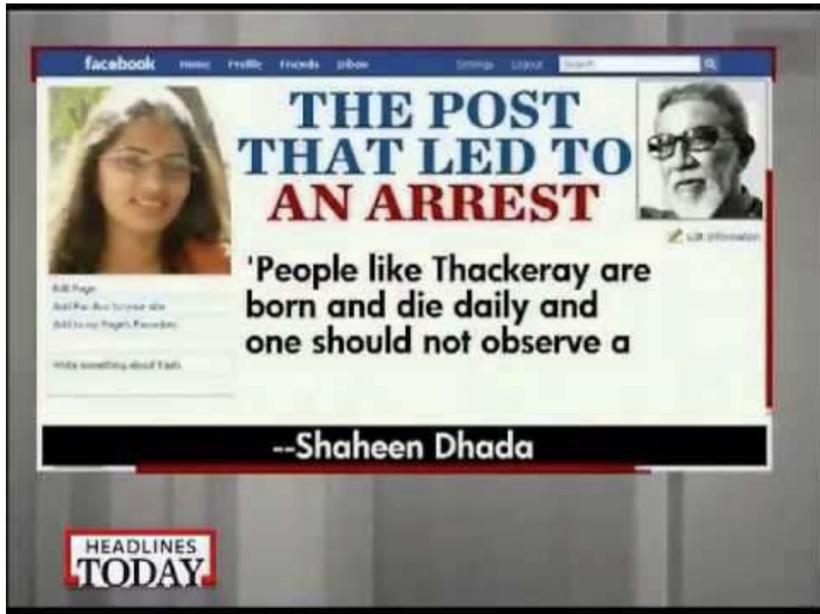
The **2012 Delhi gang rape** case involved a [rape](#) and fatal assault that occurred on 16 December 2012 in [Munirka](#), a neighbourhood in [South Delhi](#). The incident happened when a 23-year-old female [physiotherapy](#) intern, Jyoti Singh Pandey<sup>[2]</sup> was beaten and [gang raped](#) in a private bus in which she was travelling with a male friend, Awindra Pratap Pandey. There were six others in the bus, including the driver, all of whom raped the girl and beat her friend. Thirteen days after the assault, she was transferred to a hospital in [Singapore](#) for emergency treatment, but died from her injuries two days later.<sup>[3][4]</sup> The incident generated widespread national and international coverage and was widely condemned, both in India and abroad. Subsequently, public protests against the [state](#) and [central](#) governments for failing to provide adequate security for women took place in New Delhi, where thousands of protesters clashed with security forces. Similar protests took place in major cities throughout the country. Because India does not allow the press to publicize a rape victim's name, the victim has become widely known as Nirbhaya, meaning "fearless", and her life and death have come to symbolize women's struggle to end rape and the long-held practice of blaming the victim rather than the perpetrator.

# Case Studies

Arab Spring



# Case Studies: Bal Thackeray



## Facebook post on Shiv Sena Chief Bal Thackeray: Girl says she will not visit FB, 9 held for vandalism

Shaheen Dhada and Renu were arrested for posting comments opposing the Mumbai shutdown. However, they were granted bail after they furnished personal bonds, police said.

TNN | Updated: Nov 20, 2012, 06.41 PM IST



2 Comments

Save



MUMBAI/DELHI: One of the girls held for posting comments on Facebook questioning the shutdown in Mumbai for Shiv Sena Chief Bal Thackeray's funeral today said she will never again visit the social networking site while police arrested 9 Shiv Sainiks for vandalising her uncle's clinic.

# Case Studies: Shami Witness

The image shows a Twitter profile for the account @ShamiWitness. The profile picture is a black and white photograph of a lion's face. To the right of the profile picture, the text "SHAMI WITNESS" is displayed in large, bold, black capital letters. Below this, there is a summary of the account's metrics: TWEETS 129K, FOLLOWING 807, FOLLOWERS 17.7K, FAVORITES 17.5K, and LISTS 2. There are also "Follow" and "Settings" buttons. Below the metrics, there are tabs for "Tweets", "Tweets & replies", and "Photos & videos". A "Pinned Tweet" section is visible, and a "Who to follow" sidebar lists "Raghav Bahi" with a blue verified checkmark.

**SHAMI  
WITNESS**

TWEETS 129K FOLLOWING 807 FOLLOWERS 17.7K FAVORITES 17.5K LISTS 2

[Follow](#) [Settings](#)

[Tweets](#) [Tweets & replies](#) [Photos & videos](#)

Pinned Tweet

Who to follow · Refresh · View all

Raghav Bahi  @Raghav\_

# Case Studies: UK Riots

the guardian

## UK riots 'made worse' by rolling news, BBM, Twitter and Facebook

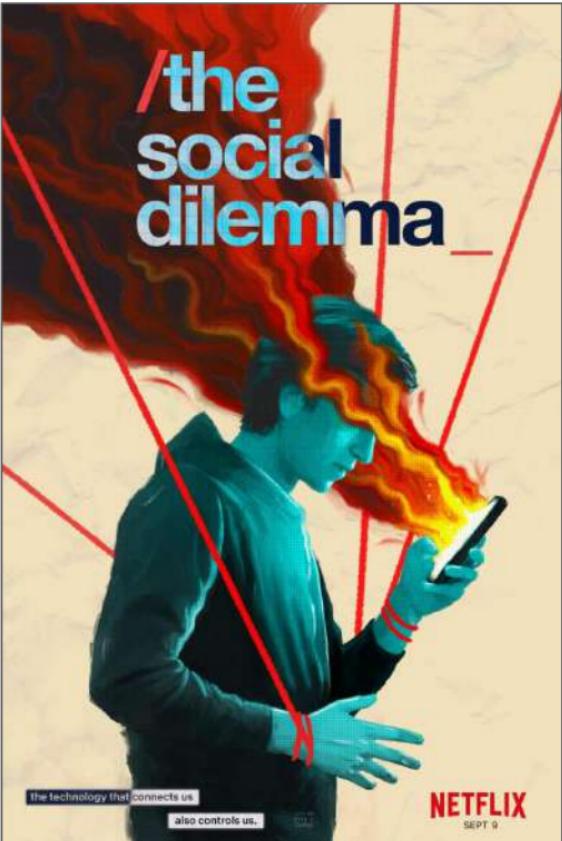
Government panel says disorder was fuelled by TV and social media but warns against closing social networks during unrest

Josh Halliday

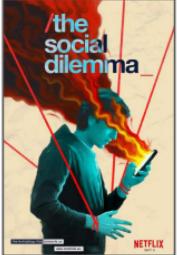
guardian.co.uk, Wednesday 28 March 2012 11.16 BST



Viral violence: Facebook and other social media blamed for inciting unrest during the UK riots. Photograph: Matthew



Source: Netflix



- X Good aspects of N/w → (+)ives.
- X How you release & How it's expected to use.
- X False News with consequences
- X Handling epidemic in age of fake News.
- X Tools defining the Social fabric.
- X Selling users.
- X if you are paying for the Product, you are the Product
  - ↳ Change in your own behavior & Perception of the product
- X engagement | growth | advt. Grabs
- X growth hacking
- X Depression increased.
- X Destabilize the fabric of Society

Source:  
Netflix

# The Great Hack

<https://www.netflix.com/title/80117542>



# Congress - Marc Zuckerberg



Zuckerberg's Senate hearing highlights in 10 minutes

4,461,748 views • Apr 11, 2018

29K 2.1K SHARE SAVE

<https://www.youtube.com/watch?v=t-IMIGV-dUI>

# Shadow Profiles

A  
B  
C  
JX  
Insta



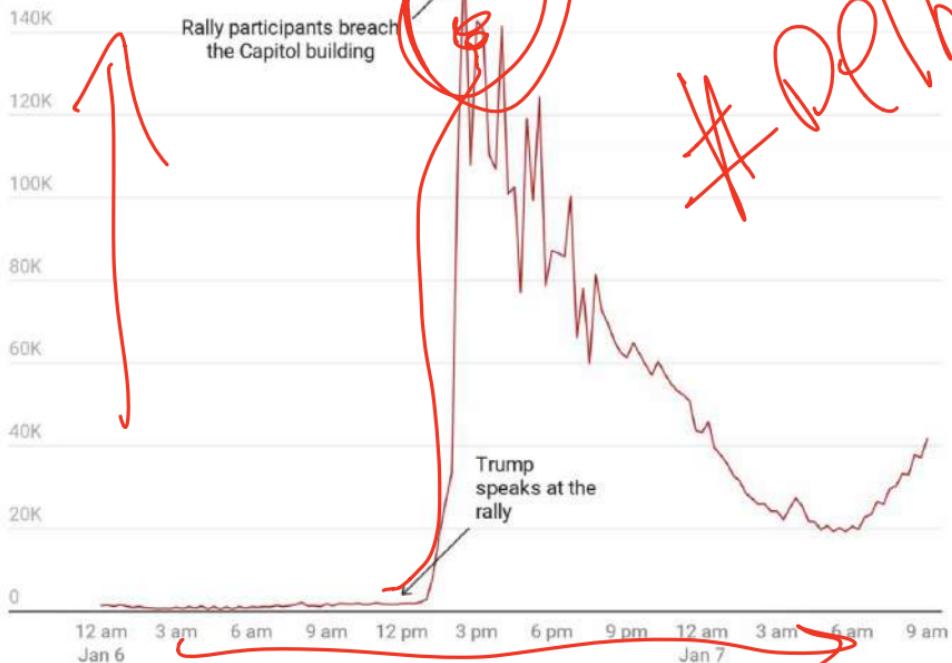
<https://www.youtube.com/watch?v=JiTQkbLzKUc>



Supporters of President Donald Trump after they stormed the Capitol building in Washington, Jan. 6, 2021. Republicans who spent years putting off a reckoning with Trump's behavior are now confronting the prospect that the storming of the Capitol by his supporters could linger for decades as a stain on the party. (Jason Andrew/The New York Times)

<https://indianexpress.com/article/world/us-capitol-hill-siege-live-updates-7139212/>

## Mentions of unrest jumped after Trump's "Save America" rally speech



Zignal Labs tracked mentions of unrest-related terms like "storm the Capitol" on social media and across the internet.

Source: Zignal Labs

recode BY Vox

<https://www.vox.com/recode/22221285/trump-online-capitol-riot-far-right-parler-twitter-facebook>

# **Capitol (Pat)riots: A comparative study of Twitter and Parler**

HITKUL, IIIT - Delhi, India

AVINASH PRABHU\*, DIPANWITA GUHATHAKURTA\*, JIVITESH JAIN\*, MALLIKA SUBRAMANIAN\*, MANVITH REDDY\*, SHRADHA SEHGAL\*, and TANVI KARANDIKAR\*, IIIT - Hyderabad, India

AMOGH GULATI\* and UDIT ARORA\*, IIIT - Delhi, India

RAJIV RATN SHAH, IIIT - Delhi, India

PONNURANGAM KUMARAGURU, IIIT - Delhi, India

On 6 January 2021, a mob of right-wing conservatives stormed the USA Capitol Hill interrupting the session of congress certifying 2020 Presidential election results. Immediately after the start of the event, posts related to the riots started to trend on social media. A social media platform which stood out was a free speech endorsing social media platform Parler; it is being claimed as the platform on which the riots were planned and talked about. Our report presents a contrast between the trending content on Parler and Twitter around the time of riots. We collected data from both platforms based on the trending hashtags and draw comparisons based on *what* are the topics being talked about, *who* are the people active on the platforms and how *organic* is the content generated on the two platforms. While the content trending on Twitter had strong resentments towards the event and called for action against rioters and inciters, Parler content had a strong conservative narrative echoing the ideas of voter fraud similar to the attacking mob. We also find a disproportionately high manipulation of traffic on Parler when compared to Twitter.

Additional Key Words and Phrases: Social Computing, Data Mining, Social Media Analysis, Capitol Riots, Parler, Twitter

## **1 INTRODUCTION**

Misinformation of the United States of America's presidential election results being fraudulent has been spreading across the world since the elections in November 2020.<sup>1</sup> Public protests and legal cases were taking place across

# What you should aim as part of the course?

Try out all labs and exercise that we are posting

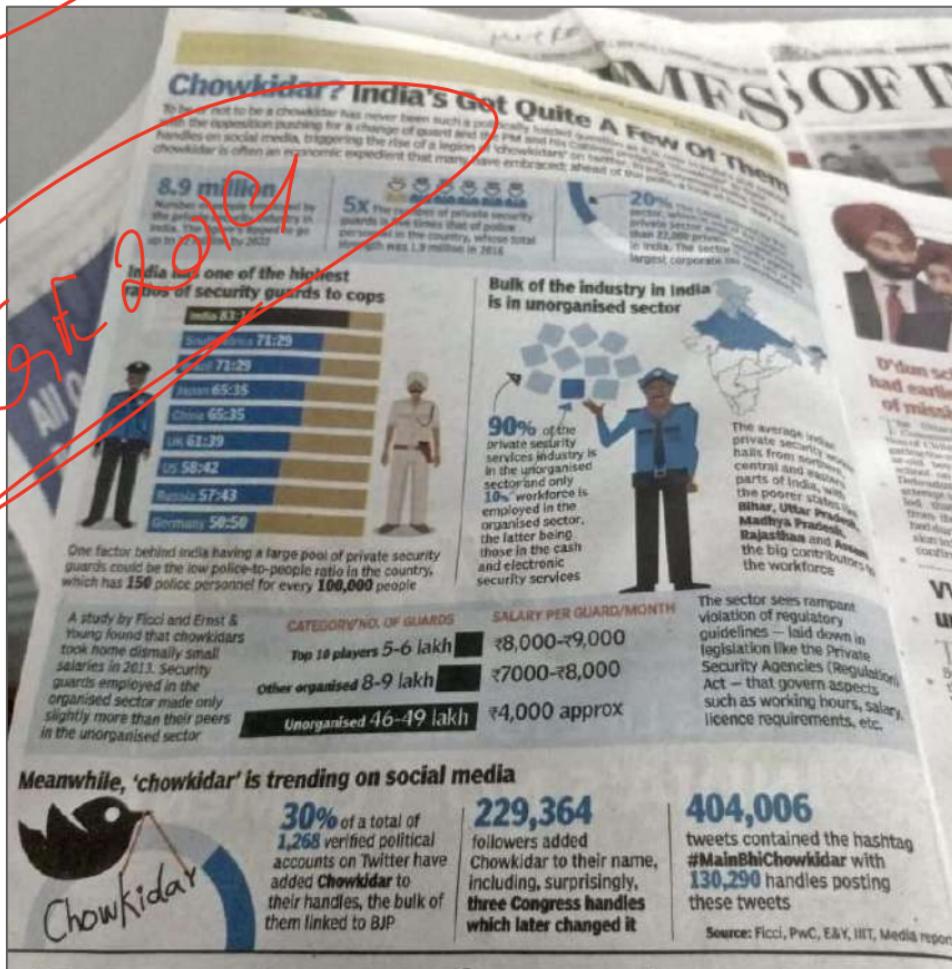
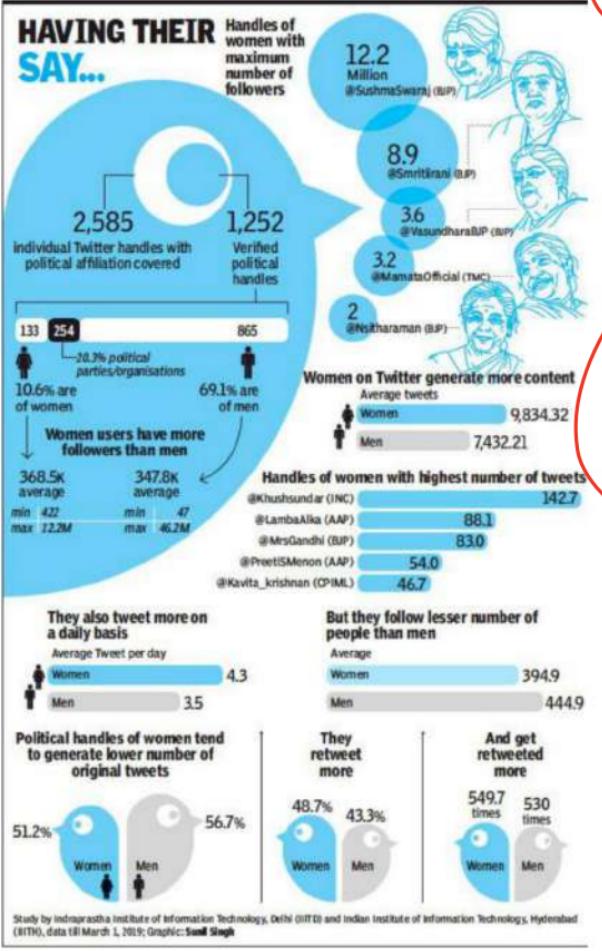
TAs will have Office hours, please attend them

I am planning to do some similar Live / Online lecture through the semester,  
please attend

Be active on the mailing, I plan to use them to inject lot of ideas, and thoughts

NLP  
Network

## HAVING THEIR SAY...



[City](#) [Delhi](#) [Mumbai](#) [Bengaluru](#) [Hyderabad](#) [Kolkata](#) [Chennai](#) [Agartala](#) [Agra](#) [Ajmer](#) [Amaravati](#) [Ahme](#)

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NEWS / CITY NEWS / DELHI NEWS / POLITICS / GET A HANDLE ON THIS: WOMEN CALLING POLL SHOTS ON TWITTER

TOP SEARCHES: Earthquake in Delhi | Delhi Capitals | Delhi pollution | Delhi rains | Delhi SBI IFSC Code

**EXPAND** THINK HOME LOAN. THINK ICICI BANK KN

## Get a handle on this: Women calling poll shots on Twitter

Mohammad Ibrar | TNN | Updated: Mar 21, 2019, 08:04 IST

[✉](#) [⎙](#) [A-](#) [A+](#)

40 [f](#) [t](#) [tw](#) [in](#) [p](#) [msg](#)



Representative image

NEW DELHI: It is politically prudent perhaps to give women their place in politics. After all, as research with Twitter data shows, handles of women on the platform have more followers on average than men and these handles also generate more content than men do. And even if the handles of women produce less original content, their retweets and engagement are high on Twitter, making them an asset for political parties especially in the coming general elections.

# PM Modi loses 100,000 followers, Rahul 9,000 in November Twitter drive

Twitter had carried out a similar exercise globally in July last year which saw the prime minister's follower count going down by around 3 lakh

Neha Alawadhi | New Delhi  
Last Updated at February 11, 2019 09:07 IST



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# Battleground Twitter: Verified political handles up 1,663% in 5 yrs

**CHIRPING  
AHEAD...**

No. of verified  
Twitter accounts

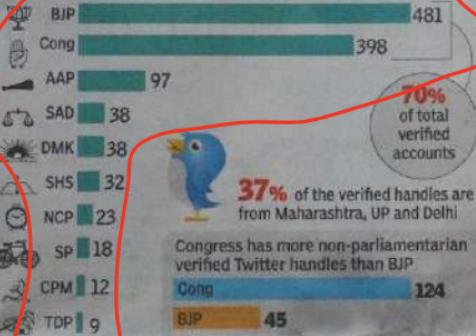
71  
Till 2014  
election

1,252

Till Mar 4,  
2019

IN 2018, CONG CREATED 41 TWITTER HANDLES IN A SINGLE DAY THAT GOT VERIFIED

No. of verified Twitter accounts of individuals affiliated to party



37% of the verified handles are from Maharashtra, UP and Delhi

70%  
of total  
verified  
accounts

Mohammad.Ibrar  
@timesgroup.com

New Delhi: Social media is going to be an important weapon in the electoral battleground this year. This is clear from the rise in the number of verified political handles from 71 to 1,252 between 2014 and March this year, with 78% of these handles belonging to members of BJP, Congress and Aam Aadmi Party.

Research conducted by students and scholars at the Indraprastha Institute of Information Technology (IIIT), Delhi, and the International Institute of Information Technology, Hyderabad, also found that 37% of the ve-

rified handles originated in Maharashtra, Uttar Pradesh and Delhi, making them the hub of online realpolitik.

The research was initiated in IIIT-D in September 2018 by eight students and a principal researcher to assess the impact of social media on the 2019 general elections. "We analysed over 21 million posts by roughly a million handles since the 2014 Lok Sabha polls," said Ponnurangam Kumaraguru, associate professor in both the institutions.

He added that he and his team then covered the data related to 2,585 Twitter handles that were affiliated to an Indian political party. "This list was manually curated and

we have been collecting data for these handles from late 2018 through the Twitter Application Programming Interface," Kumaraguru said.

He said that of the chosen handles, 1,252 political handles were found to be verified. "It is interesting to see such a large number of verified accounts for this year's election," the professor said. "In comparison, when we analysed the Twitter data for the 2014 elections, we found only 71 verified Indian political handles. This shows how big a jump there has been in the number of such handles."

Kumaraguru said that the team also examined the handles for their state representa-

tion, party affiliation and Lok Sabha / Rajya Sabha affiliations. "We found that more than 70% of the verified accounts of BJP and Congress accounts put together. If AAP is included, the figure goes up to 78%," he explained. "This indicates social media is important for the national parties. We are keen to analyse the data to study interesting patterns like diversity of topics and the manner in which the campaigns are carried out."

Congress, which has lagged BJP on social media, picked up its game last year when its leaders created 35 new Twitter handles in a single day and which were later verified.

# Picture time!

# Thanks for attending the class!



pkatiiitd



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<http://precog.iitd.edu.in/>



@ponguru

# Privacy and Security in Online Social Media

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Course on NPTEL

Week 1.2

Ponnurangam Kumaraguru (“PK”)

Full Professor

ACM Distinguished Speaker

[fb/ponnurangam.kumaraguru](https://www.facebook.com/ponnurangam.kumaraguru), @ponguru



# Overview of OSM

---







flickr

foursquare

tumblr

tinder™



whisper



twitter



Instagram  
Fast beautiful photo sharing

Pinterest



# OSM Penetration in India

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1,283,810,000  
TOTAL POPULATION



1 / 120

TABLET USERS



1 / 10

MOBILE INTERNET USERS



1 / 13

SOCIAL MEDIA USERS

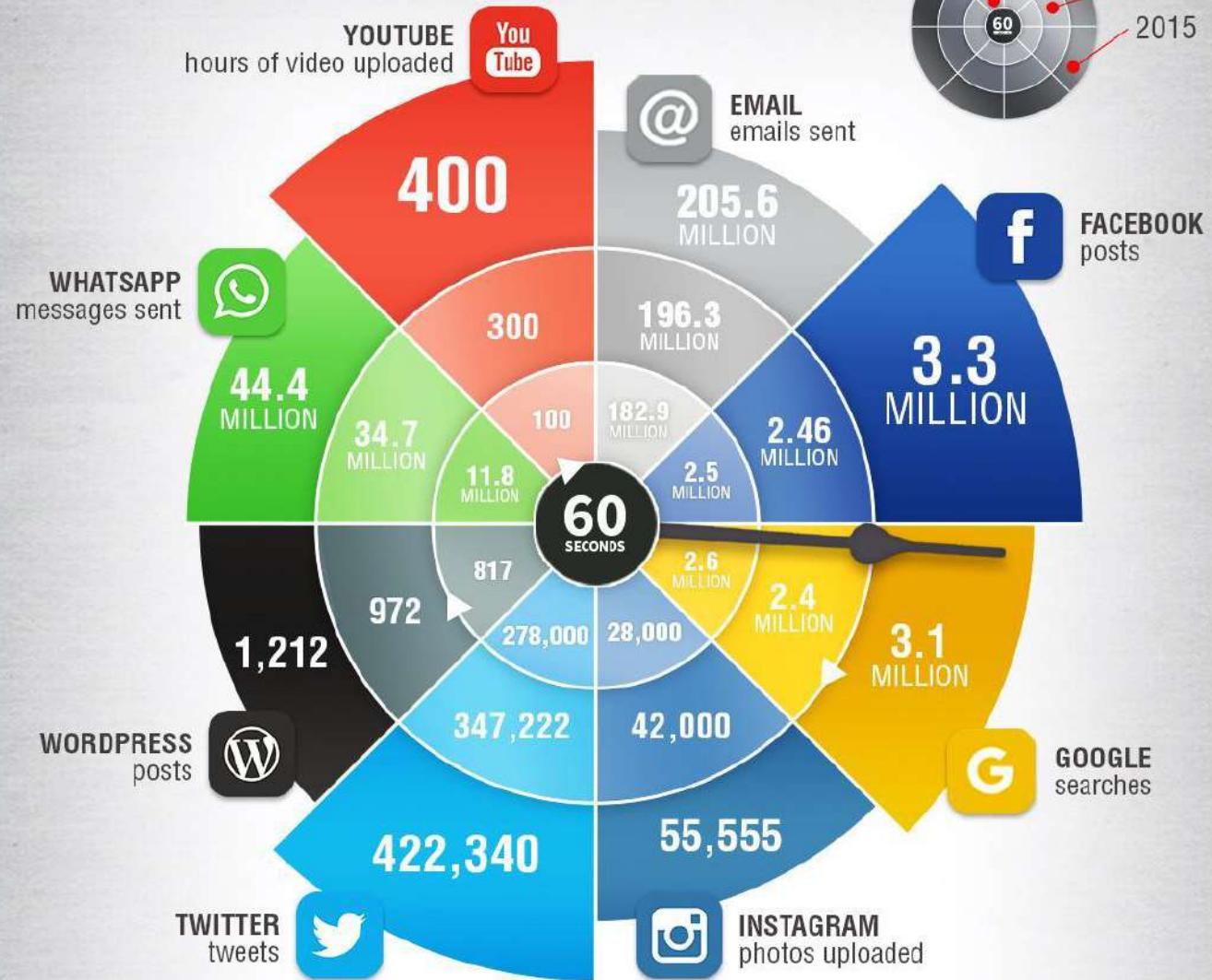
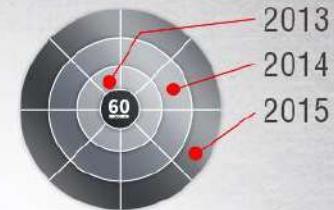


1 / 6

INTERNET USERS

# What Happens Online in 60 Seconds?

## Managing Content Shock in 2016



# 4 / 5 V's of Online Social Media



# Facebook

**Ponnurangam Kumaraguru**



Dr. Ponnurangam Kumaraguru  
Assistant Professor

**Ponnurangam Kumaraguru (P K)**

Friends 108 Mutual

Timeline About Photos 43 Friends 108 Mutual More

About

Assistant Professor at Precog@IIIT-D April 2010 to present

Studied Computer Science at Carnegie Mellon University

Lives in New Delhi, India

From Chennai, Tamil Nadu

Photos - 43



Paridhi Jain 8 hours ago

Niharika Sachdeva Prateek Dewan Aditi Gupta Anupama Aggarwal Ponnurangam Kumaraguru :P :P

xkcd: Social Media  
xkcd.com

Warning: this comic occasionally contains strong language (which may be unsuitable for children), unusual humor (which may be unsuitable for adults), and advanced mathematics

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Now 2013 2012 2011 2010 2009

Chat (Off)



Cristiano Ronaldo

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f 108,015,594



Shakira

[f Like](#) [Follow](#)

f 103,599,642



Vin Diesel

[f Like](#)

f 96,278,566



Eminem

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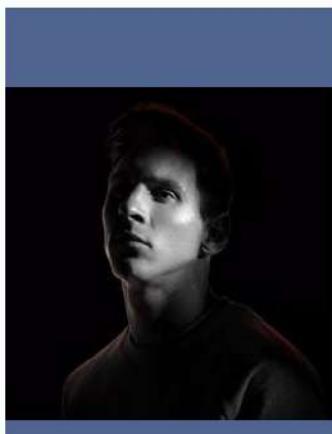
f 92,314,858



Rihanna

[f Like](#) [Follow](#)

f 81,505,422



Lionel Messi (Leo Messi)

[f Like](#)

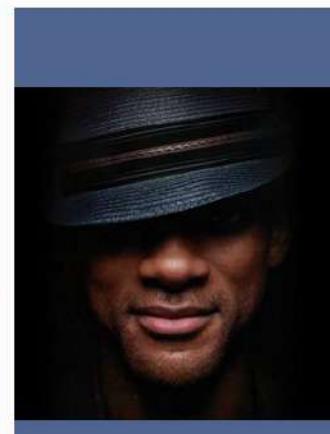
f 81,380,660



Michael Jackson

[f Like](#) [Follow](#)

f 75,967,973



Will Smith

[f Like](#)

f 75,157,098



Bob Marley

[f Like](#) [Follow](#)

f 74,342,314



Justin Bieber

[f Like](#) [Follow](#)

f 73,645,951

# Twitter



Home Connect Discover Me Search Settings PhishArt

Tweets Following Followers Favorites Lists

**Tweet to PK**  
@ponguru

Photos and videos



369 TWEETS 120 FOLLOWING 242 FOLLOWERS Follow

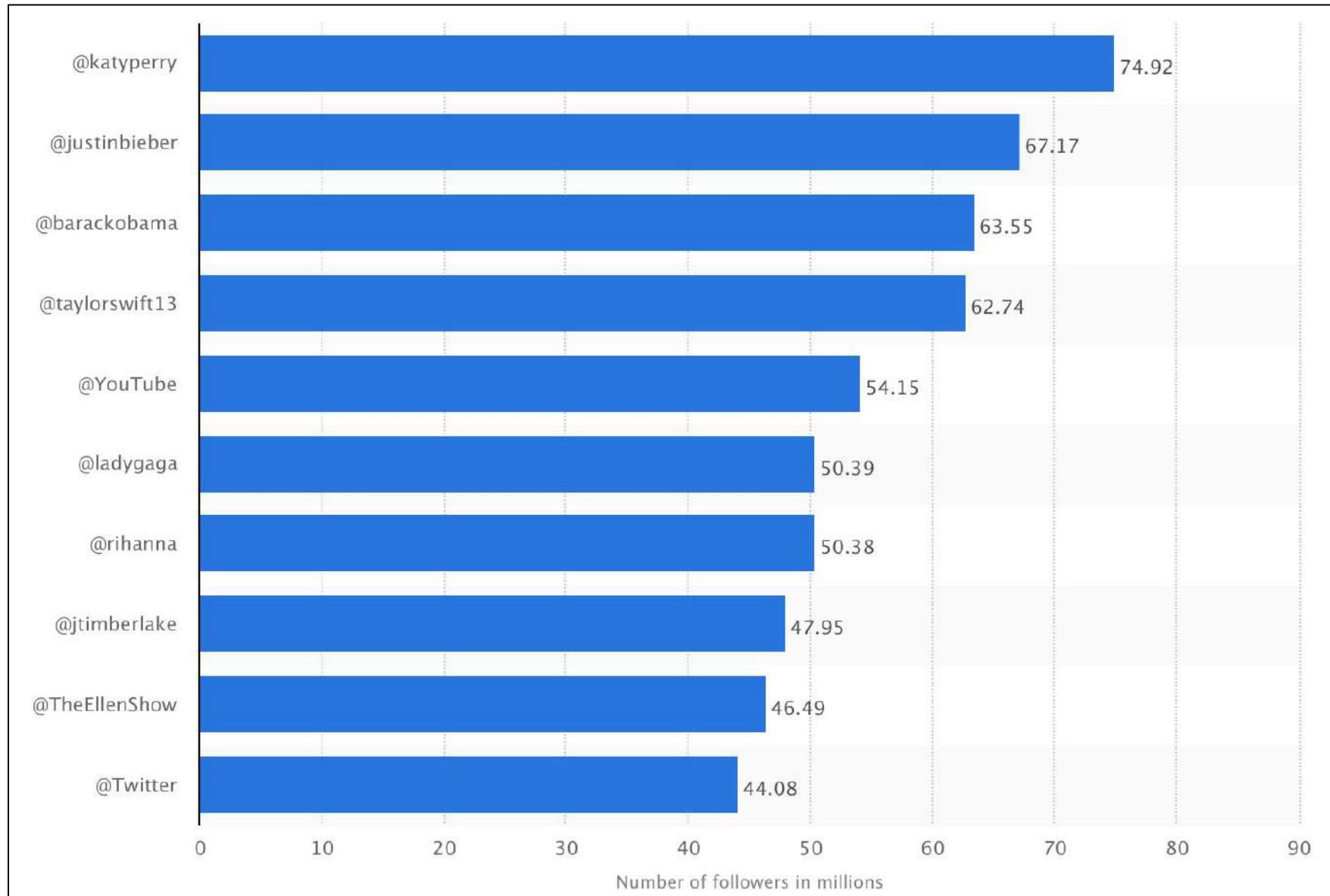
**Tweets**

**Anupama Aggarwal** @anupama\_agg 11 Jul  
RT @subimal: "@sardesairajdeep visited IIIT Delhi today. They have developed amazing tools for social media usage for politics." cc @ponguru  
 Retweeted by PK  
Expand

**PK** @ponguru 21 Jun  
How much is Industry supporting research in S & P? + 1 @\_Seanzp  
"Criminals are doing a huge amount of research." #csosummit @rachitkinger  
 Expand

Who to follow · Refresh · View all

abdullah aiman @eyemanzul Follow



# Terminology

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- Tweet
- Retweet
- Mention
- Like
- Hashtag
- Replies





v/  
S



Private	Public
Bidirectional Links	Unidirectional Links
5000 Characters	140 Characters
Like	Retweet / Favorite

# YouTube

YouTube IN

Popular on YouTube

- Music
- Sports
- Gaming
- Movies
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- euronews knowledge
- Colors TV
- BabyTV Channel
- Indiatimes presents Peps...

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Priyanka Chopra - Exotic ft. Pitbull  
by PriyankaChopraVEVO 4,320,841 views 6 days ago

Atharintiki Daredi teaser - Atharintiki daredi trailer - idlebrain.com  
by idlebrainlive 899,878 views 3 days ago

The Viva (Telugu)  
by sabarish kandregula 933,031 views 6 days ago

Phata Poster Nikhla Hero I Official Trailer 2013 I Shahid Kapoor & Ileana  
by Tips Music 861,021 views 3 days ago

### Entertainment

Attarintiki Daredi Song Teaser - Pawan Kalyan, 231,208 views 3 days ago

Varuthapadatha Vaalibar Sangam - Official Theatrical, 237,725 views 3 days ago

### Movies

SHUDDH DESI ROMANCE TRAILER HD, 1,312,719 views 1 week ago

### Music

Jadoo Ki Jhappi - Latest Song I Jacqueline, by Tips Music

Jeene Laga Hoon - Ramaiya Vastavalya - by Tips Music

Chennai Express Song - Kashmir Mein Tu, by ChennaiExp2013

Sanjoy Deb ft.

4:30

0:23

13:03

2:53

TRIVINRA 0:29

1:57

TRAILER HD 2:28

Vijay TV

MTV India

Music

# Pinterest

Screenshot of the Pinterest homepage showing a feed of pins.

The interface includes:

- Search bar at the top left.
- Pinterest logo at the top center.
- User profile icon "aditi" at the top right.
- "Friends to follow" sidebar on the left.
- A vertical sidebar on the left showing promotional banners for "WE RENT MEMORIES", "JEEP WRANGLERS", "SCOOTERS", and "BIKES".
- Pin 1: A screenshot from Harry Potter with the caption "PLEASE, TELL THEM I MEAN NO HARM" and "SORRY, PROFESSOR, BUT I MUST NOT TELL LIES." It has 5 repins and 2 likes. Repinned by Dominique Lempares onto Harry Potter.
- Pin 2: A screenshot from Harry Potter showing characters in a snowy setting with the caption "That sound? It's the sound of my heart breaking into a million pieces." and "...I just noticed that both Harry and Neville are dressed similarly to their fathers during the battle of Hogwarts." It has 7 repins and 2 likes. Pinned by Dominique Lempares onto Harry Potter.
- Pin 3: A screenshot from a movie featuring a man with curly hair.
- Pin 4: A promotional banner for "Hayden" featuring "PIXEL PERFECTION" and "OUR LATEST WORK".
- Bottom navigation bar with links to "OUR SERVICES", "FROM THE BLOG", and social media icons.

A close-up photograph of a man with dark hair and a mustache, looking directly at the camera with his hand near his mouth in a 'shh' gesture.

## Ponnurangam Kumaraguru (PK)

Founding Head, Cybersecurity Education and Research Centre (CERC)

New Delhi Area, India | Higher Education

Current      Cybersecurity Education and Research Centre (CERC) @ IIIT Delhi, Backpack Labs, MixOrg

Previous     Carnegie Mellon University, National Association of Software and Service Companies (NASSCOM), International Institute of Information Technology, Hyderabad

Education    Carnegie Mellon University

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[in.linkedin.com/in/ponguru/](https://in.linkedin.com/in/ponguru/) [Contact Info](#)

Add a section to your profile to be discovered for your next career step

# Foursquare

foursquare  Current Map View [Sign up](#)

Suggestions for Top Picks

Show me places ...

I haven't been to  My friends have been to  I have been to before  With Foursquare specials

**Apple Store** 8.8 767 5th Ave. (btwn 58th & 59th St.) Electronics · 22 here now

The Apple Store flagship is underground, but you can't miss the 32-foot glass cube atop it. Open 24/365, so Mac fans can shop for computers, software and accessories forever. [Racked 38 Member] - Racked



Lots of people like this place [Save](#) [Like](#)

**Macy's** 8.3 151 W 34th St. (btwn 6th & 7th Ave.) Department Store · 15 here now

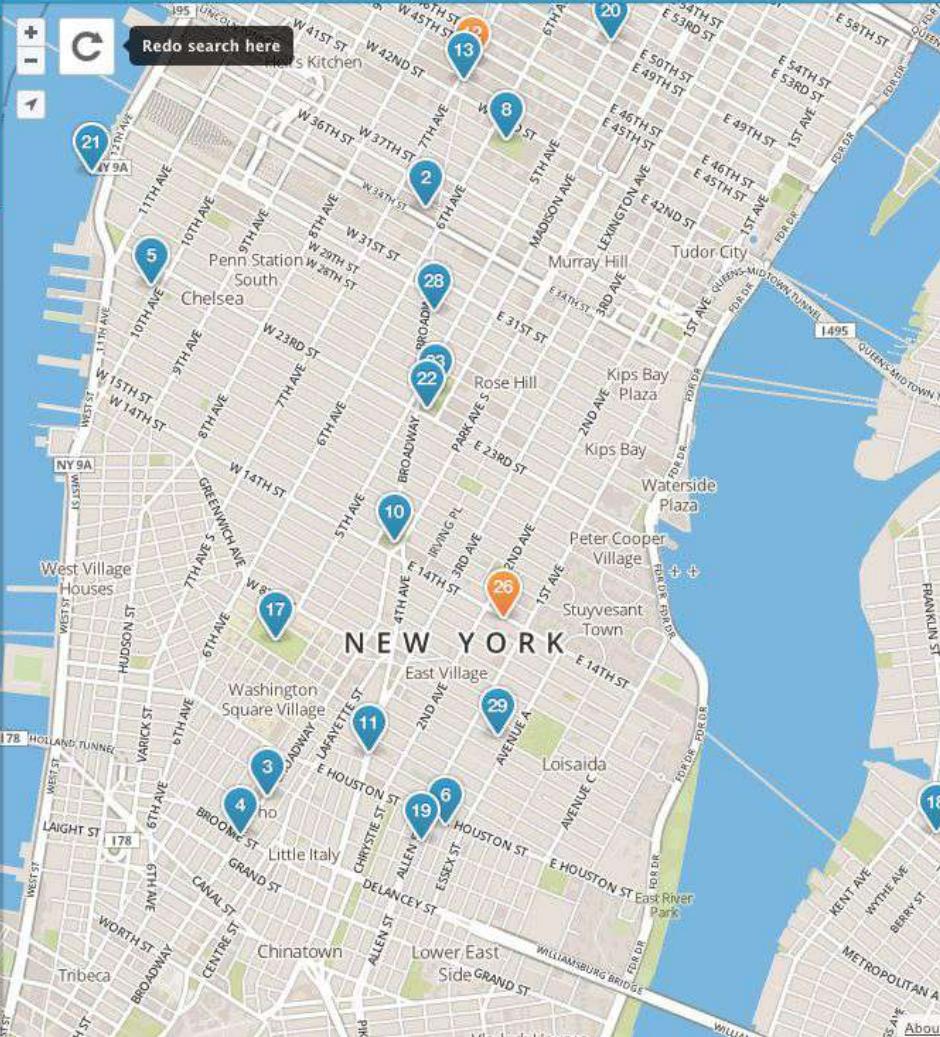
The largest store in the world, it has just about everything you need. I love their perfume department. -Tamesha Warren, Top Chef - Bravo

Over 10000 people have checked in here [Save](#) [Like](#)

**Uniqlo** 8.9 546 Broadway (btwn Spring & Prince St.) Apparel · 2 here now

Combines comfort, trend, technology (as seen in their Heat Tech collection) and affordability to turn its three-story flagship into the spot for skinny jeans and colorful basics. [Racked 38 Member] - Racked





This spot is popular on Foursquare [Save](#) [Like](#)

# Google+



Kristi Hines

Blogging and social media enthusiast who loves photography, tennis, and salsa dancing.

Posts   **About**   Photos   Videos   +1's   Buzz

Introduction   Work

Along with my full time job as an Web Strategist, I also enjoy blogging, social media, and freelance writing.

My main blog is Kikolani, which focuses on blog marketing, blogging tips and social networking strategies. I am also a regular contributor on several sites including:

- Search Engine Journal
- Social Media Examiner
- Search Engine Watch

Personal

When I'm not working, I enjoy spending time with my wonderful husband and our pets. We both enjoy hiking and playing tennis together and in local leagues (singles and doubles).

Our favorite hobby together is photography. I find it is a great stress reliever, focusing on nothing but the subject in front of my camera lens. I also enjoy scrapbooking, and hope to get back to it soon once I get a large enough workspace.

Contact Info

- Email [info@kristihines.com](mailto:info@kristihines.com)
- [kristi.hines](#) on Skype

[Edit Profile](#)

In Kristi's circles (12)



[View all >](#)

Have Kristi in circles (15)

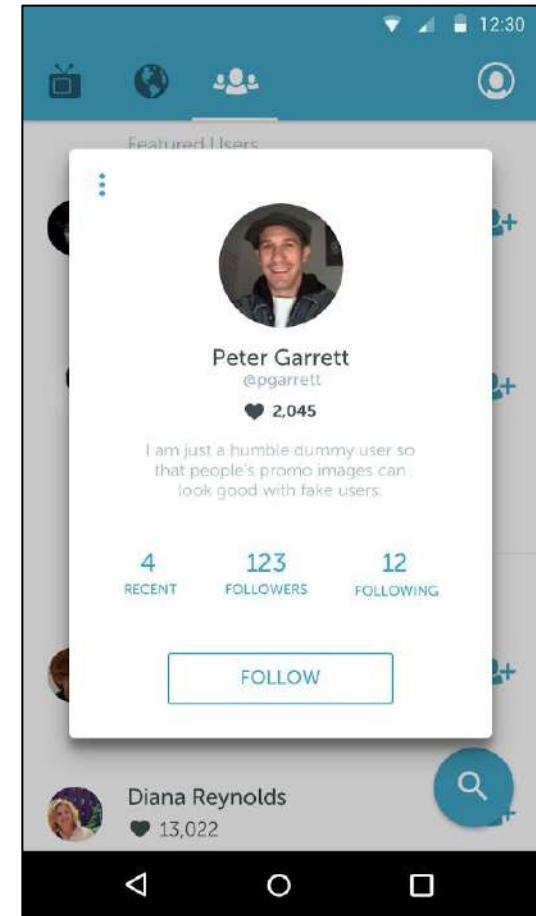
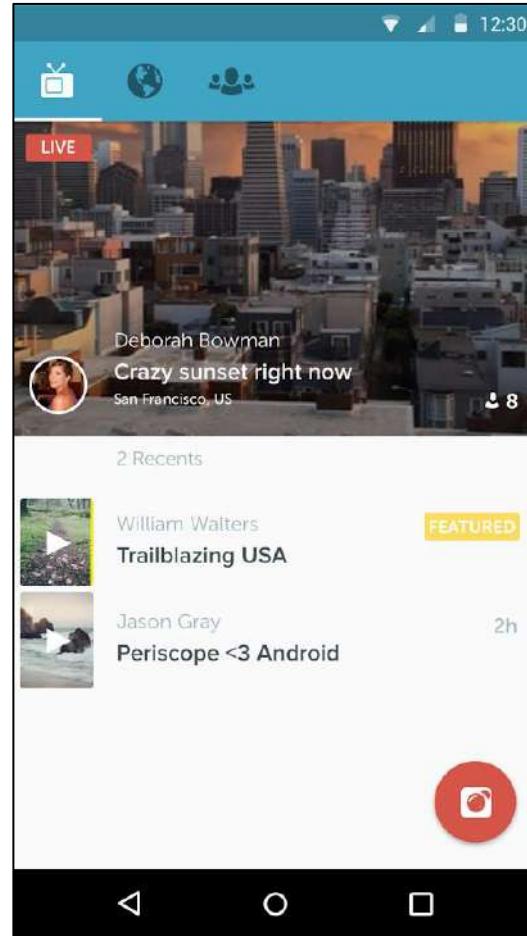
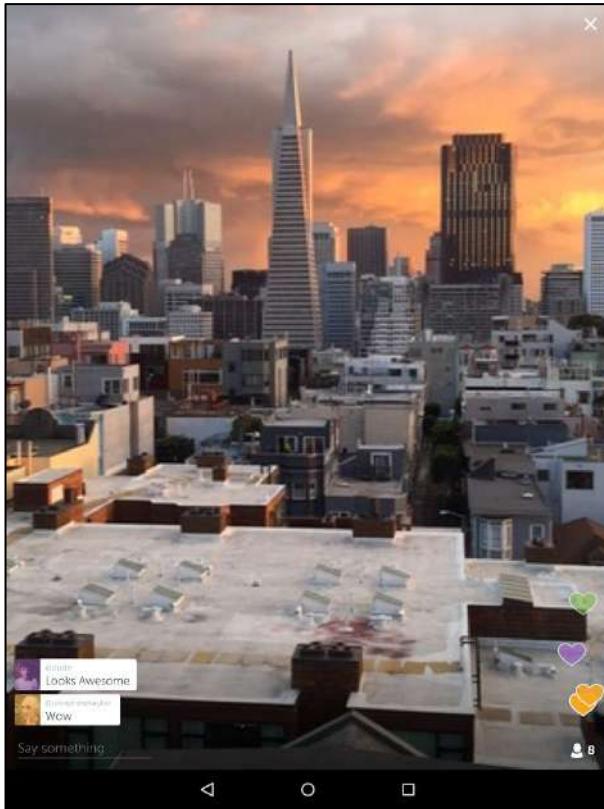


[View all >](#)

Links

-  Freelance
-  Blog Marketing
-  Photography
-  DoFollow
-  LinkedIn
-  Facebook
-  Twitter
-  Twitter
-  Kristi Hines
-  Youtube
-  Sarukura
-  Soulmates
-  Malshi
-  Infographics

# Periscope



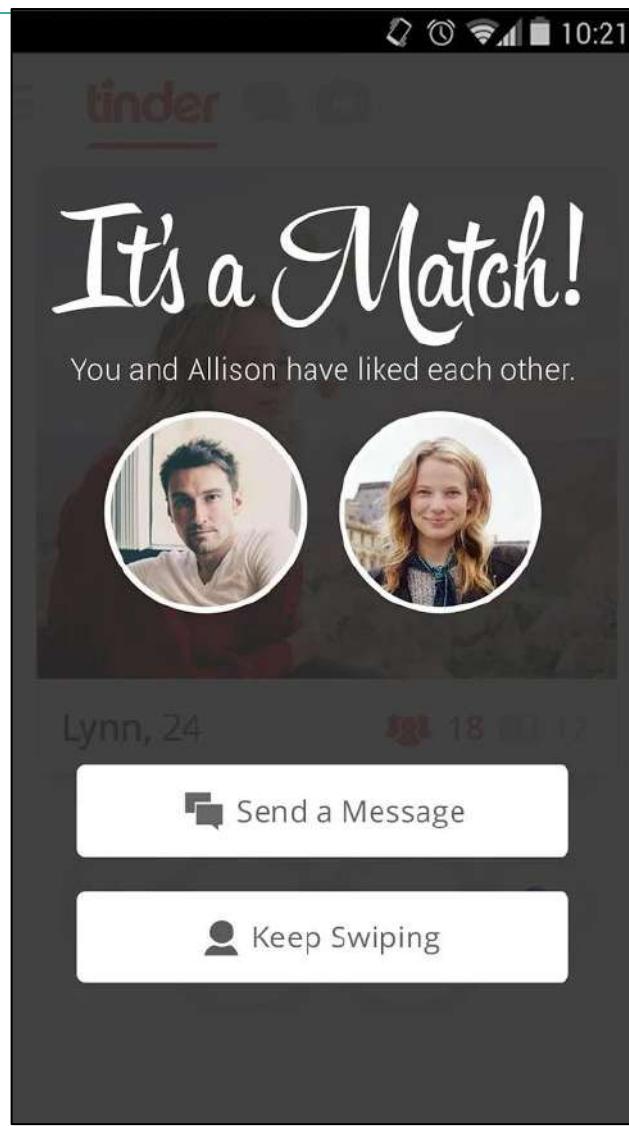
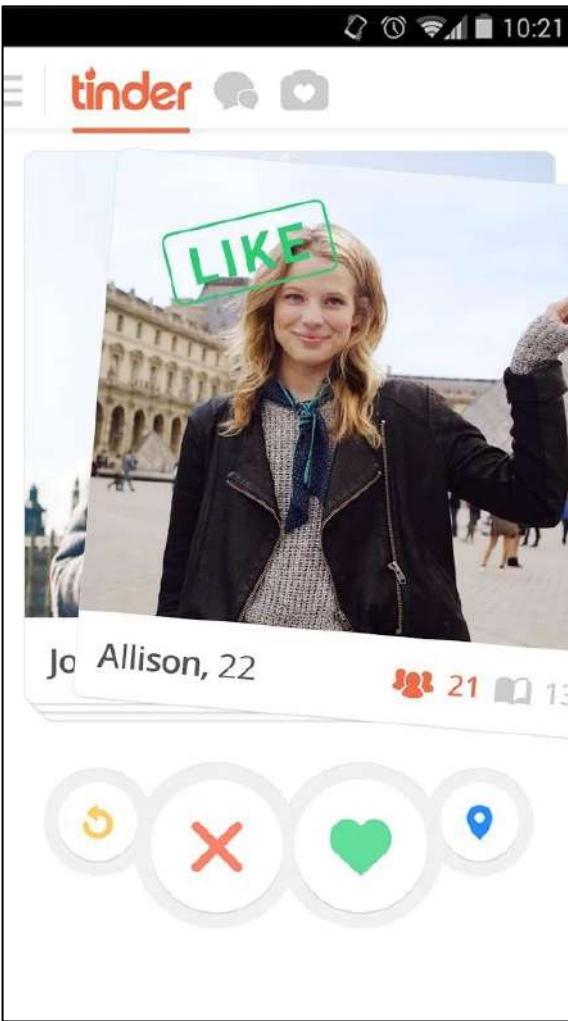
<https://www.periscope.tv/>

# Periscope

---



# Tinder



[Popular](#)[Latest](#)[LOL](#)[Confessions](#)[Relationships](#)[OMG](#)[Military](#)[Faith](#)[LGBTQ](#)[Animals](#)

## Trending Stories



### 21 Wild Stories About Black Friday Shopping

Forget about keeping the peace



### This Is What People Secretly Love About Their Families

#blessed



### 14 Funny Thanksgiving Stories That Need To Be Outdone This Year

"So... who believes in evolution?"



### 15 Honest Reactions About Dealing

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 Get it on  
**Google Play**

Or we can send it to your phone

Phone Number

Send

## Trending Searches

 **thanksgiving**

 **family**

# Perceptions!

---



Jeff Hutton  
The Terrific Pacific!



Like - Comment - Share ■ 5

# Thank you

[pk@iiitd.ac.in](mailto:pk@iiitd.ac.in)

precog.iiitd.edu.in

fb/ponnurangam.kumaraguru

# Privacy and Security in Online Social Media

---

Course on NPTEL

Week 1.3

Ponnurangam Kumaraguru (“PK”)

Full Professor

ACM Distinguished Speaker

[fb/ponnurangam.kumaraguru](https://www.facebook.com/ponnurangam.kumaraguru), @ponguru



2009



jkrums

Follow

<http://twitpic.com/135xa> – There's a plane in the Hudson. I'm on the ferry going to pick up the people. Crazy.



# Social media turns a blessing: Avani's missing photo goes viral, and she gets her mother back in 20 minutes

The photo showed the girl holding a lady railway police official's hand.



Written by **Nisha Nambiar** | Pune | Updated: May 17, 2016 2:04 am



## BEST OF EXPRESS



India

Pakistan covets territory of others and uses terrorism as state



# Find Your Missing Child

Using Social Media to bring your missing child home

[Home](#)[Contact](#)[Blog](#)[Links](#)[About FYMC](#)[DONATE NOW](#)[Resources For Families](#)[Resources For MEC Organizations](#)

# Help us help you.

[DONATE NOW](#)[GET THE GUIDE](#)[VIEW THE INFOGRAPHIC](#)[LEARN MORE ABOUT PREVENTION](#)

Welcome to Parents  
from FYMC

03:01

vimeo

A video player window featuring a man with glasses and a beard speaking directly to the camera. The video is titled "Welcome to Parents from FYMC". A play button icon and a timestamp of "03:01" are visible at the bottom of the player. The Vimeo logo is in the bottom right corner of the video frame.

# Social media turns a blessing: Avani's missing photo goes viral, and she gets her mother back in 20 minutes

The photo showed the girl holding a lady railway police official's hand.



Written by **Nisha Nambiar** | Pune | Updated: May 17, 2016 2:04 am



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Find tickets ➤

KLM

Journeys of inspiration

## BEST OF EXPRESS



India  
Pakistan covets  
territory of others and  
uses terrorism as state

## **A teenage girl was found dead just days after posting a haunting message online about the cyber bullying she was suffering.**

Britney Mazzoncini has been described by her grieving grandmother as a 'beautiful' girl who was 'loved by all'.



**Arsonists set fire to eastern European shop in Norwich »**

The 16-year-old died after she was rushed to hospital from her home in Glasgow, **the Daily Record reported.**

She had been tormented on social media by bullies, and complained about the abuse in a Facebook post days before her death.

She wrote: 'Starting to get sick of wee lassies calling me a riddy and this and that.'

'As I've said, if you have a problem with me then delete me and if you're being cheeky then you will just be blocked.'

# Role of OSN in global events: UK Riots

the guardian

## UK riots 'made worse' by rolling news, BBM, Twitter and Facebook

Government panel says disorder was fuelled by TV and social media but warns against closing social networks during unrest

**Josh Halliday**  
[guardian.co.uk](http://guardian.co.uk), Wednesday 28 March 2012 11.16 BST



Viral violence: Facebook and other social media blamed for inciting unrest during the UK riots. Photograph: Matthew

# THE TIMES OF INDIA

India

You are here: Home » India

## Nepal-India earthquake

with devastating force less than 50 miles from the capital, Kathmandu causing tremors in northern India as well.



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large campus,  
larger living



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SUNDAY OPEN

A massive earthquake killed thousands in Nepal and India on 25 April. The massive 7.9 magnitude earthquake hit Nepal

with devastating force less than 50 miles from the capital, Kathmandu causing tremors in northern India as well.

**RELATED KEYWORDS:** Twitter | Social-Media | Nepal-Earthquake | Facebook

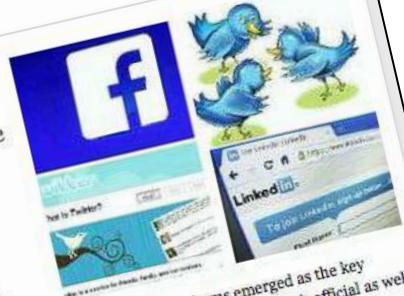
Sushmi Dey, TNN | Apr 28, 2015, 01:34AM IST

[Like](#) [Share](#) 19 [Tweet](#) 157 [8+1](#) [1](#) [in Share](#) 10

NEW DELHI: Social media appear to have beaten the traditional media with governments, various agencies and individuals using Twitter and Facebook to connect, rescue and provide relief to the thousands of people stuck in Nepal since a devastating earthquake struck the Himalayan country on Saturday.

Social media platforms emerged as the key means of communication for both official as well as personal messages. Twitter alone has registered over 4.1 million tweets in the last three days since the first shocks of the quake hit Nepal and parts of India.

**Times cares: Reach out, aid Nepal**



Social media platforms emerged as the key means of communication for both official as well as personal messages.

Waiting for archive.wired.com...

WIRED

SHARE

f SHARE  
28

t TWEET  
44

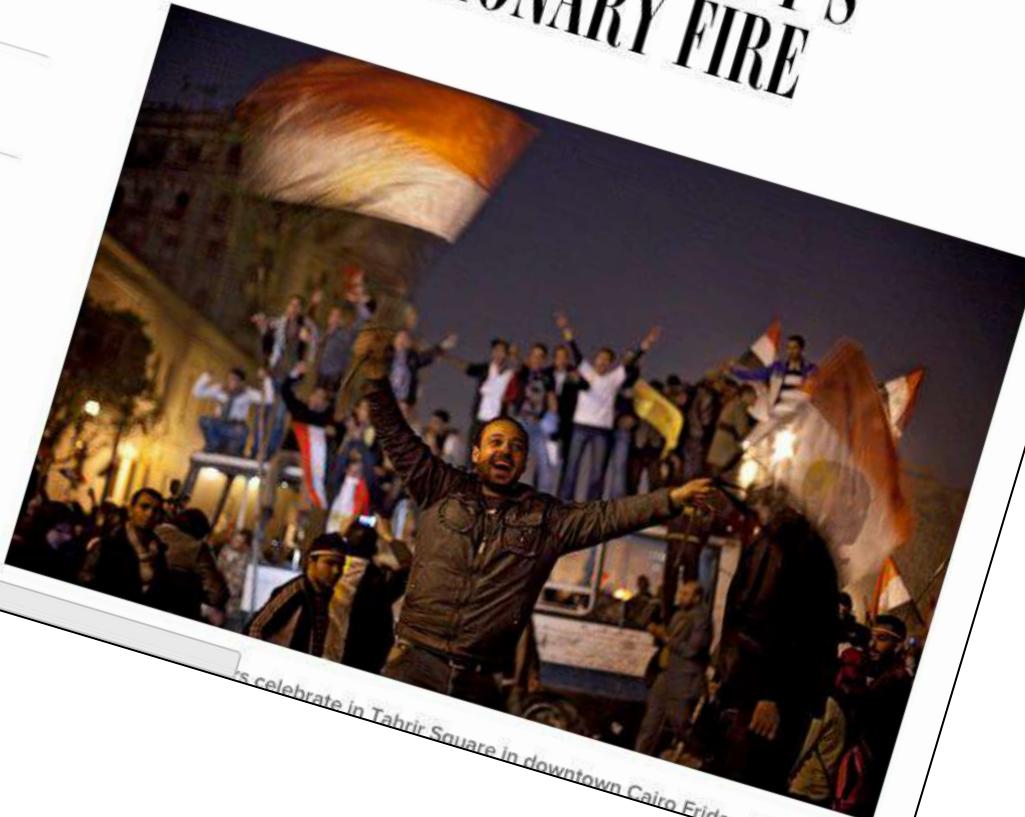
p PIN  
1

c COMMENT  
0

e EMAIL

Social Media Sparked, Accelerated Egypt's Revolutionary Fire

# SOCIAL MEDIA SPARKED, ACCELERATED EGYPT'S REVOLUTIONARY FIRE



# Boston Bombing Facebook And Twitter Page 'Fakes' Set Up To Capitalise On Tragedy

Huffington Post UK | By Felicity Morse Posted: 16/04/2013 09:34 BST | Updated: 16/04/2013 16:36 BST

Like 2,240 people like this. Be the first of your friends.

1,175

266

21

4

120

f share

tweet

+1

email

comment

GET UK ALERTS:  
Enter email

SIGN UP



FOLLOW: Facebook, Twitter, Video, Boston, Boston Bombing Fakes, Boston Marathon, Boston Marathon Bombing, Boston Usa, Fake Boston Marathon, Marathons, UK NEWS, UK News

A number of fake charity Twitter accounts and Facebook pages have been set up in the wake of the **Boston marathon bombings** in an attempt to capitalise on the tragedy. Pictures of 'child runners' who had supposedly died in the blasts were tweeted from a 'Hope for Boston' account begging for retweets to "show respect".

PRAY FOR BOSTON  
**@HopeForBoston**  
HOPE FOR BOSTON

Follow @HopeForBoston

R.I.P. to the 8 year-old boy who died in Boston's explosions, while running for the Sandy Hook kids. #prayforboston  
<http://t.co/Xmv2E81Lsb>

April 16, 2013 12:18 am via web

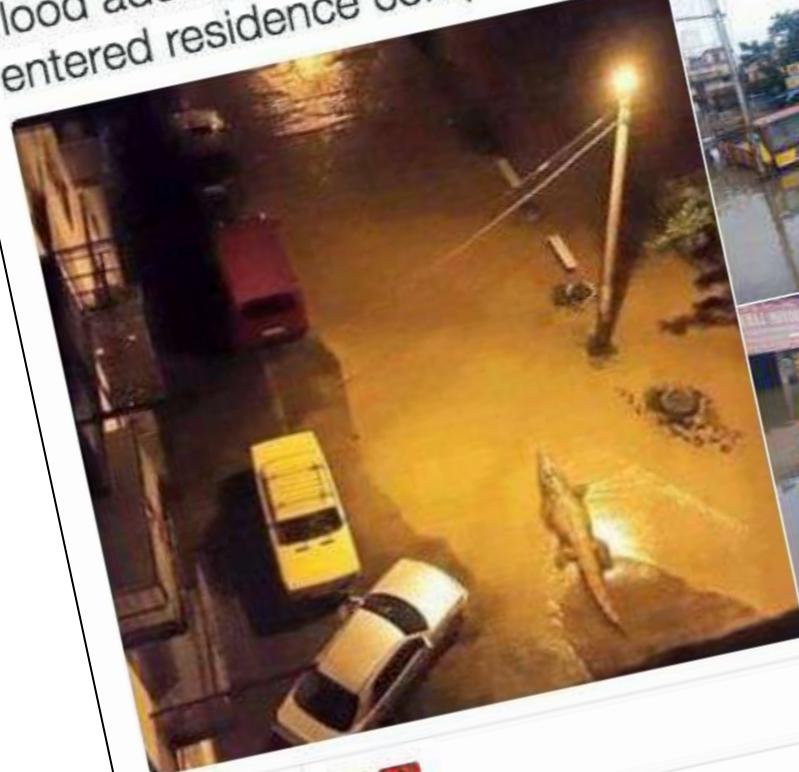
Reply Retweet Favorite





Follow

@ [REDACTED] : Chennai going down in horrible flood adding more to trouble crocodile has entered residence complex.



RETWEETS

2



1:28 PM - 4 Dec 2015

...



# Hurricane Sandy: Fake Images



DC Maryland Virginia  
@DMVFollowers



McDonalds in Virginia Beach flooded.  
[pic.twitter.com/FZBoCydM](http://pic.twitter.com/FZBoCydM)



Katina  
@kdekranis9



I TOLD Y'ALL! Shark on the highway in New Jersey!!!!  
@maxthewanted would appreciate this. #HurricaneSandy  
[pic.twitter.com/kaYMjWzT](http://pic.twitter.com/kaYMjWzT)

1:09 AM - 30 Oct 2012



Jamster  
@jamster83



Amazing picture of hurricane #Sandy decending in New York  
[pic.twitter.com/3mMhCbNq](http://pic.twitter.com/3mMhCbNq)

4:21 PM - 29 Oct 2012



5 RETWEETS 586 FAVORITES



# Other implications

---

## **MI6 chief blows his cover as wife's Facebook account reveals family holidays, showbiz friends and links to David Irving**

By JASON LEWIS

Last updated at 7:14 PM on 5th July 2009

# Other implications

GO TO HOME | GO TO SEARCH | GO TO LOGIN

Home Business News Markets Personal Finance Retirement Technology Luxury Sci

**End of Privacy**

**Why your Facebook ID is marketers' Holy Grail**



Right  
Obama  
Stocks  
No holida

# Other implications

The screenshot shows a news article from Anadolu Agency. The title is "Using too much Facebook and Twitter may cost you your job". Below the title, the date is listed as "Sun, Oct 10 10:50 AM". The main text of the article discusses how government and council employees in the UK are at risk of being sacked if they use social networking sites at work or post inappropriate comments from home. It also mentions that police censured eight employees last year for using police computers to chat online. To the right of the article, there is a dark sidebar with the text "Morga" and "Morgan Stan" partially visible, suggesting it might be a Morgan Stanley logo.

**Using too much Facebook and Twitter may cost you your job**

Sun, Oct 10 10:50 AM

London, Oct 10 (ANI): Government and council employees in the UK using social networking sites at work or posting inappropriate comments from home are likely to face serious action, which includes being sacked.

Police censured eight employees last year after they found using police computers to chat with their friends online.

Morga

Morgan Stan

A.C.E. Fund

# Takeaways Week 1

---

- Growth of Online Social Media
- 4 / 5 Vs of OSM
- Different OSMs
- Use of OSM
  - Positive
  - Negative



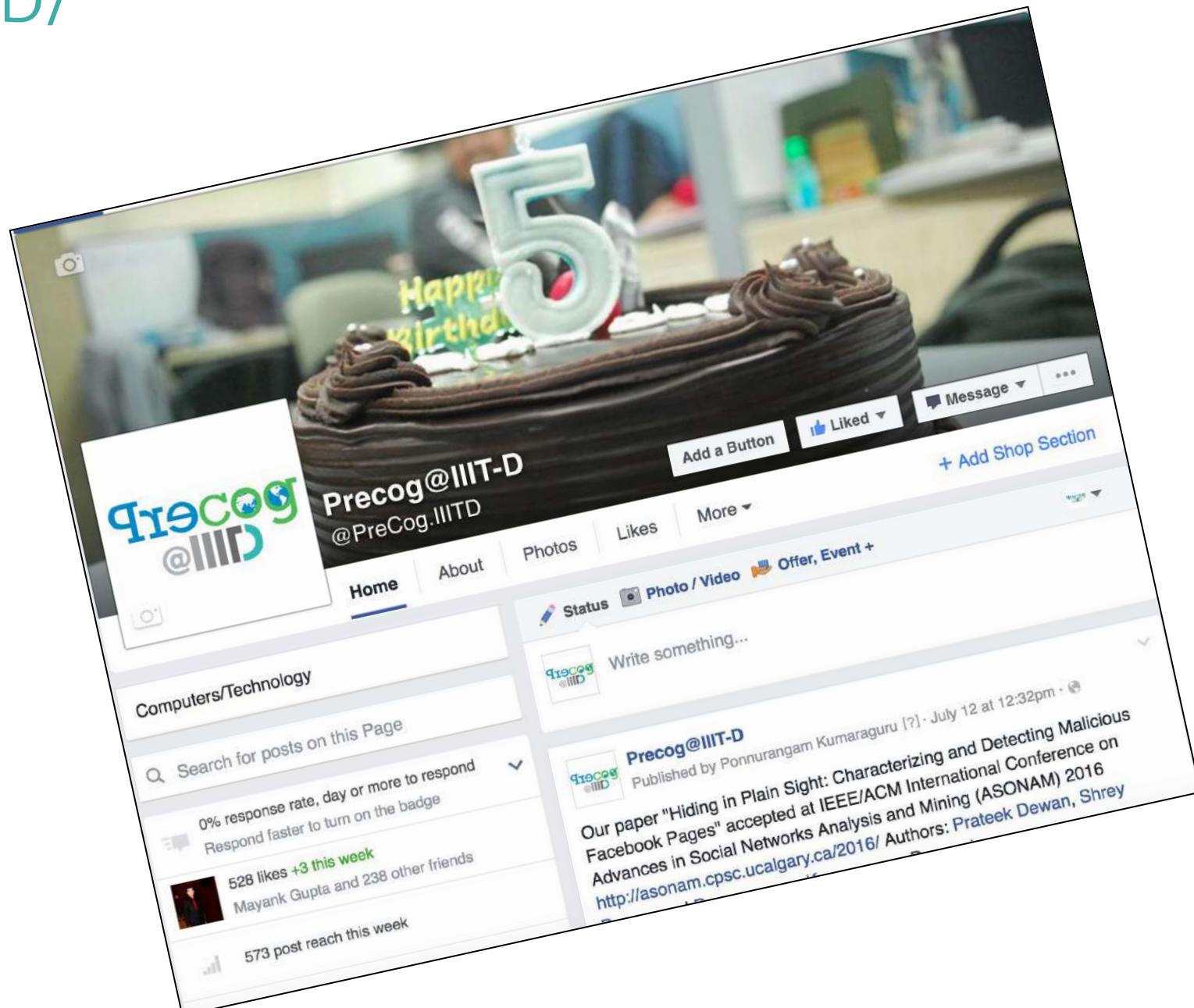
# Tutorials online

---

- Linux
- Python



<https://www.facebook.com/PreCog.IITD/>



<http://precog.iiitd.edu.in/>

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is a group of researchers who study, analyze, and build different aspects of social systems (e.g. social web systems like Twitter, Facebook), including their security and privacy. By understanding primarily derives from Data Science, Computational Social Science, Social Computing, Machine Learning, and Natural Language Processing.



## What's New!

**New!** July, 2016: Our paper *Hiding in Plain Sight: Characterizing and Detecting Malicious Facebook Pages* accepted at IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM) 2016. Authors: Prateek Dewan, Shrey Bagroy and PK.

**New!** June, 2016: PK's Keynote Address on Online Social Media: Opportunities, Challenges, and Pitfalls at IGDTUW.

**New!** June, 2016: Our paper *Social Media for Safety: Characterizing Online Interactions between Citizens and Police* accepted at 30th British Human Computer Interaction Conference (BHCI) 2016. Authors: Niharika Sachdeva, PK and Munmun De Choudhury.

### Hiding in Plain Sight: Characterizing and Detecting Malicious Facebook Pages

Prateek Dewan, Shrey Bagroy, Ponnurangam Kumaraguru  
Indraprastha Institute of Information Technology, Delhi (IIIT-D)  
Cybersecurity Education and Research Centre (CERC), IIIT-Delhi  
Email: {prateekd,shrey14999.pk}@iiitd.ac.in

**Abstract**—Facebook is the world's largest Online Social Network, having more than 1 billion users. Like most other social networks, Facebook is home to various categories of hostile entities who abuse the platform by posting malicious content. In this paper, we identify and characterize Facebook pages that engage in spreading URLs pointing to malicious content. We revisit the scope and definition of what is deemed as "malicious" untrustworthy information, mislead audience, adult and child unsafe content, scams etc. Our findings revealed that at least 5% of all malicious pages were dedicated to promote a single malicious domain. Studying the temporal posting activity of pages revealed that malicious pages were 1.4 times more active daily than benign pages. We further identified collective harmful content within a set of malicious pages spreading adult and pornographic content. Finally, we attempted to automate the process of detecting malicious Facebook pages by training multiple supervised learning algorithm on our dataset. Artificial neural networks trained on a fixed size bag-of-words performed the best and achieved an accuracy of 84.13%.

#### I. INTRODUCTION

presence of malicious pages on Facebook, set up intentionally to spread fraudulent claims, scams, and other types of malicious content.<sup>1</sup> In addition to scams and fake information, researchers have also identified and studied the spread of rumors on Facebook [8]. During events like earthquakes, and uncertainty in the local population [14]. It is thus, crucial to identify and control the spread of untrustworthy and fake information in order to minimize adverse real world impact. In this paper, we identify and characterize a set of 627 Facebook pages that published one or more malicious URLs in their most recent 100 posts. We focus our analysis on pages which spread untrustworthy information, hate speech, nudity, misleading claims, etc. that are deemed as malicious by community standards [7] and "Page Spam" definitions [6] communicated by Facebook. In an attempt to automate the process of identifying malicious Facebook pages, we train and evaluate multiple supervised learning models based on bag-of-words obtained using the textual content published by these pages.

21

# Thank you

[pk@iiitd.ac.in](mailto:pk@iiitd.ac.in)

precog.iiitd.edu.in

fb/ponnurangam.kumaraguru

# Privacy and Security in Online Social Media

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Course on NPTEL

NOC21-CS28

Week 2.1

Ponnurangam Kumaraguru (“PK”)

Full Professor

ACM Distinguished Speaker

[fb/ponnurangam.kumaraguru](https://fb.com/ponnurangam.kumaraguru), @ponguru



# Online discussion

---

- <https://groups.google.com/a/nptel.iitm.ac.in/g/noc21-cs28-discuss>
- Please participate
- Read the posts before asking any questions

# Assignment 1

---

- Hope it was simple and all of you were able to do it satisfactorily





flickr

foursquare

tumblr

tinder™



whisper

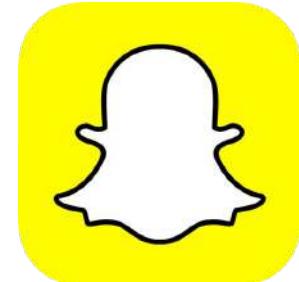


twitter



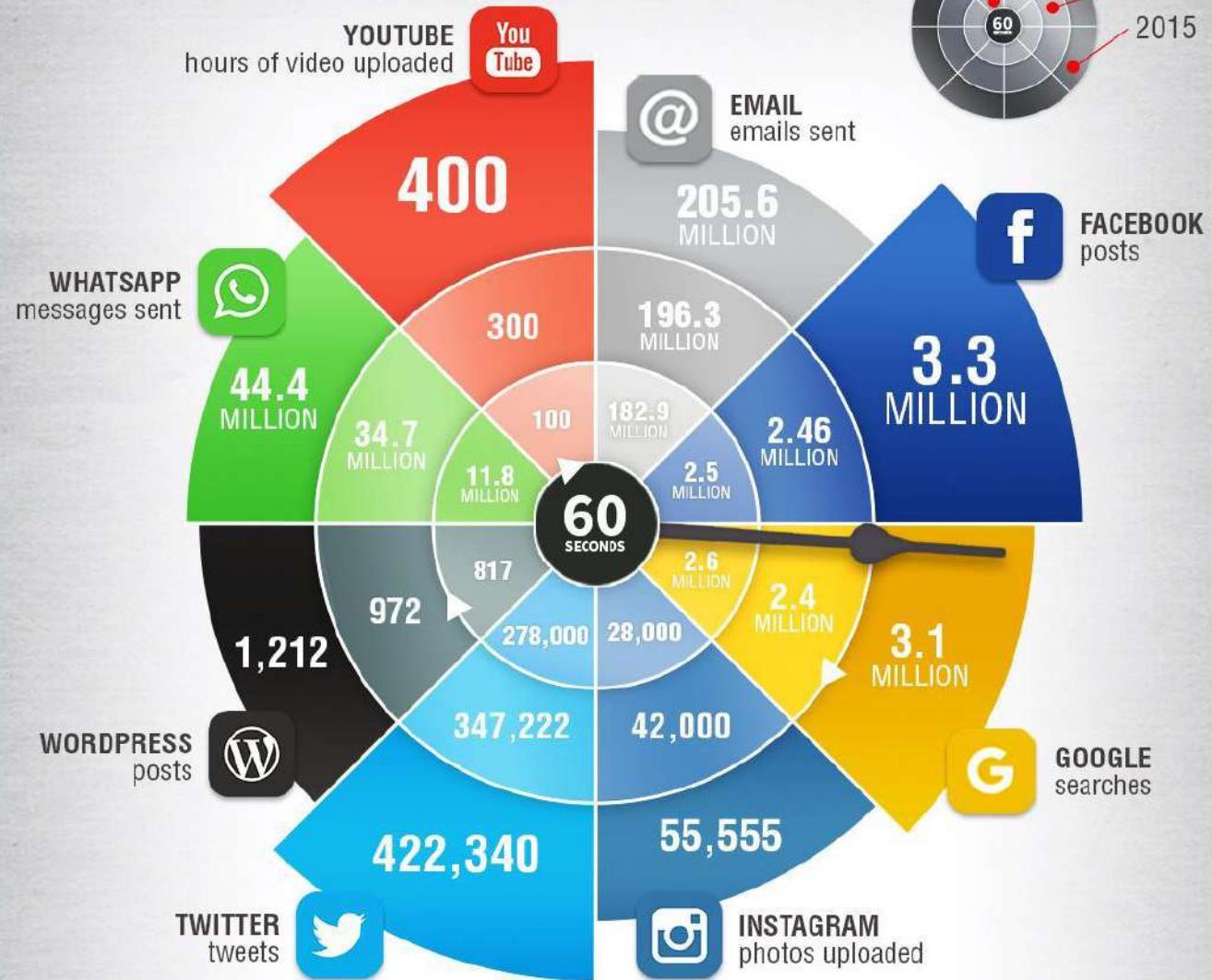
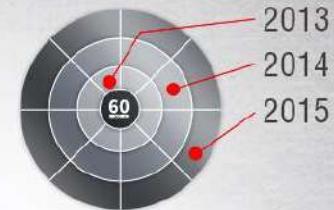
Instagram  
Fast beautiful photo sharing

Pinterest



# What Happens Online in 60 Seconds?

## Managing Content Shock in 2016



# 4 / 5 V's of Online Social Media



# Social media turns a blessing: Avani's missing photo goes viral, and she gets her mother back in 20 minutes

The photo showed the girl holding a lady railway police official's hand.



Written by **Nisha Nambiar** | Pune | Updated: May 17, 2016 2:04 am



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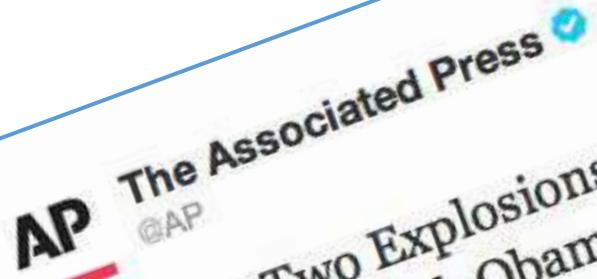
KLM

Journeys of inspiration

## BEST OF EXPRESS



India  
Pakistan covets  
territory of others and  
uses terrorism as state



Breaking: Two Explosions in the White House and Barack Obama is injured

Reply

Retweet

Favorite

More

3,063  
RETWEETS

144  
FAVORITES



12:07 PM - 23 Apr 13



Following



Follow

@ [REDACTED] : Chennai going down in horrible flood adding more to trouble crocodile has entered residence complex.



RETWEETS

2



1:28 PM - 4 Dec 2015

...

# Other implications

The screenshot shows a news article from Anadolu Agency. The title is "Using too much Facebook and Twitter may cost you your job". Below the title, the date is listed as "Sun, Oct 10 10:50 AM". The main text of the article discusses how government and council employees in the UK are at risk of being sacked if they use social networking sites at work or post inappropriate comments from home. It also mentions that police censured eight employees last year for using police computers to chat online. To the right of the article, there is a dark sidebar with the Morgan Stanley logo and the letters "Morga" and "Morgan Stan" partially visible.

**Using too much Facebook and Twitter may cost you your job**

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Police censured eight employees last year after they found using police computers to chat with their friends online.

Morga

Morgan Stan

A.C.E. Fund

# Tutorials online

---

- Linux
- Python



# Frameworks / Platforms to know

---

- APIs of OSM (e.g. Facebook / Twitter API)
- A programming language to write code to extract data (e.g. Python / RoR)
- A database to store data (e.g. MySQL / MongoDB)
- A visualization tool to query and analyze data (e.g. PhpMyAdmin / RoboMongo)

# Programming language:



- High level programming language to instruct commands and facilitate data collection
- Supports libraries for reading urls, parse data, interact with APIs, etc.

```
# Start with importing some useful libraries
import json                      # Library for handling the JSON response
import urllib                     # Library for handling URLs

# API base URL
endpoint = "https://graph.facebook.com/search?"

i=0
while i<10:
    print result_formatted["data"]
    i=i+1
```

# Application Programming Interface (API)

---

- OSM API enables developers to interact with the OSM website programmatically
- We use APIs to extract data from Twitter, Facebook, etc.
- Rate limit: How much data requests can we make?
- Each OSM has its own API and API rate limits



# Data format

---

- API returns data in the following two formats:
  - JSON
  - XML



# JSON

---

- JSON - JavaScript Object Notation
- Data structuring notation
- Sample:

**Graph API Explorer**

Home > Tools > Graph API Explorer

Application: [?] Graph API Explorer Locale: [?] English (US) ▾

Access Token: CAACEdEose0cBANAEb3kqyLNZA4H46ZAiCdbV5a7VAD2kvyZCTb2P5tosUQL7stNqJRSZB9veO6YQVYk1al649Ulrx0osVv Debug Get Access Token

**Graph API** FQL Query

GET → /616315467?fields=id,name

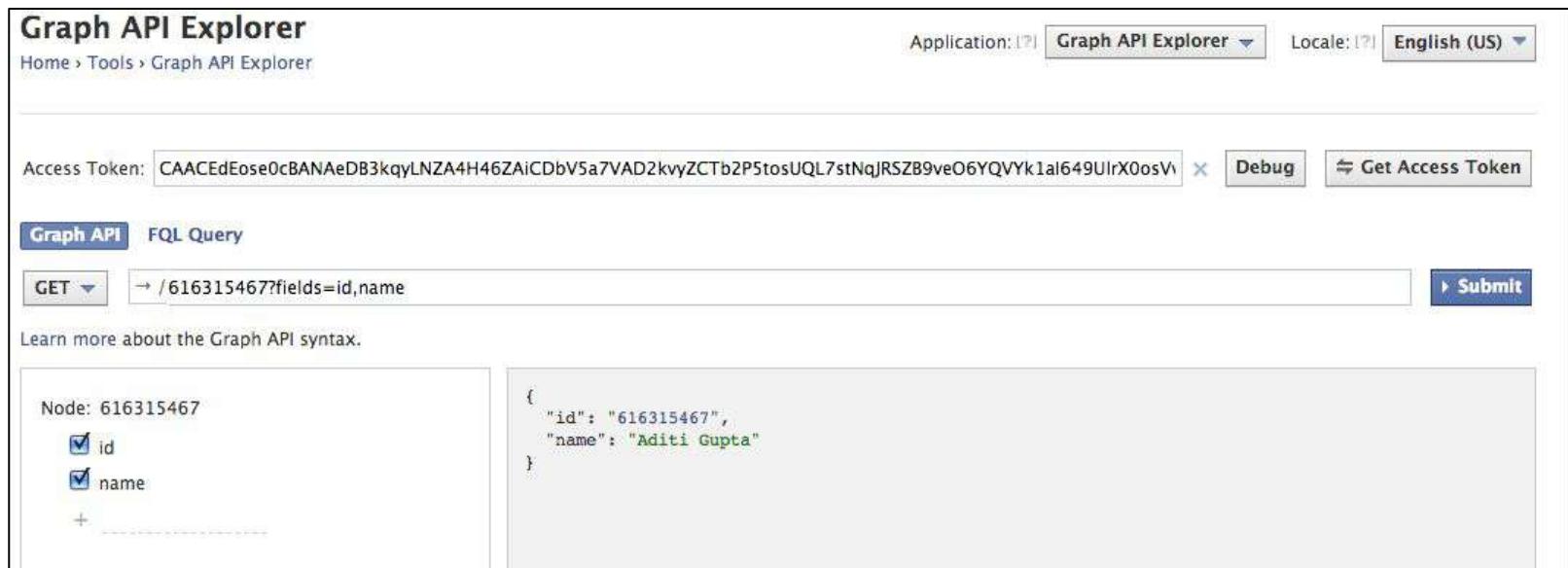
Submit

Learn more about the Graph API syntax.

Node: 616315467

id  
 name  
+

{  
  "id": "616315467",  
  "name": "Aditi Gupta"  
}



# JSON

## ● Viewing

The screenshot shows a web-based JSON viewer interface. At the top, there's a browser-like header with tabs for 'jsonviewer.stack.hu' and various links like Facebook, IIIT-D Mail, FUSION TABLE, Gmail, Google Analytics, PythonInfo Wiki, isi-conf, Noah Smith, Experimental Statist, and Other Books. Below the header, there are two tabs: 'Viewer' (which is selected) and 'Text'. The 'Viewer' tab displays a hierarchical tree view on the left under the heading 'JSON'. The tree shows two items: 'id : "616315467"' and 'name : "Aditi Gupta"'. To the right of the tree is a table with two columns: 'Name' and 'Value'. The table contains two rows: one for 'id' with value '616315467' and one for 'name' with value 'Aditi Gupta'.

Name	Value
id	"616315467"
name	"Aditi Gupta"



- Relational Database to store data
- Data is stored in rows and columns
- Retrieve using SQL queries
- Sample:

```
mysql> select user_id , user_screen_name from users_data_boston2 limit 2;
+-----+-----+
| user_id | user_screen_name |
+-----+-----+
| 605747286 | MacieBliss13
| 294673452 | I_like_HotCake
+-----+
2 rows in set (0.05 sec)

mysql> □
```

# MongoDB

```
> db.tweets.find({}, {text: 1, 'user.screen_name': 1}).limit(5).pretty()
{
  "_id" : ObjectId("54d746bd582d7f6f22e0909a"),
  "text" : "@concroc @BlrCityPolice @CPBblr will attend to this",
  "user" : {
    "screen_name" : "dcptrwestbcp"
  }
}
{
  "_id" : ObjectId("54d746bd582d7f6f22e0909b"),
  "text" : "@dcptrwestbcp @CPBblr @addlcptraffic pls let me clarify to all.Rockline Venkatesh was our chief guest who wished the children with flowers.",
  "user" : {
    "screen_name" : "dcptrwestbcp"
  }
}
{
  "_id" : ObjectId("54d746bd582d7f6f22e0909c"),
  "text" : "Road safety week: Handbills on Traffic awareness given to the public at Yeshwanthpur by PI Swaminathan http://t.co/eSkG8kjeVS",
  "user" : {
    "screen_name" : "dcptrwestbcp"
  }
}
{
  "_id" : ObjectId("54d746bd582d7f6f22e0909d"),
  "text" : "Road safety week:Bike rally for Traffic awareness at Jayanagar today. http://t.co/oA3zhmcdmN",
  "user" : {
    "screen_name" : "dcptrwestbcp"
  }
}
{
  "_id" : ObjectId("54d746bd582d7f6f22e0909e"),
  "text" : "Road Safty Week:Addl commnr of Police Sri B Dayanand with children at a painting competition at Cubbon park on Sunday http://t.co/khMlhvvzxc",
  "user" : {
    "screen_name" : "dcptrwestbcp"
  }
}
>
```

# PhpMyAdmin

## ● Access MySQL databases and query using browser

SQL to query  
databases

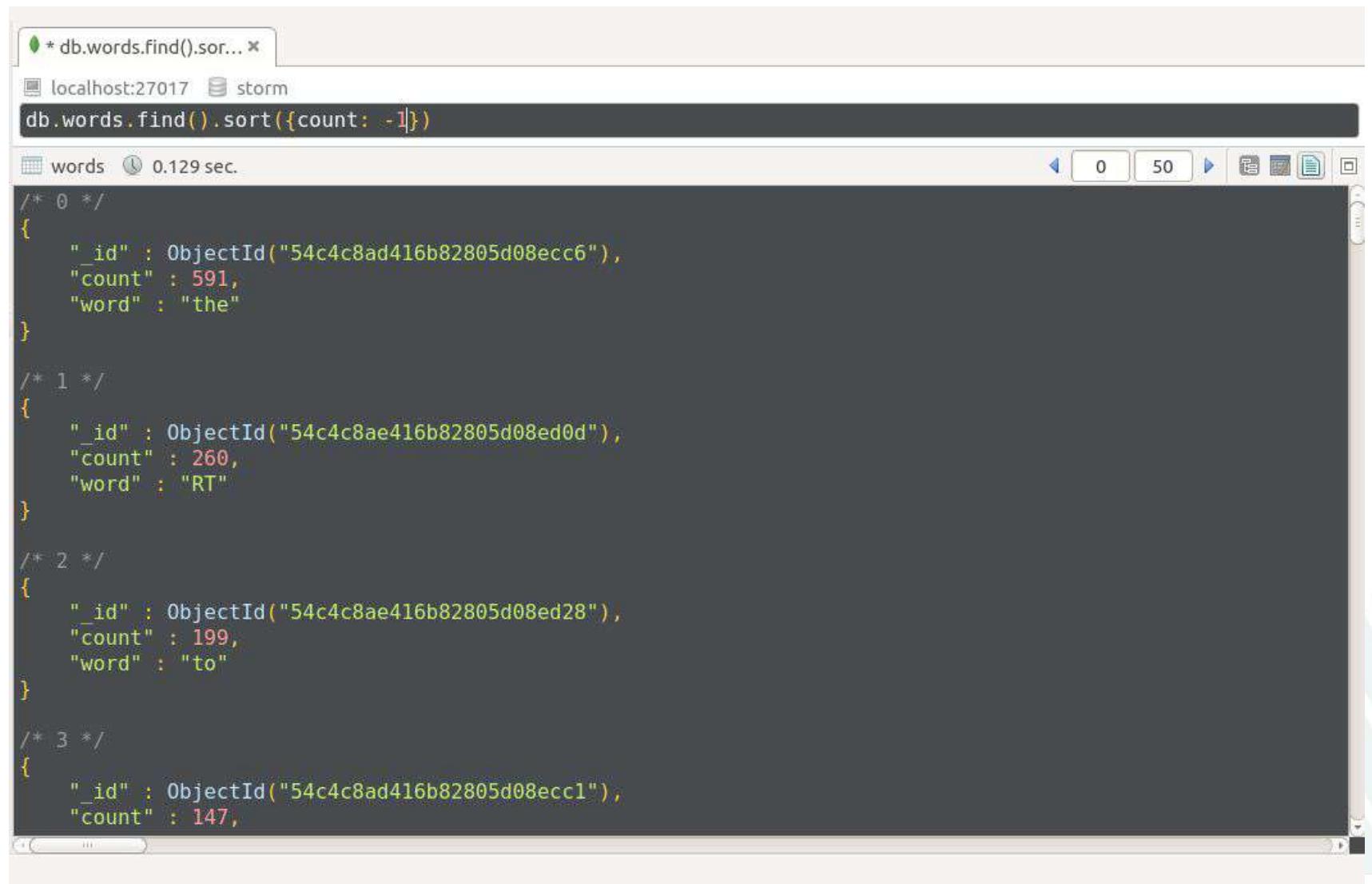
The screenshot shows the PhpMyAdmin interface for a MySQL database named 'pj\_whoswho'. The current table being viewed is 'foursquare\_user\_info'. The SQL query displayed is:

```
SELECT *  
FROM `foursquare_user_info`  
LIMIT 0 , 30
```

The results table displays 30 rows of user information, including columns like user\_id, fname, lname, friends, gender, twitter, facebook, badges, following, photos, and checkin.

	user_id	fname	lname	friends	gender	twitter	facebook	badges	following	photos	checkin
<input type="checkbox"/>	1000388	Toni	B.	11	female	NULL	1321163198	21	8	2	41
<input type="checkbox"/>	10005512	Tamara	O.	188	female	tamaramm	541738782	230	576	73	504
<input type="checkbox"/>	1000980	Marlyn	Guzman	522	female	marlynguzman	515328219	162	761	65	283
<input type="checkbox"/>	1001149	Alejandro	M.	236	male	imixe	517994607	18	4	2	31

# RoboMongo



The screenshot shows the RoboMongo interface with a query result for the database 'storm'. The query is `db.words.find().sort({count: -1})`. The results are displayed in a table with columns 'words' and '0.129 sec.'.

words	0.129 sec.
<pre>/* 0 */ {   "_id" : ObjectId("54c4c8ad416b82805d08ecc6"),   "count" : 591,   "word" : "the" }  /* 1 */ {   "_id" : ObjectId("54c4c8ae416b82805d08ed0d"),   "count" : 260,   "word" : "RT" }  /* 2 */ {   "_id" : ObjectId("54c4c8ae416b82805d08ed28"),   "count" : 199,   "word" : "to" }  /* 3 */ {   "_id" : ObjectId("54c4c8ad416b82805d08ecc1"),   "count" : 147,</pre>	

The results show four documents, indexed 0 to 3. Document 0 has an \_id of 54c4c8ad416b82805d08ecc6, a count of 591, and the word 'the'. Document 1 has an \_id of 54c4c8ae416b82805d08ed0d, a count of 260, and the word 'RT'. Document 2 has an \_id of 54c4c8ae416b82805d08ed28, a count of 199, and the word 'to'. Document 3 has an \_id of 54c4c8ad416b82805d08ecc1, a count of 147, and is partially visible.

# RoboMongo

The screenshot shows the RoboMongo interface with the following details:

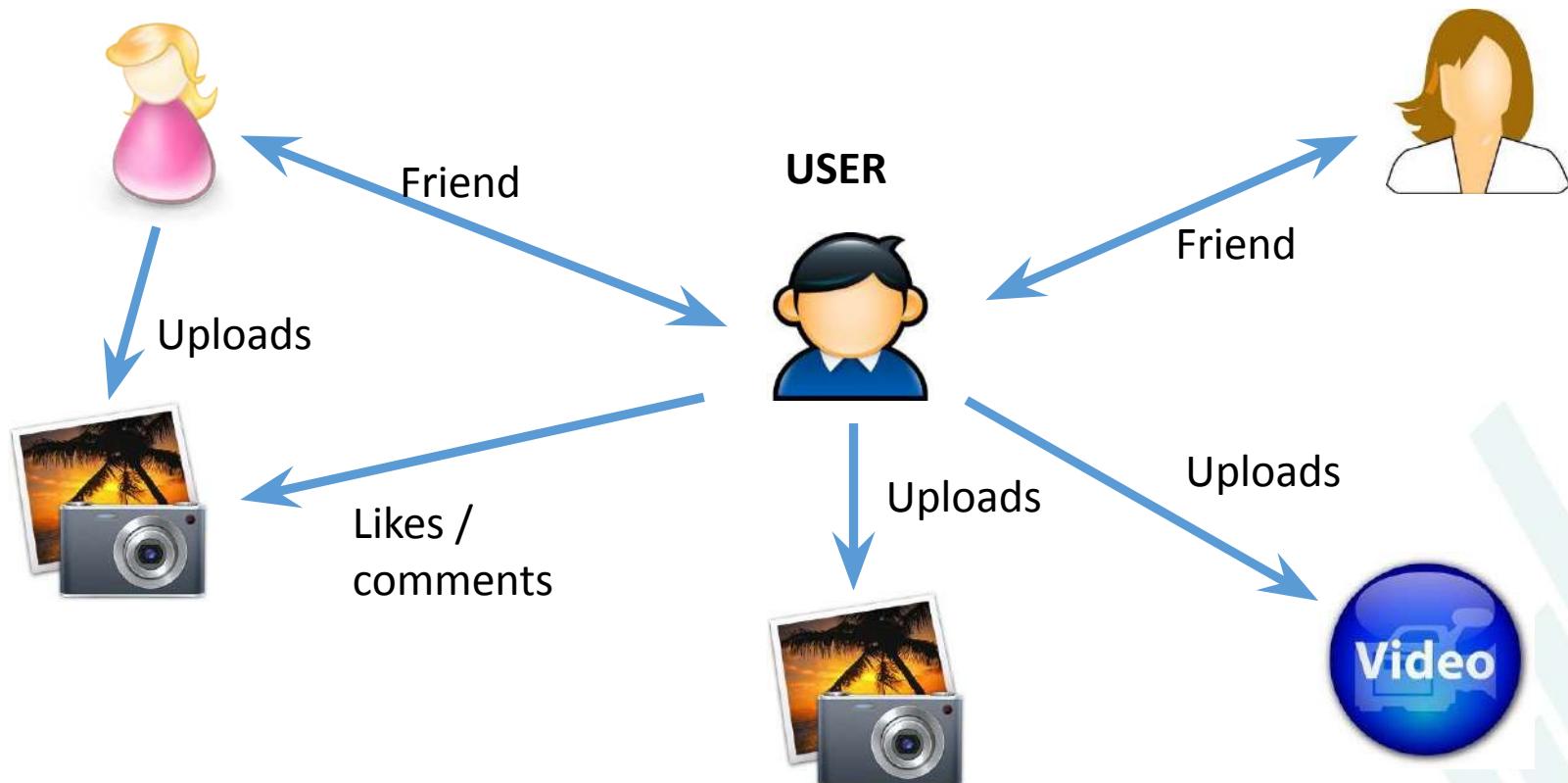
- Top Bar:** Three tabs are visible: db.words.find().sort(...), db.twitter\_tweets.fi..., and db.network\_graph\_a... (highlighted).
- Header:** localhost:27017, project\_o\_development\_2.
- Query Bar:** db.network\_graph\_analytics.find()
- Results:** A table showing the results of the query. The columns are Key, Value, and Type.
- Data Rows:** One main document object is shown, containing fields like \_id, first\_node\_seen\_at, job\_id, keyword\_id, last\_index, last\_node\_seen\_at, network\_graph\_links, network\_graph\_nodes, and an array of 8 nodes (0 through 8). Each node has fields like \_id, first\_seen\_at, in\_degree, index, last\_seen\_at, out\_degree, screen\_name, and user\_id.
- Toolbar:** Includes buttons for sorting, filtering, and other database operations.

Key	Value	Type
▼ (1) ObjectId("549e8adc786f72665701000... { 8 fields }	ObjectId("549e8adc786f726657010000")	Object
_id	ObjectId("549e8adc786f726657010000")	ObjectId
first_node_seen_at	2014-11-22 17:36:12.000Z	Date
job_id	9d2e6c63681aa8fc00a09d71	String
keyword_id	ObjectId("549e8aca786f7265c6000000")	ObjectId
last_index	735	Int32
last_node_seen_at	2014-12-11 17:00:39.000Z	Date
network_graph_links	Array [820]	Array
network_graph_nodes	Array [736]	Array
▼ 0	{ 8 fields }	Object
_id	ObjectId("549e8b18786f726657020000")	ObjectId
first_seen_at	2014-11-22 17:36:12.000Z	Date
in_degree	194	Int32
index	0	Int32
last_seen_at	2014-12-11 17:00:39.000Z	Date
out_degree	2233	Int32
screen_name	ShamiWitness	String
user_id	57914577	Int32
► 1	{ 8 fields }	Object
► 2	{ 8 fields }	Object
► 3	{ 8 fields }	Object
► 4	{ 8 fields }	Object
► 5	{ 8 fields }	Object
► 6	{ 8 fields }	Object
► 7	{ 8 fields }	Object
► 8	{ 8 fields }	Object

# All content in graph form

## ● Graph API

- Interface to extract data related to User profiles, activities, photos, pages, applications, etc.

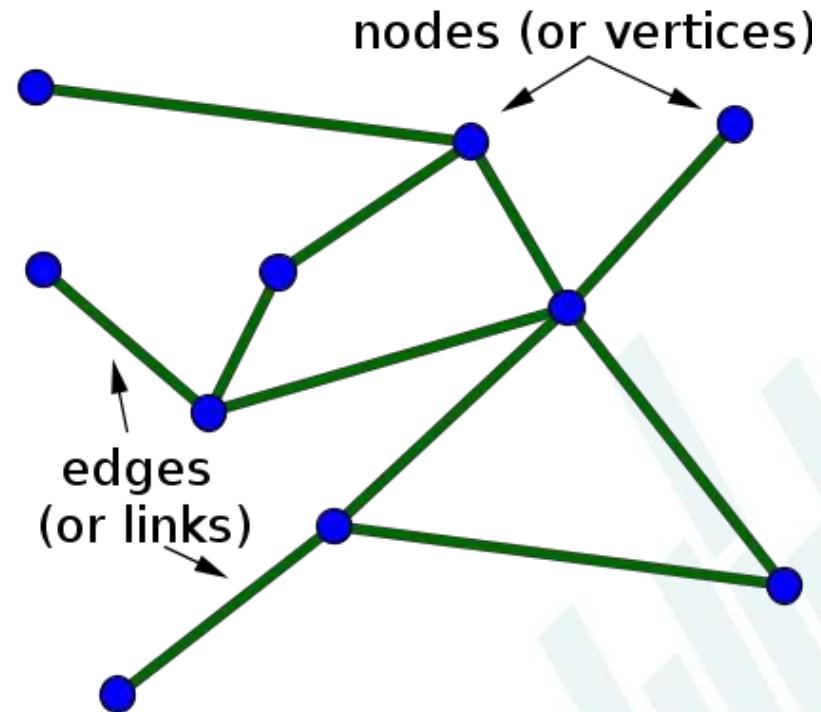


# Why is it called the Graph API

---

- All objects are stored as nodes of a “graph”
- Connections (likes, friendship etc.) are edges
- All nodes have a unique numeric ID

- Users
- Pages
- Posts
- ...



# Tutorials for this week

---

● ~~Twitter API~~ Facebook API Reddit API



# Thank you

[pk@iiitd.ac.in](mailto:pk@iiitd.ac.in)

precog.iiitd.edu.in

fb/ponnurangam.kumaraguru

# Privacy and Security in Online Social Media

---

Course on NPTEL

NOC21-CS28

Week 2.2

Ponnurangam Kumaraguru (“PK”)

Full Professor

ACM Distinguished Speaker

[fb/ponnurangam.kumaraguru](https://fb.com/ponnurangam.kumaraguru), @ponguru

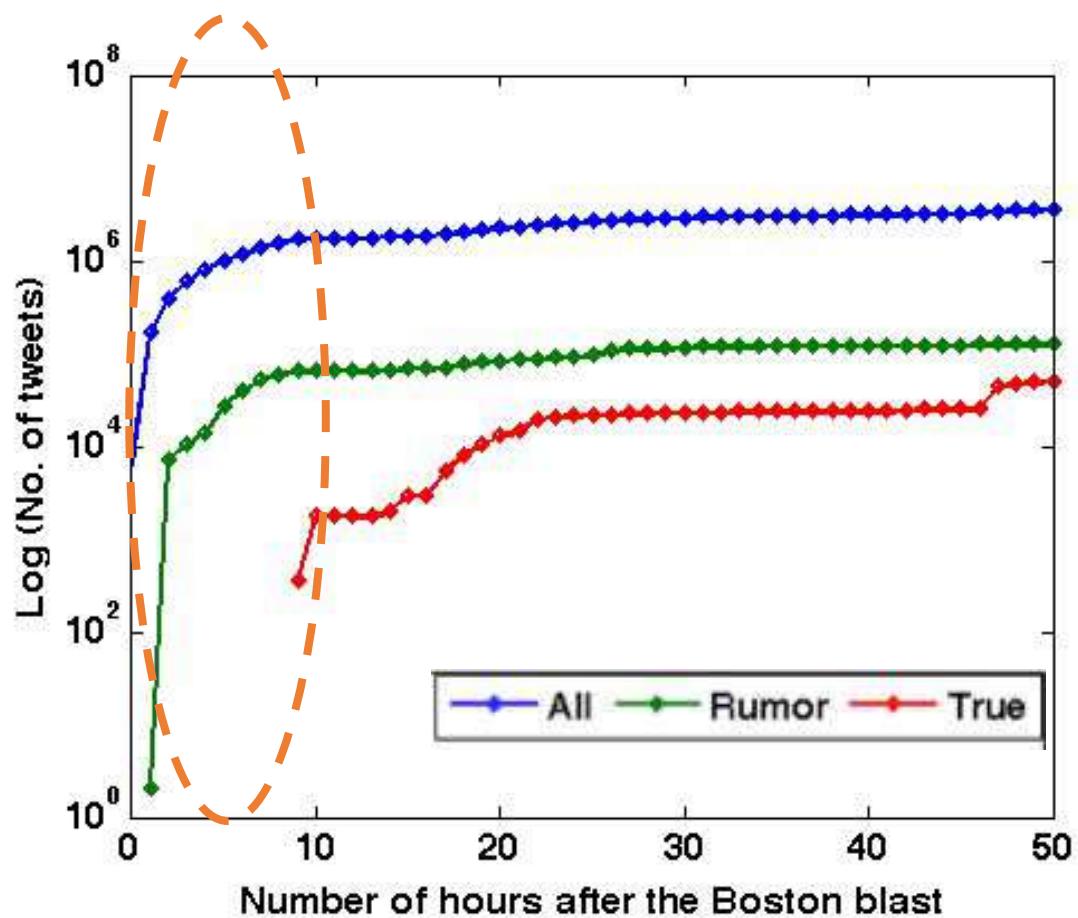


# Topics that we will cover

---

- Overview of OSM
- Linux / Python / Twitter API / Mongo DB / MySQL  
**[Hands-on]**
- Trust & Credibility
- Privacy
- Social Network Analysis, NLTK **[Hands-on]**
- e-crime
- Plotly / Highcharts / Geo-location analysis  
**[Hands-on]**
- Policing
- Identity resolution
- What next – Deep learning, machine learning, NLP, Image analysis

# Temporal Patterns



Fake content / rumors becomes viral in first 7-8 hours just after the event.

# Misinformation on Social Media

## Boston Bombing Facebook And Twitter Page 'Fakes' Set Up To Capitalise On Tragedy

Huffington Post UK | By Felicity Morse

Posted: 16/04/2013 09:34 BST | Updated: 16/04/2013 16:36 BST

Like 2,240 people like this. Be the first of your friends.

51 8

share tweet +1 email comment

GET UK ALERTS:

Enter email

SIGN UP

**FOLLOW:** Facebook, Twitter, Video, Boston, Boston Bombing Fakes, Boston Marathon, Boston Marathon Bombing, Boston Usa, Fake Boston Marathon, Marathons, UK NEWS, UK News

A number of fake charity Twitter accounts and Facebook pages have been set up in the wake of the [Boston marathon bombings](#) in an attempt to capitalise on the tragedy.

Pictures of 'child runners' who had supposedly died in the blasts were tweeted from a 'Hope for Boston' account begging for retweets to "show respect".

PRAY  
FOR  
BOSTON

@HopeForBoston  
HOPE FOR BOSTON

Follow @HopeForBoston

R.I.P. to the 8 year-old boy who died in Boston's explosions, while running for the Sandy Hook kids. [#prayforboston](#)  
<http://t.co/Xmv2E81Lsb>

April 16, 2013 12:18 am via web [Reply](#) [Retweet](#) [Favorite](#)



TECH • SPACE • HUMAN • EARTH • HISTORY • ANIMALS • ADVENTURE

## Social Media Ebola Hoax Causes Deaths

OCT 1, 2014 03:17 PM ET // BY BENJAMIN RADFORD



[VIEW RELATED GALLERY](#)

THINKSTOCK

A social media message claiming that salt water can cure or prevent Ebola may have began as an exercise in black humor but went viral causing illness and deaths in West Africa.

As ABC News reported, "A social media hoax has resulted in the deaths of at least two people and sickened dozens more. A message spread throughout Nigeria last month offered bogus advice about preventing the spread of the dread disease: 'Please ensure that you and your family and all your neighbors bath with hot water and salt before daybreak today because of Ebola virus which is spreading through the air,' the text said in part. The message also urged people to drink as much salt water as possible as protection against catching the deadly virus."

# Misinformation on Social Media



 Print

 Close

## Tweets of false shootouts cause panic in Mexico City

Published September 08, 2012 | Associated Press

MEXICO CITY – Mothers rushed to pull their kids out of school, shopkeepers slammed down their metal gates, and bus drivers radioed one another about streets to avoid after false rumors of shootouts and gunmen traveling in a caravan in a Mexico City suburb began circulating on social networks.

The false reports of violence and impending attacks in Nezahualcoyotl soon included nearby suburbs and at least one borough in the capital, spreading panic and prompting police to take to the streets in force while officials turned to Twitter, television and even hand-distributed flyers to deny the rumors.

Twitter and Facebook are often used to warn of gunbattles and other dangers in Mexico's violence-wracked cities, but the last two years have also seen social networks used to spread false warnings that have caused chaos in several cities. Mexico City has avoided large-scale violence, although drug-related killings and other crime have hit some of its suburbs, like Nezahualcoyotl.

# Misinformation Tweets

DC Maryland Virginia  
@DMVFollowers

McDonalds in Virginia Beach flooded.  
[pic.twitter.com/FZBoCydM](http://pic.twitter.com/FZBoCydM)

Reply Retweet Favorite



FAKE



AP The Associated Press  @AP Following

Breaking: Two Explosions in the White House and Barack Obama is injured

Reply Retweet Favorite More

3,063 RETWEETS 144 FAVORITES

12:07 PM - 23 Apr 13

RUMORS



#LondonRiots hearing reports that london zoo was broken into and a large amount of animals have escaped. Too far! Thats not cool :-(

@Twiggy\_Garcia, 5,178 followers

# Background: Hurricane Sandy

- Dates: Oct 22- 31, 2012
- Damages worth \$75 billion
- Coast of NE America



# Fake Image Tweets



DC Maryland Virginia  
@DMVFollowers



McDonalds in Virginia Beach flooded.  
[pic.twitter.com/FZBoCydM](http://pic.twitter.com/FZBoCydM)



Katina  
@kdekranis9

Jamster  
@jamster83



Amazing picture of hurricane #Sandy descending in New York [pic.twitter.com/3mMhCbNq](http://pic.twitter.com/3mMhCbNq)

4:21 PM - 29 Oct 2012



I TOLD Y'ALL! Shark on the highway in New Jersey!!!!  
@maxthewanted would appreciate this. #HurricaneSandy  
[pic.twitter.com/kaYMjWzT](http://pic.twitter.com/kaYMjWzT)

1:09 AM - 30 Oct 2012



5 RETWEETS 586 FAVORITES



# Motivation

the guardian

USNEWS  
BLOG

## Hurricane Sandy brings storm of fake news and photos to New York

Misinformation over storm spread quickly online, abetted by journalists no longer taught importance of verifying every source

**CNN** brings you efficient content output.

5 1 3 , 7 0 0 , 0 2 0  
Pages Saved by CleanPrint®

2.81 estimated printed pages | use the edit tools to save paper and ink! ⓘ

**Man faces fallout for spreading false Sandy reports on Twitter**

By Doug Gross, CNN  
October 31, 2012 -- Updated 2244 GMT (0644 HKT) | Filed under: Social Media

**CNN.com**

 **ComfortablySmug**  
@ComfortablySmug

 Follow

BREAKING: Confirmed flooding on NYSE. The trading floor is flooded under more than 3 feet of water.  
Reply Retweet Favorite

633 RETWEETS 32 FAVORITES

5:04 PM - 29 Oct 12 · Embed this Tweet

This tweet was one of several false reports posted by Twitter user @ComfortablySmug as Sandy pummeled New York.

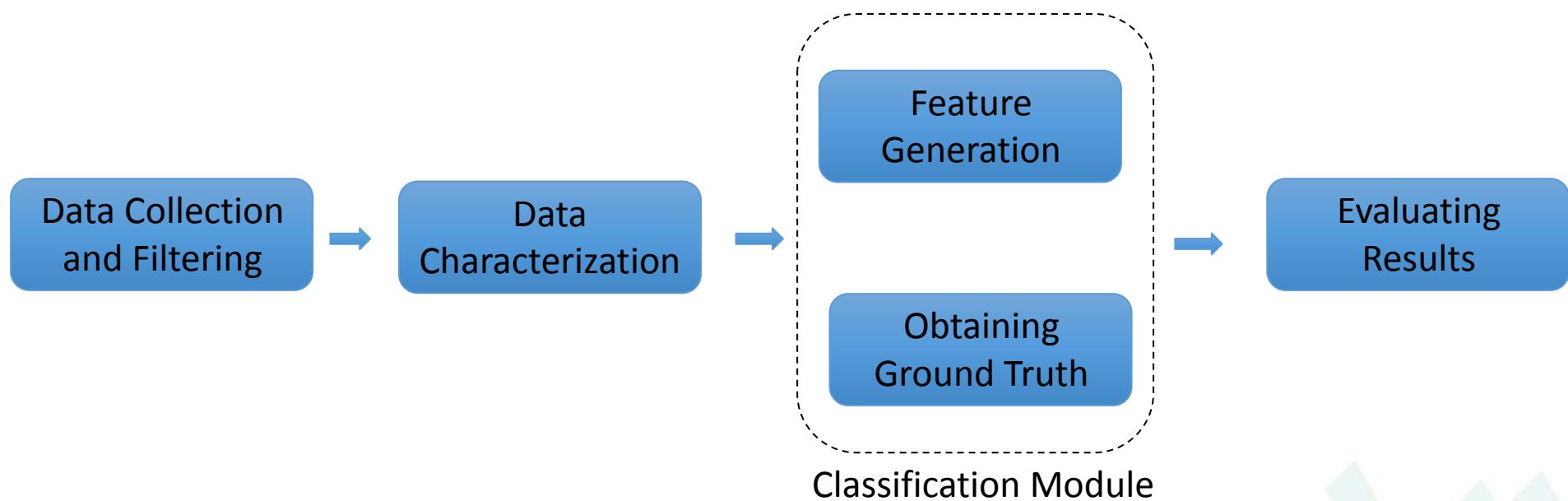
outlets.

(CNN) -- As Superstorm Sandy slammed into the East Coast on Monday night, one Twitter user in New York City posted a flurry of alarming reports about fallout from the storm -- from plans to shut down all power in Manhattan to floodwaters pouring into the New York Stock Exchange.

Like many social media messages about Sandy, they were scary and confusing, but some of them were reported as facts by news outlets.

# Methodology

---



# Data Description

<b>Total tweets</b>	1,782,526
<b>Total unique users</b>	1,174,266
<b>Tweets with URLs</b>	622,860



# Data Filtering

---

- Reputable online resource to filter fake and real images
  - Guardian collected and publically distributed a list of fake and true images shared during Hurricane Sandy

Tweets with fake images	10,350
Users with fake images	10,215
Tweets with real images	5,767
Users with real images	5,678

- One of the biggest fake content propagation datasets that have been studied by researchers

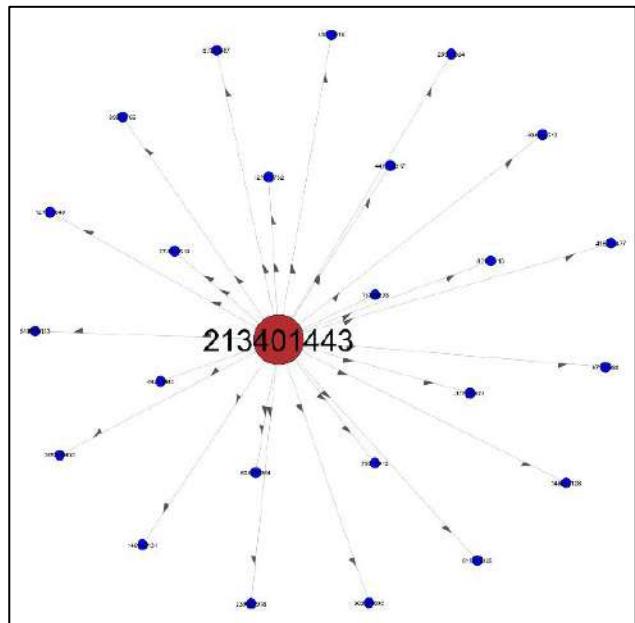
# Analysis

---

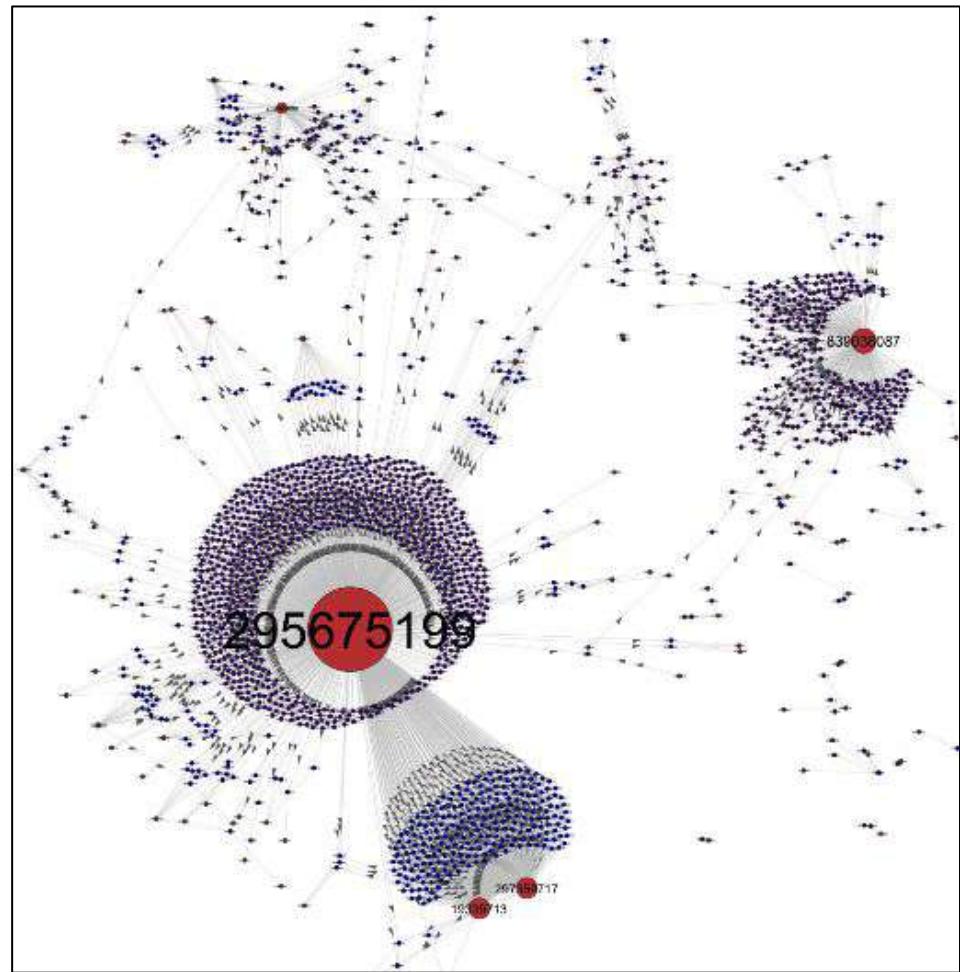
- Who
- When
- Where
- What
- Why
- How



# Network Analysis



Tweet – Retweet graph for the spread of fake images at 'nth' and 'n+1th' hour



# Classification

---

## 5 fold cross validation

User Features [F1]
Number of Friends
Number of Followers
Follower-Friend Ratio
Number of times listed
User has a URL
User is a verified user
Age of user account

Tweet Features [F2]
Length of Tweet
Number of Words
Contains Question Mark?
Contains Exclamation Mark?
Number of Question Marks
Number of Exclamation Marks
Contains Happy Emoticon
Contains Sad Emoticon
Contains First Order Pronoun
Contains Second Order Pronoun
Contains Third Order Pronoun
Number of uppercase characters
Number of negative sentiment words
Number of positive sentiment words
Number of mentions
Number of hashtags
Number of URLs
Retweet count

# Classification Results

---

	F1 (user)	F2 (tweet)	F1+F2
Naïve Bayes	56.32%	91.97%	91.52%
Decision Tree	53.24%	97.65%	96.65%

- Best results were obtained from Decision Tree classifier. 97% accuracy in predicting fake images from real
- Tweet based features are very effective in distinguishing fake images tweets from real, while the performance of user based features was very poor.

# Boston Blasts

---

- Twin blasts occurred during the Boston Marathon
  - April 15th, 2013 at 18:50 GMT
- 3 people were killed and 264 were injured
- First Image on Twitter (within 4 mins)



The Nation

# Sample Fake Tweets

 **@HopeForBoston**  
HOPE FOR BOSTON

R.I.P. to the 8 year-old boy who died in Boston's explosions,  
while running for the Sandy Hook kids. #prayforboston  
<http://t.co/Xmv2E81Lsb>

April 16, 2013 12:18 am via web   [Reply](#)   [Retweet](#)   [Favorite](#)

> 30,000 RTs

 **BostonMarathon**  
@\_BostonMarathon

Follow

For every retweet we receive we will donate  
\$1.00 to the #BostonMarathon victims  
#PrayForBoston

[Reply](#)   [Retweet](#)   [Favorite](#)   [More](#)

52,173 RETWEETS   855 FAVORITES

11:29 AM - 15 Apr 13

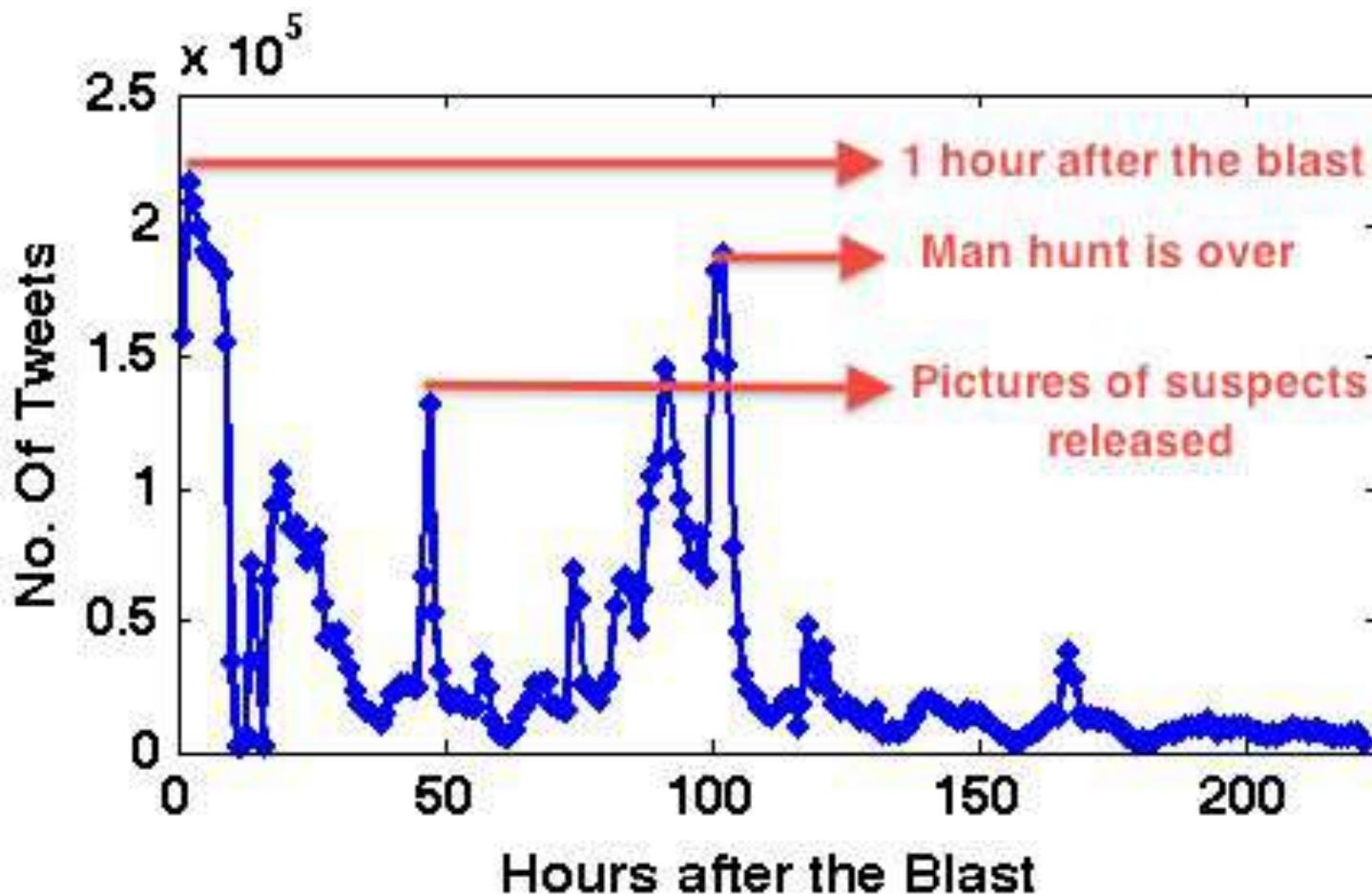
> 50,000 RTs

# Data Description

---

<b>Total tweets</b>	7,888,374
<b>Total users</b>	3,677,531
<b>Tweets with URLs</b>	3,420,228
<b>Tweets with Geo-tag</b>	62,629
<b>Retweets</b>	4,464,201
<b>Replies</b>	260,627
<b>Time of the blast</b>	Mon Apr 15 18:50 2013
<b>Time of first tweet</b>	Mon Apr 15 18:53 2013
<b>Time of first image</b>	Mon Apr 15 18:54 2013
<b>Time of last tweet</b>	Thu Apr 25 01:23 2013

# Data Description



# Geo-Located Tweets



# Identifying Rumor / True tweets

## ● Tagged most viral 20 tweet content

- Rumor / Fake
- True
- Generic (NA)

## ● Six Rumors

- 130,690 Tweets / Retweets (29%)
- *R.I.P. to the 8 year-old boy who died in Boston's explosions, while running for the Sandy Hook kids. #prayforboston*

## ● Seven True news

- 116,454 Tweets / Retweets (20%)
- *Doctors: bombs contained pellets, shrapnel and nails that hit victims #BostonMarathon @NBC6*

## ● Seven Generic

- 206,816 Tweets / Retweets (51%)
- *#PrayForBoston*

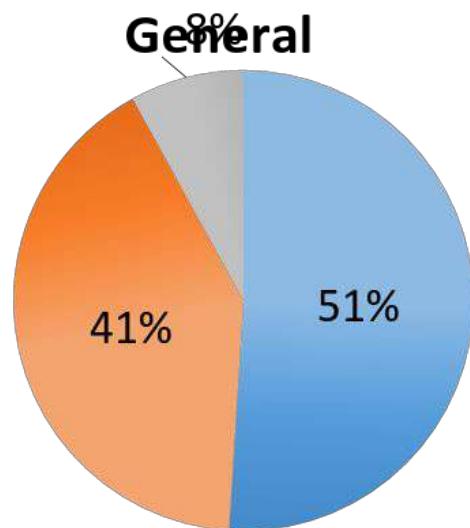
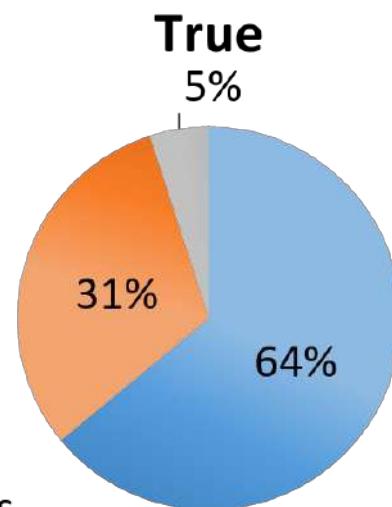
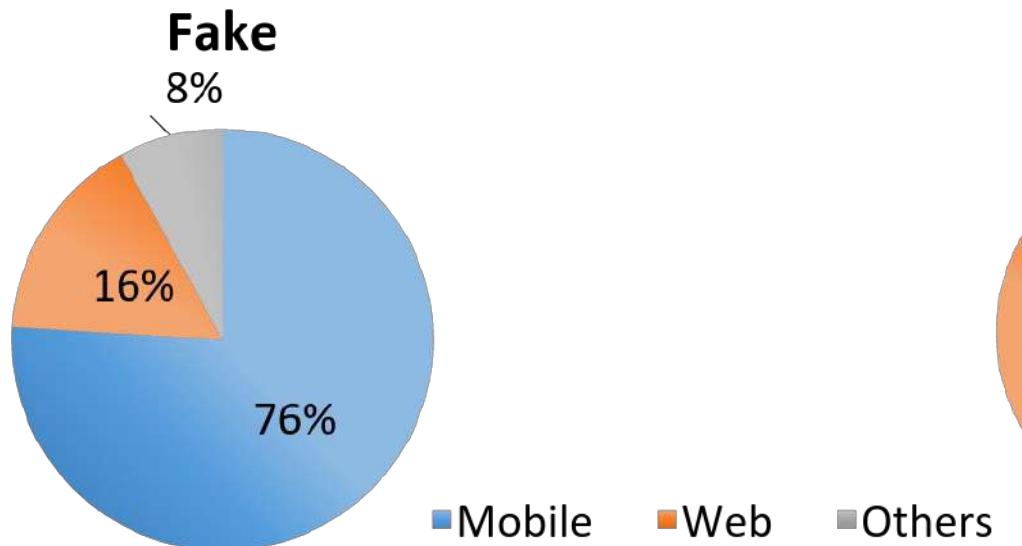
# Fake Content User Profiles

	Account 1	Account 2	Account 3	Account 4
No. of Followers	10	297	249	73,657
Profile Creation Date	Mar 24 2013	Apr 15 2013	Feb 07 2013	Dec 04 2008
Total No. of Statuses	2	2	294	7,411
No. of Fake Tweets	2	2	1	1
Current Status	Suspended	Suspended	Suspended	Active



Username: BostonMarathons

# Tweet Source Analysis



# Suspended Accounts

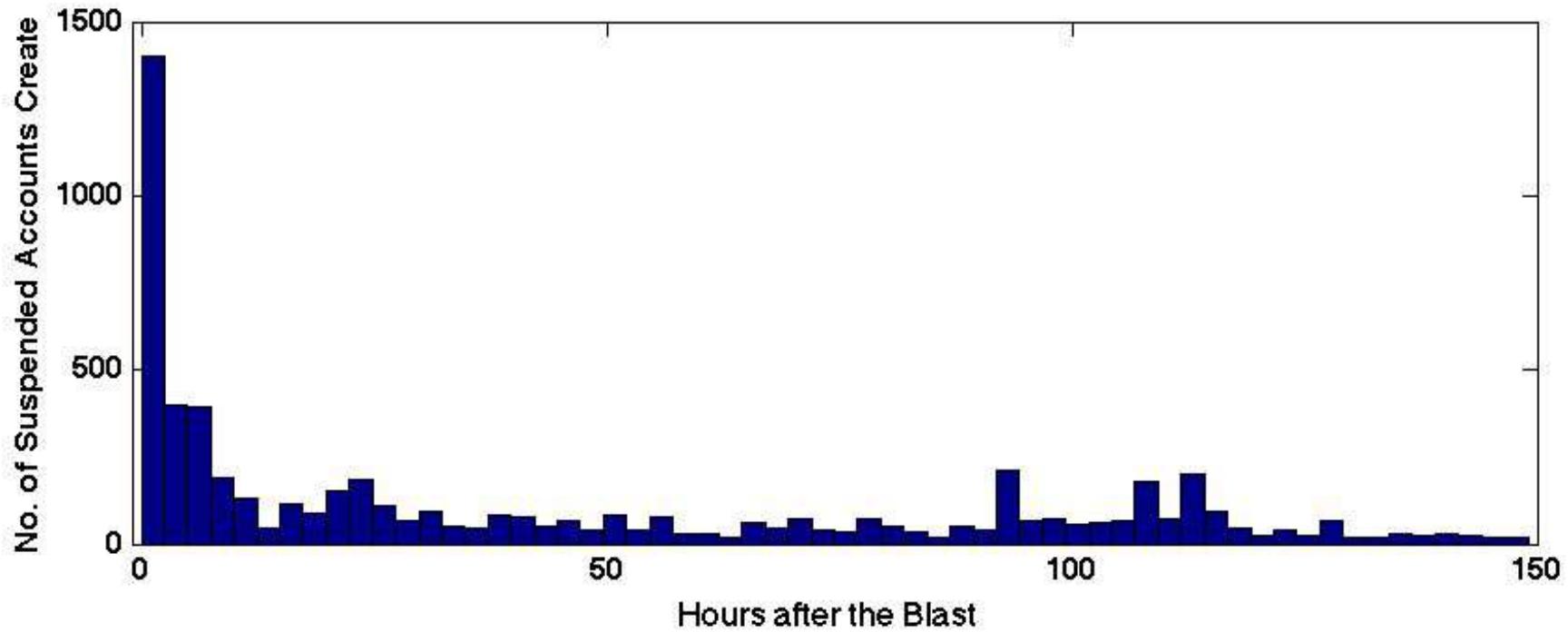
---

- **31,919** new Twitter accounts created during Boston blasts, that tweeted about the event
- Out of these **19%** [6,073 accounts] were deleted or suspended by Twitter



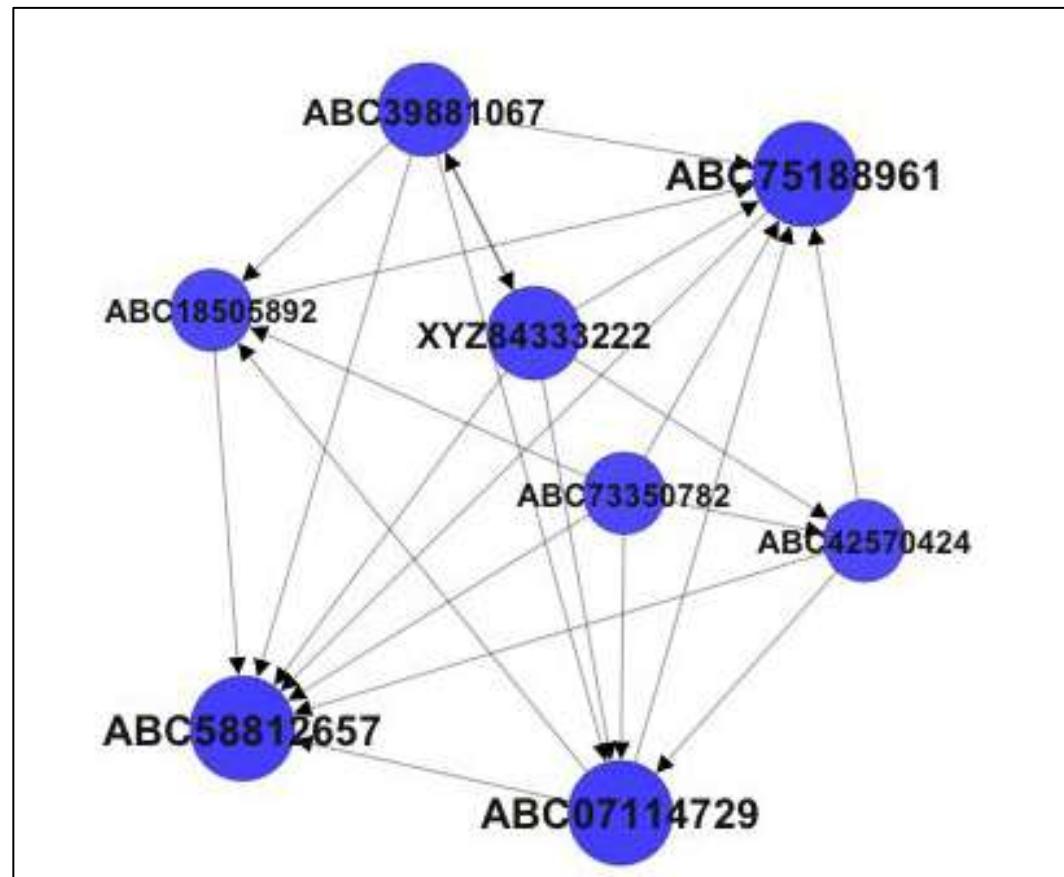
# Fake / Malicious Accounts

---

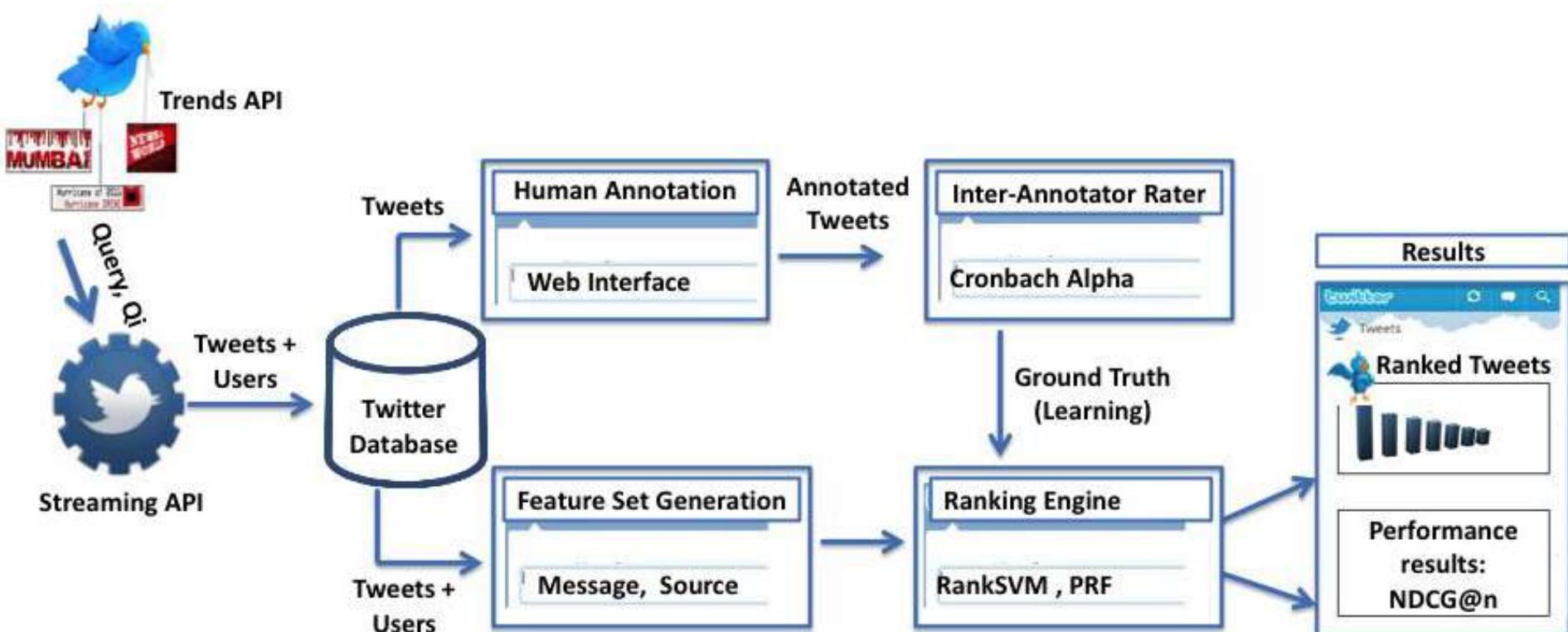


# Network Analysis of Fake Accounts

Closed community



# Architecture



# Data Statistics

Events	Tweets	Trending Topics
UK Riots	542,685	#ukriots, #londonri- ots, #prayforlondon
Libya Crisis	389,506	libya, tripoli
Earthquake in Virginia	277,604	#earthquake, Earth- quake in SF
JanLokPal Bill Agitation	182,692	Anna Hazare, #jan- lokpal, #anna
Apple CEO Steve Jobs resigns	158,816	Steve Jobs, Tim Cook, Apple CEO
US Downgrading	148,047	S&P, AAA to AA
Hurricane Irene	90,237	Hurricane Irene, Tropical Storm Irene
Google acquires Motorola Mobility	68,527	Google, Motorola Mobility
News of the World Scandal	67,602	Rupert Murdoch, #murdoch
Abercrombie & Fitch stocks drop	54,763	Abercrombie & Fitch, A&F
Muppets Bert and Ernie were gay	52,401	Bert and Ernie
Indiana State Fair Tragedy	49,924	Indiana State Fair
Mumbai Blast, 2011	32,156	#mumbaiblast, Dadar, #needhelp
New Facebook Messenger	28,206	Facebook Messenger

# Annotation

---

## ● Step 1

- R1. Contains information about the event
- R2. Is related to the event, but contains no information
- R3. Not related to the event
- R4. Skip tweet

## ● Step 2

- C1. Definitely credible
- C2. Seems credible
- C3. Definitely incredible
- C4. Skip tweet.



# Annotation Results

---

- Each tweet annotated by 3 people
- Inter-annotator agreement (Cronbach Alpha) = 0.748
- 30% of tweets provide information (17% credible information) and 14% was spam

# Feature Sets

Message based features
Length of the tweet
Number of words
Number of unique characters
Number of hashtags
Number of retweets
Number of swear language words
Number of positive sentiment words
Number of negative sentiment words
Tweet is a retweet
Number of special symbols [\$, !]
Number of emoticons [:-), :-(]
Tweet is a reply
Number of @- mentions
Number of retweets
Time lapse since the query
Has URL
Number of URLs
Use of URL shortener service
Message based features
Length of the tweet
Number of words

Source based features
Registration age of the user
Number of statuses
Number of followers
Number of friends
Is a verified account
Length of description
Length of screen name
Has URL
Ratio of followers to followees
Source based features
Registration age of the user
Number of statuses
Number of followers

# Evaluation Metric

---

Evaluation Metric: NDCG (Normalized Discounted Cumulative Gain)

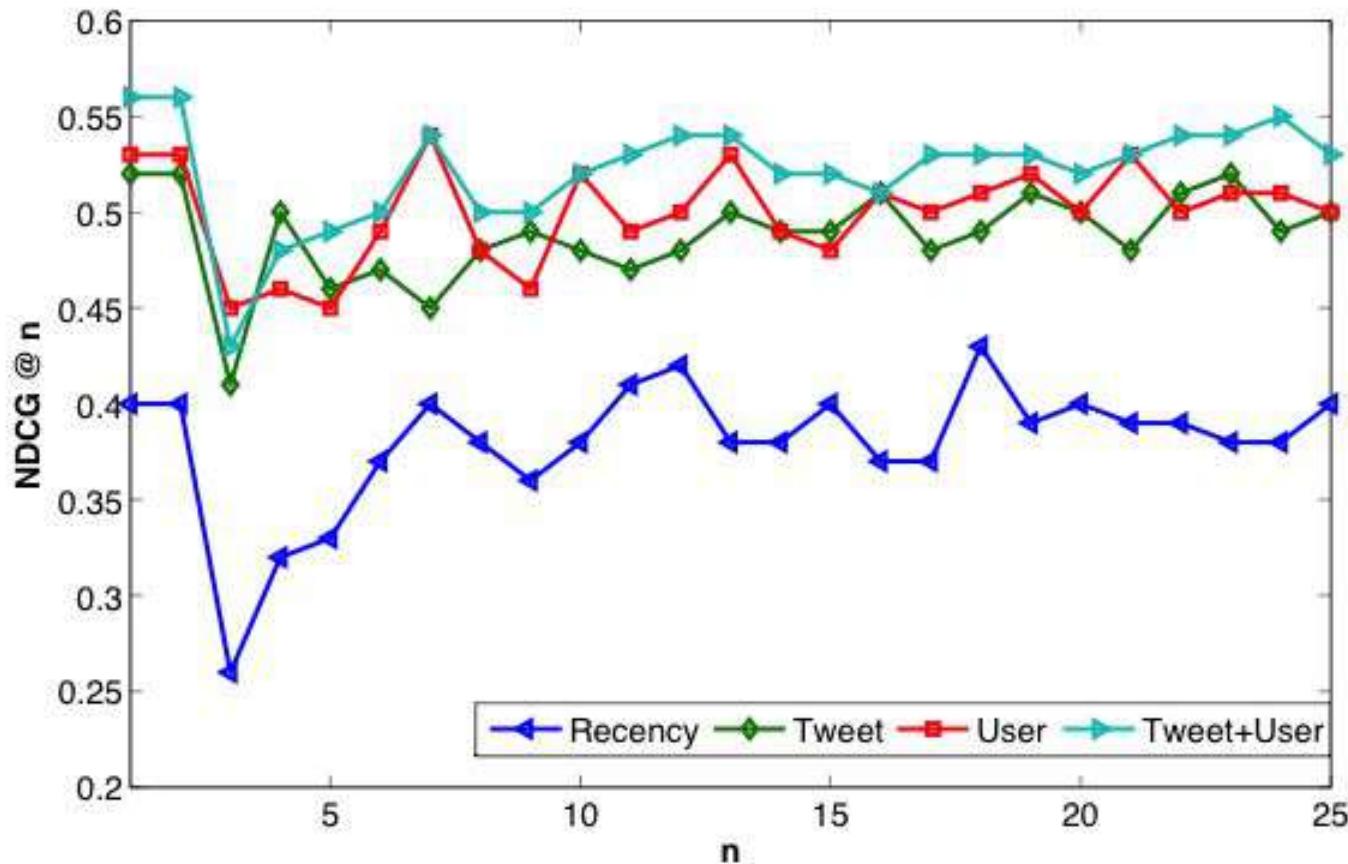
$$DCG@n = \sum_{i=1}^n \frac{1}{\log_2(1+i)} (2^{label(v_i)} - 1)$$

NDCG is the standard metric used to evaluate “graded” results



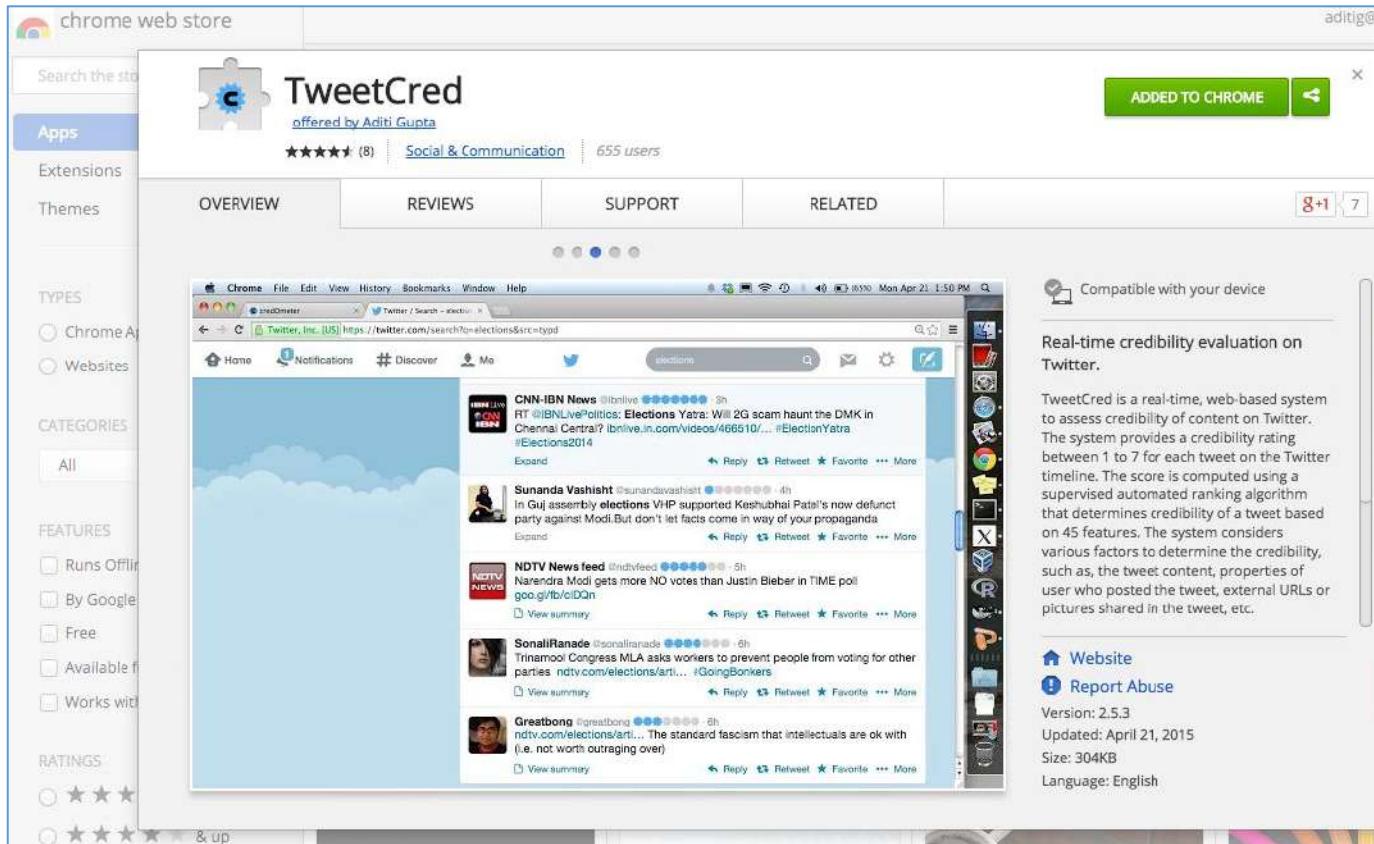
# Ranking Results

- Tweet and user based features contribute in determining the credibility – it matters “*what you post and who you are*”



# TweetCred

## ● Available as a Chrome Extension



# Live Demo of TweetCred

---



# Features for Real-time Analysis

Feature set	Features (45)
Tweet meta-data	Number of seconds since the tweet; Source of tweet (mobile / web/ etc); Tweet contains geo-coordinates
Tweet content (simple)	Number of characters; Number of words; Number of URLs; Number of hashtags; Number of unique characters; Presence of stock symbol; Presence of happy smiley; Presence of sad smiley; Tweet contains 'via'; Presence of colon symbol
Tweet content (linguistic)	Presence of swear words; Presence of negative emotion words; Presence of positive emotion words; Presence of pronouns; Mention of self words in tweet (I; my; mine)
Tweet author	Number of followers; friends; time since the user if on Twitter; etc.
Tweet network	Number of retweets; Number of mentions; Tweet is a reply; Tweet is a retweet
Tweet links	WOT score for the URL; Ratio of likes / dislikes for a YouTube video

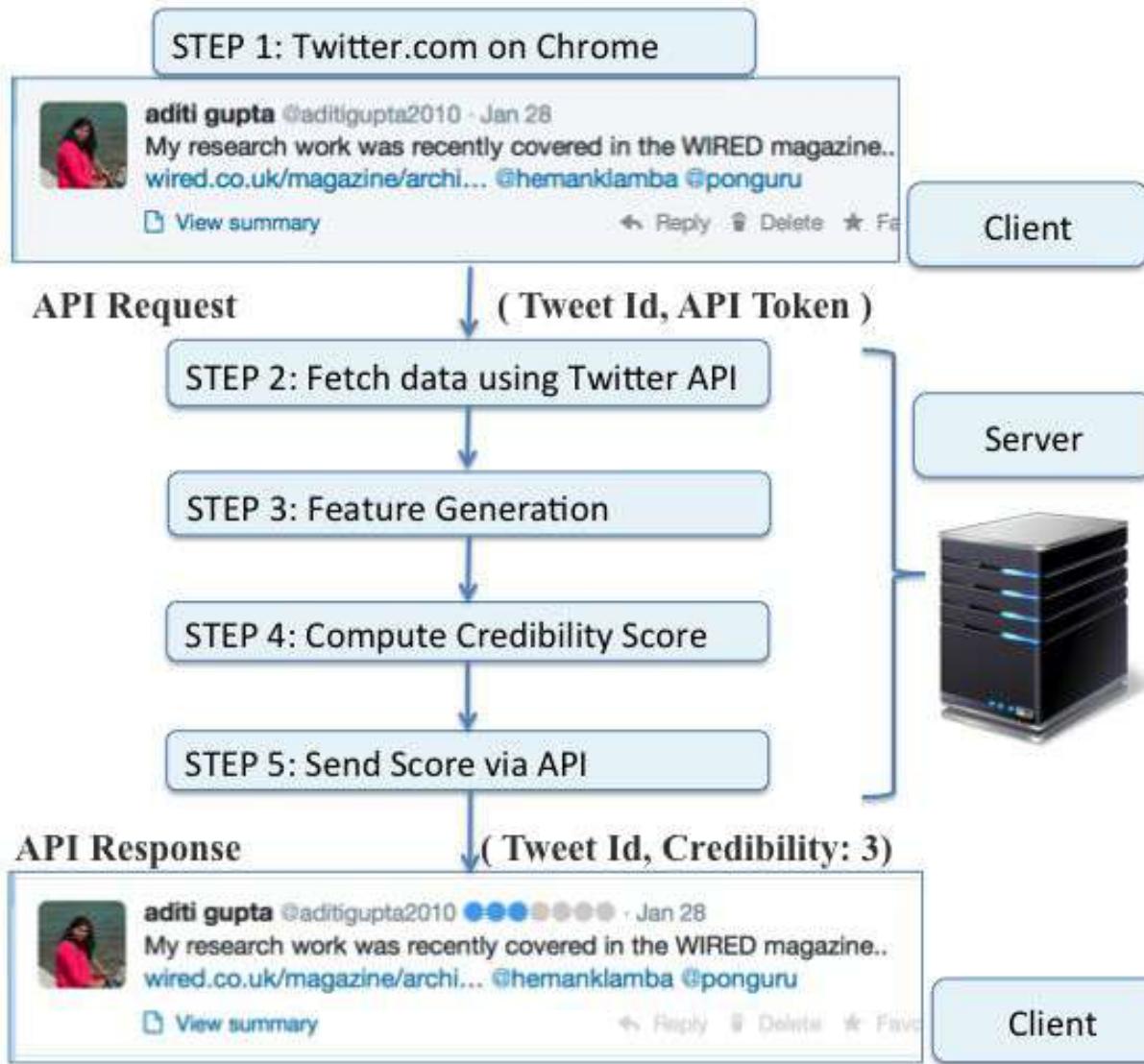
# Top Ten Features

---

- No. of characters in tweet
- Unique characters in tweet
- No. of words in tweet
- User has location in profile
- Number of retweets
- Age of tweet
- Tweet contains URL
- Tweet contains via
- Statuses / Followers
- Friends / Followers



# Implementation



# Feedback by Users



BBC Breaking News

@BBCBreaking



Follow

Earthquake of 6.8 magnitude shakes buildings  
in Mexico City, no immediate reports of  
damage [bbc.in/1jF11rB](http://bbc.in/1jF11rB)

Reply Retweet Favorite More

RETWEETS  
732

FAVORITES  
159



7:27 AM - 8 May 2014

Credibility: High (6/7)

Reply to @BE

Do you agree?



RedCrossArkansas

@ArkRedCross



Follow

#redcross providing cots and blankets for  
Mayflower Middle School, 10 Leslie King Dr.,  
Mayflower AR #arwx #ARtornado

Reply Retweet Favorite More

RETWEETS  
136

FAVORITES  
42



11:04 PM - 27 Apr 2014

Credibility: Low (1/7)

Reply to @ArkP

What is your rating?



# Users of TweetCred

---

## Sample users:

- Emergency responders
- Firefighters
- Journalists / news media
- General users



# Quick summary for Week 2

---

- Frameworks / Platforms

- APIs – Twitter & Facebook Reddit
- Python
- MySQL / MongoDB
- PhpMyAdmin

- Rate limits

- JSON

- Graphs

- Credibility

- Data collection for an event

- Who, When, Where, What, Why, and How

- Network analysis



# Takeaways / Questions?

---



# Thank you

[pk@iiitd.ac.in](mailto:pk@iiitd.ac.in)

precog.iiitd.edu.in

fb/ponnurangam.kumaraguru

# Privacy and Security in Online Social Media

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Course on NPTEL

NOC21-CS28

Week 3.1

Ponnurangam Kumaraguru (“PK”)

Full Professor

ACM Distinguished Speaker

[fb/ponnurangam.kumaraguru](https://www.facebook.com/ponnurangam.kumaraguru), @ponguru



# Frameworks / Platforms to know

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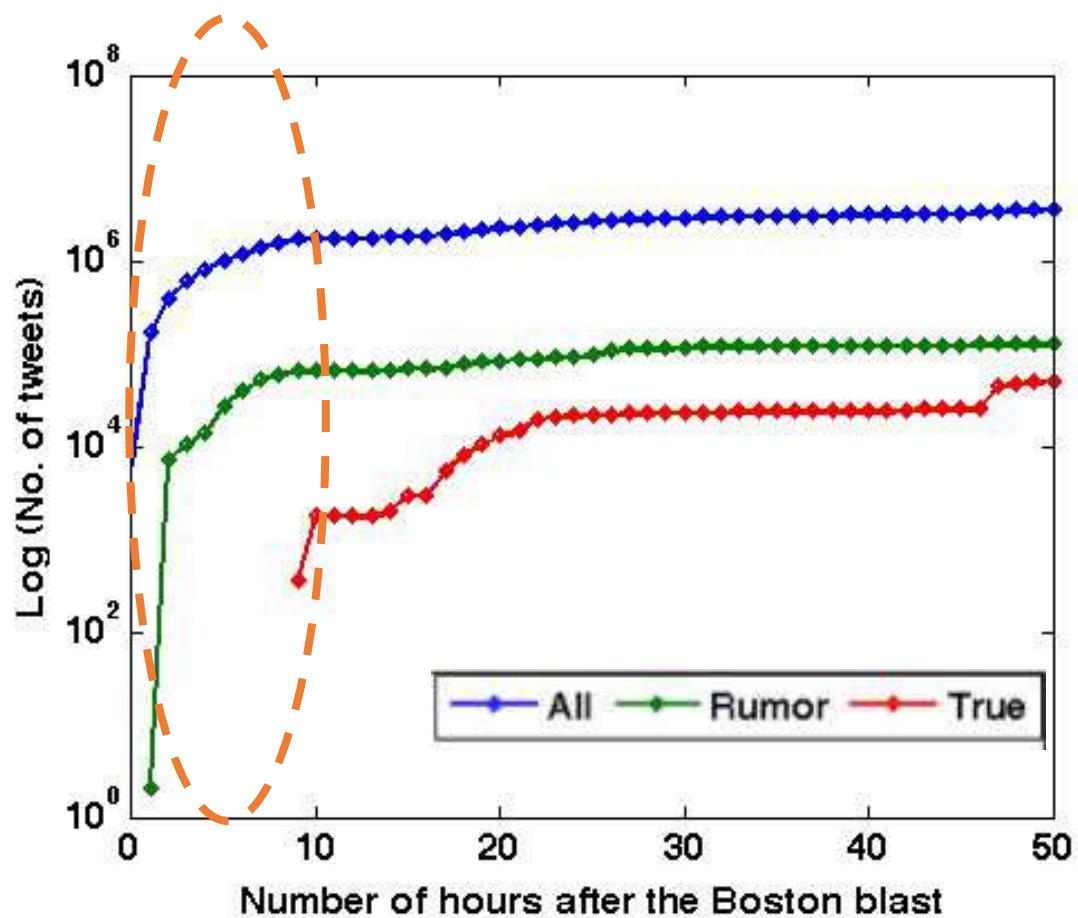
- APIs of OSM (e.g. Facebook / Twitter API)
- A programming language to write code to extract data (e.g. Python / RoR)
- A database to store data (e.g. MySQL / MongoDB)
- A visualization tool to query and analyze data (e.g. PhpMyAdmin / RoboMongo)

# Tutorials for this week

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● ~~Twitter API~~ Facebook API Reddit API

# Temporal Patterns



Fake content / rumors becomes viral in first 7-8 hours just after the event.

# Misinformation Tweets



McDonalds in Virginia Beach flooded.  
pic.twitter.com/FZBoCydM

Reply Retweet Favorite



FAKE



AP The Associated Press @AP Following

Breaking: Two Explosions in the White House and Barack Obama is injured

Reply Retweet Favorite More

3,063 RETWEETS 144 FAVORITES

12:07 PM - 23 Apr 13

RUMORS



#LondonRiots hearing reports that london zoo was broken into and a large amount of animals have escaped. Too far! Thats not cool :-(

@Twiggy\_Garcia, 5,178 followers

# Fake Image Tweets



DC Maryland Virginia  
@DMVFollowers

Follow

McDonalds in Virginia Beach flooded.  
[pic.twitter.com/FZBoCydM](http://pic.twitter.com/FZBoCydM)



Katina  
@kdekranis9

Follow

I TOLD Y'ALL! Shark on the highway in New Jersey!!!!  
@maxthewanted would appreciate this. #HurricaneSandy  
[pic.twitter.com/kaYMjWzT](http://pic.twitter.com/kaYMjWzT)

1:09 AM - 30 Oct 2012



Jamster  
@jamster83

Follow

Amazing picture of hurricane #Sandy descending in New York [pic.twitter.com/3mMhCbNq](http://pic.twitter.com/3mMhCbNq)

4:21 PM - 29 Oct 2012



5 RETWEETS 586 FAVORITES

# Analysis

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- Who
- When
- Where
- What
- Why
- How



# Classification

---

User Features [F1]
Number of Friends
Number of Followers
Follower-Friend Ratio
Number of times listed
User has a URL
User is a verified user
Age of user account

Tweet Features [F2]
Length of Tweet
Number of Words
Contains Question Mark?
Contains Exclamation Mark?
Number of Question Marks
Number of Exclamation Marks
Contains Happy Emoticon
Contains Sad Emoticon
Contains First Order Pronoun
Contains Second Order Pronoun
Contains Third Order Pronoun
Number of uppercase characters
Number of negative sentiment words
Number of positive sentiment words
Number of mentions
Number of hashtags
Number of URLs
Retweet count

# Sample Fake Tweets

 **@HopeForBoston**  
HOPE FOR BOSTON

R.I.P. to the 8 year-old boy who died in Boston's explosions,  
while running for the Sandy Hook kids. #prayforboston  
<http://t.co/Xmv2E81Lsb>

April 16, 2013 12:18 am via web   [Reply](#)   [Retweet](#)   [Favorite](#)

> 30,000 RTs

 **BostonMarathon**  
@\_BostonMarathon

Follow

For every retweet we receive we will donate  
\$1.00 to the #BostonMarathon victims  
#PrayForBoston

[Reply](#)   [Retweet](#)   [Favorite](#)   [More](#)

52,173 RETWEETS   855 FAVORITES

11:29 AM - 15 Apr 13

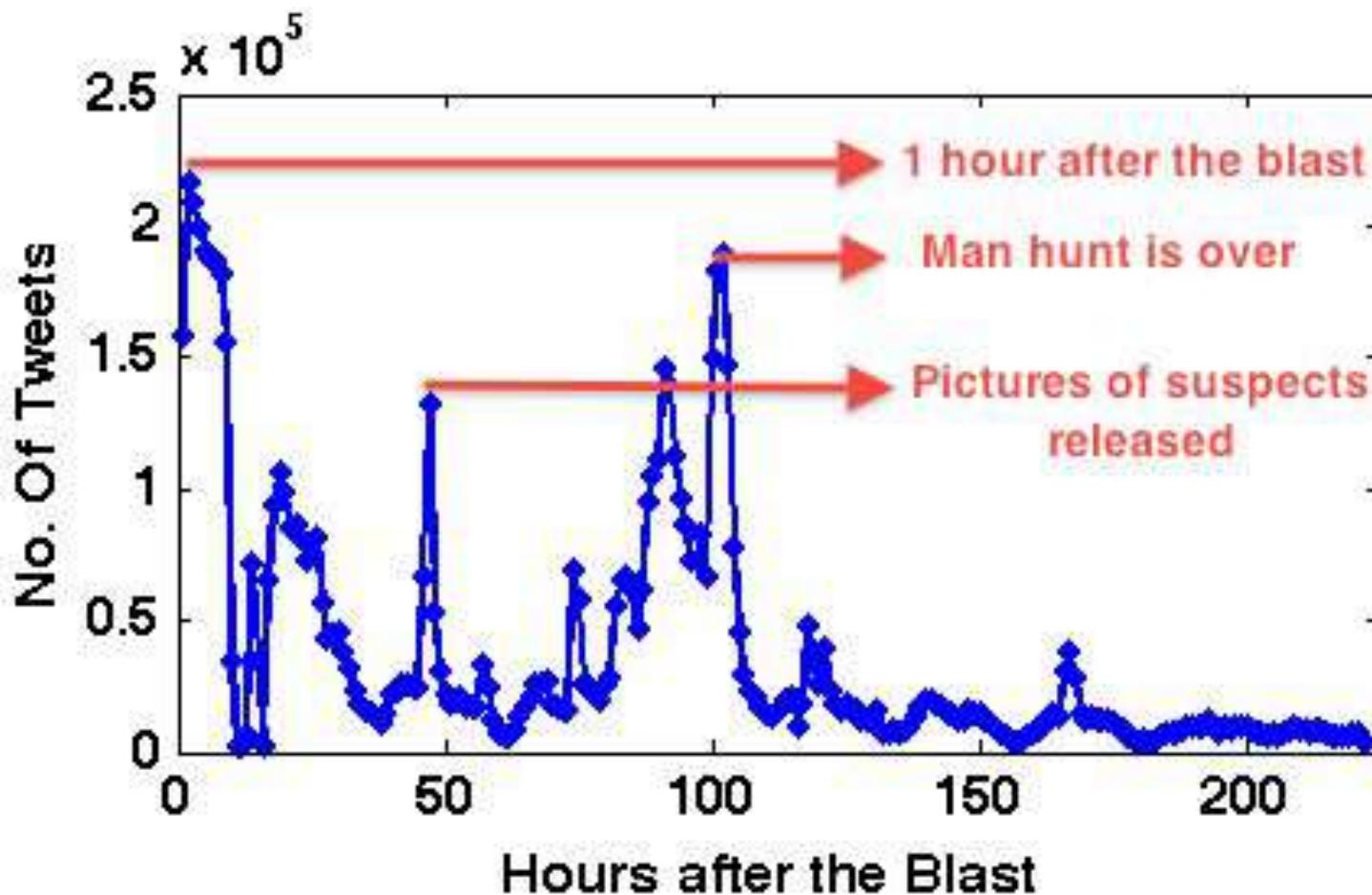
> 50,000 RTs

# Data Description

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<b>Total tweets</b>	7,888,374
<b>Total users</b>	3,677,531
<b>Tweets with URLs</b>	3,420,228
<b>Tweets with Geo-tag</b>	62,629
<b>Retweets</b>	4,464,201
<b>Replies</b>	260,627
<b>Time of the blast</b>	Mon Apr 15 18:50 2013
<b>Time of first tweet</b>	Mon Apr 15 18:53 2013
<b>Time of first image</b>	Mon Apr 15 18:54 2013
<b>Time of last tweet</b>	Thu Apr 25 01:23 2013

# Data Description

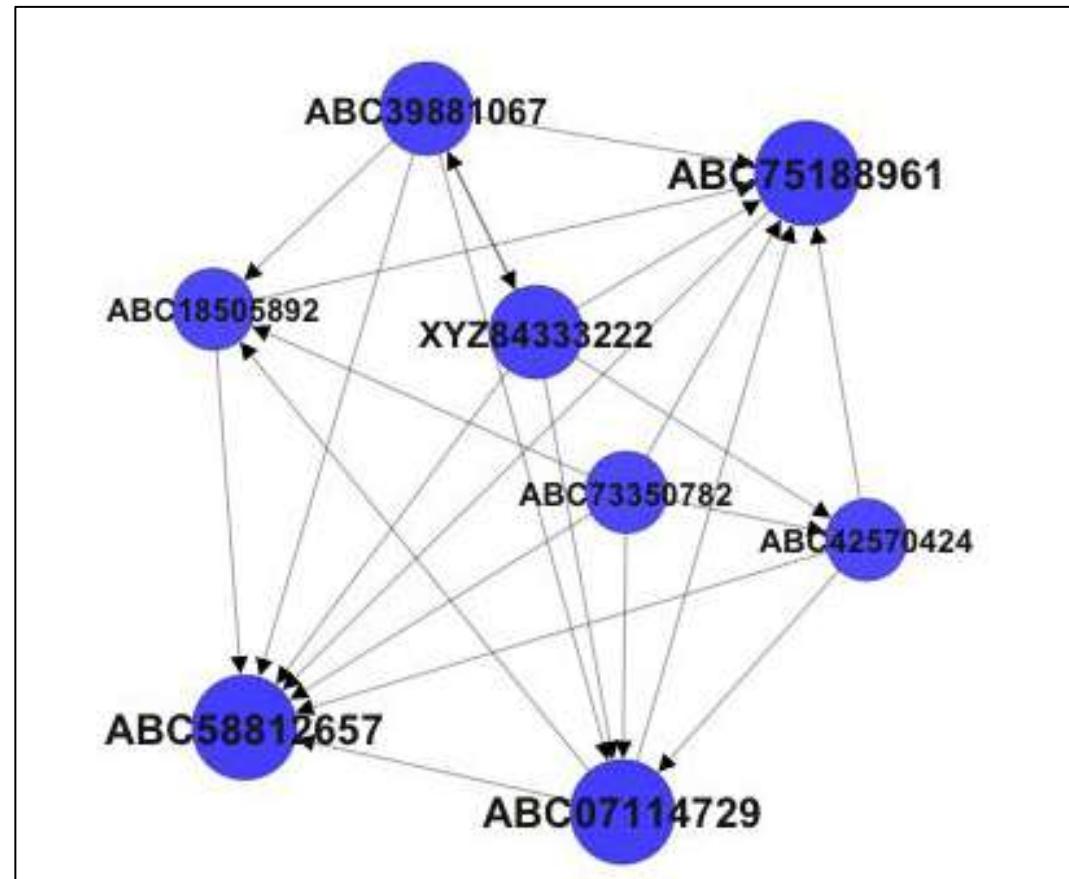


# Geo-Located Tweets

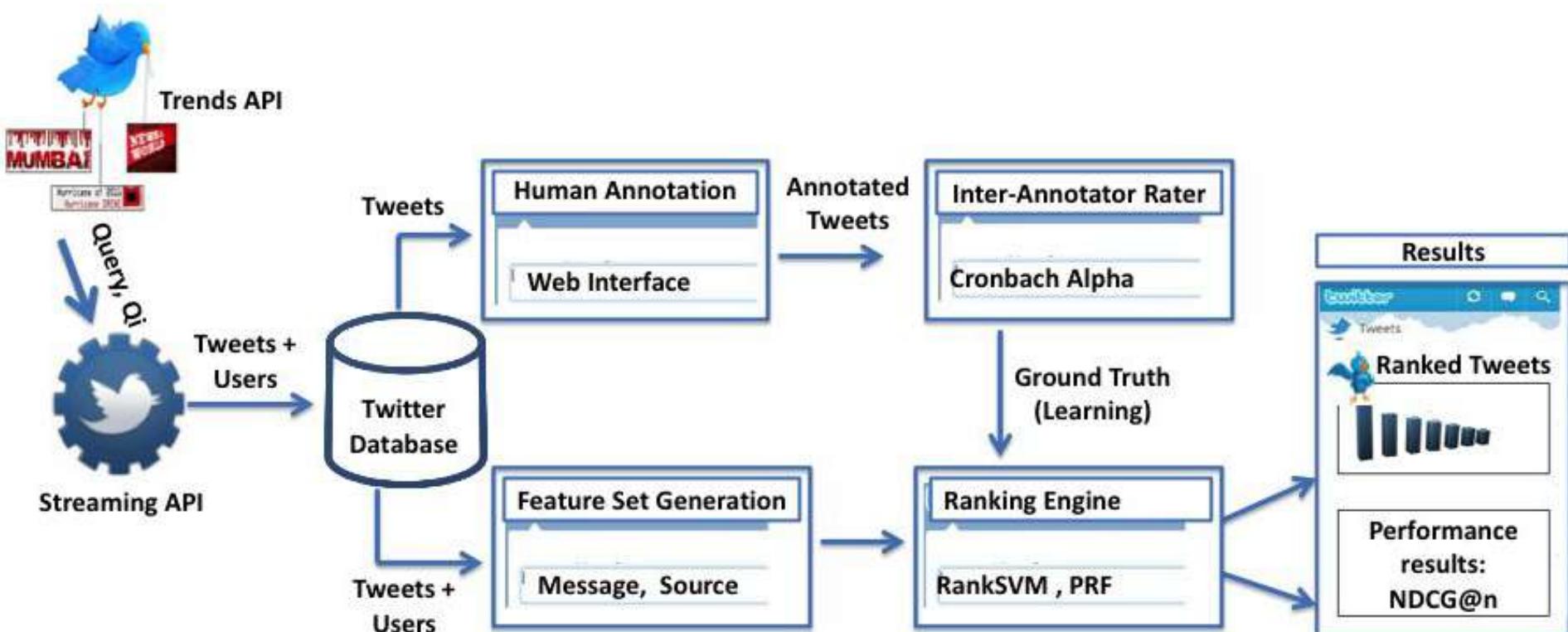


# Network Analysis of Fake Accounts

Closed community

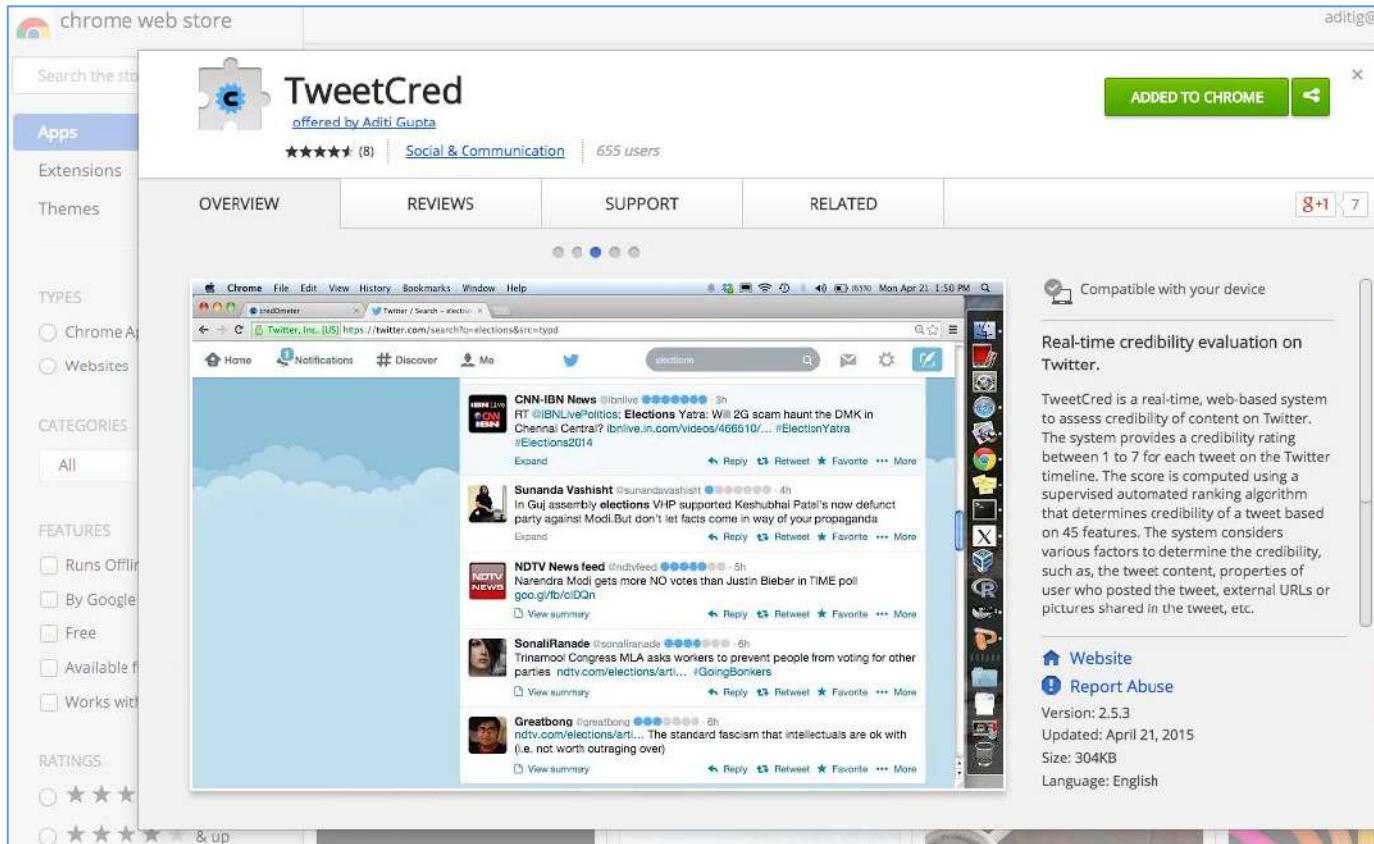


# Architecture



# TweetCred

## ● Available as a Chrome Extension



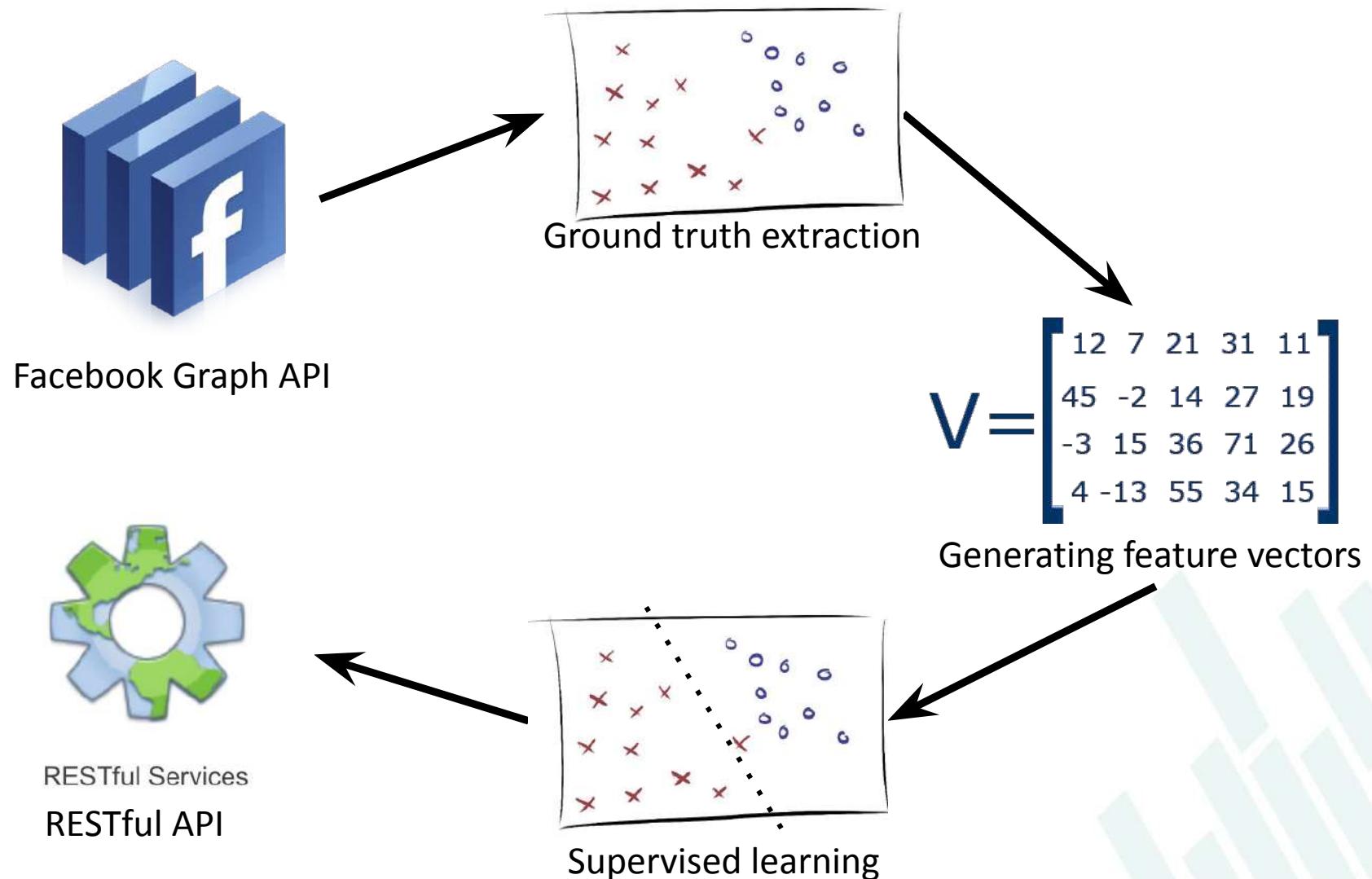
# Facebook

---

- Features are different
- Different network structure
  - Friendship



# FBI: Methodology



# Web of Trust scores

<http://www.domain.com>



Reputation: Unsatisfactory / Poor / Very poor (less than 60)

Confidence: High (greater than 10)

OR

Category: Negative



**Malicious**

# Plugin

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- <https://chrome.google.com/webstore/detail/facebook-inspector/jlhjfkmldnokgkhbhgbnmiejokohmlfc>
- <https://addons.mozilla.org/en-US/firefox/addon/fbi-facebook-inspector/>

# Demo

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# Thank you

[pk@iiitd.ac.in](mailto:pk@iiitd.ac.in)

precog.iiitd.edu.in

fb/ponnurangam.kumaraguru

# Privacy and Security in Online Social Media

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Week 3.2

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[fb/ponnurangam.kumaraguru](https://www.facebook.com/ponnurangam.kumaraguru), @ponguru



# App details

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- API Key
- API Secret
- Access token

# Tutorial: Twitter API

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# Topics that we will cover

---

- Overview of OSM
- Linux / Python / Twitter API / Mongo DB / MySQL  
**[Hands-on]**
- Trust & Credibility
- Privacy
- Social Network Analysis, NLTK **[Hands-on]**
- e-crime
- Plotly / Highcharts / Geo-location analysis  
**[Hands-on]**
- Policing
- Identity resolution
- What next – Deep learning, machine learning, NLP, Image analysis

# How do we define privacy?

---



# Westin's 3 categories

---

- Fundamentalists, 25%
- Pragmatists, 60%
- Unconcerned, 15%



You thought that on the Internet nobody  
knew you were a dog...

---



...but then you started getting personalized ads for your favorite brand of dog food

# #privacyindia12

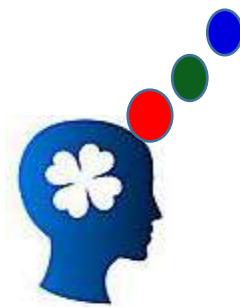
## Methodology



20 Interviews



4 FGDs

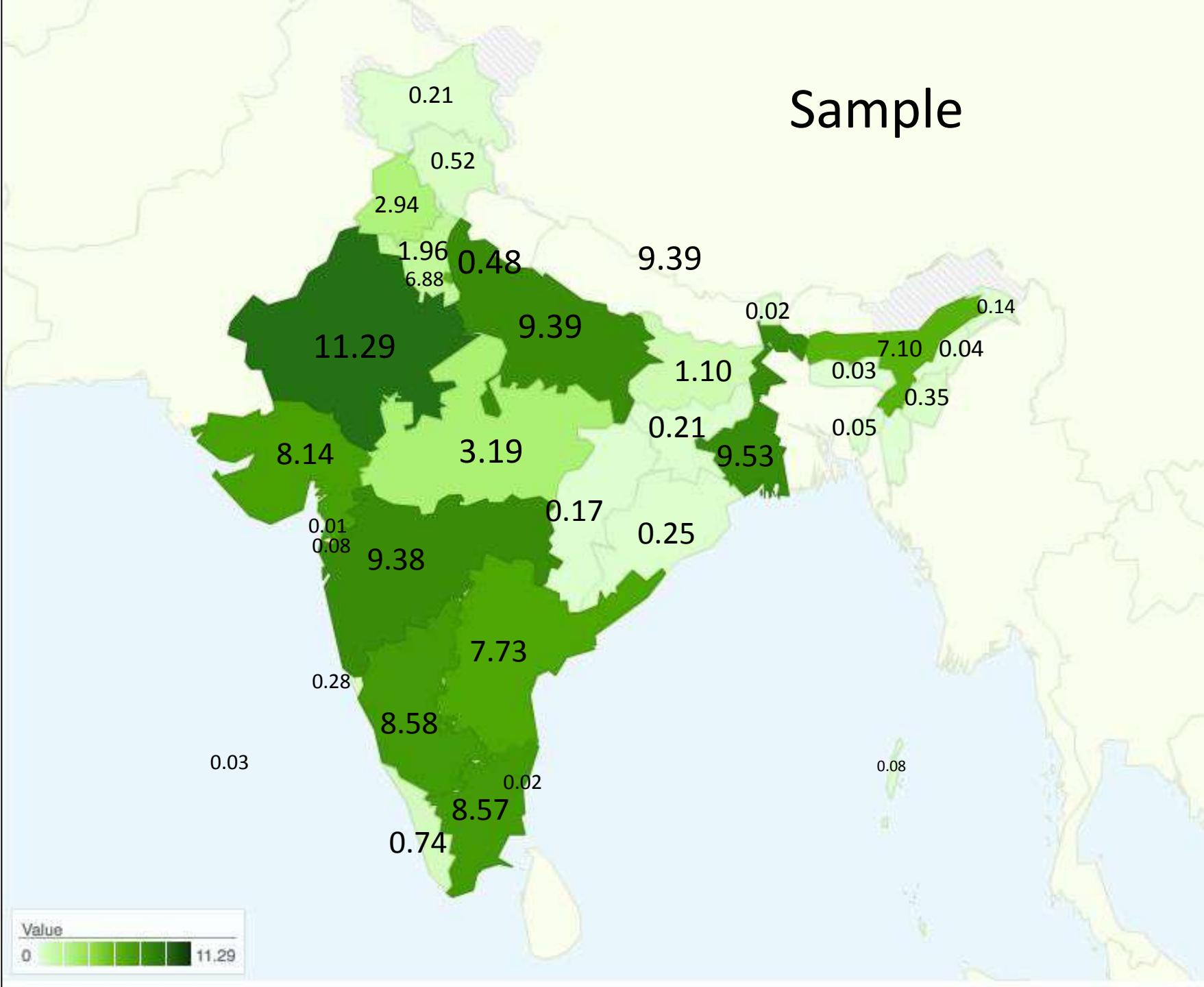


10,427 Surveys



18 months!

# Sample



# Demographics

---

Age (N=10,350)	
<18	1.54
18-24	21.31
25-29	32.20
30-39	25.90
40-49	14.09
50-64	4.46
65+	0.50

Gender (N= 10,232)	
Male	67.57
Female	32.43

# Internet & Social Media

What do you feel about privacy of your personal information on your OSN?

**Q42, N = 6,855**

It is not a concern at all	
Since I have specified my privacy settings, my data is secure from a privacy breach	
Even though, I have specified my privacy settings, I am concerned about privacy of my data	
It is a concern, but I still share personal information	
It is a concern; hence I do not share personal data on OSN	

# Internet & Social Media

---

What do you feel about privacy of your personal information on your OSN?

Q42, N = 6,855	
It is not a concern at all	
Since I have specified my privacy settings, my data is secure from a privacy breach	42.13
Even though, I have specified my privacy settings, I am concerned about privacy of my data	
It is a concern, but I still share personal information	
It is a concern; hence I do not share personal data on OSN	

# Internet & Social Media

---

What do you feel about privacy of your personal information on your OSN?

Q42, N = 6,855	
It is not a concern at all	19.30
Since I have specified my privacy settings, my data is secure from a privacy breach	42.13
Even though, I have specified my privacy settings, I am concerned about privacy of my data	23.84
It is a concern, but I still share personal information	8.02
It is a concern; hence I do not share personal data on OSN	6.71

# Internet & Social Media

---

If you receive a friendship request on your most frequently used OSN, which of the following people will you add as friends?

Q43, N = 6,929	
Person of opposite gender	
People from my hometown	
Person with nice profile picture	
Strangers (people you do not know)	
Somebody, whom you do not know or recognize but have mutual / common friends with	
Anyone	

# Internet & Social Media

---

If you receive a friendship request on your most frequently used OSN, which of the following people will you add as friends?

Q43, N = 6,929	
Person of opposite gender	
People from my hometown	
Person with nice profile picture	10.12
Strangers (people you do not know)	
Somebody, whom you do not know or recognize but have mutual / common friends with	
Anyone	

# Internet & Social Media

---

If you receive a friendship request on your most frequently used OSN, which of the following people will you add as friends?

Q43, N = 6,929	
Person of opposite gender	27.39
People from my hometown	
Person with nice profile picture	10.12
Strangers (people you do not know)	
Somebody, whom you do not know or recognize but have mutual / common friends with	
Anyone	2.99

# Internet & Social Media

---

If you receive a friendship request on your most frequently used OSN, which of the following people will you add as friends?

Q43, N = 6,929	
Person of opposite gender	27.39
People from my hometown	19.51
Person with nice profile picture	10.12
Strangers (people you do not know)	4.99
Somebody, whom you do not know or recognize but have mutual / common friends with	8.31
Anyone	2.99

<http://precog.iiitd.edu.in/research/privacyindia/>

# Different types of Privacy issues in FB?

---



# Thank you

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precog.iiitd.edu.in

fb/ponnurangam.kumaraguru

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PreCog  
@IIITD



# Topics that we will cover

---

- Overview of OSM
- Linux / Python / Twitter API / Mongo DB / MySQL  
**[Hands-on]**
- Trust & Credibility
- Privacy
- Social Network Analysis, NLTK **[Hands-on]**
- e-crime
- Plotly / Highcharts / Geo-location analysis  
**[Hands-on]**
- Policing
- Identity resolution
- What next – Deep learning, machine learning, NLP, Image analysis

# Westin's 3 categories

---

- Fundamentalists, 25%
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- Unconcerned, 15%



# Internet & Social Media

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# Internet & Social Media

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<http://precog.iiitd.edu.in/research/privacyindia/>

# Hard to define

---

“Privacy is a value so complex, so entangled in competing and contradictory dimensions, so engorged with various and distinct meanings, that I sometimes despair whether it can be usefully addressed at all.”

Robert C. Post, *Three Concepts of Privacy*,  
89 Geo. L.J. 2087 (2001).



# Control over information

---

“Privacy is the claim of individuals, groups or institutions **to determine for themselves** when, how, and to what extent information about them is communicated to others.”

“...each individual is continually engaged in a **personal adjustment process** in which he balances the desire for privacy with the desire for disclosure and communication....”

Alan Westin, *Privacy and Freedom*, 1967

# Forms of Privacy

---

- Information

- Internet

- Communication

- Telephone

- Territorial

- Living space

- Bodily

- Self



# Background

---

- In 2000, 100 billion photos were shot worldwide
- In 2010, 2.5 billion photos per month were uploaded by Facebook users only
- In 2015, 1.8 billion photos uploaded everyday on Facebook, Instagram, Flickr, Snapchat, and WhatsApp
- Facebook, Microsoft, Google, Apple have acquired / licensed products that do Face recognition

# Many things are colluding

---

- Increasing public self-disclosures through online social networks
  - Photos
- Improving accuracy in Face recognition
- Cloud, ubiquitous computing
- Re-identification techniques are getting better



# Question

---

- Can one combine publicly available online social network data with off-the-shelf face recognition technology for
  - Individual re-identification
  - Finding potentially, sensitive information



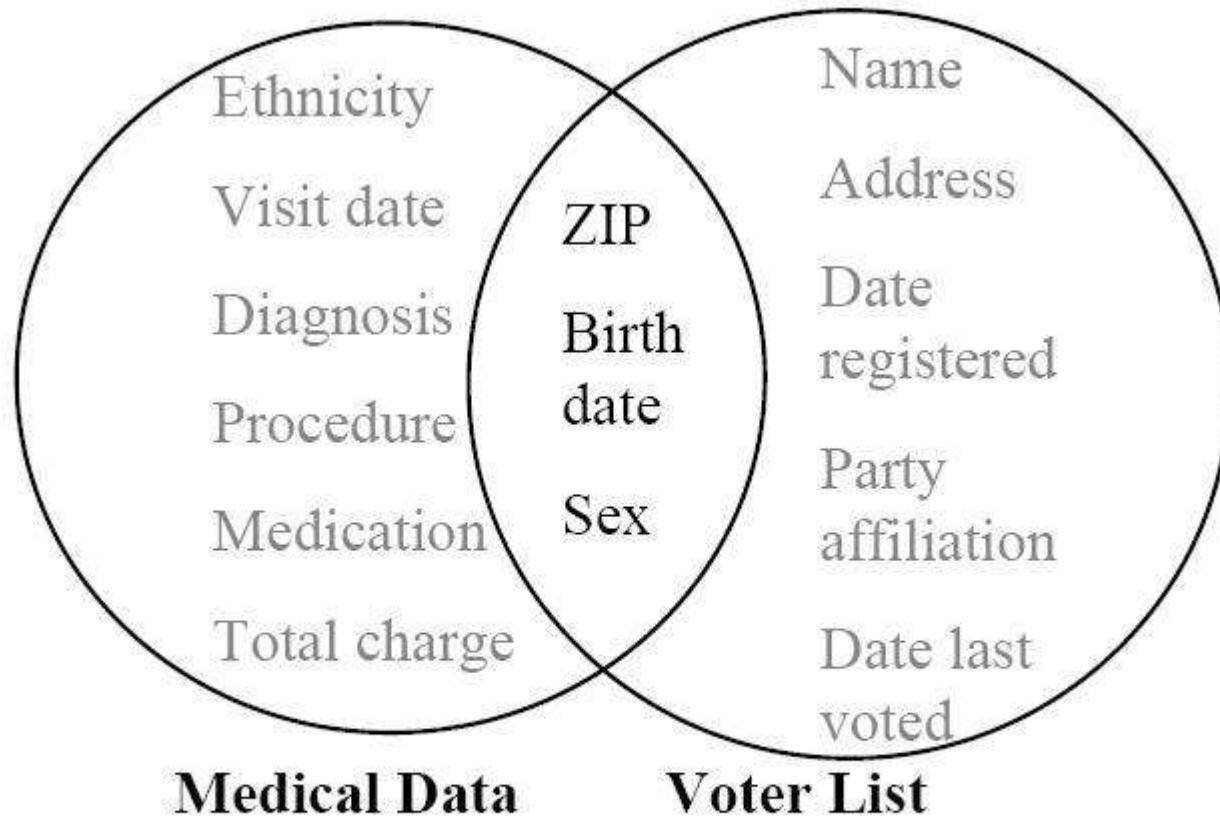
# Goal is to

---

- Use un-identified source {Match.com, photos from Flickr, CCTVs, etc.} + identified sources {Facebook, Linkedin, Govt. websites, etc.}
- To get some sensitive information of the individual {gender orientation, SSN, Aadhaar #, etc.}



# Latanya Sweeney



**Figure 1** Linking to re-identify data

# Experiment 1

---

- Online – Online
- Mined publicly available images from FB to re-identify profiles on one of the most popular dating sites in the US
- Used <http://www.pittpatt.com/> for face recognizing
  - Pittpatt acquired by Google
  - Face detection
  - Face recognition
- Use Tensorflow now



# Experiment 1: Data

---

- Identified
- Downloaded FB profiles from one city in USA
- Profiles: 277,978
- Images: 274,540
- Faces detected: 110,984



# Experiment 1: Data

---

- Un-Identified
- Downloaded profiles of one of the popular dating websites
- Pseudonyms to protect their identities
- Photos can be used to identify
- Same city was used to search
- Profiles: 5,818
- Faces detected: 4,959

# Experiment 1: Approach

---

- Unidentified {Dating site photos} + Identified {FB photos} → Re-identified individual
- More than 500 million pairs compared
- Used only the best matching pair for each dating site picture
- PittPatt produces score of -1.5 to 20
- Crowd sourced to Mturkers for validating PittPatt
- Likert scale, 1 – 5
- At least 5 Turkers for each pair

# Experiment 1: Results

---

- Highly likely matches: 6.3%
- Highly likely + Likely matches: 10.5%
- 1 on 10 from the dating site can be identified

# Reactions?

---

- What can you do better if you were the attacker?



# Experiment 2

---

- Offline to online
- Pictures from FB college network to identify student strolling in campus



# Experiment 2: Data

---

- Webcam to take 3 pics per participant
- Collected over 2 days
- Facebook data for the university
  - Profiles: 25,051
  - Images: 26,262
  - Faces detected: 114,745

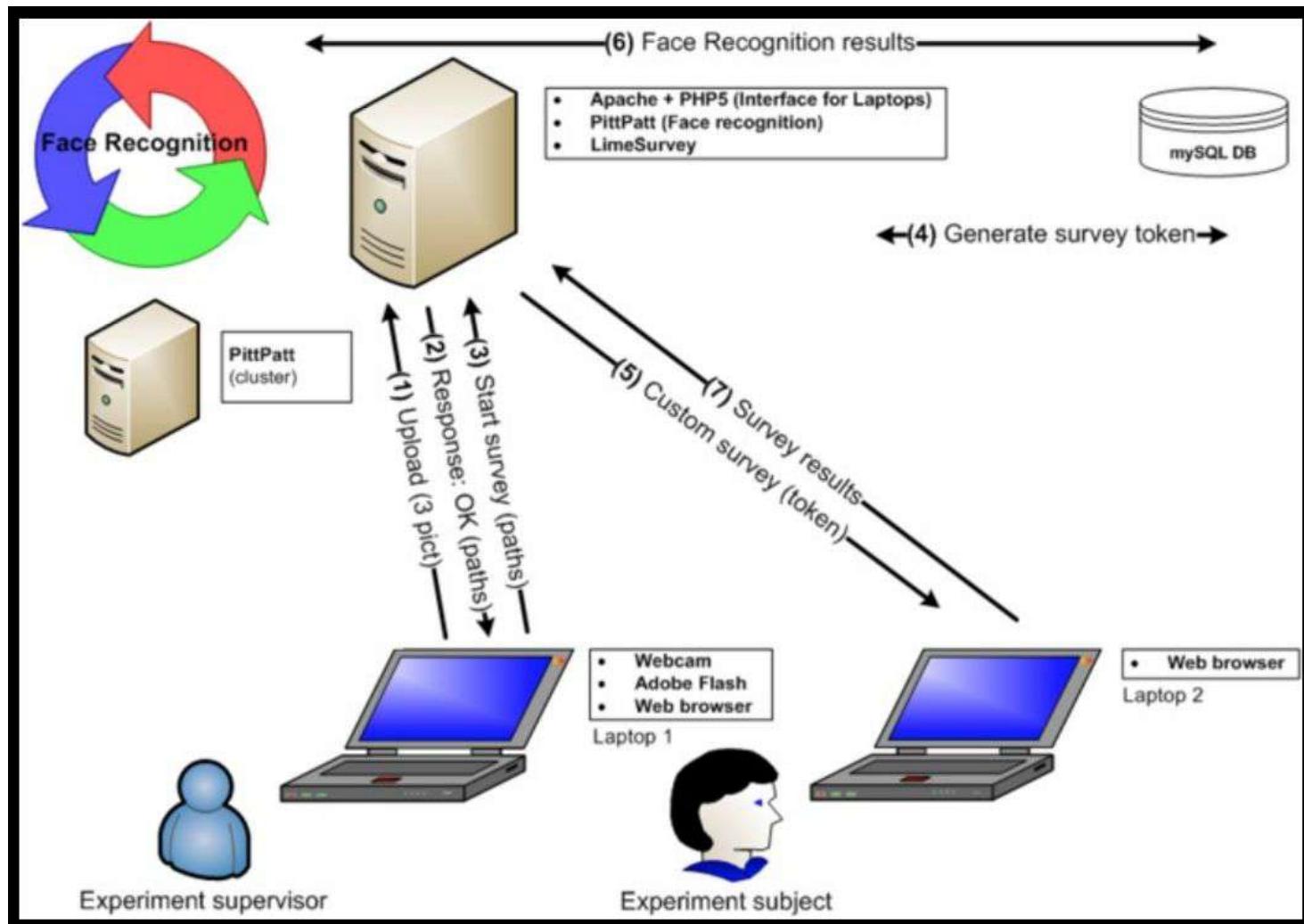


# Experiment 2: Process

---

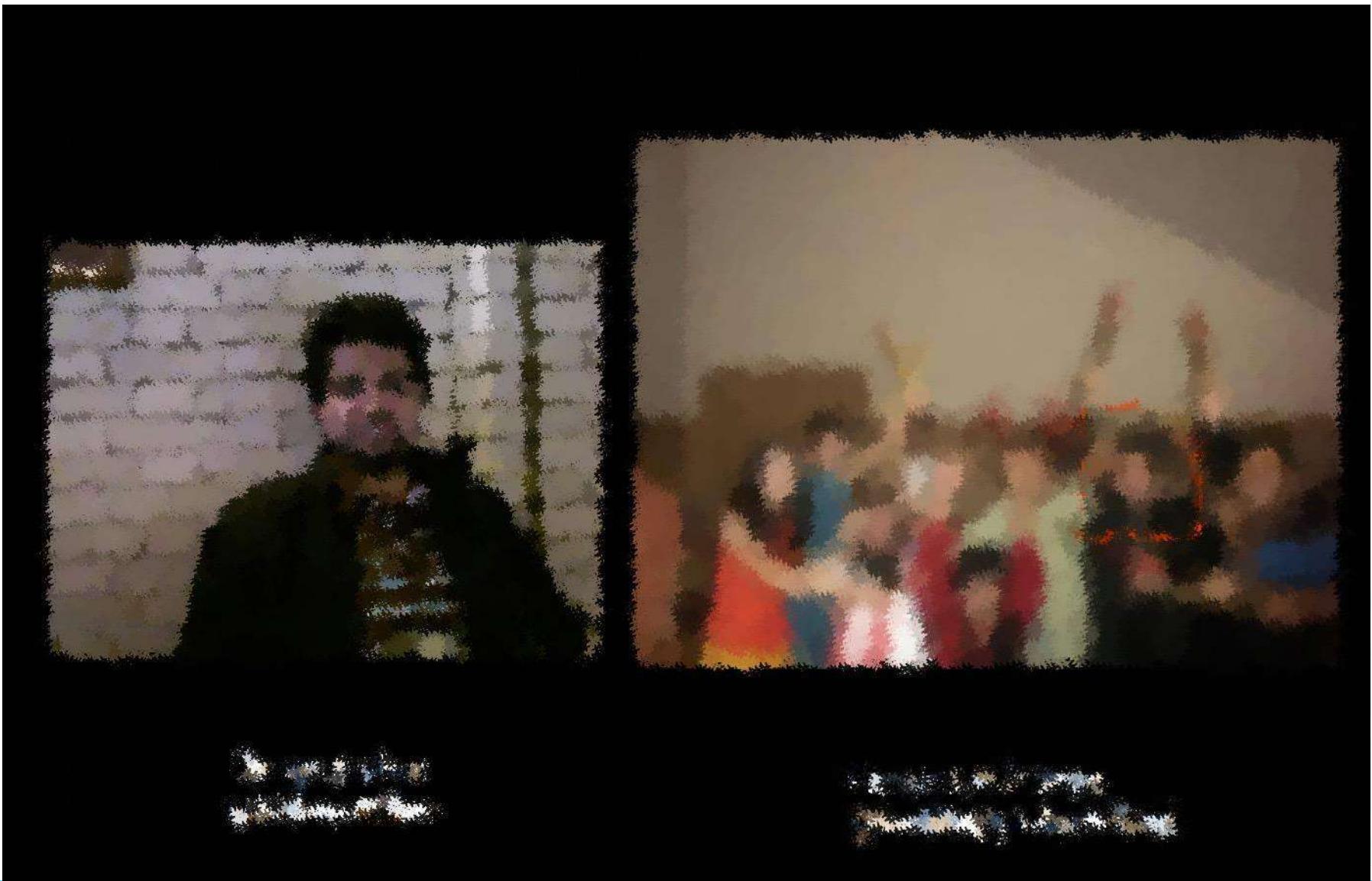
- Pictures taken of individuals walking in campus
- Asked to fill online survey
- Pictures matched from cloud while they are filling survey
- Last page of the survey with options of their pictures
- Asked to select the pics which matched closely, produced by the recognizer

# Experiment 2: Process



# Experiment 2: Process

---



# Experiment 2: Results

---

- 98 participants
  - All students and had FB accounts
- 38.18% of participants were matched with correct FB profile
  - Including a participant who mentioned that he did not have a picture on FB
  - Average computation less than 3 seconds

# Experiment 3

---

- Predicted SSN from public data
- Faces / FB data + Public data → SSN
- 27% of subjects' first 5 SSN digits identified with four attempts – starting from their faces
- Predicted sensitive information like SSN



# What can you think of doing in India?

- Aadhaar number?
- Other details?



# References

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- <https://www.blackhat.com/docs/webcast/acquisti-face-BH-Webinar-2012-out.pdf>
- <http://www.heinz.cmu.edu/~acquisti/papers/privacy-facebook-gross-acquisti.pdf>

# Thank you

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# Experiments

---

- Online – Online
- Offline – Online
- Predicted SSN from public data



---

# **We Know Where You Live: Privacy Characterization of Foursquare Behavior**

**Tatiana Pontes\*, Marisa Vasconcelos\*, Jussara Almeida\*,  
Ponnurangam Kumaraguru†, Virgilio Almeida\***

\*Universidade Federal de Minas Gerais, Brazil

†Indraprastha Institute of Information Technology, India

\*{tpontes,marisav,jussara,virgilio}@dcc.ufmg.br

†pk@iiitd.ac.in

# Beware of What You Share: Inferring Home Location in Social Networks

Tatiana Pontes\*, Gabriel Magno\*, Marisa Vasconcelos\*, Aditi Gupta<sup>†</sup>,  
Jussara Almeida\*, Ponnurangam Kumaraguru<sup>†</sup>, Virgilio Almeida\*

\*Universidade Federal de Minas Gerais, Brazil  
`{tpontes,magno,marisav,jussara,virgilio}@dcc.ufmg.br`

<sup>†</sup>Indraprastha Institute of Information Technology, India  
`{aditig,pk}@iiitd.ac.in`

# Interested?

---

- WWW <http://www.www2017.com.au/>
- ICWSM <http://icwsm.org/2017/>
- COSN <http://cosn.acm.org/>
- CSCW <https://cscw.acm.org/2017/>
- ...



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# How you use OSM?

---

- How many friends and followers do you have on Facebook and Twitter?
- How many of you are friends with police on your social network?
- How often you use social networks to
  - Post comments
  - Interact with police

Ever wondered What makes police to use social media?

# The Power: Social Media

---



Do you remember this picture?

# #myNYPD



NYPD NEWS @NYPDnews

Do you have a photo w/ a #myNYPD. It may be feat.

11:25 PM - 22 Apr 2014

428 RETWEETS 226 FAVORITES



Michael Krieger  
@LibertyBlitz

Follow

This is what the top pictures on #myNYPD hashtag look like at the moment:

2:40 AM - 23 Apr 2014

117 RETWEETS 38 FAVORITES



# #myNYPD to #myLAPD

#MyNYPD Twitter Fail Spawns #MyLAPD, Showing Police Hard At Work Beating Folks Up



Gaga Cheat

@MissStef0318



#MyLAPD well, it's @HawthornePD in L.A. county so it counts.  
Watch your dogs! Your police force working for you.

7:13 AM - 23 Apr 2014

132 RETWEETS 46 FAVORITES



# Multiple Police Dept. on OSN

The screenshot shows the official Facebook page of the Delhi Traffic Police. The cover photo features two men in uniform clapping. The timeline tab is selected. On the left sidebar, it shows 205k likes, 651 check-ins, and an option to open the page always. The right sidebar has a text input field with 'Write something...' and a 'Post' button.

The screenshot shows the official Facebook page of the Hyderabad City Police. The cover photo features a blue shield logo. The timeline tab is selected. On the left sidebar, it shows 21k likes, 247 check-ins, and an option to open the page always. The right sidebar has a post from the page itself.

# BLR City Police on OSN

**BENGALURU CITY POLICE**  
11 hrs ·

Tweet by Addl. Commissioner of Police - Traffic  
Bengaluru City.

Dr. M.A. Saleem, IPS  
@AddlCPTraffic

We have commenced operations of BMTC buses on Avenue road from today on experimental basis, Hope to decongest Town hall area.

Like · Comment · Share

138k people like this · 54 people like this · Most Relevant · 1 share

Open always · Write a comment... · Post

Get additional info · Like · Reply · 1 · 11 hrs

Invite friends to · at will be terrible for pedestrians.. avenue road has so many carts, pedestrians and luggage autos going.. · Like · Reply · 11 hrs

4.2 of 5 stars · View Reviews

**ABOUT** >

Premier enforcer for law and order in the city of Bengaluru, India

**Keep citizens informed**

Dr. M.A. Saleem, IPS  
@AddlCPTraffic

We are taking up traffic signal synchronization on 10 corridors in the city for smooth traffic flow.



**M N Reddi, IPS**

@CPB1r

M N Reddi, IPS, YOUR Commissioner of Police, Bengaluru City. Trying to make Bengaluru Police, YOUR OWN POLICE!

Bengaluru City - 560001

[bcp.gov.in/home.aspx](http://bcp.gov.in/home.aspx)



TWEETS

8,187

FOLLOWING

46

FOLLOWERS

335K

FAVORITES

848

Tweets

Tweets & replies

Photos & videos

Pinned Tweet



**M N Reddi, IPS** @CPB1r Oct 28

My new bio for @CPB1r : " M N Reddi, IPS, Commissioner of Police, Bangalore City. Trying to make Bangalore Police YOUR OWN POLICE!"



TWEETS  
10.7K

FOLLOWING  
60

FOLLOWERS  
688K

LIKES  
960



Following

## N S Megharikh, IPS

@CPBIR

N S Megharikh, IPS, Commissioner of Police.

📍 Bengaluru City - 560001

🔗 [bcp.gov.in/home.aspx](http://bcp.gov.in/home.aspx)

📅 Joined July 2014

[Tweet to N S Megharikh, IPS](#)

### Tweets

### Tweets & replies

### Media



N S Megharikh, IPS @CPBIR · 23h

एक गरीब लड़के को एक चिराग मिला  
उसने उठाया और रगड़ दिया  
ज़ोरदार धमाका हुआ  
खुद मर गया,  
"अलादीन का जमाना गया,  
लावारीस वस्तुओं से दूर रहो

Who to follow · Refresh · View all



Shah Rukh Khan @iamsrk

Follow



Aamir Khan @aamir\_khan

Follow



Shashi Tharoor @Shashi...

Follow

Find friends

# Popular departments

Police Departments	Likes	Followers	Post	Joined
<b>USA</b>				
New York	383,372	147,000	No	2012
Boston	137,403	312,000	No	2010
Baltimore	36,530	70,400	Yes	2012
Metropolitan, Columbia	16,071	56,900	Yes	2008
Seattle	12,912	103,000	No	2010
<b>UK</b>				
Greater Manchester*	98,193	205,000	Yes	2011
West Midlands*	86,904	115,000	No	2008
Essex*	66,461	85,300	No	2011
London*	46,889	267,000	No	2011
Northern Ireland*	26,173	71,300	No	2009

# Popular departments - India

Police Departments	Likes	Followers	Post	Joined
Bangalore Traffic	2,49,968	8,045	Yes	2012
Delhi Traffic	2,02,858	2,59,000	Yes	2011
Hyderabad Traffic	1,88,480	1,361	Yes	2012
Bangalore City	1,05,463	12,100	Yes	2011
Kolkata Traffic	63,789	-	Yes	2010
Chennai	50,979	1,108	Yes	2013
Gurgaon	43,901	718	Yes	2013
Gurgaon Traffic	24,475	-	Yes	2010
Hyderabad	13,602	537	Yes	2014
UP Police PR	8,486	4,585	Yes	2013
Guwahati Police	3,255	295	Yes	2011

# Bangalore Police



**BANGALORE CITY POLICE**

MISSION OF BANGALORE CITY POLICE  
law is upheld fairly and firmly, to prevent crime and keep the peace in partnership with the community professed to work without fear, favour or偏見.

**Bangalore City Police**  
20,909 likes - 529 talking about this



**TRAFFIC POLICE BANGALORE CITY**

A PUBLIC SAFETY CAMPAIGN BY BANGALORE CITY TRAFFIC POLICE

**Bangalore Traffic Police**  
90,270 likes - 3,860 talking about this

Government Organization  
BTP at your service



**BANGALORE CITY POLICE**

TWEETS 652 PHOTOS/VIDEOS 8 FOLLOWERS 668

[Tweets](#) [Tweets and replies](#)

BangaloreCityPolice

**Bangalore City Police**

ಈ ರೆಕರ್ಡ ವಾಂಟೆಡ್ ಅವರಾಧಿಸು ಬರ್ಗ್ ಮಾಹಿತಿ ನೀಡಿದರೆ 10 ಲಕ್ಷ ನಾಡು ಕಣ ನೀಡಲಾಗುತ್ತದೆ. ಯಾನೆನ್ ಭಯ್ಲ, ತಹಸೆನ್, ಅನದಲ್ಲ ಅಥ್ವ ಮತ್ತು ದಾನ್ಸ್ ಇ ಎಲ್ಲ "ವಾಂಟೆಡ್ ಅವರಾಧಿಸು" ಮುಂತ್ಯೆ ಪ್ರೆಸೆಂಟ್ ಭಯೋಳಾಜನ್ ಸ್ಪೆಶ್ಲ್ (ATS) 2011 ಮತ್ತು 2012 ರಲ್ಲಿ ಮುಂತ್ಯೆ ಮತ್ತು ಪ್ರೆಚ್ಚಾಂತ್ರ ಸ್ಪೆಕ್ಯೂಲರ್ ನಾಂಬಾರ್ಡ್ಸ್‌ಡ್ರಾರ್.

ಈ ಅವರಾಧಿಸು ಬರ್ಗ್ ಯಾಂಟ್ ಮಾಹಿತಿ ನೀಡಿದ್ದರೆ, ರೂಪ್ಟಿ ಇ ನಂಬಾಗೆ ಈ ಮಾದಿ ತರಿಸಿ. ದಂರವಾಡಿ ನಂಬಿ : Tel: 022.23791619, Mob: +91.9619122222 / +91.8652012345

ಈ ಮೆಲ್ಲಿ : [atswantedaccused@gmail.com](mailto:atswantedaccused@gmail.com)  
ನಿಮ್ಮ ಕೆನಡ ಮತ್ತು ಪ್ರೆರಾಖಿನ್ನು ಸಂಪರ್ಕಿಸಿದಾಗಿ ಗ್ರಾಫ್ತ್‌ಡಾರಿ ಇಡಲಾಗುತ್ತದೆ.

Cash reward of Rs. 10 Lac on providing information of these Wanted Criminals

Yasin Bhatkal, Tahseen, Asadullah Akhtar and Waqas are all 'WANTED CRIMINALS' by the Anti Terrorism Squad (ATS) Mumbai in connection with the Mumbai and Pune Bomb blasts in 2011 and 2012.

If you have any information about these criminals, please report to the authorities immediately.  
Tel: 022. 23791619, Mob: +91. 9619122222 / +91. 8652012345  
Email: [atswantedaccused@gmail.com](mailto:atswantedaccused@gmail.com)

Your name and details will be kept completely confidential.  
Like · Comment · Share · February 28



<https://www.facebook.com/blrcitypolice>

# Delhi Police



**Delhi Traffic Police**  
176,993 likes · 1,203 talking about this

Government Organization  
Delhi Traffic Police manages 'traffic mobility with safety'. Substantial achievements in traffic management with lesser accidents...

About · Suggest an Edit

 Photos  176k Likes

 **Delhi Traffic Police**  
20 hours ago

We thank all those who posted their condolences and prayers on the death of Constable Mana Ram in response to the post of Spl. CP/Traffic. Some posts sought more details of the incident and the action against the offenders. This is an update.

Constable Mana Ram of Traffic Unit lost his life yesterday in what can certainly not be called an accident when he signalled a car to follow the diversion pl... See More

Like · Comment · Share  54 Shares

 147 people like this.

 View previous comments  2 of 183

 **Atul Arora** please bring one post in delhi police of saheed mana ram family person and demand heavy punishment for those person who killed one of the brave soldier of delhi police  
about an hour ago · Like

 **Praveen Kumar Panna** It is not a time mourn... What Mana Ram did deserves respect.. but this is only one extreme case of what happens daily in NCR.. the growing arrogance of local people, car owners or drivers.. Everyone has chacha, mama as ministers or police officials... ... See More  
43 minutes ago · Like



<https://www.facebook.com/pages/Delhi-Traffic-Police/117817371573308>

# Delhi fake account?



**Delhi Traffic Polize**  
**(Delhi Traffic Police)**

[Message](#) ...

[Timeline](#) [About](#) [Photos](#) [Friends](#) [More ▾](#)

**DO YOU KNOW DELHI TRAFFIC?**

If you know Delhi Traffic, send him a message.

**ABOUT**

 Lives in New Delhi, India

**PHOTOS**



**Traffic Advisory**

in view of VVIP movement, traffic diversions shall be given on the following roads today:

1. Sardar Patel Marg
2. Panchsheel Marg
3. Kamal Ataturk Marg



<https://www.facebook.com/delhitraffic.polize?ref=ts>

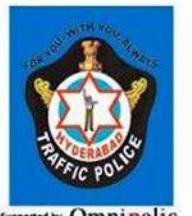
# UP Police

The cover photo features the official emblem of the Uttar Pradesh Police at the top, followed by the text "U.P. Police" in large, bold, white letters, and "FaceBook Page of U.P. PolicePR" below it. The background of the cover photo is a dark blue gradient.



 UP Police PR shared Pro TO Dgp UP's status.  
September 8

# Hyderabad Police



FOR YOU WITH YOU-ALWAYS  
HYDERABAD TRAFFIC POLICE

**Supported by Omnipolis**

## Mayor of Bogota

**Hyderabad Traffic Police**  
129,679 likes · 12,107 talking about this

Government Organization  
Post your Grievances, Suggestions, Feedback and Participation interest in various initiatives of Hyderabad Traffic Police. Officially Launched - 3-Aug-2014  
About - Suggest an Edit

 Photos       Traffic Fines & More



FOR YOU WITH YOU-ALWAYS  
HYDERABAD TRAFFIC POLICE

**Hyderabad Traffic**  
@HYDTraffic

TWEETS 15    PHOTOS/VIDEOS 1    FOLLOWING 1    FOLLOWERS 1,004

Tweets    Tweets and replies

7:57 PM -  Hyderabad Traffic @HYDTraffic 10 AU



**Hyderabad Traffic Police**  
June 12

In a medical emergency EVERY SECOND counts..Make way for the ambulance...Save life...Empty Ambulance in emergency is also to pickup emergency case so just Give Way to Ambulance which is in hurry to save life.....Admin HR !

Like · Comment · Share

40 Shares

146 people like this.

Top Comments ▾

 HYDERABAD CITY POLICE  
HAWK EYE

 HYDERABAD CITY POLICE  
HAWK EYE

**Top APP Solutions**

**hyderabadpolice** 

@hydcitypolice

The Hyderabad Police is here for you 24/7. We're committed to making it quicker and easier for you to get the service you need from us.

Hyderabad

[hyderabadpolice.gov.in/Default.htm](http://hyderabadpolice.gov.in/Default.htm)

Joined October 2014

[Tweet to hyderabadpolice](#)

 9490616555

 fb/hyderabadpolice

 Lost Report App

TWEETS 5,081 FOLLOWING 157 FOLLOWERS 10.8K LIKES 475

[Settings](#) [Follow](#)

**Tweets** [Tweets & replies](#) [Media](#)

Pinned Tweet

**hyderabadpolice** @hydcitypolice · Aug 11 [facebook.com/hyderabadpolice](http://facebook.com/hyderabadpolice) ...

HAWKEYE HYDCOP

Empowering Public to be a Citizen Police Empowering Frontline Police Officers

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 Aamir Khan  @aamir\_khan [Follow](#)

 Anupam Kher  @Anupam... [Follow](#)

Find friends

# Hyderabad

---



# Gurgaon Police



**Gurgaon Traffic Police**  
16,908 likes · 743 talking about this

Government Organization  
To join Gurgaon Traffic Police alert service, subscribe to facebook notifications.

About - Suggest an Edit Photos Likes



**Gurgaon Police**  
Government Organization

Timeline About Photos Likes

PEOPLE > Post Photo

12k likes Write something on th



TWEETS 230 PHOTOS/VIDEOS 1 FOLLOWING 44 FOLLOWERS 187

Tweets Tweets and replies

Gurgaon Police @GurgaonPolice1



**Gurgaon Traffic Police**  
June 12

पिछले वर्ष की तुलना में जानलेवा (Fatal) दुर्घटनाओं में कमी।  
पिछले वर्ष दिनांक 01.01.2013 से 11.06.2013 तक जिला गुडगांव में कुल 197 जानलेवा दुर्घटनाए (Fatal Accidents) हुए जबकि इस वर्ष दिनांक 01.01.2014 से 11.06.2014 तक कुल 177 जानलेवा दुर्घटनाए (Fatal Accidents) हुए हैं। इस प्रकार पिछले वर्ष की तुलना में 10.15% की कमी आई है।

Like · Comment · Share 1 Share

59 people like this.

View 10 more comments

 **Sanjeev Saxena** Sir, Whenever an accident occurs a family loses an Member, and data is imposed as Fatality and any CP would like to have minimum fatality figure, however it is the duty of HUDA also to improve Road Design and Footpath Etc why own blame on GTP only ??... See More

# Guwahati Police



Guwahati City Police  
@GhtvCityPolice

TWEETS: 5 FOLLOWING: 192 FOLLOWERS: 262

Tweets Tweets and replies

Guwahati City Police @GhtvCityPolice



Guwahati City Police  
2,184 likes - 6 talking about this

Local Business  
O/o Senior Superintendent of Police, Guwahati, India  
03612464557/8

Guwahati City Police  
January 14, 2013

Basistha Snatchers.. (10 photos)



26/04/2012 21:15

Like · Comment · Share      10 3

# Kolkata Police



Kolkata Traffic Police  
53,719 likes · 1,250 talking about this

Product/Service  
KolkataTraffic Police location: Kolkata  
<http://twitter.com/Kptraffic>

53,719



TWEETS 8 FOLLOWING 50 FOLLOWERS 413

Follow

Kolkata Police  
@KolkataPolice  
Fake Kolkata Police Twitter : )  
Kolkata



TWEETS 1 FOLLOWING 4 FOLLOWERS 19

Kolkata police  
@Kolkatapolice1  
Kolkata and west bengal police

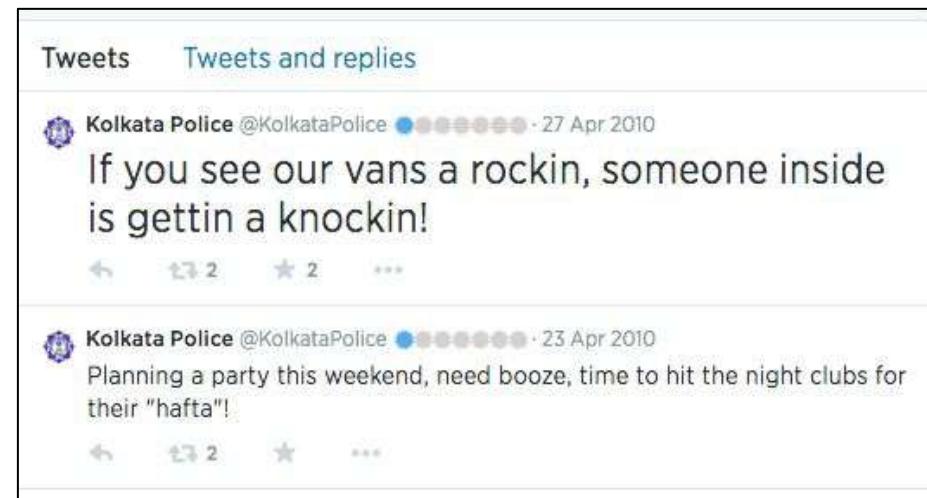


Kolkata Traffic Police  
June 14.

On 14th June 2014 at about 13.00hrs demonstration at college Square, earlier procession will be taken out from Sealdah & Howrah Rail Station, expected strength 3000/4000.

Like · Comment · Share 1 Share

12 people like this.



Tweets Tweets and replies

Kolkata Police @KolkataPolice 27 Apr 2010  
If you see our vans a rockin, someone inside is gettin a knockin!

Kolkata Police @KolkataPolice 23 Apr 2010  
Planning a party this weekend, need booze, time to hit the night clubs for their "hafta"!



<https://twitter.com/KolkataPolice>

# Pune Police



**Pune Traffic Police**  
4.0 ★★★★☆ (671 ratings)  
55,271 likes · 12,729 talking about this ·



TWEETS 2 FOLLOWING 0 FOLLOWERS 58

**Pune Police**  
@PunePolice  
[punepolice.gov.in](http://punepolice.gov.in)

Pune Traffic Police  
June 13

जा.क्र./पोउआ/वाहा/ ८० १४  
पुणे दिनांक - ९६ / ०६ / २०१४

प्रेसनोट

पुणे शहरातील याहतुक सुरक्षित व सुरक्षीतपणे होणेकरीता, महाराष्ट्र शासन युह विभाग क्र. एम. व्ही. ए. ०९१६/८७१/सोआरए - ३७/टीआरए - २, दिनांक - २७/०५/१९९६ चे नोटीफिकेशनमुसार नोटार याहन करण्यात करून ३७५, १९६(९) (१) (भी), १९६(४) अंदाये नाला प्राप्त झालेल्या अधिकाराचा याप्र करून प्राप्त हरकती व सुचनाया विचार करून मी कि, भी. यादव, पोलीस उप-आयुक्त, याहतुक नियंत्रण शाखा, पुणे शहर, यापुढी या ठिकाणी काही पाळीग निर्देश असतील ते रद्द करण्यात येत असुन तात्पुरत्या स्वरूपात खालील प्रमाणे आदेश निर्गमित करण्यात येत आहेत.

तरी नागरीकांनी याबद्दल आपल्या काही सुदाना असल्यात त्या पोलीस उप-आयुक्त, याहतुक नियंत्रण शाखा, साथू वासवानी रोड, पुणे - १ याची कार्रवाईत दिनांक - ९६ / ०६ / २०१४ ते दिनांक - १८ / ०६ / २०१४ पर्यंत लेयी स्वरूपात कल्याच्यात, नागरीकोऱ्या सूचन व हरकती विचार करून व अस्यावश्यक सेवेतील याहने (उदा. फायरबिंग, पोलीस वाहने, रुग्णादाहीका, इ.) खेरीज करून अंतिम आदेश काढण्यात येतील.

कोरेगाव पाके याहतुक विभाग पुणे अंतर्गत, कृष्णाकुंज सोसायटी ते इशान टॉवर को-ऑप सोसायटीपर्यंत रस्त्याचे दोन्ही याजूस नों - पार्किंग करणेत येत आहे.

१३/६  
(विष्यास पांडरे)  
पोलीस उप-आयुक्त, याहतुक  
पुणे शहर

Like · Comment · Share  
130 people like this.

21 Shares  
Top Comments -

# Jaipur Police



**Traffic Police Jaipur**  
2 hours ago

जयपुर दिल्ली राष्ट्रीय राजमार्ग-४ पर कोटपुतली के पास फ्लाई आँवर पर सुरक्षा कारणों से अजमेर से दिल्ली की ओर जाने वाले भारी वाहनों को डायवर्ट कर कमला नेहरू नगर अजमेर रोड से आगरा रोड की तरफ एवं एक्सप्रेस हाईवे से सीकर रोड की तरफ निम्न दो रास्तों से निकाला जा रहा है।

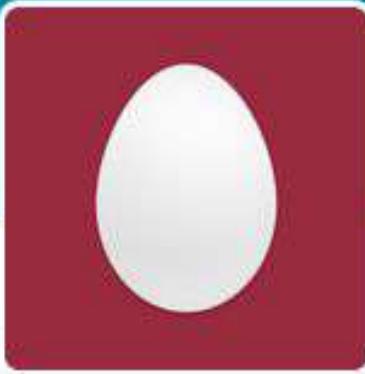
1. अजमेर से दिल्ली की ओर जाने वाले भारी वाहन कमला नेहरू नगर से बदरवास तिराहा, बी-२ बाईपास, जवाहर सर्किल, खोनागौरियान, आगरा रोड दौसा, सिकन्दरा, अलवर, रामगढ़, गुडगाँव होते हुए दिल्ली जा सकेंगे।
2. अजमेर से दिल्ली की ओर जाने वाले भारी वाहन एक्सप्रेस हाईवे, सीकर रोड, चौमू, अजीतगढ़, नीम का थाना, नारनौल होते हुए दिल्ली जा सकेंगे।

आपसे बहुत सारे सहयोग की अपेक्षाओं के साथ.....

Like · Comment · Share

14 people like this.

# Like it or not but you are there!

A large red square placeholder for a profile picture, containing a white egg-shaped outline.

FOLLOWING: 37 FOLLOWERS: 6 More ▾

**Jaipur Police**  
@JaipurPolice  
 Joined March 2012

[Tweet to Jaipur Police](#)

**Teacher's Music CD**  
@TeachersMusicCD  
 Teacher's - The Light Is Within. You agree that you are at least 25 years of age to interact with Teacher's on Twitter.  
[Follow](#)

**Diggileaks**  
@Diggileaks  
 Bloggers Beware....!! I am soon going to apply for a patent for the Diggileaks way of leaking a news... leaving no RIGHTS or LEFTS. It's ONLY ME...  
[Follow](#)

# Multiple accounts



Mumbai Police  
@mumbaicops  
Protecting & serving Mumbai - Keep updated with latest news on how we are combating crime,fear & disorder in the community. Call helpline (100)  
Mumbai,India · mumbaipolice.maharashtra.gov.in/index.asp

0 TWEETS    1 FOLLOWING    0 FOLLOWERS

[Follow](#)



chetan gavali  
@MumbaiPolice  
Joined June 2010

[Tweet to chetan gavali](#)

FOLLOWING 1 FOLLOWERS 36 More ▾



delhi police  
@delhipolice2

24 TWEETS    1 FOLLOWING    7,874 FOLLOWERS

[Following](#)

# Accounts in the country!

In an attempt to understand the comprehensive view of usage of Online Social Media by Police organizations, we have developed this page with different Facebook and Twitter handles of various police organizations in the country. If you see any of the pages / handles are missing or erroneously linked to wrong pages / handles, please let us know, we will be happy to fix it. Our hope is to create a True Positive dataset of all Social Media presence of police organizations. Please feel free to write to [pk@iiitd.ac.in](mailto:pk@iiitd.ac.in) for any feedback / suggestions / questions.

State	Police organization with State/City	Facebook page	Twitter handle	Source
Andaman & Nicobar	Andaman Police	-	<a href="#">AndamanPolice</a>	Yet to be confirmed
Andhra Pradesh	Andhra Police	<a href="#">uday8bnapsp</a>	-	Yet to be confirmed
Andhra Pradesh	Visakhapatnam Traffic Police	<a href="#">visakhapatnamtrafficpolice</a>	-	Yet to be confirmed
Assam	Assam Police	<a href="#">Assam-Police-144712972235962</a>	<a href="#">assam_police</a>	Taken from website
Assam	Central Police District - Guwahati	<a href="#">CPDGuwahati</a>	-	Yet to be confirmed
Assam	Guwahati Police	<a href="#">Guwahati-City-Police-211606768891234</a>	-	Yet to be confirmed
Bihar	Patna Traffic Police	<a href="#">PatnaTrafficPolice</a>	-	Yet to be confirmed
Chandigarh	Chandigarh Traffic Police	<a href="#">trafficpolicechd</a>	-	Taken from website
Chandigarh	Chandigarh Police	<a href="#">Chandigarh-Police-224891637660233</a>	-	Yet to be confirmed
Chhattisgarh	Chhattisgarh Police	<a href="#">Chattisgarh-police-270969929619557</a>	-	Taken from website
Chhattisgarh	Durg Police	<a href="#">Durg-Police-598102293653829</a>	-	Taken from website

# Analyzing Accounts

Continuing our efforts in helping policing in the country with usage of online social media, we have built this portal. The Portal helps analyse the presence of different police Facebook pages and Twitter handles, it also helps in comparing these accounts. This first version presents four different analyses described below. Currently, the portal has data for the last 5 years of these pages & accounts.

**a) Total posts / Likes / Comments:** This shows the engagement of the police department on social media on a given time frame. This presents the total number of posts, total number Likes, and total number of Comments on the respective Facebook pages. This also presents the total number of Retweets, Tweets, and Favorites of the Twitter handle.

**b) Accountability Tree:** We capture this through different words such as "how can", "why" and "issues". These words populated in the list "Change Keyword". For example, you can view the tree with "why" as the keyword to understand the questions posed in the status updates / posts with "why", one can modify the keyword to "need" to understand the needs of citizens mentioned in the posts. We believe, this can be very useful for police organizations to understand the actionable information from the posts. [See More -->](#)



# Thank you

[pk@iiitd.ac.in](mailto:pk@iiitd.ac.in)

precog.iiitd.edu.in

fb/ponnurangam.kumaraguru

# Privacy and Security in Online Social Media

---

Course on NPTEL

NOC21-CS28

Week 5.2

Ponnurangam Kumaraguru (“PK”)

Full Professor

ACM Distinguished Speaker

[fb/ponnurangam.kumaraguru](https://www.facebook.com/ponnurangam.kumaraguru), @ponguru



# Objective of Study

---

*Whether OSN can support police to get actionable information about crime and residents' opinion about policing activities in urban cities of India.*





M N Reddi, IPS

@CPB1r



Following

## Social Networks for Police n Residents in India: Examining Crime Prevention



Social Exploring

### ABSTRACT

Safety is a concern for most people. It can act in multiple ways with citizens and police. In developing countries, online social networks (OSNs) such as Facebook and Twitter are used by OSN users to communicate about safety concerns and how to prevent them. For this, we analyzed Facebook posts from Bangalore police for one month. Our results disclosed that citizens' interest in safety and safety-related issues are increasing. In addition to citizens' comments on residents' satisfaction in their neighborhood, they also comment on residents' satisfaction in their neighborhood. Police response to knowledge, reply, and talk with residents' post and help them to feel safe. Online social networks can help police to interact with residents. We found that OSNs can help in and develop mutual account.

### Keywords

Community safety, Police, Online social networks.

### Categories and Subject

II.1 Information interfaces and organization interfaces inspired cooperative work

### 1. INTRODUCTION

Police officers interact with the day-to-day safety and

residents to make digital or hard copies of all or part of this work for promotional purposes. It is a general rule that the author retains the right to make or distribute the preprint commercial or otherwise and that copies be made available to the public notice and the publication on the first page. Copyright for components of this work owned by others than the author must be asserted by them in their individual notices. In this study, we analyze 255 posts and 1,000 comments from residents on Facebook page of Bangalore City Police (BCP) in India. Bangalore City Police was established in 1963 and is responsible for the overall policing in the Bangalore city. Bangalore police



PK

@ponguru

Our paper on Bangalore City Police FB page receives best paper award in the US  
[precog.iiitd.edu.in/Publications\\_f...](http://precog.iiitd.edu.in/Publications_f...) @CPB1r  
@goyal\_abhei @niharikasachdev



RETWEETS

15

FAVORITES

15



3:45 AM - 1 Jun 2015



## 'Social media a great tool for crime prevention'

2015 Year Of  
[www.tourism.gov.in](http://www.tourism.gov.in)

K.V. ADITYA

 Like  Share

This is outcome

The city police

Most posts by  
neighbourhood  
said a study of

The study, 'So  
Crime Prevent  
Indraprastha  
city police as a

The study ana  
posts from cit  
cops about eve  
that most of th

Jun 08 2015 : The Economic Times (Bangalore)

# Study on City Police's Social Media Use Bags US Varsity Award

Bharath Joshi

**Bengaluru**

**A paper presented by researchers with a Delhi institute shows how social media networks have forced the police become more accountable**

The city police's impressive social media visibility caught the attention of participants at an academic event as far a place as the Arizona State University in the US last week.

It was an international conference on digital government research, where technology researchers Niharika Sachdeva and Ponnurangam Kumaraguru from the Indraprastha Institute of Information Technology, Delhi (IIIT-Delhi), walked away with the award for producing the best research paper.

The paper showed how social networks have forced the police in India to be come more accountable.

This was also the first time the Bengaluru police experiment with the social media to promote community policing made its way into an academic institution.

The study found that if there was lack of information, police requested for more information and was provided in 29 follow-up posts. An analysis of the response of the BCP to the posts by residents reveals that cops have replied to 172 posts with an action-taken report on Facebook. The average response time was found to be over 30 hours.

# Methodology: Data Collection



Collected public posts, 21 July - 21 Aug 2014



Posts &  
Comments

1600  
comments on  
255 posts

Filtered = Posts from citizens to Police

# Methodology: Data Coding

## ● Thematic Inductive Analysis

24 categories (Public)

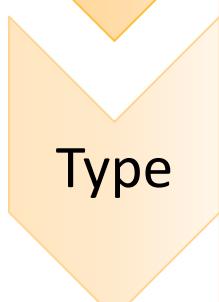


- Missing: Missing people complains
- Query: Ask how to get police assistance
- Traffic: Report Traffic menace on roads



- Formal
- Informal

2 Categories (both)



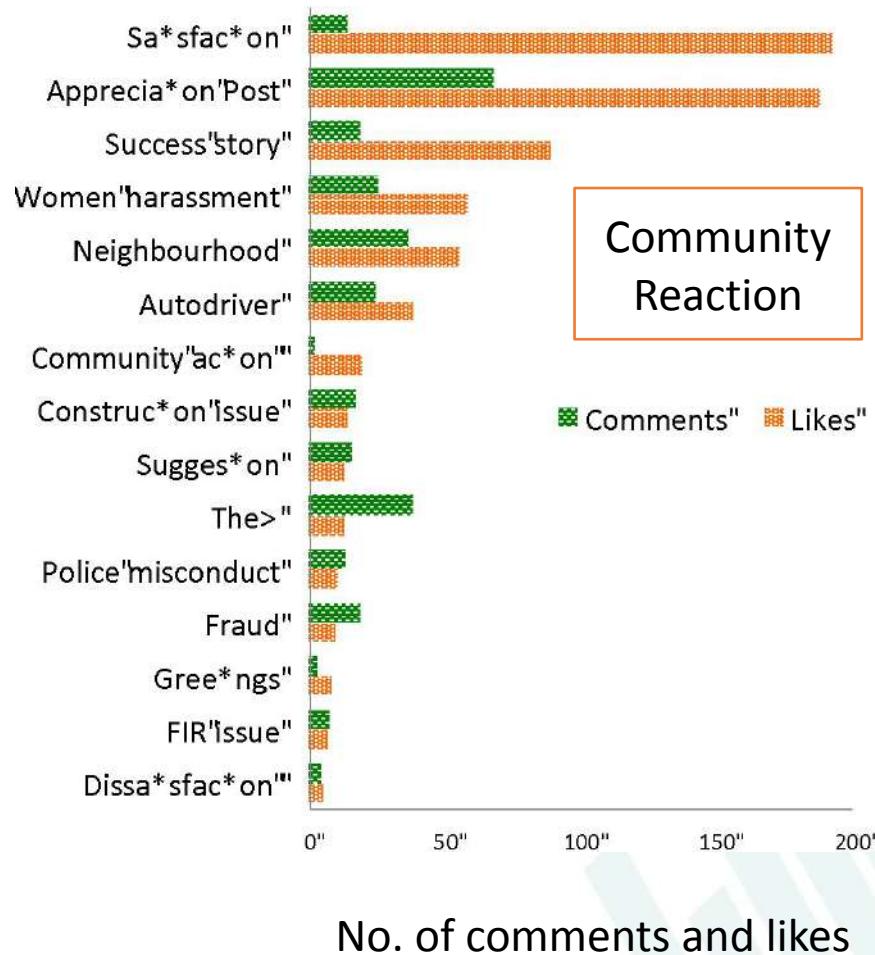
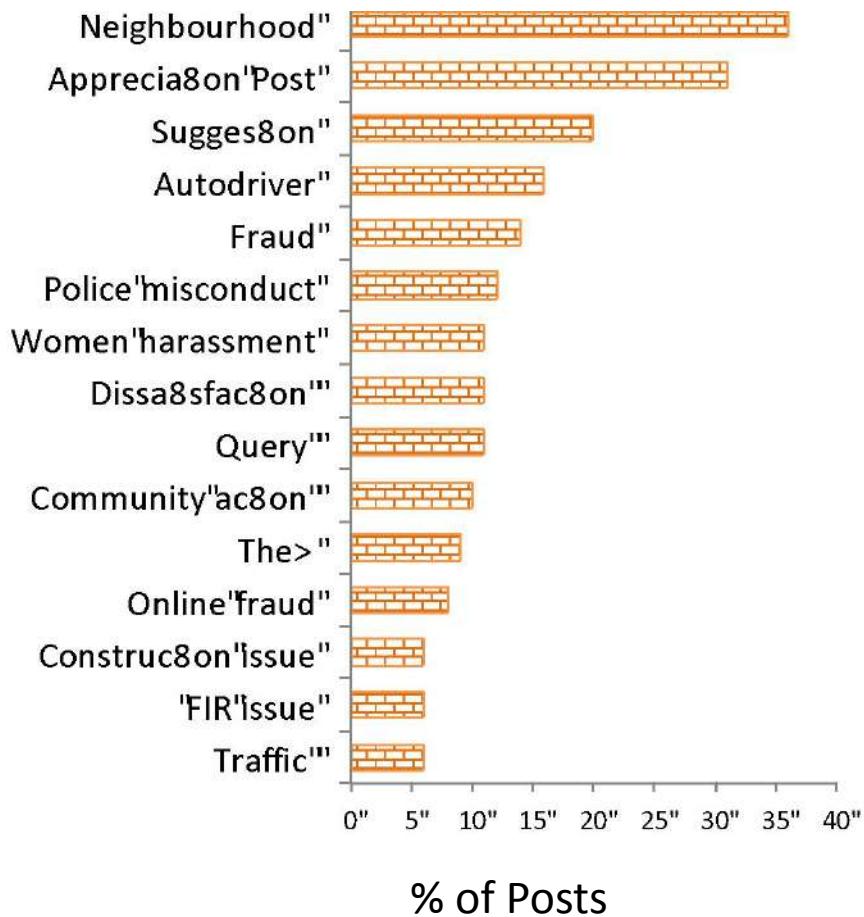
- Acknowledge to: Like or say thanks
- Reply to: Suggest a solution
- Follow-up by: Ask for further details
- Ignored by: No reply

4 Categories (police)

## ● Lexical analysis using word trees

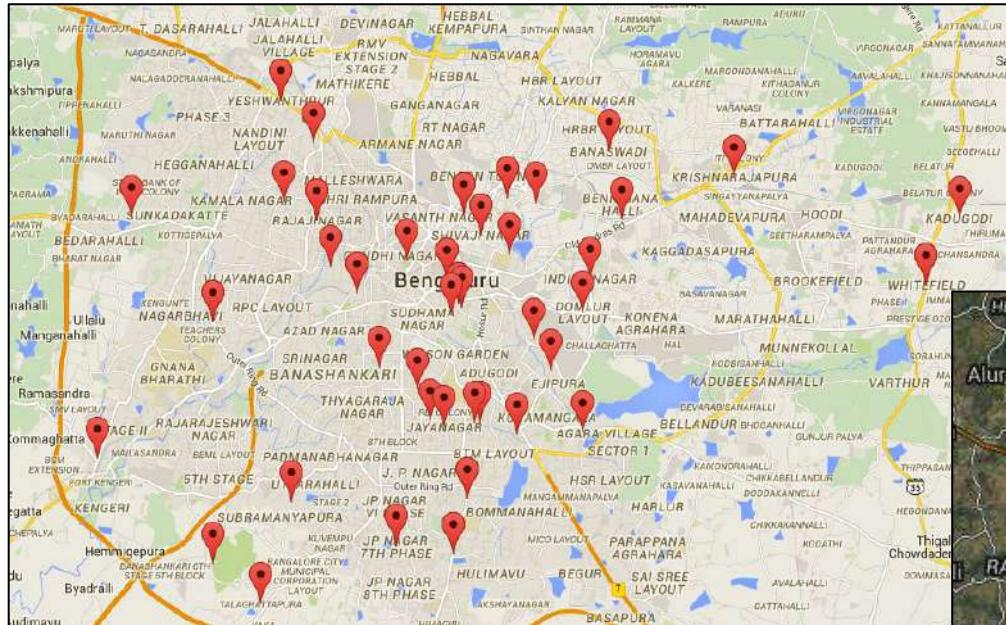
# Results

## ● Know persistent, direct, and apparent concerns

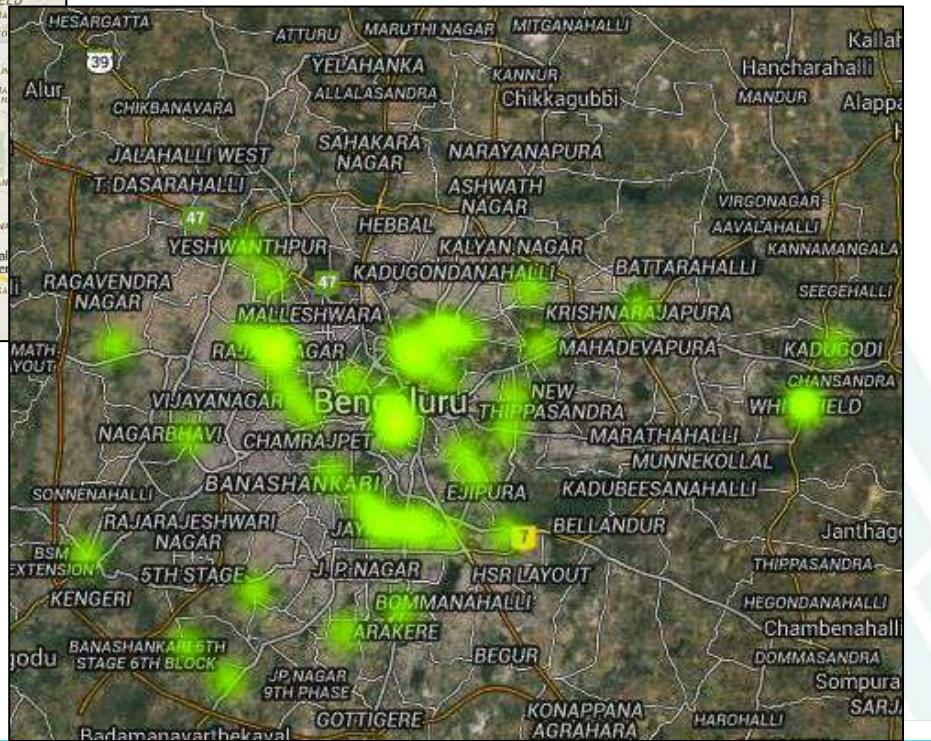


# Actionable Information

## ● Spatial Data



# Unique Places



# Intensity of complains

# Actionable Information

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## ● Temporal data



**Saturday evening.**

**“Time – between 5.30 pm and 6pm. Location: The circle between Freedom Park and the route that goes into Cubbon Park, towards Century Club. Not a single police posted here. I was waiting for an auto at the circle and these two guys rode by asking if they could drop me. . . . Please ensure there are police put here for safety . . .”**

# Communication Style



Formal: 68

*"Dear Sir, Request to take action on Railway Station parking contractors they are not issuing parking slips . . . today @Yashwantpur Railway Station Tumkur Roadside Entrance Parking."*

Informal: 187

*Kudos to the Banaswadi Traffic Police Team. My Salute and sincere thanks to the Banaswadi Traffic Inspector XXX. . . . An ANGEL in disguise*



Always formal  
Instrumental  
Approach

*Dear XXX, Please provide the exact landmark..Thank you."*

Facebook can become an efficient instrument that help police always stay visible and connected with residents.

# Response Time

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	<b>Time Taken to Respond</b>
Average time	30.53 hours
Maximum time	211.16 hours
Minimum time	4 minutes
Std. dev	41.26 hours

# Engagement Type



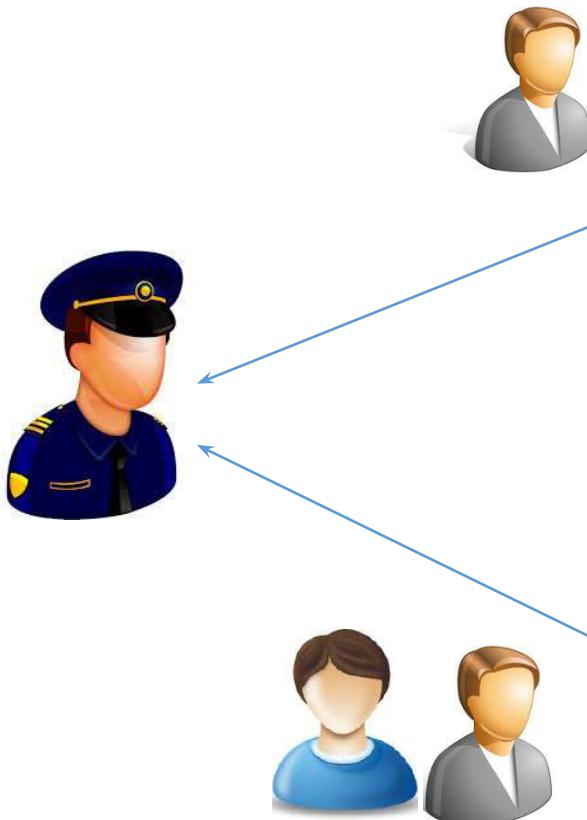
# Understanding Victimization

Word	#
Fear	7
Worried	6
Concerned	8
Notice of	13
Issue	22
Trouble	4

worried {

- if somebody will miss use my bike , and because i do not have an
- the person who has duplicated my Reg no will commit
- once they realize that this girl (my daughter) has meddled
- them coming back to attack me .
- being traced .
- to approach the local police as I have seen them take money from

# Direct v/s Indirect



**My Vehicle KA-02-HW-3183 white color Honda Dio was stolen from Kadamba Hotel (Near Modi Hospital), RajajiNagar on Friday (25th July) evening between 6:30-7:45PM. Please help in tracing my vehicle.**

**Dear BCP, though I stay at JP Nagar, but being part of KSFC Layout RWA (Banaswadi Police station) , I got to know that there are frequent problem at KSFC Layout near BBMP Hall . . . 8-10 youths were creating a public nuisance > (shouting, boozing, manhandling, etc.) yesterday i.e. on 27/7/14, Sunday night 9 pm. We need your support to help avoid a molestation scenario at KSFC Layout. Thank you**

# Accountability

July 22, 2014 · Bangalore · 

Dear Commissioner of Police,

After all these rapes, molestations and kidnap vehicles with tinted cars, how is it that we can and especially school buses plying around with curtains inside that block the windows? Doesn't the criminals? Why aren't all the constables en drivers of tinted or curtained vehicles like cars

[Like](#) · [Comment](#) · [Share](#)

 2 people like this.

 Write a comment...

**BENGALURU CITY POLICE** 

forwarded to Addl. Commissioner of Police - Thank you..

[Like](#) · [Reply](#) ·  1 · July 23, 2014 at 4:34pm

 I highly appreciated! thank you!

[Like](#) · July 23, 2014 at 6:27pm · Edited

 Write a reply...

August 19, 2014 · 

It is the duty of every citizen to keep a watch around his surroundings, be cautious of isolated and dark places, and to inform the police of anything wrong going on and not keep mum about it or scared about it, and ensure that the citizen helps the police in their act of keeping the society and the city safe. After all, Bangalore is our city, our pride. Our support to Bangalore Police in its endeavor to bring the notorious criminals, anti-social elements, and wrong-doers to book should always be continuous just as the efforts of the Police Officers who sacrifice their family time, personal leisure for the sake of us all. It is because of them that we are safe. Respect and Salute to the Police Department.

[Like](#) · [Comment](#) · [Share](#)

 BENGALURU CITY POLICE likes this.

 Write a comment...

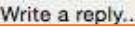


**BENGALURU CITY POLICE** 

highly appreciated! thank you!

[Like](#) · July 23, 2014 at 6:27pm · Edited

 Write a reply...



Mutual Accountability

# Accountability

- Police responds and allows itself to be held accountable
  - Maintains formal communication style even for frustrated people

Bangalore City Police  
July 22, 2014 · Bangalore · 45

Dear Commissioner of Police,

After all these rapes, molestations and kidnappings occurring in cars and vehicles with tinted cars, how is it that we can see so many cars and buses, and especially school buses plying around with their vehicles tinted? or curtains inside them? Why do they encourage and embolden the criminals? Why aren't all the constables empowered to punish the drivers of tinted or curtained vehicles like cars and buses, on the spot?

Like · Comment · Share

2 people like this.

Write a comment...

Bangalore City Police  
July 23, 2014 · 4:34pm

This post has been forwarded to Addl. Commissioner of Police - Traffic for taking necessary action on this..Thank you.

Like · Reply · 1 · July 23, 2014 at 4:34pm

highly appreciated! thank you!

Like · July 23, 2014 at 6:27pm · Edited

# Accountability

---

- Citizens accept that they are also accountable to make city safe

Bangalore City Police  
August 19, 2014

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# Accountability

- Citizen hold police accountable

why

these illegal practices are not being stopped .  
are you harassing us on roads ?  
isn't the traffic police doing anything to stop the menace of Eunuchs es  
everyone is overlooking the clear culprit .  
did he do it ?  
he want to verify my name he hang up the call . when i tried calling ba  
because we blindly trust those ppl without meeting face to face , pleas  
can t we ?  
should he give an FIR for my negligence .  
ru collecting my data base everyday , so show the same enthusiasm t  
now ?  
am I being the spoil sport ?  
**don't you stop** ↗ Tobacco ?  
it ?

don't  
Weight: 2

you the Police or the Excise Department Allow Bars to be Open till

Word Tree visualizations of posts in which residents questioned police using the word *why*.

# Understanding Needs / Wants

---

- Police can encounter fear and anxiety if they know:
  - residents expectations like needs and wants
  - Expectations, if met, can increase feeling of safety



# Understanding Needs

need  
to

punished . keep doing raids and check...may help but rather than pumping out water why not to stop leakage .  
strict law system as well .. these kind of fellow must not escape from Law ....  
cross check for previous offenses in order to prevent such perverts from harming society again !  
discuss with their higher ups to file an F I R ?  
mend der manners .

changed ... just like in Dubai zero crime rate

be

sorrow thinking about the cause for Bandh .. can we ensure that criminal gets punishment at the earliest and ensure that these things done , please do not ignore the fact that the teachers of that school were locking up kids in dark rooms , this is a torture method booked too . also , the previous school , deens academy had covered up malpractice by the same perpetrator , please book the cl arrested .

upgrade our laws...like if a person involved in more than 2 affencess , if its been proved with evidence . ... then dont send him to the jail...  
**do more research on why that is .**

hang this guy ... atleast put him in bars for lifetime ...  
amend the criminal laws .  
put our foot down to such behaviour

comm. once

understand that for such genuine grievances most search sites like google and yahoo are very helpful provided their is genuineness of the follow this

know wat is there in his PC or MOBILE phone jst show his face to public and make sure the laws are amended .

react to another incident

provide their states identity card as proof and must be submitted during their travel .

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prompt action on every case to prove Indian police is the best .  
a rule in india against rape that even by the word or thought of it the person intending to do such a heinous crime should have shiver down his spine .  
thing to happen .

residential permit to park in residential areas for longer times given only after you show proof of residence .  
, they r very arrogant .

help we are new to bangalore

our girls in PGs to be safe...period

more such things to happen .

is to take some cue from saudi arabia and china where justice is delivered with in 30 days .  
CCTVs in police stations more than we need the COP on social media .

the COP on social media .

same kind of patrolling ...!

safety .

all your support

any sort of help from the citizens of Bangalore , pls let us know .

Long term solutions .

change the person who framed this was unaware of future , till day we cannot follw the same rules , we need changes , we cannot keep saying no our law does not changes , we cannot keep saying no our law does not say this , i wont allow that , come on amend it Give justice , Make my country a safe place , I know writing long a rule to shoot or hang such rapists in public .

for them to do the business .

justice , not just the parents .

# Understanding Wants

want to hear more of these .  
**see** the punishment to such rapist .  
this monster !!!!  
and delete the rest ?  
know .  
say thanks to BCP SIR .  
tell this to our parents because my friend marriage is going to happen  
ask you one question if those teachers of vibgyer school prooved guilty  
read in papers about all the solved cases and the next , we dont want  
work not people who want to beg and make children beg .... I suggest  
beg and make children beg .... I suggest u take up the issue of giving  
protect that bastard ... why you dont have any daughters .... you dont  
save your daughters from like this bastards ... why you are protecting  
BCP to seriously look into this issue .  
details i can give  
a safe city and we are dependent on you ..  
his spouse , daughter , parents and relatives to see his face in T.V and n

# Discussion: The way forward

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- Observable OSN for Actionable Information and Collective Action
  - Tools to mark posts as follow-up, reply etc. does not exist
- OSN for Mutual Accountability
  - Much needed for overworked departments
- Understanding fear and Victimization effects



# Thank you

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# Privacy and Security in Online Social Media

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Course on NPTEL

NOC21-CS28

Week 5.3

Ponnurangam Kumaraguru (“PK”)

Full Professor

ACM Distinguished Speaker

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# Measuring Human Behavior

- Exploring the feasibility of social media in quantifying attributes of communication
- Identifying behavioral attributes like affective expression, engagement and social and cognitive response processes



Citizen to Citizen



Police to Citizen



Police to Police



Citizen to Police

# Research Questions

---

## ● *RQ 1: Topical Characteristics*

- Nature of content and topics that characterize social media discussion threads

## ● *RQ 2: Engagement Characteristics*

- How do citizens and police engage in social media discussion threads?

## ● *RQ 3: Emotional Exchanges*

- Nature of emotions and affective expression that manifest on social media

## ● *RQ 4: Cognitive and Social Orientation*

- What are the linguistic attributes that characterize cognitive and social response processes?

# Methodology

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85 Public and official Police Department

Average age 3 years (from 2010 – April 2015)

47,474 wall posts and 85,408 status updates

# Data Categorization

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Total Posts	w/ $\geq 1$ Comment	P&C	C
 85,408	46,845	5,519 $P_{P\&C}$	41,326 $P_C$
 47,474	24,984	17,196 $C_{P\&C}$	7,788 $C_C$

# Measures of Behavior

Topics

- N Gram Analysis
- K-means Clusters

Engagement

- No. of police and citizen who comment in posts
- Distinct citizens who comment in posts
- Average no. of likes and comments

Emotional

- Valence
- Arousal

LIWC and Anew Dictionary

Social and cognitive

- Interpersonal Focus
- Social Orientation
- Cognition

LIWC Dictionary

# Topic Characteristics



Focus on advisories, the status of different cases being investigated



Unigram	Freq.	Unigram	Freq.
rules	0.015	safety	0.012
safety	0.014	following	0.011
violations	0.014	notice	0.010
challans	0.011	prosecuted	0.009
please	0.011	movement	0.008
citizens	0.01	complaint	0.008

(U = 700, p < .05, z = -3.57)

# Topic Characteristics



Most posts tend to request police to take action on their complaints



Unigram	Freq.	Unigram	Freq.
please	0.026	people	0.022
take	0.021	please	0.02
action	0.019	one	0.019
people	0.019	take	0.016
one	0.019	action	0.015
time	0.017	time	0.015
near	0.017	number	0.013

Higher Reference to “people”

# Clusters of Topics

- Police initiated discussions are more focused than citizen initiated.

## Awareness drive / safety campaigns

*Road sense is the offspring of courtesy and the parent of safety*



## Prosecuted / action taken reports

*Action taken by [Withheld], Reg your tweet petition,  
@[withheld]; 33 parking tag & 6 no parking, 1 foot path  
parking. Cases booked on hospital road*

## Advisories on situations

*Good -- Morning to all the Commuters of Shillong City,  
there is heavy movement over NH - 40 – 44 and  
Madanrtting down side, Lumdiengjri area stretch.  
Please do not overtake*

# Clusters of Topics

- Police initiated discussions are more focused than citizen initiated.

## Appreciation

*Heartiest congratulations to [withheld] police for nabbing [withheld] agent within 24hrs. wow!!! Kudos and respect*



## Newspaper articles

*Please ACT: [http://timesofindia.indiatimes.com/videos/news/...](http://timesofindia.indiatimes.com/videos/news/)*

## Citizen tips and complaints

*4th Nov 2014 [withheld]: Driving in wrong side at Teghoria U Turn*

## Neighbourhood problems

*"Learn from the Delhi incident and ensure that no buses in Kolkata have tinted glasses. One such bus was spotted on Gariahat road Regn. #. [Withheld]. Kindly take appropriate action. Thank you*

## Missing people

*"Sir plz help find my nephew, he is missing since today morning, he is from kodagu, contact [withheld]*

# Research Questions

---

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- What are the linguistic attributes that characterize cognitive and social response processes?

# Engagement / Comments Characteristics

## ● Content Generators

	Police	Citizen	
	 	 	
Police + Citizens	55,028	1,79,176	17,124      12,630
Citizens Only	54,982	1,79,176	17,081      12,630

26% lower

# Engagement / Comments Characteristics



	Comments*		Likes**	
	Avg.	Std. dev	Avg.	Std. dev
Cp&c	3.34	19.19	9.4	253.85
Cc	3.69	13.79	13.38	201.57

9.49% lower

29.75% lower

**Citizen post:** "My family and I are getting the unwanted calls from the given number [withheld]. Especially he is misbehaving with a female member. My Number is - [withheld]"

**Police reply:** "Dear [withheld], Please visit at your nearest Police Station and lodge a complaint with details and they will assist you in this regard... Thankyou"

Police suggests an appropriate action and the discussion tends to close early, resulting in lower interaction

# Research Questions

---

## ● *RQ 1: Topical Characteristics*

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# Emotional Expressions

- Negative sentiment higher in citizen initiated threads



	C <sub>P&amp;C</sub>		C <sub>C</sub>	
	Avg	Std. dev	Avg	Std. dev
Negative				
Affect	0.021	0.03	0.018	0.04
Anxiety	0.001	0.01	0.003	0.02
Anger	0.006	0.02	0.005	0.02
Arousal	4.4	1.74	3.9	2.16

16.67%  
higher in C<sub>P&C</sub>

# Emotional Expressions

- Negative sentiment higher in citizen initiated threads



	Cp&c		Cc	
	Avg	Std. dev	Avg	Std. dev
NA**	0.021	0.03	0.018	0.04
Anx**	0.001	0.01	0.003	0.02
Anger**	0.006	0.02	0.005	0.02
Arousal**	4.4	1.74	3.9	2.16

200% higher  
in Cc

*I am just worried if Hyderabad Traffic Police [HTP] makes things worse like always and create more chaos. Frankly speaking... it's the lower income group or the people who are not aware using high beams. Try to educate people on road.*

# Emotional Expressions

- Negative sentiment higher in citizen initiated threads

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NA**	0.021	0.03	0.018	0.04
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Arousal**	4.4	1.74	3.9	2.16



12.82%

higher in Cpc

*Higher arousal and negative affect to be markers of sensitisation because of crime!*

# Research Questions

---

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# Social and Cognitive Orient.

- Discussion threads involving just the citizens are highly self-attention focused



	C <sub>P&amp;C</sub>		C <sub>C</sub>	
ppron	0.062	0.059	0.045	0.056
i	0.008	0.017	0.014	0.033
shehe	0.002	0.01	0.003	0.003
they	0.005	0.013	0.008	0.008

75% More

Likely citizens mostly express their own concerns that they face with others

*I have lived in the UK and all the time I have never heard anyone honking. Honking is not required if you know how to drive [...] Can anyone advise me where to complain if I see anyone who don't comply ?*

# Why it matters?

---

- Helps police improve policing and community sensing
  - Facebook can be used to record and sense behavioural attributes such as engagement, emotions, and social support
  
- Enable police and citizen community to enhance emotional support to residents experiencing safety issues
  - Discussion threads with police and citizen commentary showed reduced levels of anxiety, showing police interactions can be calming to citizens.

# Technological Implications

---

- Helping communities to make consensus based decisions regarding support and actions they seek from police
- Help gauge changing emotions and behaviour among citizens
  - Timely and early predictive analytical systems
- Sense and record the reactions of citizens and share these records with decision makers
  - Take timely measures and gain better insights

# Thank you

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Week 6.1

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# Topics that we will cover

---

- Overview of OSM
- Linux / Python / Twitter API / Mongo DB / MySQL  
**[Hands-on]**
- Trust & Credibility
- Privacy
- Policing
- Social Network Analysis, NLTK **[Hands-on]**
- e-crime
- Plotly / Highcharts / Geo-location analysis  
**[Hands-on]**
- Identity resolution
- What next – Deep learning, machine learning, NLP, Image analysis

# Multiple Police Dept. on OSN

The screenshot shows the official Facebook page of the Delhi Traffic Police. The cover photo features two men in uniform clapping at an event. The page includes a banner for 'DELHI POLICE WEEK' and 'ROAD SAFETY' with a fine of 'Rs. 2000/-'. The sidebar displays the Delhi Police logo and statistics: 205k likes, 651 check-ins, and links to 'Open always' and 'Get additional info'. The main interface shows standard Facebook controls like Post, Photo / Video, and Write something... with a Post button.

The screenshot shows the official Facebook page of the Hyderabad City Police. The cover photo features the police crest. The page includes a banner with the slogan 'Freedom From Fear Forever'. The sidebar displays the Hyderabad City Police logo and statistics: 21k likes, 247 check-ins, and links to 'Open always' and 'Get additional info'. The main interface shows standard Facebook controls like Contact Us, Like, Message, and More.

# Objective of Study

---

*Whether OSN can support police to get actionable information about crime and residents' opinion about policing activities in urban cities of India.*



# Understanding Needs

need  
to

punished . keep doing raids and check...may help but rather than pumping out water why not to stop leakage .  
strict law system as well .. these kind of fellow must not escape from Law ....  
cross check for previous offenses in order to prevent such perverts from harming society again !  
discuss with their higher ups to file an F I R ?  
mend der manners .

changed ... just like in Dubai zero crime rate

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sorrow thinking about the cause for Bandh .. can we ensure that criminal gets punishment at the earliest and ensure that these things done , please do not ignore the fact that the teachers of that school were locking up kids in dark rooms , this is a torture method booked too . also , the previous school , deens academy had covered up malpractice by the same perpetrator , please book the cl arrested .

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, they r very arrogant .

help we are new to bangalore

our girls in PGs to be safe...period

more such things to happen .

is to take some cue from saudi arabia and china where justice is delivered with in 30 days .  
CCTVs in police stations more than we need the COP on social media .

the COP on social media .

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Long term solutions .

change the person who framed this was unaware of future , till day we cannot follw the same rules , we need changes , we cannot keep saying no our law does not changes , we cannot keep saying no our law does not say this , i wont allow that , come on amend it Give justice , Make my country a safe place , I know writing long a rule to shoot or hang such rapists in public .

for them to do the business .

justice , not just the parents .

# Understanding Wants

want to hear more of these .  
**see** the punishment to such rapist .  
this monster !!!!  
and delete the rest ?  
know .  
say thanks to BCP SIR .  
tell this to our parents because my friend marriage is going to happen  
ask you one question if those teachers of vibgyer school prooved guilty  
read in papers about all the solved cases and the next , we dont want  
work not people who want to beg and make children beg .... I suggest  
beg and make children beg .... I suggest u take up the issue of giving  
protect that bastard ... why you dont have any daughters .... you dont  
save your daughters from like this bastards ... why you are protecting  
BCP to seriously look into this issue .  
details i can give  
a safe city and we are dependent on you ..  
his spouse , daughter , parents and relatives to see his face in T.V and n

# Research Questions

---

## ● *RQ 1: Topical Characteristics*

- Nature of content and topics that characterize social media discussion threads

## ● *RQ 2: Engagement Characteristics*

- How do citizens and police engage in social media discussion threads?

## ● *RQ 3: Emotional Exchanges*

- Nature of emotions and affective expression that manifest on social media

## ● *RQ 4: Cognitive and Social Orientation*

- What are the linguistic attributes that characterize cognitive and social response processes?

# Methodology

---

85 Public and official Police Department

Average age 3 years (from 2010 – April 2015)

47,474 wall posts and 85,408 status updates

# Technological Implications

---

- Helping communities to make consensus based decisions regarding support and actions they seek from police
- Help gauge changing emotions and behaviour among citizens
  - Timely and early predictive analytical systems
- Sense and record the reactions of citizens and share these records with decision makers
  - Take timely measures and gain better insights

# Topics that we will cover

---

- Overview of OSM
- Linux / Python / Twitter API / Mongo DB / MySQL  
**[Hands-on]**
- Trust & Credibility
- Privacy
- Policing
- Social Network Analysis, NLTK **[Hands-on]**
- e-crime
- Plotly / Highcharts / Geo-location analysis  
**[Hands-on]**
- Identity resolution
- What next – Deep learning, machine learning, NLP, Image analysis

# Different crimes on OSM

---

- Phishing
- Fake X
- Social reputation: Fake followers /  
Crowdturfing
- Clickbaiting
- Account compromise
- Account impersonation
- Work from home scam
- ...



# Phishing

---

- Act of tricking someone into handing over her login credentials in order to exploit personal information



# Phishing

---

- Facebook Technical Support sent you a notification
- Facebook new login system
- .....
- Facebook credentials being important now!



# Fake customer service accounts

PROOFPOINT



A real customer tweets at a major bank.



Fraudsters intercept the tweet with a link to a fake support site that tries to steal her actual bank account credentials.

# Fake comments on popular posts

PROOFPOINT

**Salahdin Mrabit**  
Comment at 12/20/15 9:50:37 AM  
Links: <http://9879846548.blogspot.com/2015/12/Insurance.html>  
<http://9879846548.blogspot.com/2015/12/Insurance.html> ↗  
(<http://9879846548.blogspot.com/2015/12/Insurance.html>) ←震惊  
Minaj Scandal and Sexy Tape Video Leaked  
[See less](#)  
[View on Facebook](#) | Posted via: Web | Deleted

Scammers often pretend to be Facebook users so they can comment on posts that lead to a credit card phish.

# Fake live streaming videos

PROOFPOINT

Comment at [REDACTED]  
Links: <http://sports.vslive.net/nba-mobile-tv-pc-tv-cable-tv-live-streaming-radio->  
[https://externalxx.fbcdn.net/safe\\_image.php?d=AQCxNdqH7p4hKyim&w=720&h=720](https://externalxx.fbcdn.net/safe_image.php?d=AQCxNdqH7p4hKyim&w=720&h=720)

Watch Golden State Warriors vs Milwaukee Bucks >>>Live:<http://goo.gl/3ajqgl> (<http://sports.vslive.net/nba-mobile-tv-pc-tv-cable-tv-live-streaming-radio-station-info/>)<<<< >>>Live:<http://goo.gl/3ajqgl> (<http://sports.vslive.net/nba-mobile-tv-pc-tv-cable-tv-live-streaming-radio-station-info/>)<<<< (Share  
[https://externalxx.fbcdn.net/safe\\_image.php?d=AQCxNdqH7p4hKyim&w=720&h=720&url=http%3A%2F%2Fsports.vslive.net%2Fwp-content%2Fuploads%2F2014%2F11%2Fnba-team-listings.jpg&cfs=1](https://externalxx.fbcdn.net/safe_image.php?d=AQCxNdqH7p4hKyim&w=720&h=720&url=http%3A%2F%2Fsports.vslive.net%2Fwp-content%2Fuploads%2F2014%2F11%2Fnba-team-listings.jpg&cfs=1))

[See less](#)

[View on Facebook](#) | Posted via: Web | Deleted

Here's a comment that an online thief posted on the Facebook page of an NBA team that promises a live-stream of a game.

# Fake online discounts

PROOFPOINT



Fraudsters create fake social media accounts for real businesses like Netflix to carry out financial phishing scams.

# Fake online surveys and contests

PROOFPOINT

CNN April 13 at 3:45pm · 48

Unarmed Russian fighter jets made two extremely close overflights this week of the USS Donald Cook, sailing in the Baltic Sea, CNN has learned.

<http://cnn.it/157TPGm>

**BREAKING NEWS**

**STUNNING VIDEO AS RUSSIAN JET**

541K Views

Like Comment Share

5.3K

2,500 shares

Write a comment...  
Press Enter to post

David R Burnes What's your opinion? We'd like to know! Participate in our research surveys and enter to win prizes! <http://goo.gl/O99wxE>

Like · Reply · April 14 at 5:23pm

Criminals use the comment section to target as many people as possible with fake online surveys and quizzes that steal personal information.

# Foursquare Spam: Fake Tip

## Advertising / Marketing



 **Cisco** left a tip at **Baskin Robbins**  
Jan 3 - Pantai Medical Centre, Kuala Lumpur, Malaysia

“ Buy the original XanGo mangosteen juice at best price  
<http://www.x1concept.com>

## Scam / Phishing



A screenshot of a phishing website titled "Customer Sign In". It features fields for "Customer No." and "Password". Below the fields, a link says, "If you have forgotten your password, please call our Internet Help Line". To the right of the form, there is a cartoon illustration of a thief wearing a mask and carrying a bag, holding a credit card.

Customer Sign In

Customer No.

Password

If you have forgotten your password, please call our Internet Help Line

# Social reputation

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Skills & Expertise

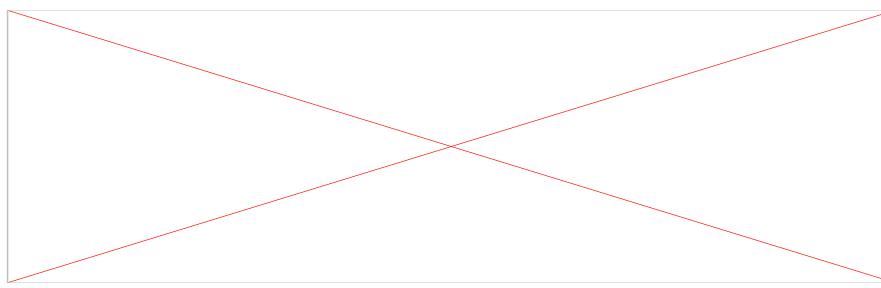
24 Social Media Marketing	[grid of 24 profile icons]
19 Social Media	[grid of 19 profile icons]
11 Online Advertising	[grid of 11 profile icons]
7 Digital Marketing	[grid of 7 profile icons]
7 Email Marketing	[grid of 7 profile icons]
7 Blogging	[grid of 7 profile icons]
6 Public Speaking	[grid of 6 profile icons]
6 Social Networking	[grid of 6 profile icons]
3 Marketing Strategy	[grid of 3 profile icons]
2 Web Analytics	[grid of 2 profile icons]

Endorsements

24 Social Media Marketing	[grid of 24 profile icons]
19 Social Media	[grid of 19 profile icons]
11 Online Advertising	[grid of 11 profile icons]
7 Digital Marketing	[grid of 7 profile icons]
7 Email Marketing	[grid of 7 profile icons]
7 Blogging	[grid of 7 profile icons]
6 Public Speaking	[grid of 6 profile icons]
6 Social Networking	[grid of 6 profile icons]
3 Marketing Strategy	[grid of 3 profile icons]
2 Web Analytics	[grid of 2 profile icons]

More Skills & Expertise

2 Corporate Blogging	2 Content Marketing	1 Internet Marketing
1 Web Development	1 Conference Speaking	1 Facebook
1 Google Analytics	1 Content Strategy	1 Social Marketing
PHP		



# Social reputation manipulation

flipKart.com

Search for a product, category or brand

SEARCH

Must for a Deep Sleep

Awesome packaging, comes in a vacuum sealed pack. Inflates as soon as you cut open the packaging. Pretty large in size. Makes your sleep more comfortable. No more nightmares due to grubby pillows. Quite nice product on flipkart.. !

2 of 2 users found this review helpful.

Permalink Report Abuse

Nice one

Awesome packaging, comes in a vacuum sealed pack. Inflates as soon as you cut open the packaging. Pretty large in size. Makes your sleep more comfortable. No more nightmares due to grubby pillows. Quite nice product on flipkart..

1 of 1 users found this review helpful.

Permalink Report Abuse

## Amazon Sues 1,000 People Over Fake Reviews

The e-commerce giant hopes to crack down on bogus product reviews across the site.

⌚ 10/19/2015 12:55 pm ET | Updated Oct 19, 2015

# Clickbaiting

---

 Celeb Style Weekly

August 20

You'll NEVER believe which two stars got into a fight on the red carpet last night!! CLICK to find out which starlet they were fighting over!! ---->

<http://bit.ly/1b7quT9>



# # hijacking

Coca-Cola  @CocaCola

Follow

Time for a Royal Celebration! #Royalbaby  
[pic.twitter.com/IITsX3lHfQ](http://pic.twitter.com/IITsX3lHfQ)

9:41 PM - 22 Jul 2013



Time for a royal celebration...

Share a Coke with...

#ShareaCoke      open happiness\*

©2013 The Coca-Cola Company. Coca-Cola, Coke, Share Happiness, the Coca-Cola logo, the Coca-Cola script logo, and "Share Happiness" are trademarks or registered trademarks of The Coca-Cola Company.

# # hijacking



DiGiorno Pizza   
@DiGiornoPizza

#WhyIStayed You had pizza.

9/8/14,



DiGiorno Pizza   
@DiGiornoPizza

A million apologies. Did not read what the hashtag was about before posting.

Reply Retweet Favorite More

# Compromised account

**AP** The Associated Press   Following

@AP

Breaking: Two Explosions in the White House and Barack Obama is injured

Reply Retweet Favorite More

1,452 RETWEETS	63 FAVORITES	
----------------	--------------	--

12:07 PM - 23 Apr 13

# Impersonation

---

[Home](#) ▶ [Bollywood](#) ▶

## Kiran Rao Files Complaint Against Imposter For Fake Facebook Account

[Press Trust of India](#) | June 05, 2016 14:48 IST ([Mumbai](#))



# Work from home scam

---

**WANTED**

AS SEEN ON  
**TV** Pinterest CNN  
Twitter Facebook

**Want to make an EXTRA SALARY simply by filling out surveys for major companies?**

**Get Paid \$5-\$40 per survey,  
and they just take 5-10 minutes each!**

I made 80 bucks last week at **opiniongathering.com**

# Thank you

[pk@iiitd.ac.in](mailto:pk@iiitd.ac.in)

precog.iiitd.edu.in

fb/ponnurangam.kumaraguru

# Privacy and Security in Online Social Media

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Course on NPTEL

NOC21-CS28

Week 6.2

Ponnurangam Kumaraguru (“PK”)

Full Professor

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[fb/ponnurangam.kumaraguru](https://www.facebook.com/ponnurangam.kumaraguru), @ponguru



# Link farming

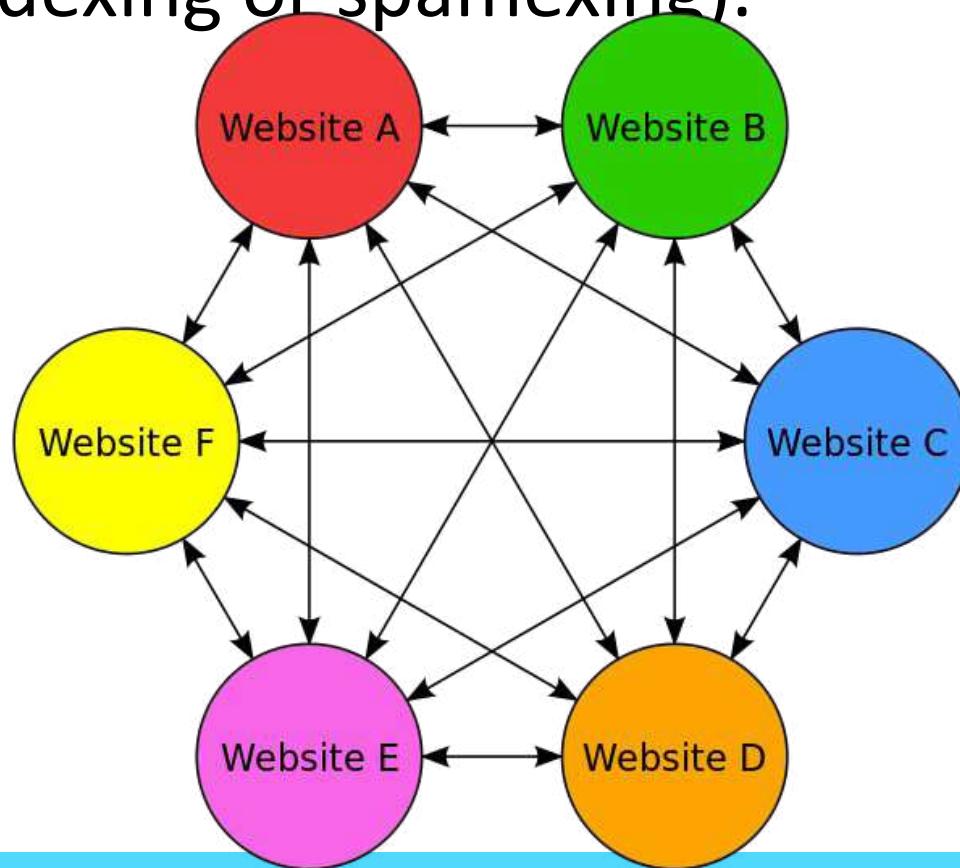
---

- Search engines rank websites / webpages based on graph metrics such as Pagerank
  - High in-degree helps to get high Pagerank
- Link farming in Web
  - Websites exchange reciprocal links with other sites to improve ranking by search engines

# Link farming

---

- A link farm is a form of spamming the index of a search engine (sometimes called spamdexing or spamexing).



# Why link farming in Twitter?

---

- Twitter has become a Web within the Web
  - Vast amounts of information and real-time news
  - Twitter search becoming more and more common
  - Search engines rank users by follower-rank, Pagerank to decide whose tweets to return as search results
  - High indegree (#followers) seen as a metric of influence
  - Klout score influenced by Twitter indegree
  
- Link farming in Twitter
  - Spammers follow other users and attempt to get them to follow back (Reciprocity)

# Link farming in Web & Twitter similar?

---

## ● Motivation is similar

- Higher indegree will give better ranks in search results

## ● Who engages in link farming?

- Web – spammers
- Twitter – spammers + many legitimate, popular users !!!

## ● Additional factors in Twitter

- ‘Following back’ considered a social etiquette

# Is link farming in Twitter spam at all?

---

- Your reactions?



# Spam in Twitter

- “five spam campaigns controlling 145 thousand accounts combined are able to persist for months at a time, with each campaign enacting a unique spamming strategy.”

**Suspended  
An Anal**

Kurt Thomas<sup>†</sup> Christopher Grier<sup>‡</sup>  
<sup>†</sup>University of California, Berkeley  
<sup>‡</sup>University of California, Berkeley  
{kthomas, grier}@berkeley.edu

**ABSTRACT**

In this study, we examine the abuse of online social networks at the hands of spammers through the lens of the tools, techniques, and support infrastructure they rely upon. To perform our analysis, we identify over 1.1 million accounts suspended by Twitter for disruptive activities over the course of seven months. In the process, we collect a dataset of 1.8 billion tweets, 80 million of which belong to spam accounts. We use our dataset to characterize the behavior and lifetime of spam accounts, the campaigns they execute, and the wide-spread abuse of legitimate web services such as URL shorteners and free web hosting. We also identify an emerging marketplace of illegitimate programs operated by spammers that include Twitter account sellers, ad-based URL shorteners, and spam affiliate programs that help enable underground market diversification.

Our results show that 77% of spam accounts identified by Twitter are suspended within one day of their first tweet. Because of these pressures, less than 9% of accounts form social relationships with regular Twitter users. Instead, 17% of accounts rely on hijacking trends, while 52% of accounts use unsolicited mentions to reach an audience. In spite of daily account attrition, we show how five spam campaigns controlling 145 thousand accounts combined are able to persist for months at a time, with each campaign enacting a unique spamming strategy. Surprisingly, three of these campaigns send spam directing visitors to reputable store fronts, blurring the line regarding what constitutes spam on social networks.

# Spam in Twitter

- “We find that 8% of 25 million URLs posted to the site point to phishing, malware, and scams listed on popular blacklists.”
- “We find that Twitter is a highly successful platform for coercing users to visit spam pages, with a clickthrough rate of 0.13%, compared to much lower rates previously reported for email spam”

## @spam: The Underground on 140 Characters or Less \*

Chris Grier<sup>†</sup> Kurt Thomas<sup>\*</sup> Vern Paxson<sup>†</sup> Michael Zhang<sup>†</sup>

<sup>†</sup>University of California, Berkeley  
{grier, vern, mczhang}@cs.berkeley.edu

<sup>\*</sup>University of Illinois, Champaign-Urbana  
kathoma2@illinois.edu

### ABSTRACT

In this work we present a characterization of spam on Twitter. We find that 8% of 25 million URLs posted to the site point to phishing, malware, and scams listed on popular blacklists. We analyze the accounts that send spam and find evidence that it originates from previously legitimate accounts that have been compromised and are now being puppeteered by spammers. Using clickthrough data, we analyze spammers' use of features unique to Twitter and the degree that they affect the success of spam. We find that Twitter is a highly successful platform for coercing users to visit spam pages, with a clickthrough rate of 0.13%, compared to much lower rates previously reported for email spam. We group spam URLs into campaigns and identify trends that uniquely distinguish phishing, malware, and spam, to gain an insight into the underlying techniques used to attract users.

Given the absence of spam filtering on Twitter, we examine whether the use of URL blacklists would help to significantly stem the spread of Twitter spam. Our results indicate that blacklists are too slow at identifying new threats, allowing more than 90% of visitors to view a page before it becomes blacklisted. We also find that even if blacklist delays were reduced, the use by spammers of URL shortening services for obfuscation negates the potential gains unless tools that use blacklists develop more sophisticated spam filtering.

### 1. INTRODUCTION

Within the last few years, Twitter has developed a following of 106 million users that post to the site over one billion times per month [16]. As celebrities such as Oprah, Ashton Kutcher, and Justin Bieber attract throngs of Twitter followers, spammers have been quick to adapt their operations to target Twitter with scams, malware, and phishing attacks [3]. Promising users great diets and more friends, or simply stealing accounts, spam has become a pervasive problem throughout Twitter [8].

Notable attacks on Twitter include the brute force guessing of weak passwords that led to exploitation of compromised accounts to advertise diet pills [26]. Phishing is also a significant concern on Twitter, leading the site to completely redesign the sending of private messages between users to help mitigate attacks [7]. Even though Twitter is vigilant at notifying users and works to stop phishing, spammers continue to create and compromise accounts, sending messages from them to fool users into clicking on scams and harmful links.

Despite an increase in volume of unsolicited messages, Twitter currently lacks a filtering mechanism to prevent spam, with the exception of malware, blocked using Google's Safebrowsing API [4]. Instead, Twitter has developed a loose set of heuristics to quantify spamming activity, such as excessive account creation or requests to befriend other users [22]. Using these methods along with

# Spam in Twitter

- “finding that 16% of active accounts exhibit a high degree of automation.”
- “find that 11% of accounts that appear to publish exclusively through the browser are in fact automated accounts that spoof the source of the updates.”

## Detecting and Analyzing Automated Activity on Twitter

Chao Michael Zhang<sup>1</sup> and Vern Paxson<sup>1,2\*</sup>

<sup>1</sup> University of California, Berkeley, CA

<sup>2</sup> International Computer Science Institute, Berkeley, CA

**Abstract.** We present a method for determining whether a Twitter account exhibits automated behavior in publishing status updates known as *tweets*. The approach uses only the publicly available timestamp information associated with each tweet. After evaluating its effectiveness, we use it to analyze the Twitter landscape, finding that 16% of active accounts exhibit a high degree of automation. We also find that 11% of accounts that appear to publish exclusively through the browser are in fact automated accounts that spoof the source of the updates.

### 1 Introduction

Twitter is a microblogging service that allows its members to publish short status updates known as *tweets*. Over 180 M visitors interact with Twitter each month, generating 55 M tweets/day [13]. User accounts and their status updates are public by default, accessible by the general public via Twitter’s two application program interfaces (APIs). The large number of users, low privacy expectations, and easy-to-use API have made Twitter a target of abuse, whether relatively benign in the form of spam and disruptive marketing tactics [5], or malicious in the form of links to malware [17] and phishing schemes [8]. Often abuse on Twitter employs automation for actions such as publishing tweets following another user and sending links through private messages.

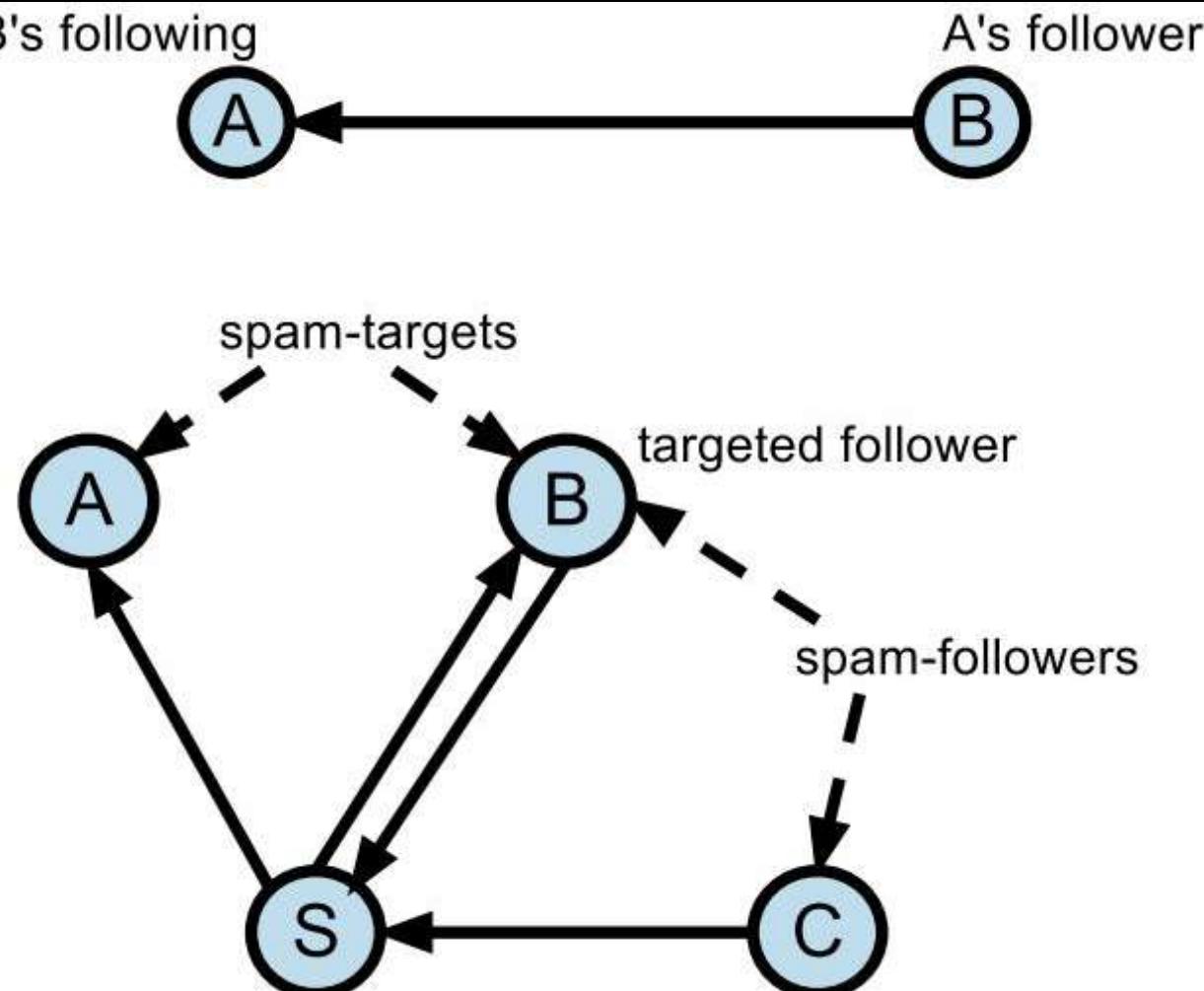
# Dataset

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- Complete snapshot of Twitter, 2009
- 54 million users, 1.9 billion links! Largest dataset!



# Nodes



# Spammers

---

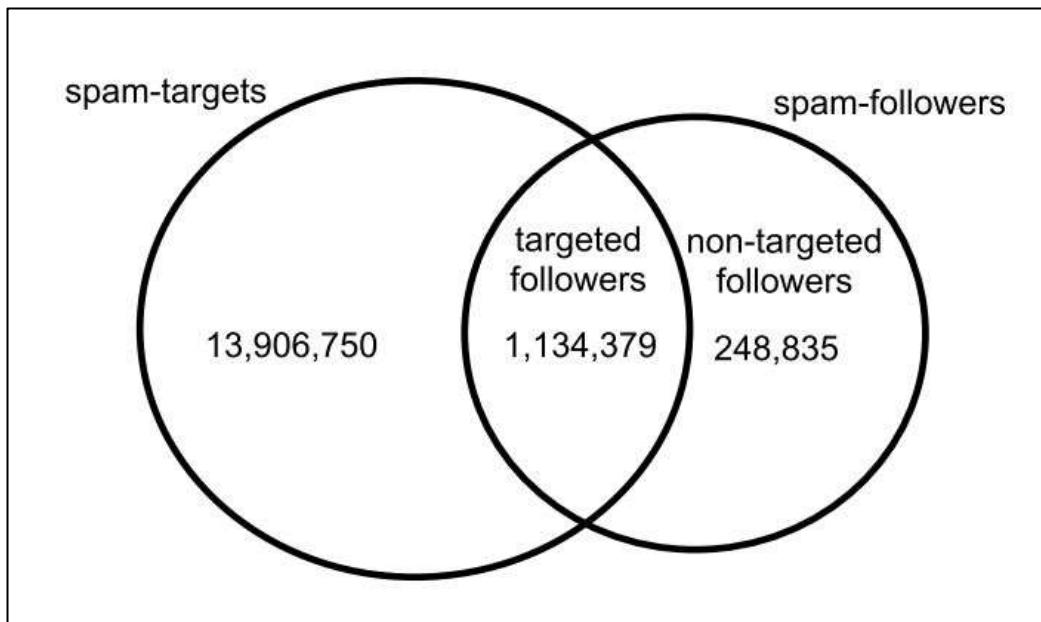
- 379,340 accounts has been suspended in the interval, Aug 09 – Feb 11
  - Spam-activity or long inactivity
- 41,352 suspended accounts posted at least one blacklisted URL shortened by bitly, tinyurl



# Spammers

---

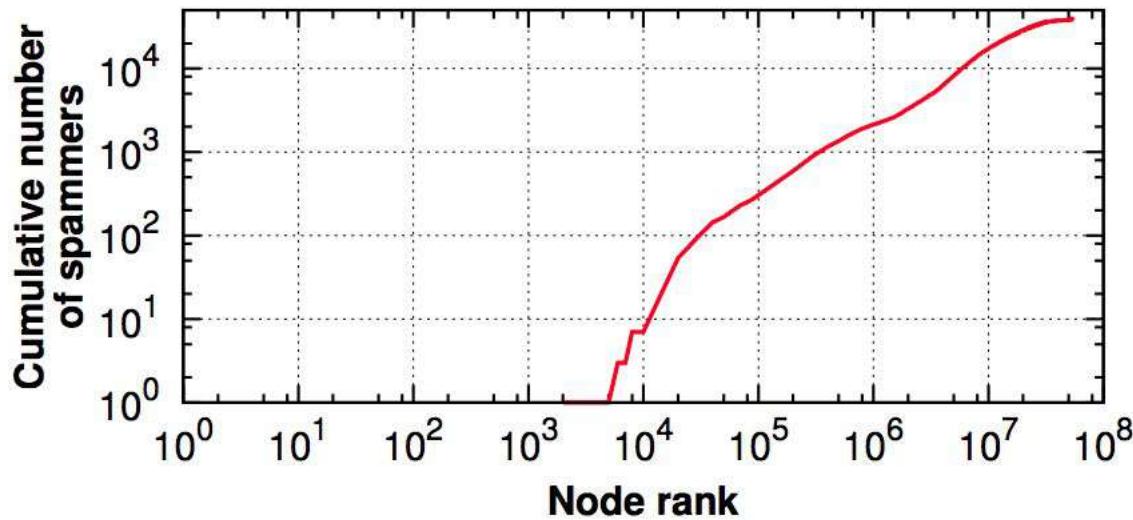
- # of spam-targets, spam-followers, their overlap
- 82% of spam followers overlap with the spam-targets



# Spammers

---

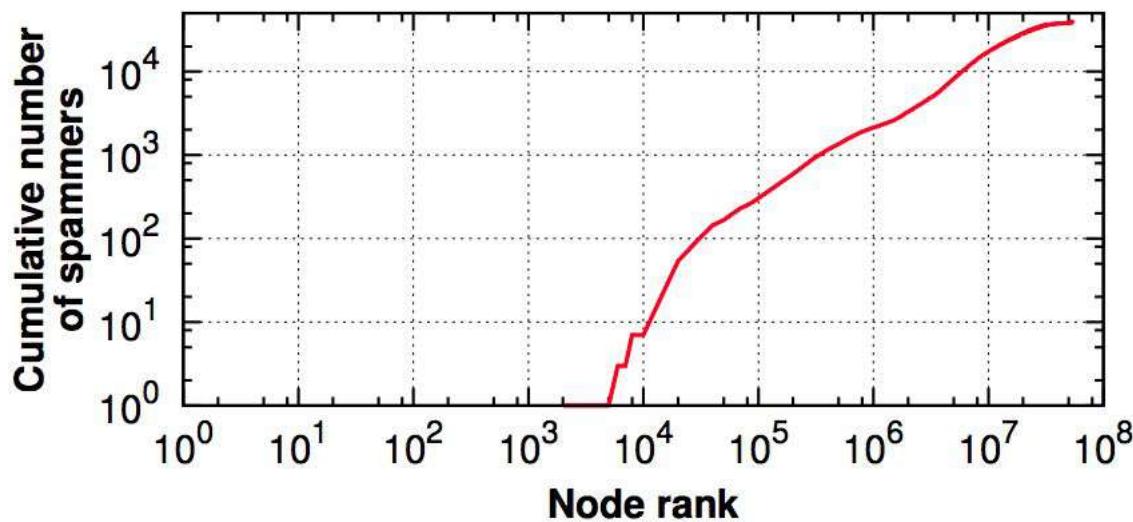
- # of spammers who rank within the top K according to pagerank



# Spammers

---

- # of spammers who rank within the top K according to pagerank
- 7 spammers rank within 10,000, 304 within 100,000 and 2,131 within 1million



# Thank you

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precog.iiitd.edu.in

fb/ponnurangam.kumaraguru

# Privacy and Security in Online Social Media

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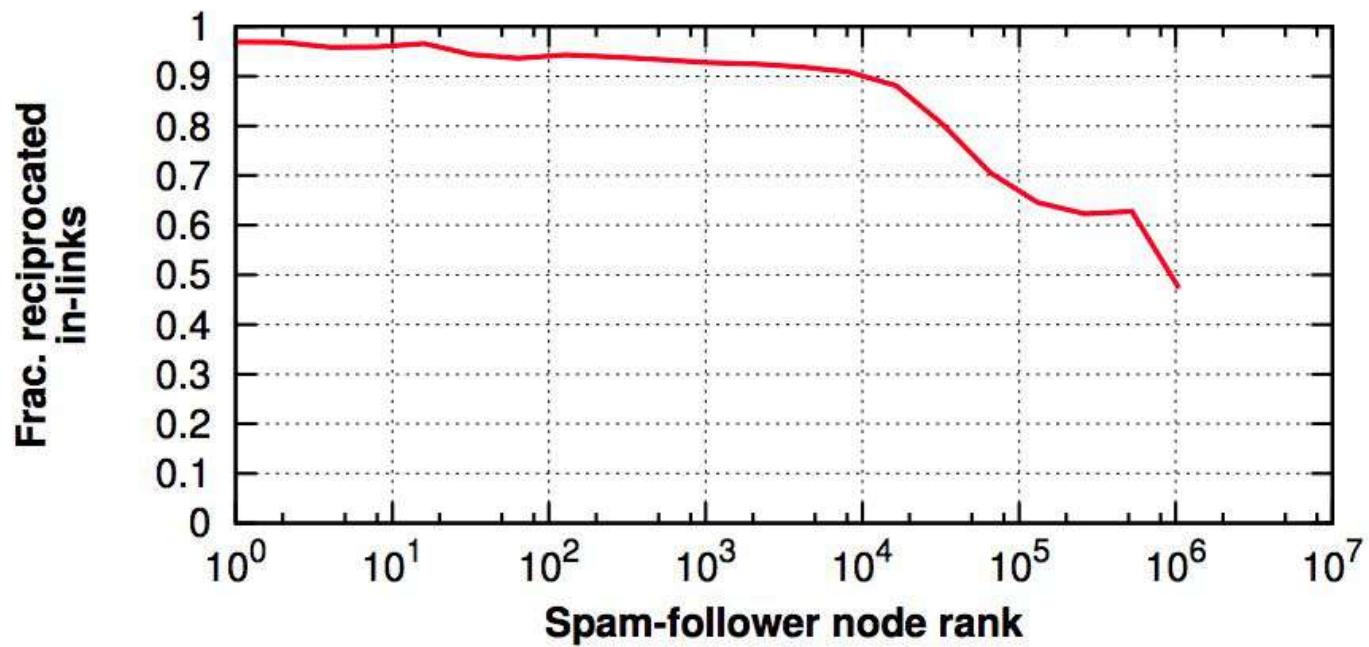
[fb/ponnurangam.kumaraguru](https://www.facebook.com/ponnurangam.kumaraguru), @ponguru



# Spammers

---

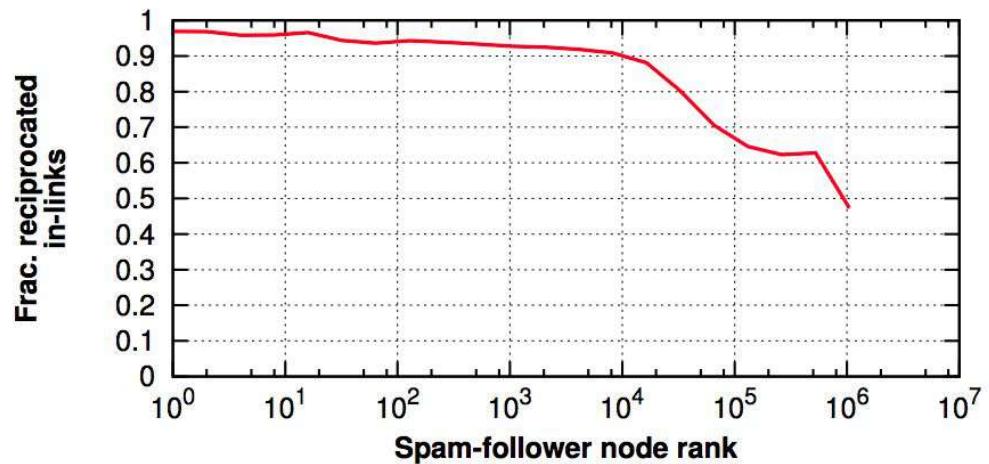
- Fraction of reciprocated in-links from spammers vs spam-follower node rank



# Spammers

---

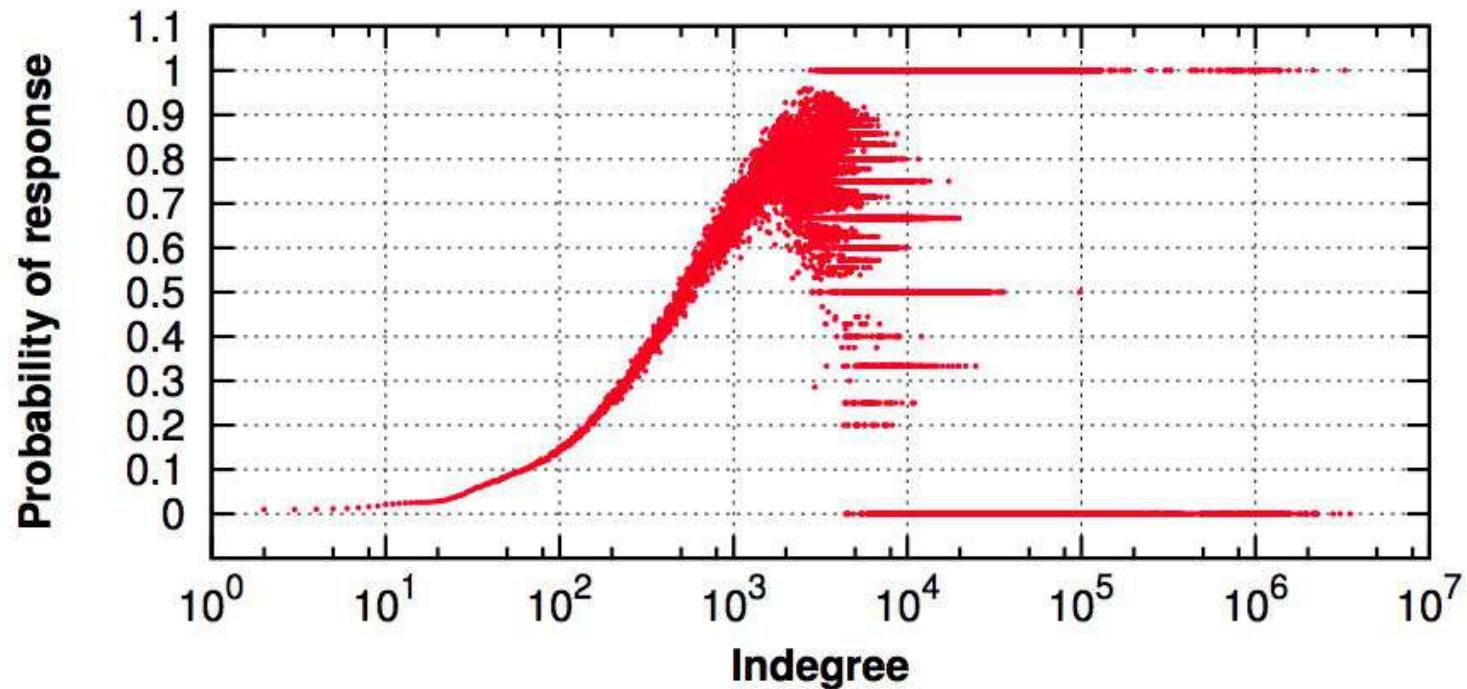
- Top 100,000 spam-followers account for 60% of all links acquired by the spammers
- Top spam-followers tend to reciprocate all links established to them by spammers



# Popular users more likely

---

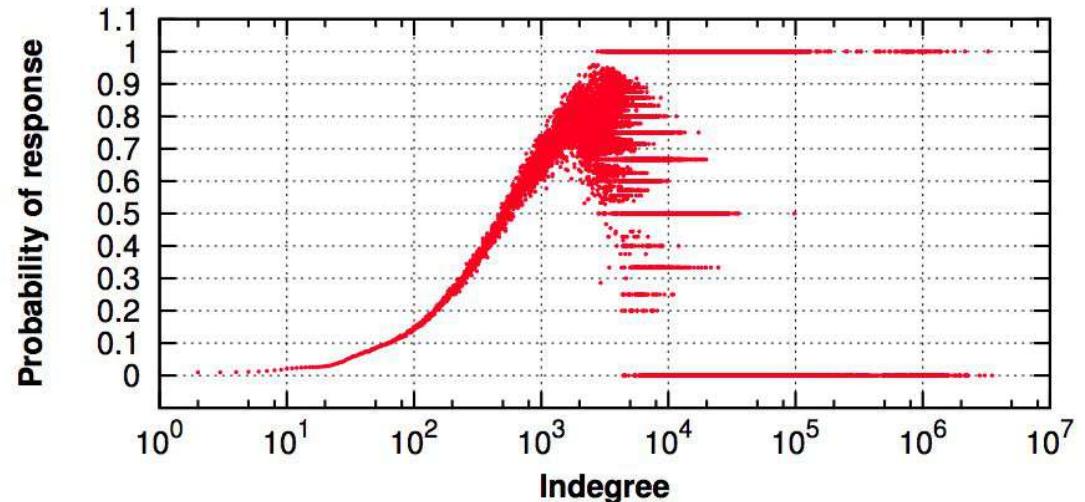
- Probability of response vs indegree for all users targetted by spammers



# Popular users more likely

---

- Probability of response vs indegree for all users targetted by spammers
- Users with low indegree do not reciprocate to links from spammers.
- Responsiveness increases with number of followers



# Top 5 link farmers

---

- Twitter account bios
- Having most links to spammers and highest pagerank
- Popular accounts

Top 5 link farmers according to	
#links to spammers	Pagerank
Larry Wentz: Internet, Affiliate Marketing	Barack Obama: Obama 2012 campaign staff
Judy Rey Wasserman: Artist, founder	Britney Spears: It's Britney
Chris Latko: Interested in tech. Will follow back	NPR Politics: Political coverage and conversation
Paul Merriwether: helping others, let's talk soon	UK Prime Minister: PM's office
Aaron Lee: Social Media Manager	JetBlue Airways: Follow us and let us help

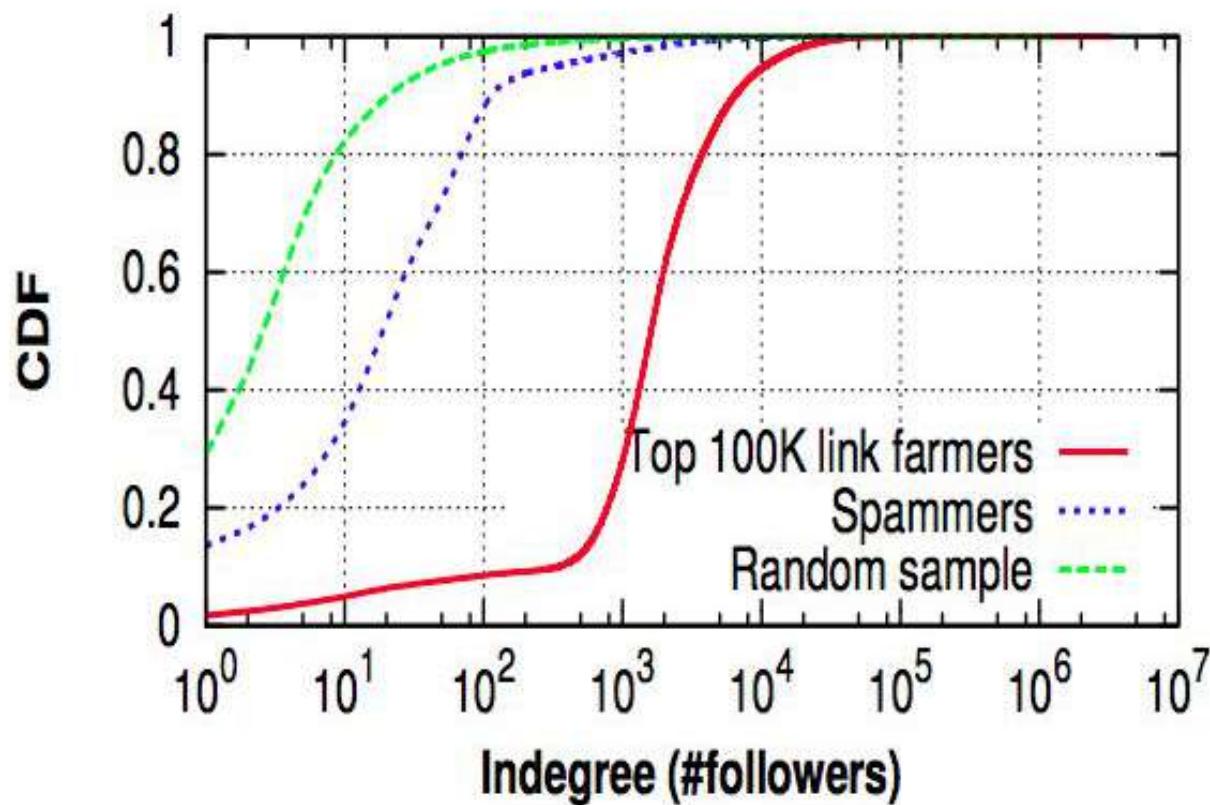
# Top link farmers are not spammers

---

- 100,000 link farmers
- 18,826 were suspended
- 4,768 were “not found”
- 76% still active
- 235 are verified
- Manually checked 100 random users (volunteers)
- 86 were real accounts
  - Business, internet marketing, ENT, money and social media

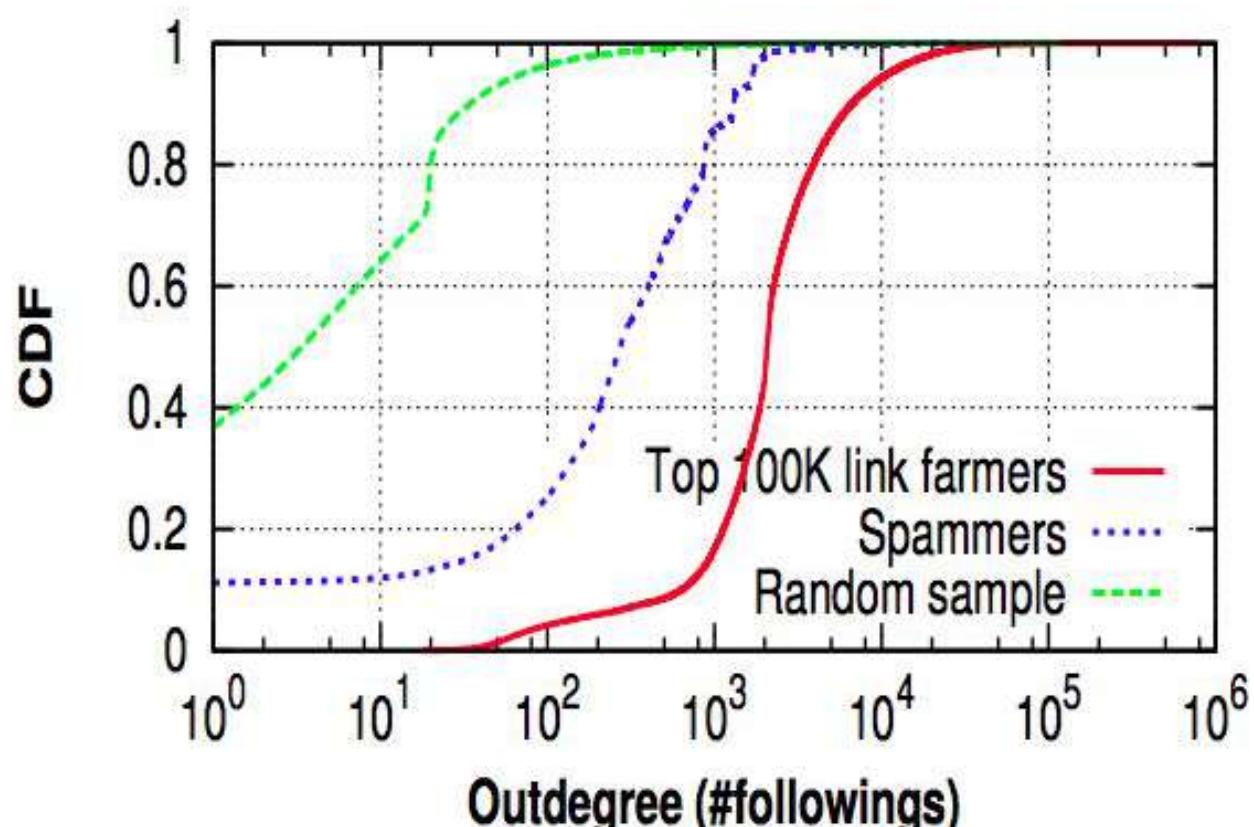
# Node degree distribution: In

- Top link farmers have very high indegree compared to spammers and random sample



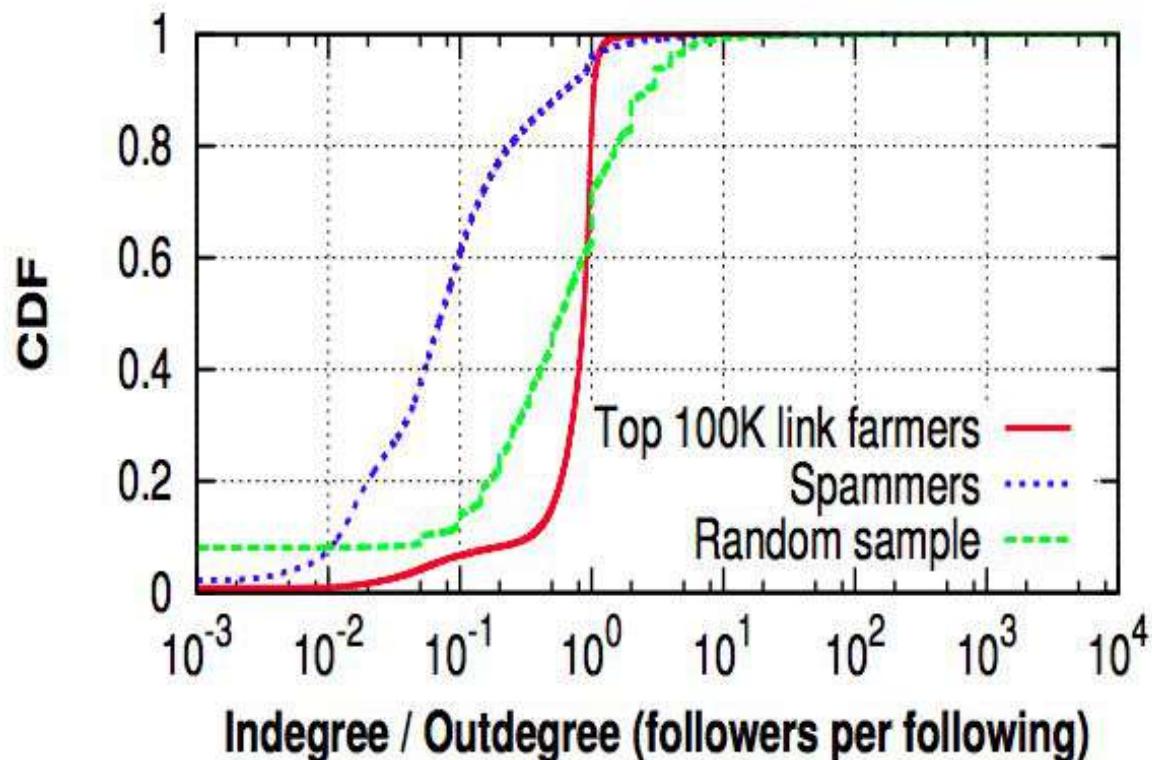
# Node degree distribution: Out

- Top link farmers have very high outdegree compared to spammers and random sample



# Node degree distribution: In/Out

- Most of the top link farmers have ratio near 1



# Account bio of top 100,000 & random sample

A word cloud centered around the word "market". Other prominent words include "internet", "social", "people", "love", "business", "entrepreneur", "online", "free", "passion", and "blog". The words are in various colors like red, blue, green, and orange, and are arranged in a circular, radiating pattern.

A word cloud centered around the word "life" in large, bold, red letters. Other prominent words include "music", "love", "time", "people", "world", "friend", "design", "family", and "girl". Smaller words surrounding these include "mom", "http", "busi", "person", "develop", "enjoy", "student", "art", "beauty", "fun", "real", "live", "consult", "media", "www", "mother", "travel", "social", "tweet", "commun", "marry", "school", "writer", "husband", "manage", "god", "lover", "profession", "sport", "kid", "photograph", "market", "plain", "happy", "artist", and "wife". The words are in various sizes and colors, including shades of red, brown, and black.

# Account bio of top 100,000 & random sample

- LF: promoting their own business or content or trends in a domain. Links to legitimate external sources
- RS: don't tweet to external sources



# Conclusion

---

- Characteristics of links farmers
- Surprisingly, legitimate, popular, and highly active users such as bloggers, and experts mostly likely engage in link farming
- Increase social capital and influence



# Thank you

[pk@iiitd.ac.in](mailto:pk@iiitd.ac.in)

precog.iiitd.edu.in

fb/ponnurangam.kumaraguru

# Privacy and Security in Online Social Media

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PreCog  
@IIITD



# Cost of reading privacy policies

---

- What would happen if everyone read the privacy policy for each site they visited once each month?
- Time = 244/hours year
- Cost = USD 3,534/year
- National opportunity cost for reading privacy policy = 781 billion USD



A. McDonald and L. Cranor. The Cost of Reading Privacy Policies. I/S: "A Journal of Law and Policy for the Information Society. 2008 Privacy Year in Review Issue. <http://lorrie.cranor.org/pubs/readingPolicyCost-authorDraft.pdf>

# Goals

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- To help individuals avoid regrettable online disclosures



# Facemail from MIT

---



# Experimental setup

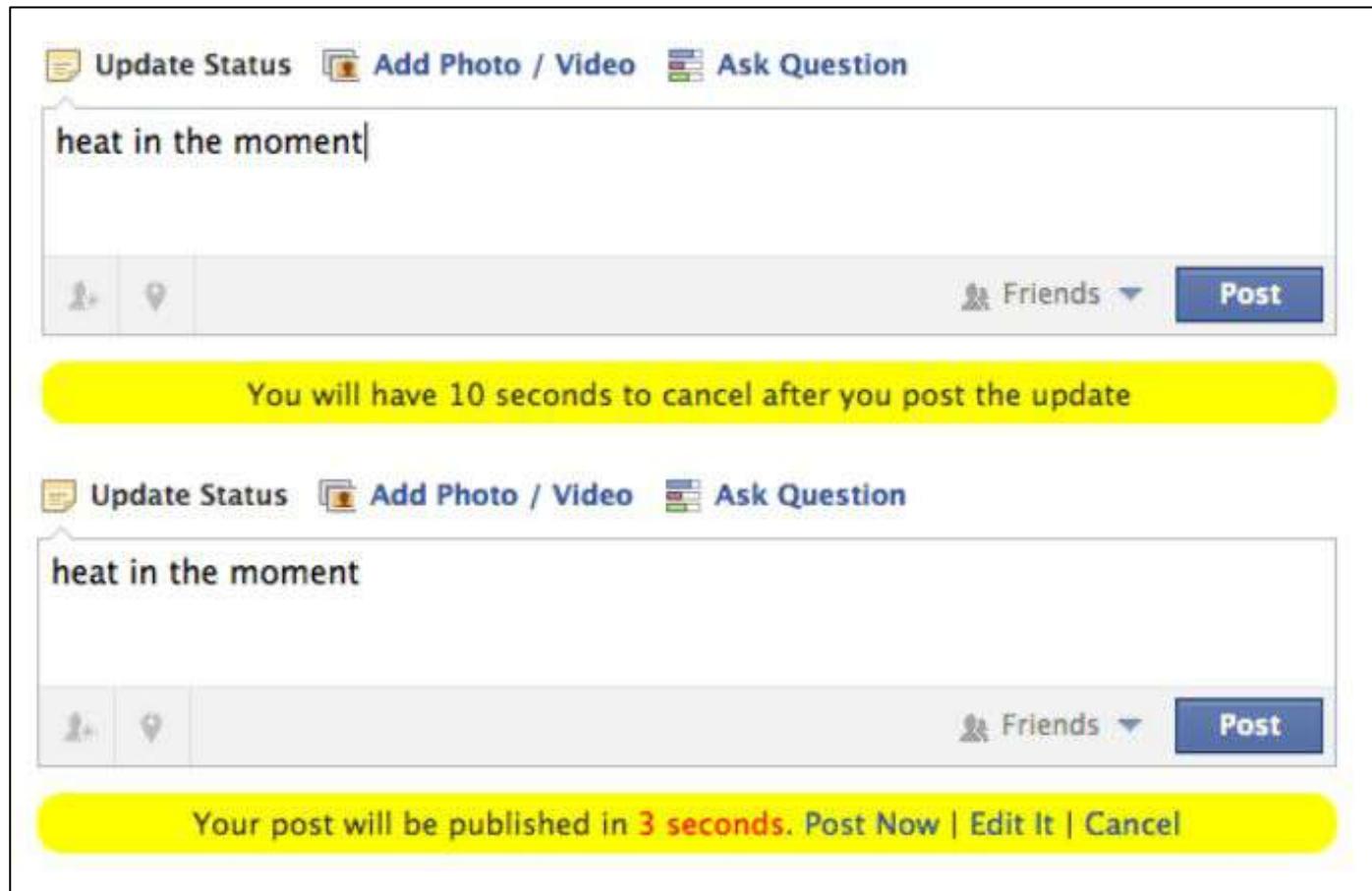
---

- Picture nudge
- “These people, your friends, and FRIENDS OF YOUR FRIENDS can see your post.”



# Experimental setup

## ● Timer nudge



# Experimental setup

---

## ● Sentiment nudge



# Methodology

---

- Chrome browser
- Exit survey, follow-up interviews
- IRB approved
- Recruitment
  - Craigslist, flyers, emails, etc.
- 21 participants who completed the field study and 13 participated in the interviews

# Analysis metrics

---

- Number of changes in inline privacy settings
- Number of cancelled or edited posts
- Posts frequency
- Topic sensitivity



# Profile picture nudge

---

- One participant changed from “Friends” to “Friends except acquaintances” when she posted “Survived one of the craziest, most exhausting days ever!”
- Another participant ended up cancelling “a couple of posts” because of the profile picture nudge



# Timer nudge

---

- One participant mentioned “at times annoying and at time handy”
  - Wait for timer to expire or hit “post now”
  - Make it more public when it was “venting” type
- Another participant said, made me think about the posts
  - Cancelled a few because of thinking



# Sentiment nudge

---

- Nudge was missing the context
  - Error in finding the sentiment
- Many participants cancelled their posts because of the nudge
- Post frequency reduced for sensitive information, 13 → 7



# Conclusion

---

- Interventions help users make better decision
- More work is needed to understand which type of nudge works in which context



# Thank you

[pk@iiitd.ac.in](mailto:pk@iiitd.ac.in)

precog.iiitd.edu.in

fb/ponnurangam.kumaraguru

# Privacy and Security in Online Social Media

---

Course on NPTEL

NOC21-CS28

Week 7.3

Ponnurangam Kumaraguru (“PK”)

Full Professor

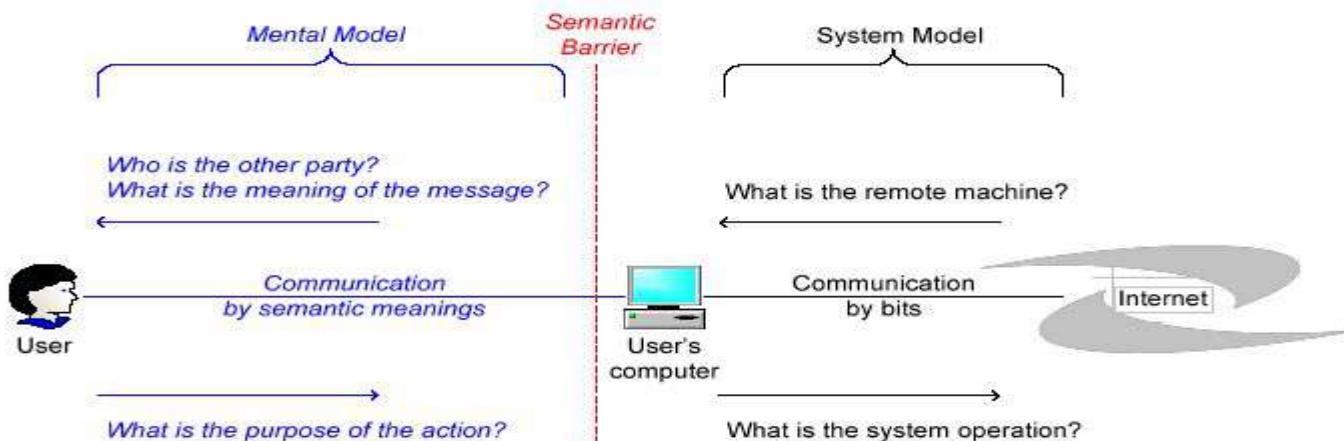
ACM Distinguished Speaker

[fb/ponnurangam.kumaraguru](https://www.facebook.com/ponnurangam.kumaraguru), @ponguru

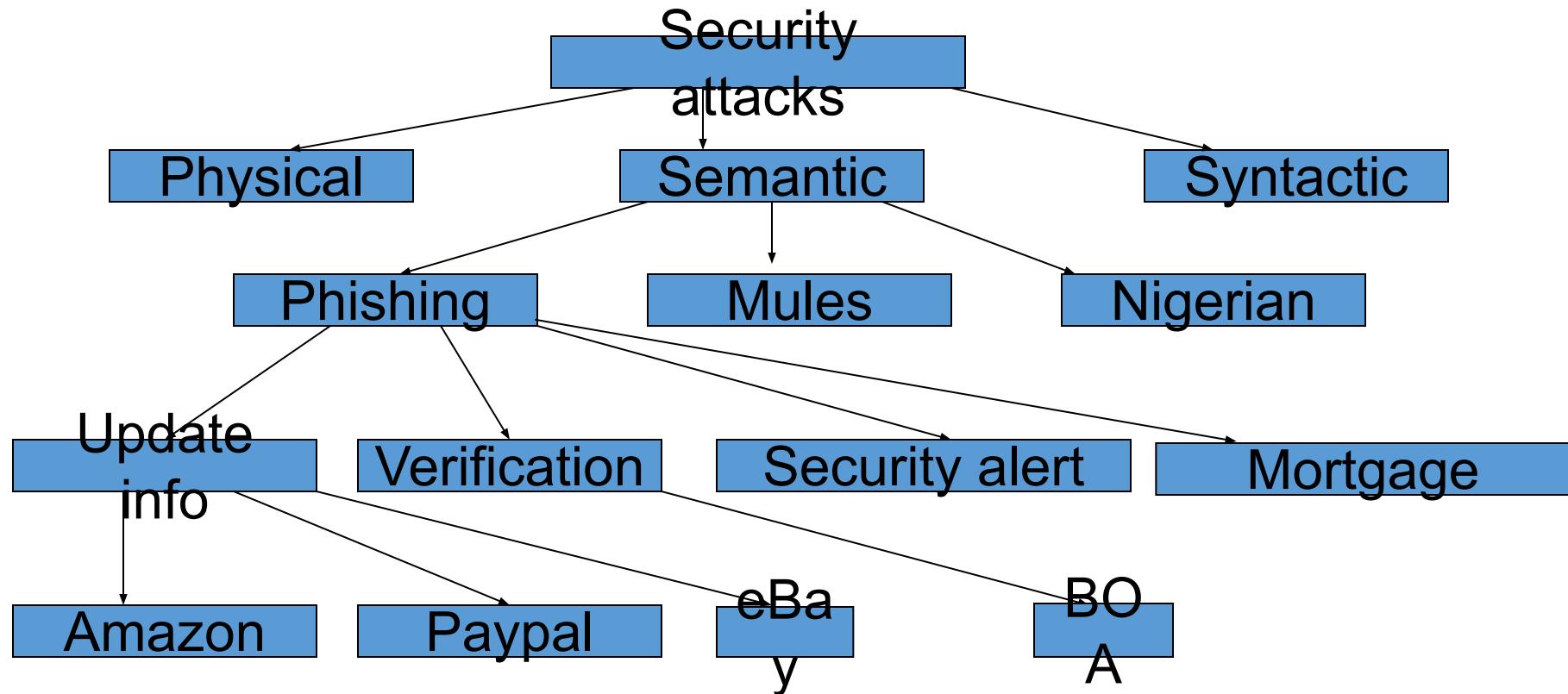


# Semantic Attacks

- “*Target the way we, as humans, assign meaning to content.*”
- System and mental model



# Semantic attacks



# An email that we get

From: isri-phd-students-indiv-bounces@mailman.srv.cs.cmu.edu on behalf of eBay Inc [supprefnum8304194205199@ebay.com]  
To: isri-people@cs.cmu.edu  
Cc:  
Subject: eBay: urgent security notice [Sun, 05 Feb 2006 18:54:02 -0400]

Sent: Sun 2/5/2006 6:03 PM



Dear eBay Member,

We regret to inform you that your eBay account could be suspended if you don't re-update your account information.

To resolve this problem please visit link below and re-enter your account information:

[https://signin.ebay.com/ws/eBayISAPI.dll&SignIn&sid=verify&co\\_partnerId=2&siteid=0](https://signin.ebay.com/ws/eBayISAPI.dll&SignIn&sid=verify&co_partnerId=2&siteid=0)

If your problems could not be resolved your account will be suspended for a period of 24 hours, after this period your account will be terminated.

For the User Agreement, Section 9, we may immediately issue a warning, temporarily suspend, indefinitely suspend or terminate your membership and refuse to provide our services to you if we believe that your actions may cause financial loss or legal liability for you, our users or us. We may also take these actions if we are unable to verify or authenticate any information you provide to us.

Due to the suspension of this account, please be advised you are prohibited from using eBay in any way. This includes the registering of a new account. Please note that this suspension does not relieve you of your agreed-upon obligation to pay any fees you may owe to eBay.

Regards,  
Safeharbor Department eBay, Inc  
The eBay team

This is an automatic message, please do not reply

# Features in the email

From: isri-phd-students-indiv-bounces@mailman.srv.cs.cmu.edu on behalf of eBay Inc [supprefnum8304194205199@ebay.com]  
To: isri-people@cs.cmu.edu

Sent: Sun 2/5/2006 6:03 PM

Subject: eBay: Urgent Notification From Billing Department



Dear eBay Member,

We regret to inform you that your eBay account could be suspended if you don't re-update your account information.

To resolve this problem please visit link below and re-enter your account information:

[https://signin.ebay.com/ws/eBayISAPI.dll&SignIn&sid=verify&co\\_partnerId=2&siteid=0](https://signin.ebay.com/ws/eBayISAPI.dll&SignIn&sid=verify&co_partnerId=2&siteid=0)

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Regards,  
Safeharbor Department eBay, Inc  
The eBay team

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# Features in the email

From: isri-phd-students-indiv-bounces@mailman.srv.cs.cmu.edu on behalf of eBay Inc [supprefnum8304194205199@ebay.com]  
To: isri-people@cs.cmu.edu  
Cc:  
Subject: eBay: urgent security notice [Sun, 05 Feb 2006 18:54:02 -0400]

Sent: Sun 2/5/2006 6:03 PM



We regret to inform you that your eBay account could be suspended if you don't update your account information.

[https://signin.ebay.com/ws/eBayISAPI.dll&SignIn&sid=verify&co\\_partnerId=2&siteid=0](https://signin.ebay.com/ws/eBayISAPI.dll&SignIn&sid=verify&co_partnerId=2&siteid=0)

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Regards,  
Safeharbor Department eBay, Inc

The eBay team

This is an automatic message, please do not reply

# Features in the email

From: isri-phd-students-indiv-bounces@mailman.srv.cs.cmu.edu on behalf of eBay Inc [supprefnum8304194205199@ebay.com]  
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[https://signin.ebay.com/ws/eBayISAPI.dll?SignIn&sid=verify&co\\_partnerid=2&sidteid=0](https://signin.ebay.com/ws/eBayISAPI.dll?SignIn&sid=verify&co_partnerid=2&sidteid=0)

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Regards,  
Safeharbor Department eBay, Inc  
The eBay team

This is an automatic message, please do not reply

# Website to collect information

ebay.com - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites

<http://www.kusi.org/hcr/eBay/ws23/eBayISAPI.htm>

**eBay®**

**Sign In** [Help](#)

**New to eBay?** **or** **Already an eBay user?**

If you want to sign in, you'll need to register first.

Registration is fast and free.

[Register >](#)

**eBay User ID**   
[Forgot your User ID?](#)

**Password**   
[Forgot your password?](#)

[Sign In Securely >](#)

[Keep me signed in](#) on this computer unless I sign out.

Done Internet

# Phishing Cost

The cost of phishing

Cost for 10,000-employee organization	Cost per employee	Percent cost	
Part 1. The cost to contain malware	\$208,174	\$22	6%
Part 2. The cost of malware not contained	\$338,098	\$35	9%
Part 3. Productivity losses from phishing	\$1,819,923	\$191	48%
Part 4. The cost to contain credential compromises	\$81,920	\$9	2%
Part 5. The cost of credential compromises not contained	\$1,020,705	\$107	27%
Total extrapolated cost \$3,768,820	\$3,768,820	\$395	100%



# Types of Phishing Attacks

---

- Phishing
- Context-aware phishing / spear phishing
- Whaling
- Vishing
- Smsishing
- Social Phishing?



# Until now, work that we have seen?

- Using voters database
- Using Medical health database
- Using Pictures from FB

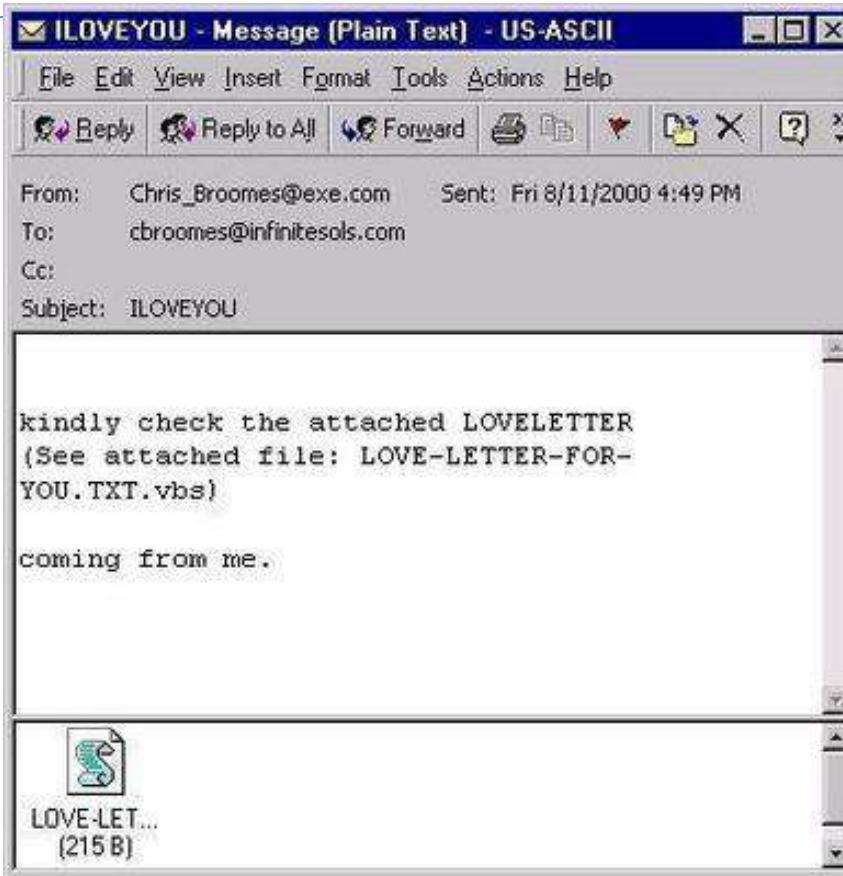


# Goal

---

- To see how phishing attacks can be performed by collecting personal information from social networks
  - How easily or effectively can phisher use this information?



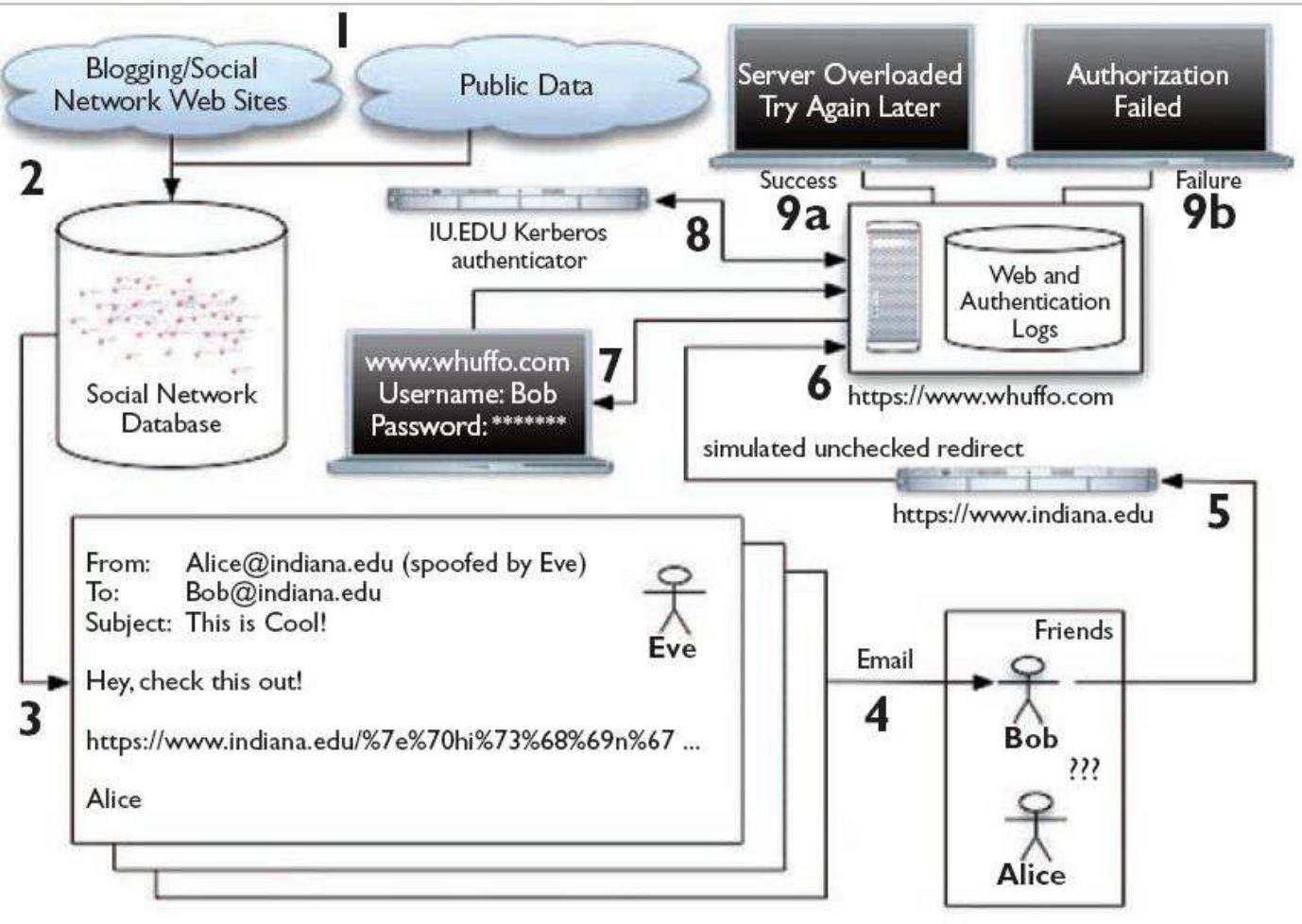


# Methodology

---

- Collected publicly available personal information using simple tools like Perl LWP library
- Correlated this data with IU's address book database
- Launched in April 2005
- Age between 18 – 24





# Control Vs. Experiment

---

- Control: The email from IU email ID, but, from an unknown person
- Experiment: From a friend in IU



# Methodology

---

- Blogging, social network, and other public data is harvested
- Data is correlated and stored in a relational database
- Heuristics are used to craft spoofed email message by Eve “as Alice” to Bob (a friend)
- Message is sent to Bob
- Bob follows the link contained within the email message and is sent to an unchecked redirect
- Bob is sent to attacker whuffo.com site
- Bob is prompted for his University credentials
- Bob’s credentials are verified with the University

# Victims

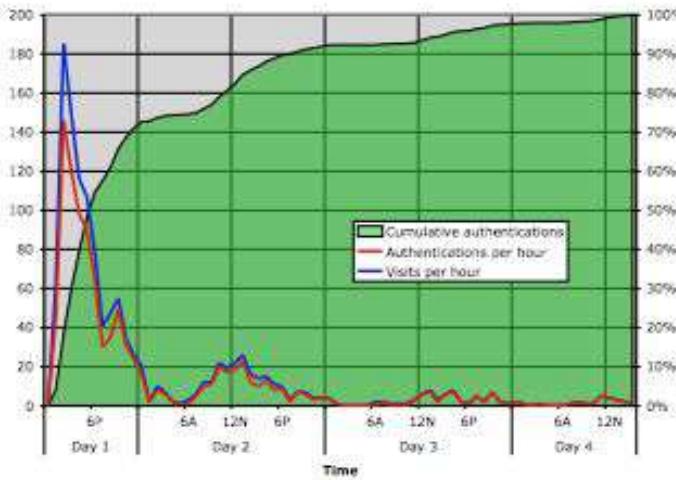
---

	Successful	Targeted	Percentage	95% C.I.
Control	15	94	16%	(9–23)%
Social	349	487	72%	(68–76)%

- Control group high – sender email ID was IU
- Experimental condition consistent with other studies

# Success rate

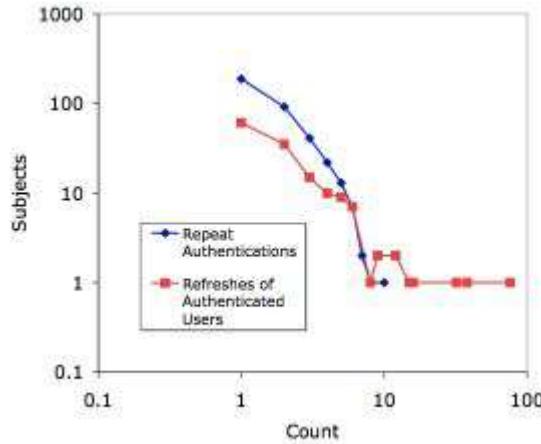
---



- 70% authentications in first 12 hrs
- Takedown has to be successful

# Repeated authentications

---



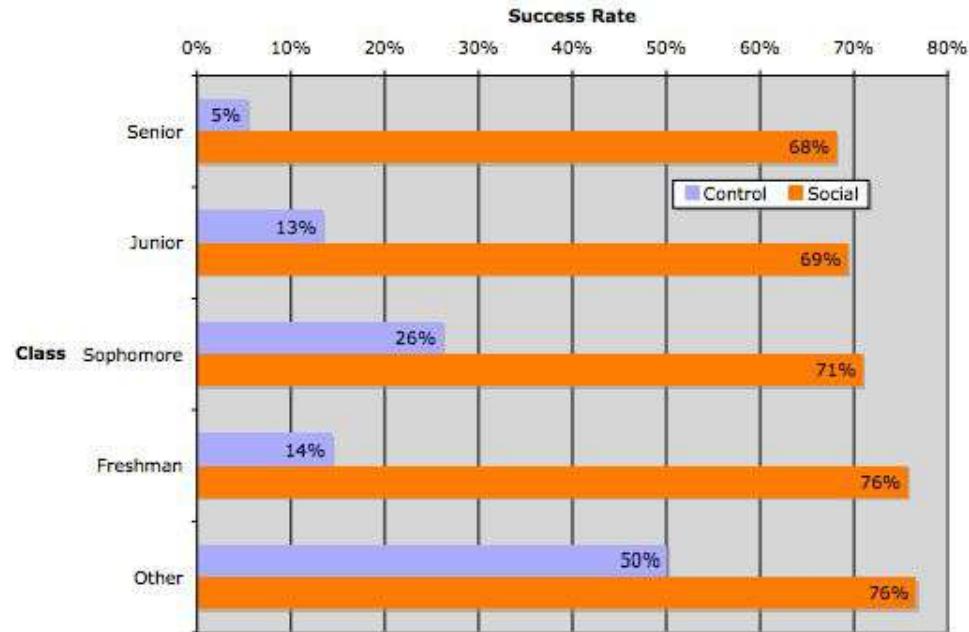
- Subject tried multiple times
- Tried again because “overload” message was shown
- Lower bound of users to fall, continued to be deceived
- Some tried 80 times

# Gender

---

	To Male	To Female	To Any
From Male	53%	78%	68%
From Female	68%	76%	73%
From Any	65%	77%	72%

- 18,294 Ms and 19,527 Fs
- Overall F more victims
- More successful if it came from opposite gender
- F to M (13%) was more effect than M to F (2%)



- Younger targets more vulnerable



- All majors significant difference between control and experimental
- Max difference in Science
- Technology lowest #satisfying 😊

# Reactions

---

- Anger
  - Unethical, inappropriate, illegal, fraudulent
  - Researchers fired
  - Psychological cost
- Denial
  - Nobody accepted that they fell for it
  - Admitting our vulnerability is hard
- Misunderstanding over spoofing emails
- Underestimation of publicly available information

# Conclusions

---

- Extensive educational campaigns
- Browser solutions
- Digitally signed emails
- OSM provides lot more information for making the attack successful



# References

---

- <http://markus-jakobsson.com/papers/jakobsen-commacm07.pdf>



# References

---

- [http://www.mpi-sws.org/~farshad/TwitterLi  
nkfarming.pdf](http://www.mpi-sws.org/~farshad/TwitterLinkfarming.pdf)
- [www.isical.ac.in/~acmsc/TMW2014/N\\_gang  
uly.ppt](http://www.isical.ac.in/~acmsc/TMW2014/N_gang<br/>uly.ppt)



# Thank you

[pk@iiitd.ac.in](mailto:pk@iiitd.ac.in)

[precog.iiitd.edu.in](http://precog.iiitd.edu.in)

[fb/ponnurangam.kumaraguru](https://www.facebook.com/ponnurangam.kumaraguru)

# Privacy and Security in Online Social Media

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Course on NPTEL

NOC21-CS28

Week 8.1

Ponnurangam Kumaraguru (“PK”)

Full Professor

ACM Distinguished Speaker

[fb/ponnurangam.kumaraguru](https://www.facebook.com/ponnurangam.kumaraguru), @ponguru



# What is the difficulty in matching?

---

- <https://www.facebook.com/ponnurangam.kumaraguru>
- <https://twitter.com/ponguru>
- <https://in.linkedin.com/in/ponguru>

Ponnurangam  
Kumaraguru (P K)

Update Info 1 View Activity Log 10+ ...

TWEETS 1,020 FOLLOWING 156 FOLLOWERS 882 FAVORITES 14

Edit profile

PK @ponguru

Tweets Tweets & replies Photos & videos

Pinned Tweet

# Ponnurangam Kumaraguru (PK)

500+  
connections

Associate Professor @ IIIT Delhi

New Delhi Area, India | Higher Education

Current Data Security Council of India, IIIT-Delhi

Education Carnegie Mellon University

Recommendations 1 person has recommended Ponnurangam

Websites Personal Website

# This lecture

---

- Tracking social footprint / identities across different social network

# **Other Times, Other Values: Leveraging Attribute History to Link User Profiles across Online Social Networks**

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Indraprastha Institute of  
Information Technology (IIIT-D),  
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County (UMBC),  
USA  
joshi@cs.umbc.edu

## **ABSTRACT**

Profile linking is the ability to connect profiles of a user on different social networks. Linked profiles can help companies like Disney to build psychographics of potential customers and segment them for targeted marketing in a cost-effective way. Existing methods link profiles by observing high similarity between most recent (current) values of the attributes like name and username. However, for a section of users observed to evolve their attributes over time and choose dissimilar values across their profiles, these current values have low similarity. Existing methods then falsely conclude

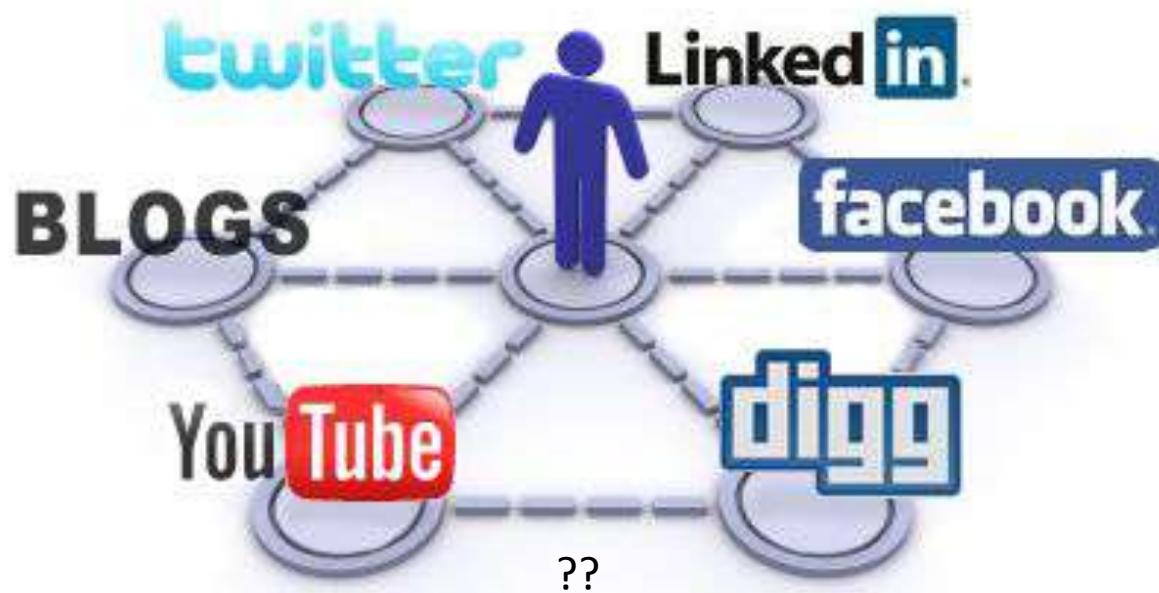
mation, lists her friends and later creates content to share with her friends. The quality, quantity and veracity of the information created and shared by her vary with the OSN, thereby resulting in dissimilar profiles of the same user, scattered on the world wide web, with no explicit links directing to one another. These disparate profiles liberate her from any privacy concerns that could emerge if the profiles were implicitly collated. However, linking these disparate unlinked profiles can benefit various stakeholders.

Companies like Disney and PepsiCo carry out psychographic segmentation based upon customers' activities, interests, opinions

Jain, P., Kumaraguru, P., and Joshi, A. Other Times, Other Values:  
Leveraging Attribute History to Link User Profiles across Online Social Networks.

# Knowing this can be useful!

---



# De-duplicating audience

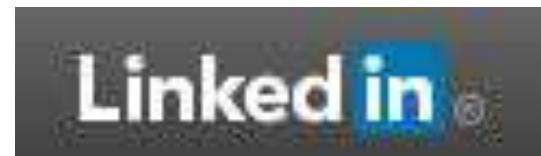
---



437,632 likes



FOLLOWERS  
153K

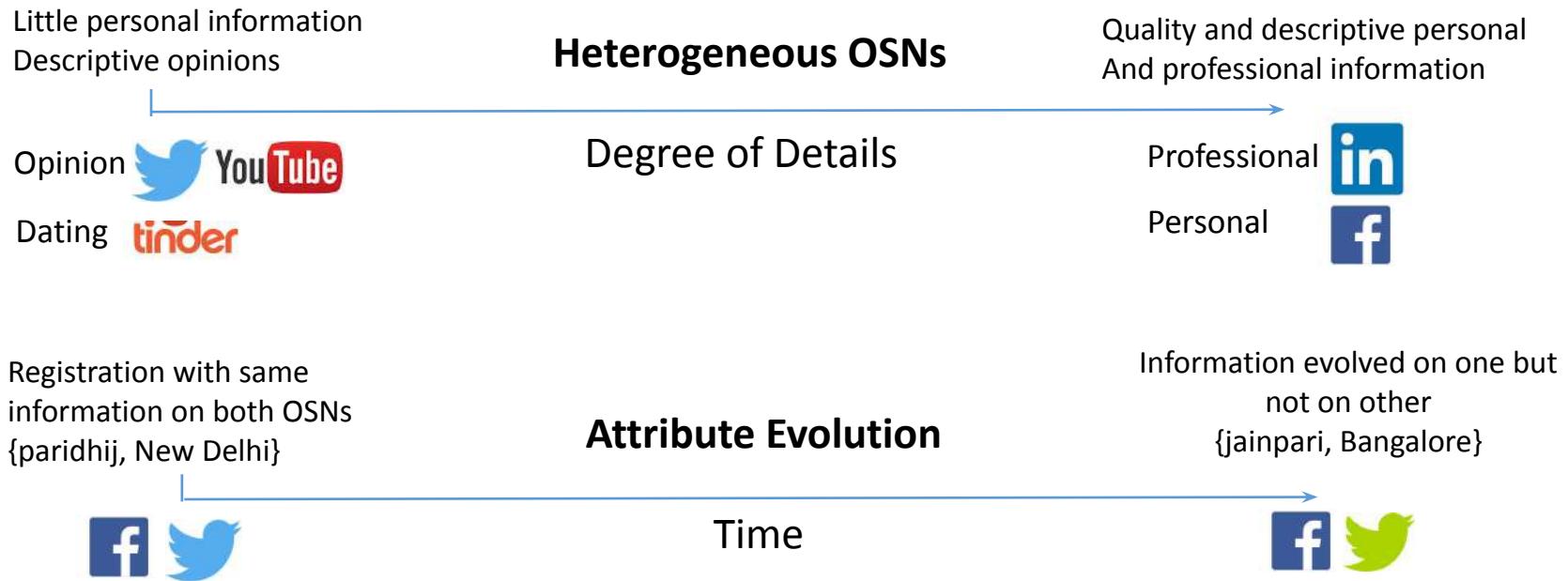


805,097 followers

Social audience = 437,632 + 153,000 + 805,097 or less??

# Challenges

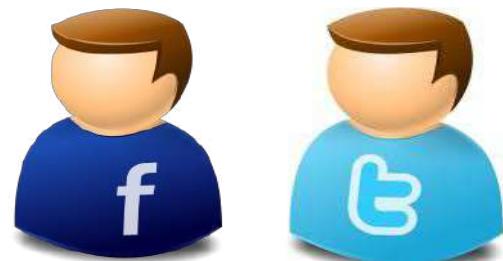
---



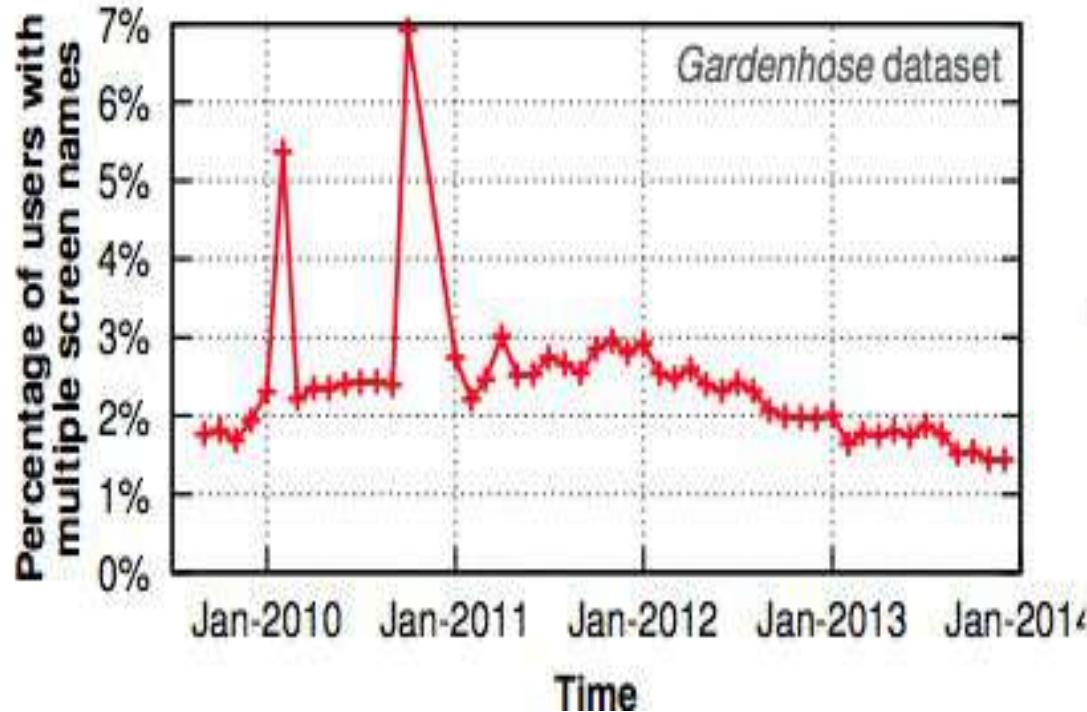
# Profile linking approach

---

- List common attributes
- Compare attribute values using syntactic, semantic or graph based methods
- High similarity denote profiles refer to a single user
- Values considered here are the most recent (current) values of the attributes



# But the values change!

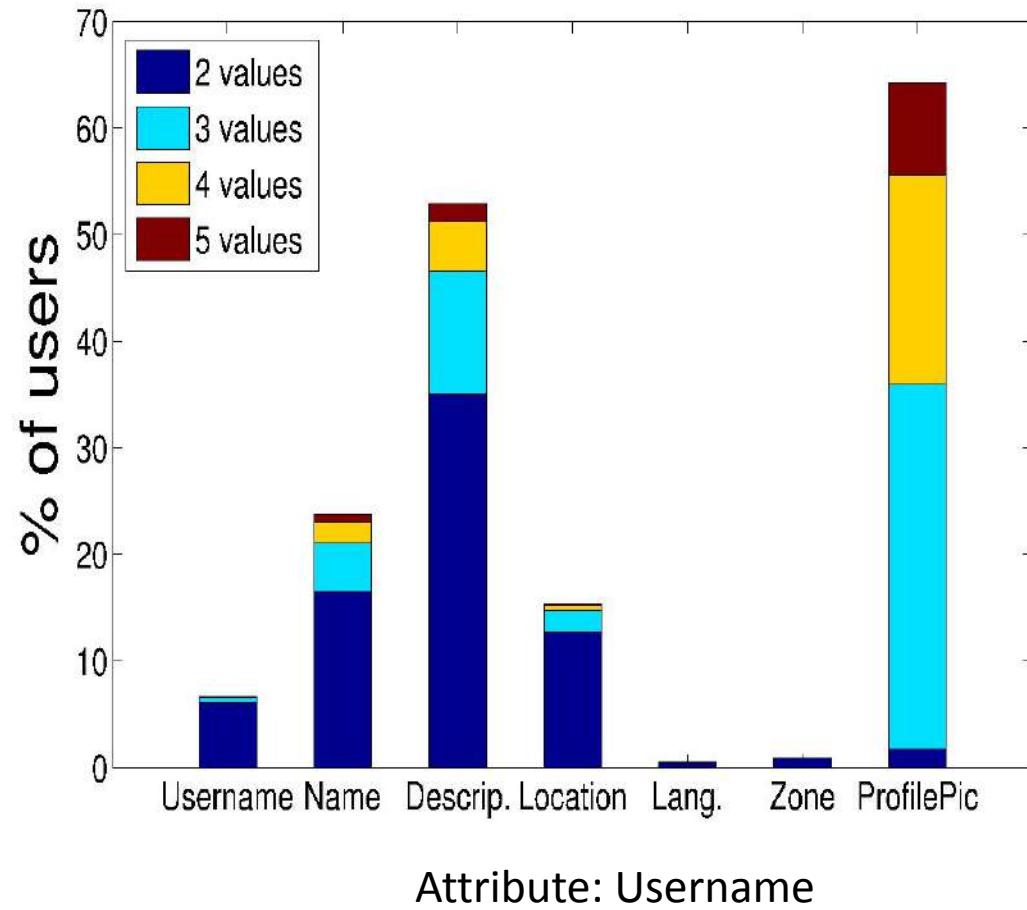


Attribute: Username

# of users tracked: 376 million [random]

Tracking period: 4 years

# Values change

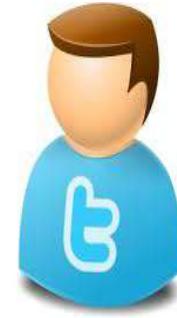
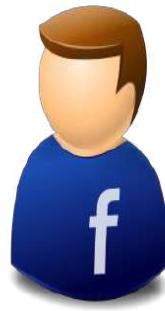
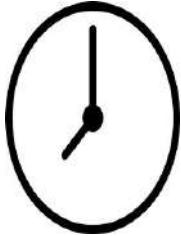


# of users tracked: 8 million [random]

Tracking period: 2 months

# Reality!

---



Registration: t1

Observation: t2

Observation: t3

@nitinsgr

@nitinsgr

@nitinsgr

@nitinsgr

@explorer\_nitin

@logicalIndian

Attribute Evolution

Unmatching values

# Problem Statement

---

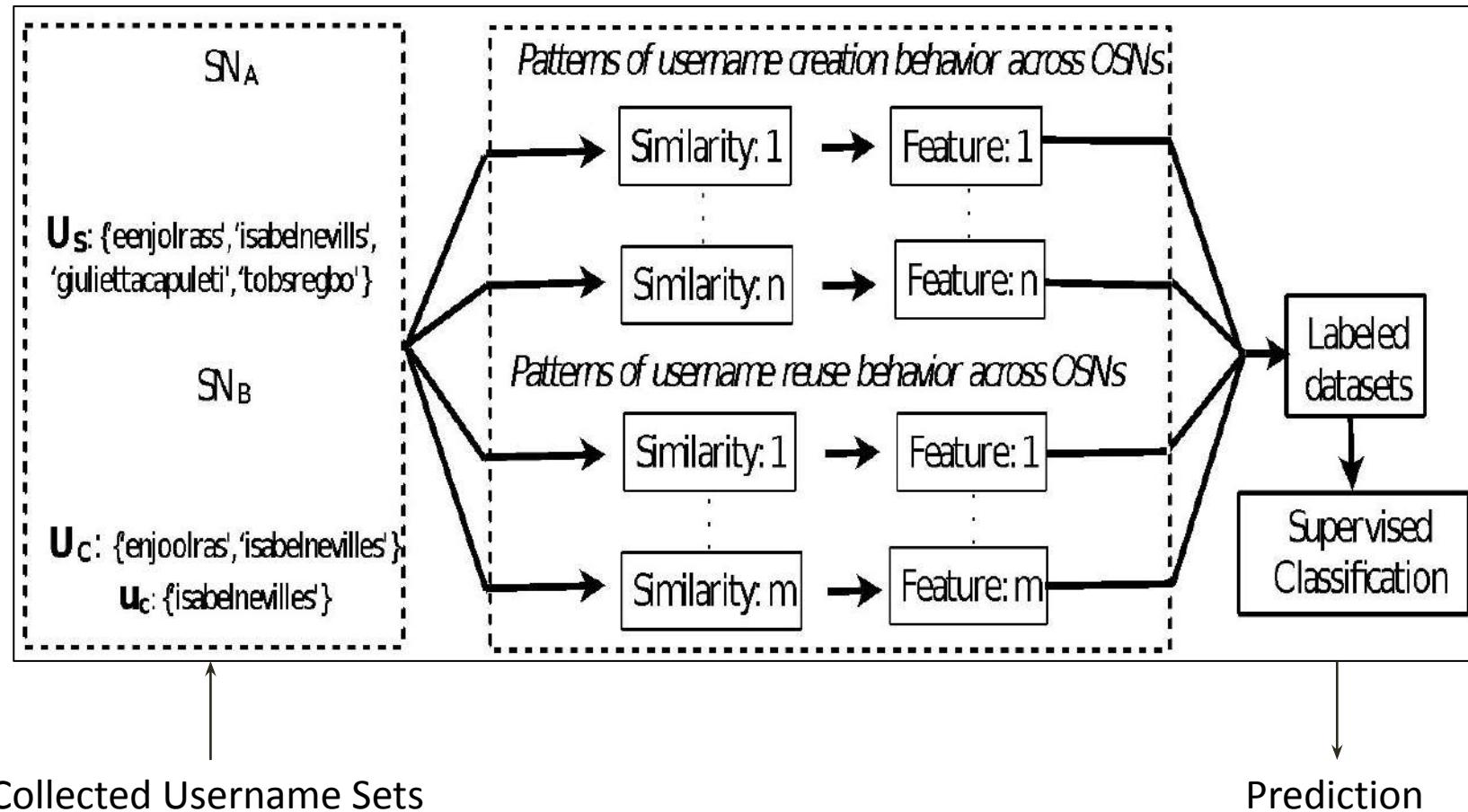
*Given two user profiles and the respective **username** sets,  
each composed of past and current **usernames**,  
find if profiles refer to a single individual?*

# Why only usernames?

---

- Unique attribute of a user
- Universally and publicly available attribute
- Homogenous, character and length restricted
- Easier history collection methods for username as other attributes

# Methodology



# Ground Truth Collection

- Self-identification behavior [Cross-referencing one's OSN accounts]
- Extrovert users

Twitter username → luzy  
@yourgirlluzy

Tumblr username on the URL → girlonthesportingnewss.tumblr.com

145 Photos and videos

TWEETS 22.9K FOLLOWING 246 FOLLOWERS 555 FAVORITES 153 Follow

Tweets Tweets & replies Photos & videos

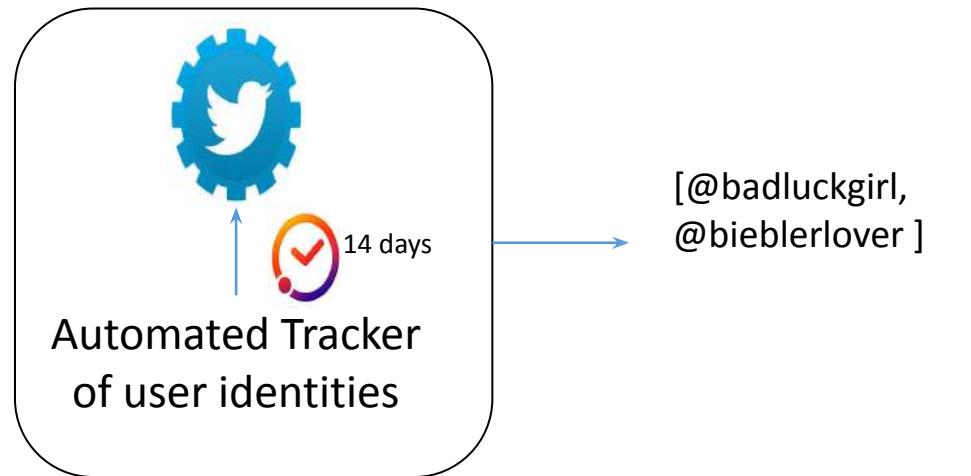
luzy retweeted the devil herself @forestfeminist · 4h \*finds cute twitter boy\* \*finds cute twitter boy's problematic tweets\* god dammit not again

luzy @yourgirlluzy · 4h Cuando las investigaciones no están escritas en tercera persona me siento muy incómoda.

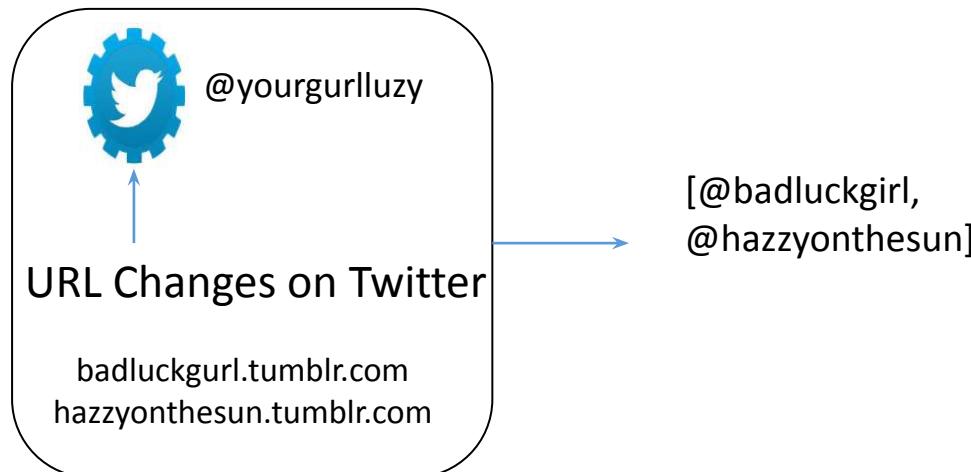
# Past Usernames Collection

---

<http://twitter.com/yourgurlluzy>



<http://girlonthesportingnewss.tumblr.com>



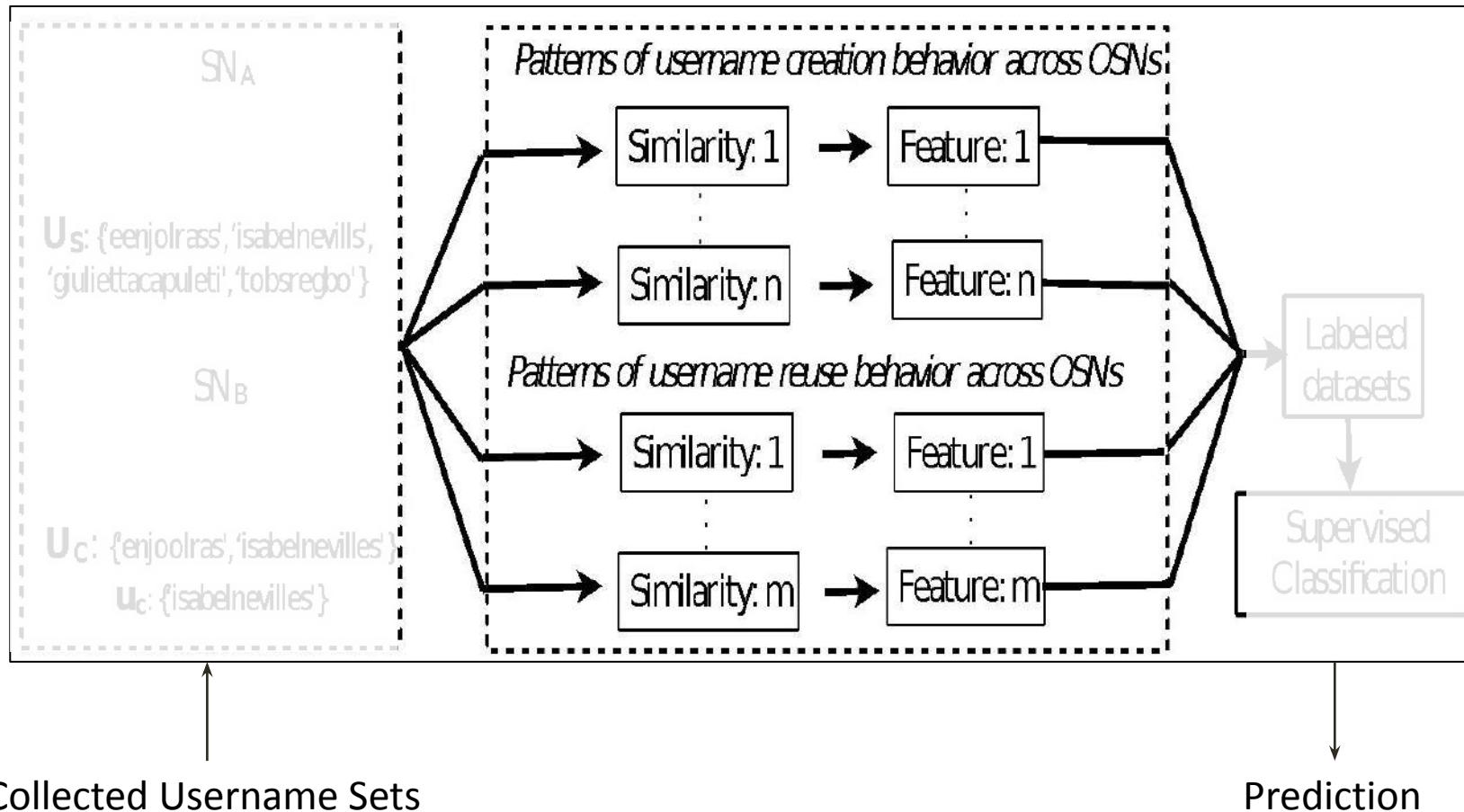
# Sample

---

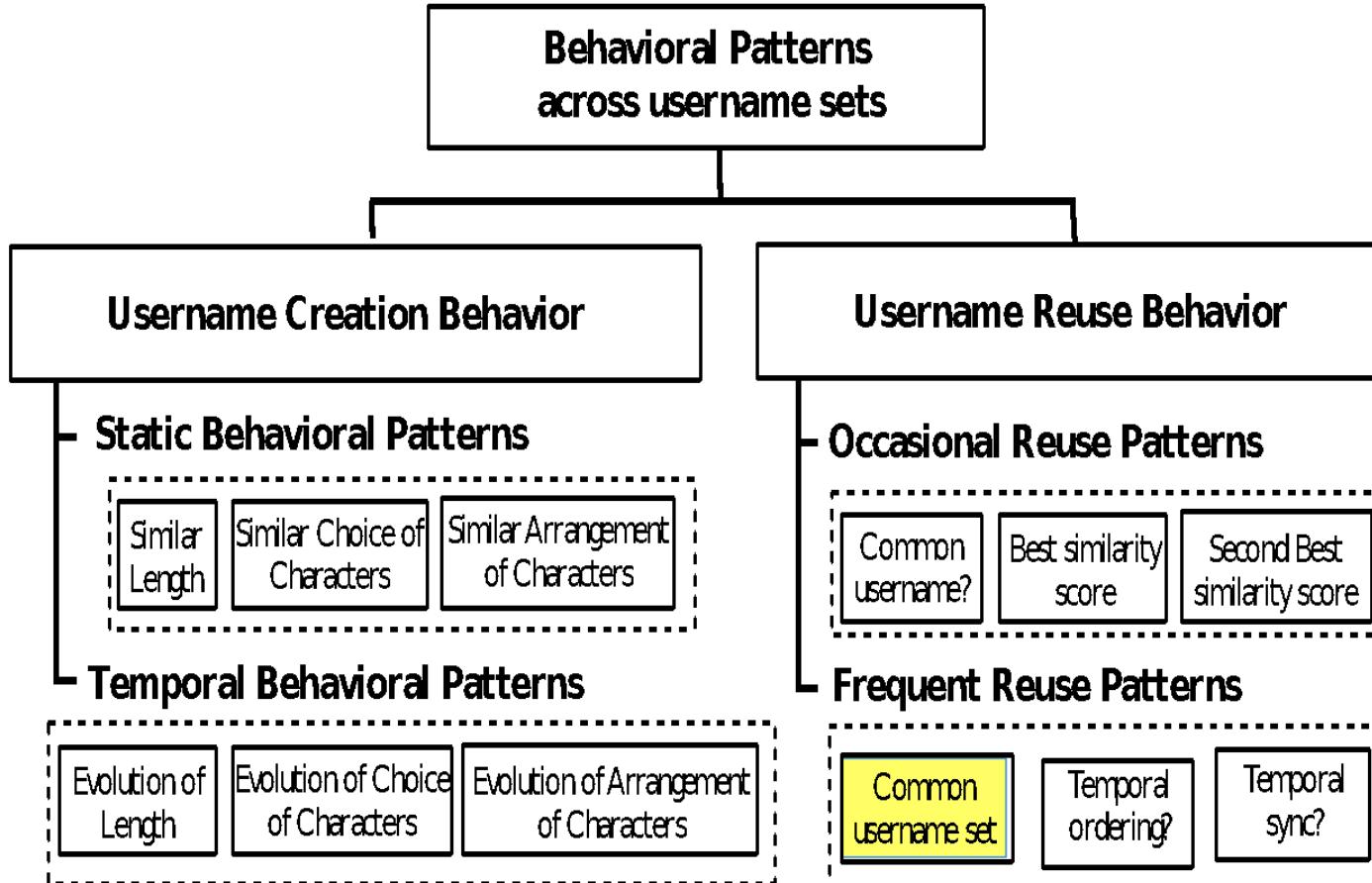
- **User ID:** 595929421
- **Past usernames on Twitter:**
  - ["**bigeasye\_**", "reezy11\_", "epiceric\_", "soulanola", "**swampson\_**", "hebethheeeric", "swampkidd\_"]
- **Past Usernames on Instagram:**
  - ["**bigeasye\_**", "epiceric17", "swampson", "hebethheeeric"]}

# Methodology

Assumption: Consistent user behavior within and across networks over time

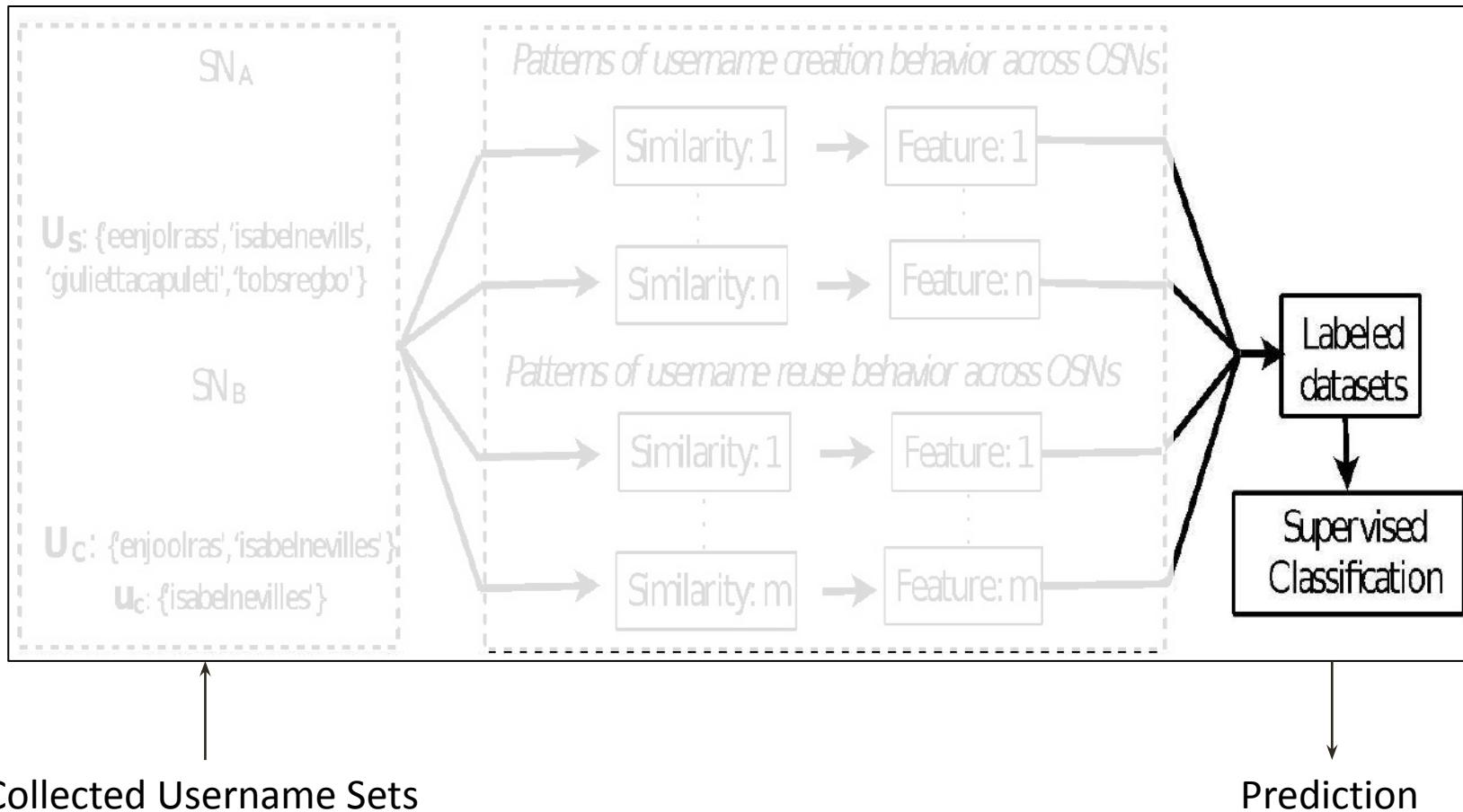


# Features



# Features: 26

# Methodology



# Datasets

---

- Linking profiles

- Twitter – Instagram
- Twitter – Tumblr
- Twitter - Facebook

- Past usernames available for both profiles:

- 21,446 positive pairs, 21,449 negative pairs

- Past usernames available only on Twitter but current username available on other profile:

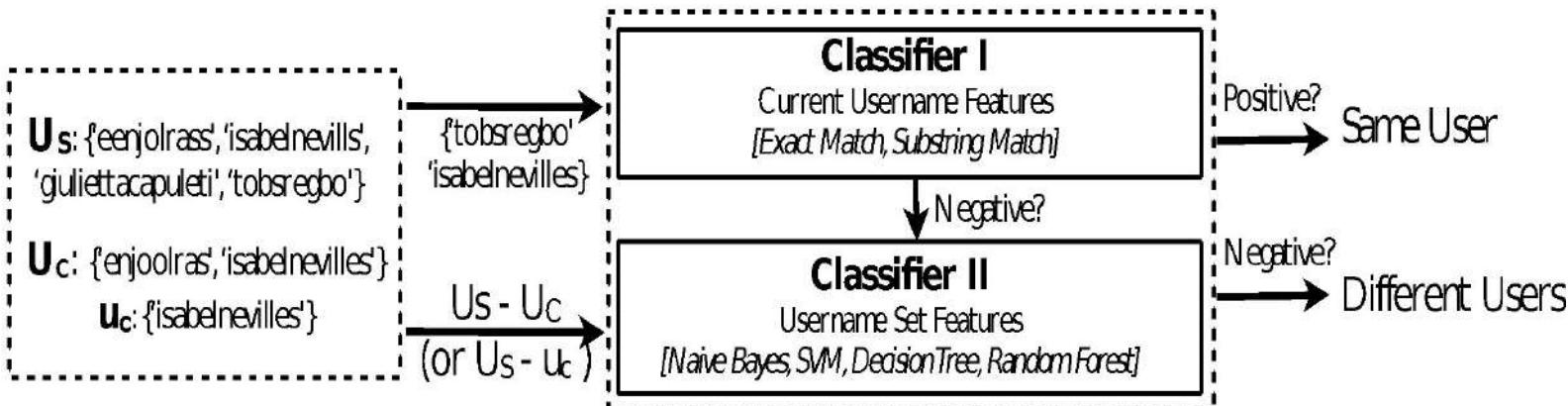
- 112,451 positive pairs, 112,451 negative pairs

# Supervised Classification

## 1. Independent Supervised Framework



## 2. Cascaded Supervised Framework



# Prediction

---

Framework Config.	Accuracy	FNR	FPR
Exact Match (b1)	<b>55.38</b>	<b>89.34</b>	<b>0.00</b>
Substring Match (b2)	60.99	78.46	0.00
Independent [Naive Bayes]	72.19	55.86	0.13
Cascaded [b1 → Naive Bayes]	72.48	55.27	0.14
<b>Cascaded [b1 → SVM [Linear]]</b>	<b>76.74</b>	<b>45.16</b>	<b>1.65</b>
Cascaded [b2 → Naive Bayes]	72.51	54.97	0.17
Cascaded [b2 → SVM [Linear]]	76.84	45.16	1.25

# Prediction

---

A comparison of cascaded framework accuracy with and without Twitter-Tumblr instances

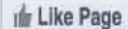
Framework Config.  
[History on Both or  
One]

	Accuracy	FNR	FPR
Exact Match (b1)	55.38	89.34	0.00
<b>Cascaded [all network]</b>	<b>76.74</b>	<b>45.16</b>	<b>1.65</b>
Exact Match without Tumblr (b1)	66.17	67.51	0.00
<b>Cascaded [without Tumblr]</b>	<b>91.20</b>	<b>16.60</b>	<b>0.96</b>

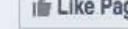
# Measuring Volume of Sentiments

 **Phạm Hoàng Nam** 😤 feeling annoyed  
June 27 · Hanoi, Vietnam ·   
I fucking hate Adobe Flash Player, force me updating new version nearly every two weeks. Can't leave without this shit. Fucking hate those mofo's :<  
7 Likes 9 Comments

 Like  Comment  Share

 **Lok C. - DigitalRev TV Cameraman**   
June 28, 2014 ·   
Apple, why? You created #Aperture, LR was just a copycat. 8 years, I'm happy to avoid Adobe. I always hate Adobe, since I was a graphic designer. Now they can charge LR for a fortune, annually. Sad day.  
386 Likes 67 Comments 2 Shares

 Like  Comment  Share

 **Pure Sugar Studios**   
May 11, 2013 ·   
UGH! all my adobe products are being temperamental and will not start! How long until the cloud is useable? Anyone else have this issue?  
[#hateadobe](#)

 Like  Comment  Share

??



**Sarah Tolzmann** @notetosarah · 18h  
when Photoshop "zones out" for a full 4 minutes and sends me into panic mode... THANKS ADOBE. HATE YOU, MEAN IT.



**Jolly Ol' Teek** @TeekTheTweeter · Aug 13  
@redlianak I use Premiere Elements. I hate Adobe with a fiery passion, but I wouldn't recommend anything else.

[View conversation](#)

??



**Jeremy Miller** @jrmillier · Aug 13  
I hate that Adobe will lock you into a monthly subscription for a year. That's some BS.

??



**Michael Laing** @Michael\_Laing · Aug 12  
@IAmPlxmas Both programs have advantages and disadvantages, C1 give a better final edit but LR is faster. I also hate that Adobe, Adobe RGB.

[View conversation](#)

# Conclusion

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- Profile linking may be necessary for many organizations / needs
- Better profile linking is possible with past history of user handles



# Activity

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- Take 2 of your accounts or any accounts that you know are same in 2 different social networks
- Find out various ways in which you can link these 2 accounts
  - List the features
- List down things that you will change in the profile to make it look as 2 different networks

# References

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- Paridhi Jain's Ph.D. thesis work

# Thank you

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fb/ponnurangam.kumaraguru

# Privacy and Security in Online Social Media

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Course on NPTEL

NOC21-CS28

Week 8.2

Ponnurangam Kumaraguru (“PK”)

Full Professor

ACM Distinguished Speaker

[fb/ponnurangam.kumaraguru](https://www.facebook.com/ponnurangam.kumaraguru), @ponguru



# Anonymous Networks

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- 4chan
- Whisper
- Secret
- Yik Yak
- Wickr

# Why use Anonymous Networks?

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- Increasing awareness of privacy
- Snowden disclosures
- PRISM Surveillance program
- Bal Thackeray incident
- Many other incidents around the world

# What is Whisper?

**whisper**    Home    Stories    Questions    ...    Search

Popular    Latest    LOL    Confessions    Relationships    OMG    **Military**    Faith    LGBTQ    Animals

**Related Stories**



**Raw Confessions From Those in Israel Who Long for Peace - And Conflict**

The complicated lives of soldiers in the field and at home



**The Heartbreaking Military Confessions Of Whisper**

Anonymous confessions on the secret-sharing app Whisper capture the complicated lives of soldiers in the field and at home.

**Get Our Free App!**

Whisper is the best place to express yourself online.

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Or we can send it to your phone

<https://whisper.sh>

# What is Whisper?



<https://www.youtube.com/watch?v=pX9l9kR2tTc>

# Hearts / Chat

The image displays two screenshots of a mobile application interface, likely from the Whisper app, illustrating the 'Hearts' and 'Chat' features.

**Left Screenshot:** A post by user 'Corkscrew' (3 weeks ago) titled 'What my friends know about me'. The post features a large image of an iceberg floating in water, with the visible part above the surface. Below the image, the text reads: 'What my Whisper peeps know about me'. The post has received 13 likes. At the bottom, there are buttons for 'Reply' and 'Chat', and a note to 'Swipe up to view 1 reply'.

**Right Screenshot:** A 'Latest' feed showing four posts:

- A post by 'Coca Cola' (1 min ago) with the caption: 'You are inconsiderate and you are naive. Please stop talking. You always make yourself look foolish.' It includes a small image of a Coca-Cola bottle.
- A post by 'I have a serious coke addiction.... Coca Cola that is.... Have 2 have them just' (1 min ago) with a similar caption and image.
- A post by 'Dinner & a Movie' (1 min ago) with the caption: 'listening to my roomie and landlady argue. oh joy.'
- A post by 'My mother and I were biking when we almost got hit by a pizza delivery car from my favorite pizza shop. never going there again' (1 min ago) with a photo of a pizza.

At the bottom of the right screenshot is a navigation bar with icons for Home, Explore, Chat (highlighted with a purple circle and a plus sign), and Me.

# Terminology / Claims

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- Whispers
- Replies
- Anonymous names
- Does not associate any personal information with user ID
- Does not archive any user history
- Does not support persistent social links between users
- “Heart” a message anonymously
- Private messages

# Whisper



whisper

Somewhere

23s ago

No Replies.  
Download the app to reply to this whisper!



Download on the  
App Store

Get it on  
Google Play

Phone Number

Get link

# Goals

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- How do whisper users interact in an anonymous environment?
- Do users form communities similar to those in traditional social networks?
- Does whisper's lack of identities eliminate strong ties between users?
- Does it eliminate stickiness critical to long term engagement as in traditional SN?

# Data collection

---

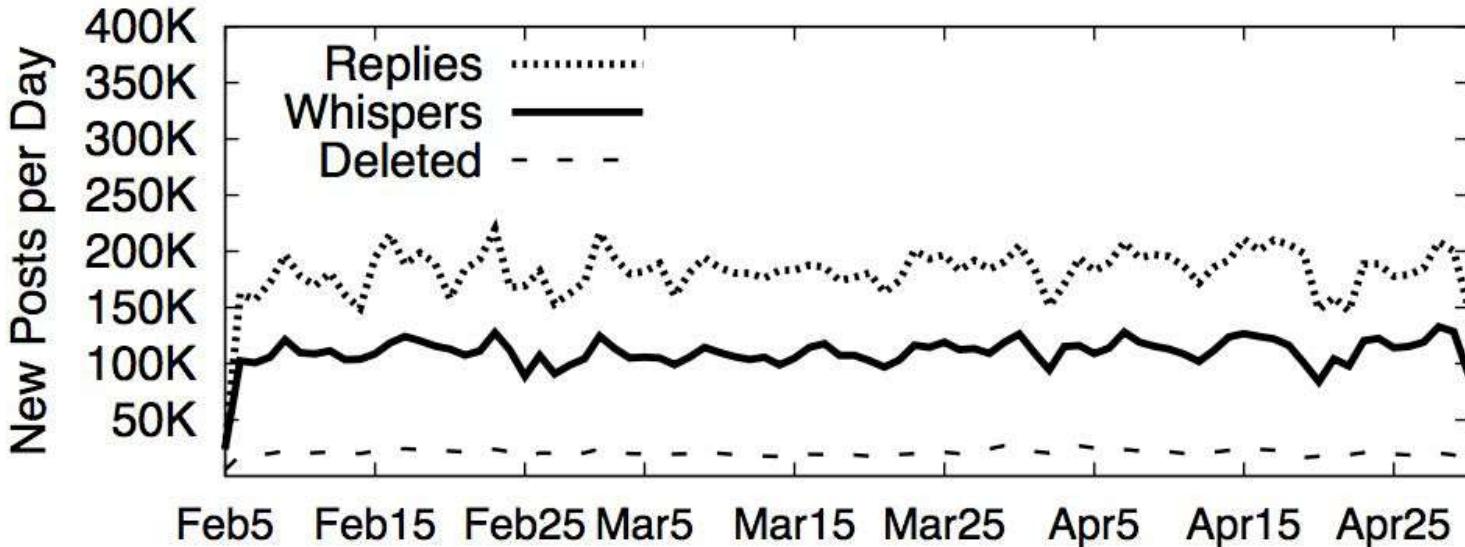
- Feb 6<sup>th</sup> – May 1<sup>st</sup> 2014
- Collected “Latest” list by scrapping
- Data include
  - WhisperID
  - Timestamp
  - Plain text of the whisper
  - Author’s nickname
  - A location tag
  - # of replies (marked with the whisper)
  - Likes

# Data collection

---

- 9,343,590 whispers
- 15,268,964 replies
- 1,038,364 GUIDs
  - Global Universal Identifier
  - Makes it possible to track user, but was removed in June 2014
- Interacted with Whisper team

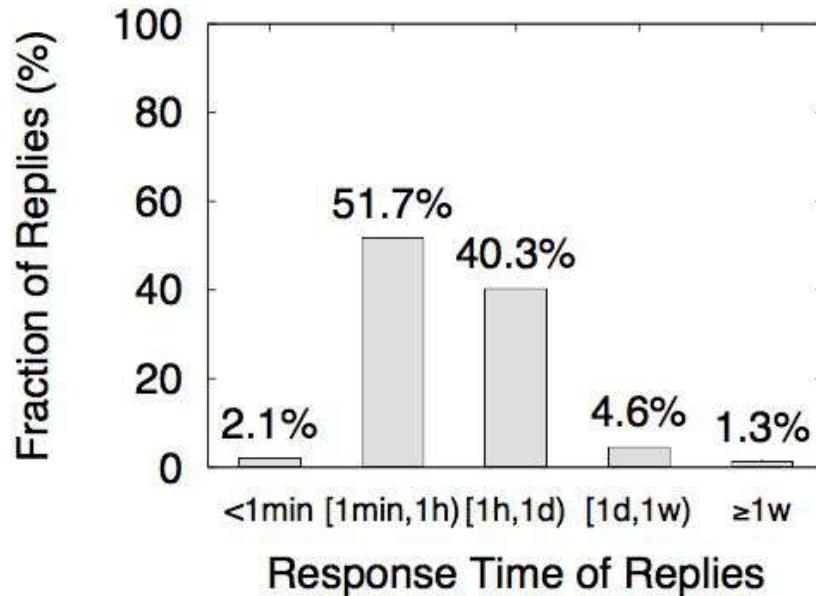
# Data



- 55% of whispers receives no replies
- 25% have a chain of at least 2 replies

# Time between original & reply

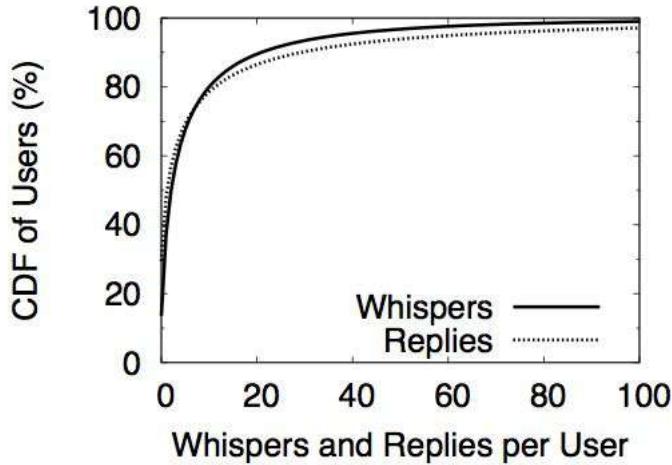
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- 54% of replies arrive within an hour of the original whisper
- 94% of replies arrives in one day
- 1.3% of replies arrive a week or more
- “If a whisper does not get attention shortly after posting, it is unlikely to get attention later.”

# Posts per user

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- 80% users post less than 10 total whispers or replies
- 15% of users only post replies but no original whispers
- 30% of users only post whispers but no replies

# Network analysis

---

Graph	# of Nodes	# of Edges	Avg. Degree	Clustering Coef.	Avg. Path Length	Assortativity Coef.
Whisper	690K	6,531K	9.47	0.033	4.28	-0.011
Facebook	707K	1,260K	1.78	0.059	10.13	0.116
Twitter	4,317K	16,972K	3.93	0.048	5.52	-0.025

- High average Degree. Users interact with large sample of other users.
- Whisper users are likely to interact with complete strangers who are highly unlikely to interact with each other (low clustering coef.)
- 100 random nodes. Avg. path length calculated. Shortest average path among 3.
- Above 3 used to infer that graph is random than “small world”

# Network analysis

---

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- Assortativity measures the probability for nodes in a graph to link to other nodes of similar degrees.
- Close to zero → random graph

# Content moderation

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- 1.7 million whispers have been deleted in 3 months
- 18% of content deleted compared to 4% in Twitter

# Content moderation: Process

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- Extracted keywords from all whispers
- Removed common stop-words
- Removed words that appear in less than 0.05% of whispers
- Compute *deletion ratio* for each word
  - # of deleted whispers with this word / all whispers with this keyword
- Rank the words with deletion ratio
- Top and bottom keywords

# Content moderation: Process

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- Run on all 9 million original whispers
- 1.7 M were deleted
- 2,324 keywords ranked by deletion ratio
- Manually put them in categories

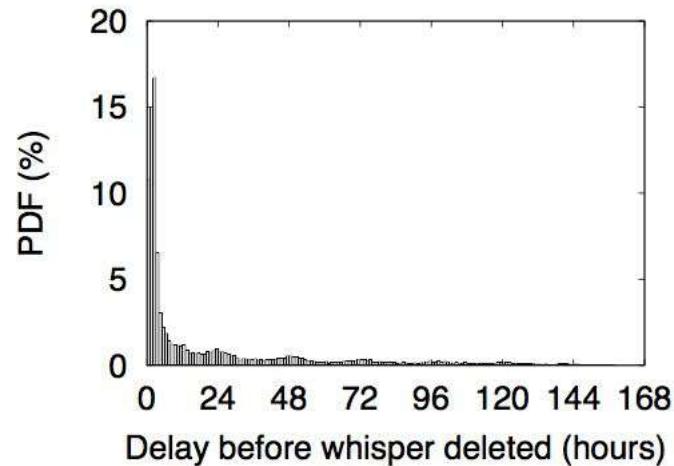
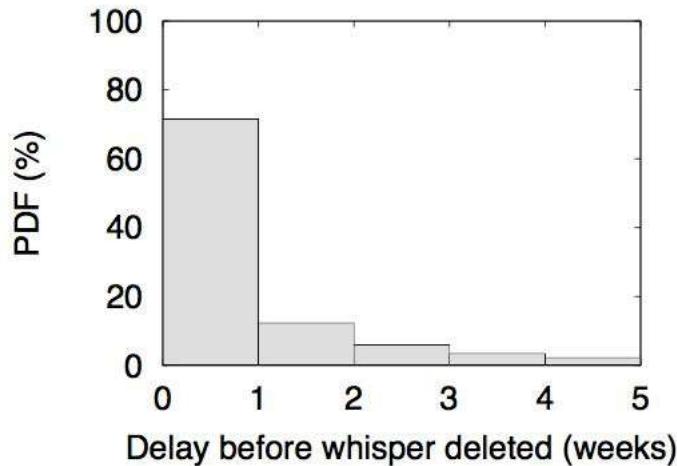
# Content moderation

---

<b>Topic</b>	<b>Top 50 Keywords Most Related to Deleted Whispers</b>
Sexting (36)	sext, wood, naughty, kinky, sexting, bj, threesome, dirty, role, fwb, panties, vibrator, bi, inches, lesbians, hookup, hairy, nipples, freaky, boobs, fantasy, fantasies, dare, trade, oral, takers, sugar, strings, experiment, curious, daddy, eaten, tease, entertain, athletic
Selfie (7)	rate, selfie, selfies, send, inbox, sends, pic
Chat (7)	f, dm, pm, chat, ladys, message, m
<b>Topic</b>	<b>Top 50 Keywords Least Related to Deleted Whispers</b>
Emotion (17)	panic, emotions, argument, meds, hardest, fear, tears, sober, frozen, argue, failure, unfortunately, understands, anxiety, understood, aware, strength
Religion (10)	beliefs, path, faith, christians, atheist, bible, create, religion, praying, helped
Entertain. (8)	episode, series, season, anime, books, knowledge, restaurant, character
Life story (6)	memories, moments, escape, raised, thank, thanks
Work (5)	interview, ability, genius, research, process
Politics (1)	government
Others (3)	exactly, beginning, example

# Deletion delay

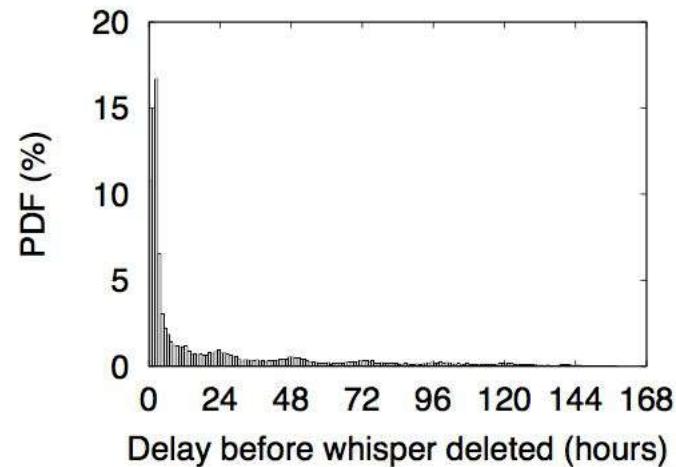
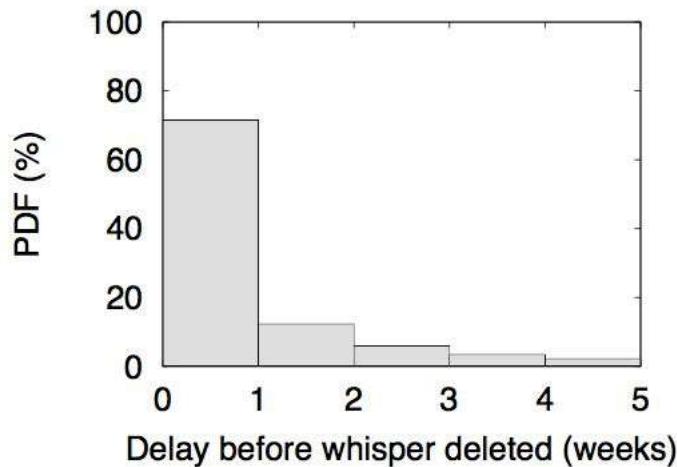
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- 70% of deleted whispers are “deleted” within one week after posting
- 2% of the whispers stay for more than a month
  - Done by moderators

# Deletion delay

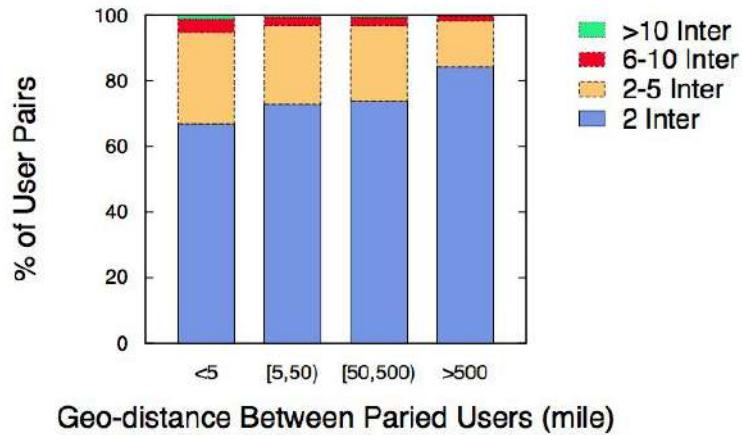
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- Fine grained analysis
- Recrawled for 200K latest whispers
- 32,153 was deleted
- Peak deletion 3 – 9 hrs
- Majority deletes within 24 hrs

# User interactions

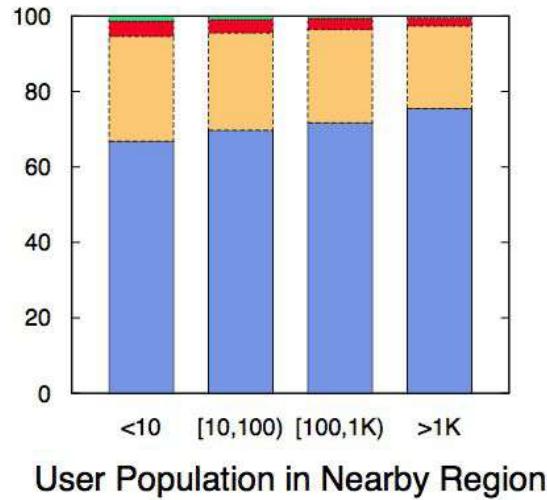
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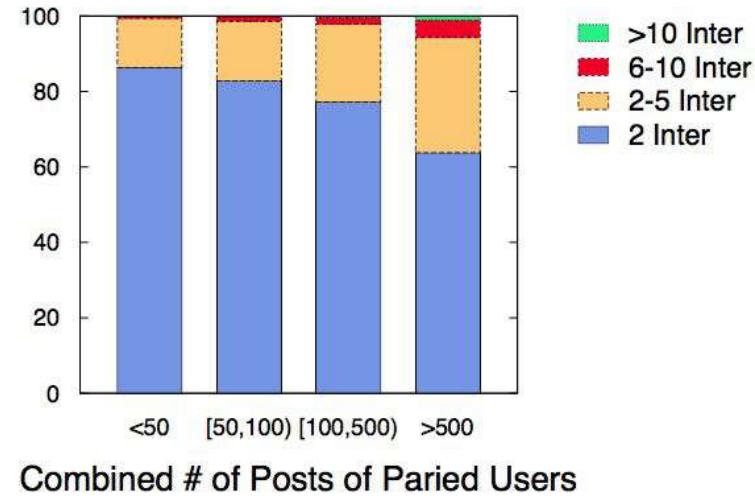
- 503K user pairs
- 90% of the two users co-located in the same “State”
- 75% have their distance < 40 miles

# User interactions

% of User Pairs



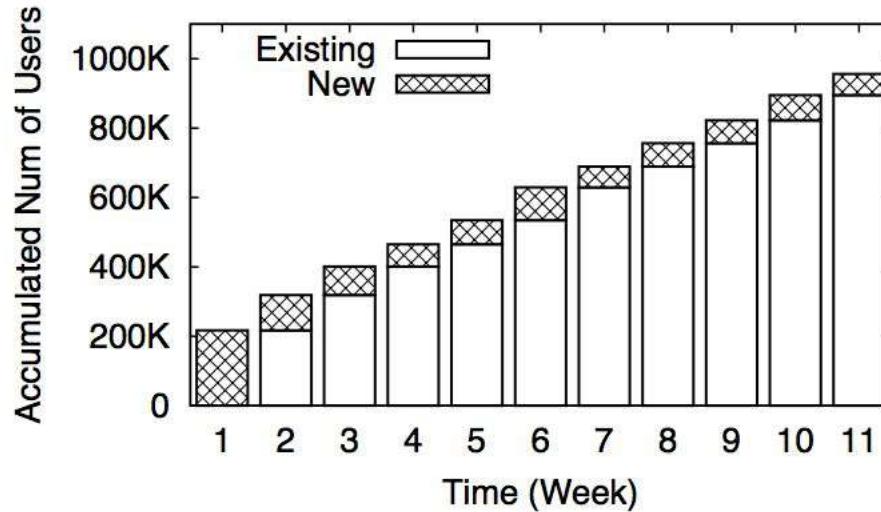
% of User Pairs



- Smaller user population in same nearby area, higher chance of encounter
- More whispers 2 users post, more likely they encounter each other

# User engagement

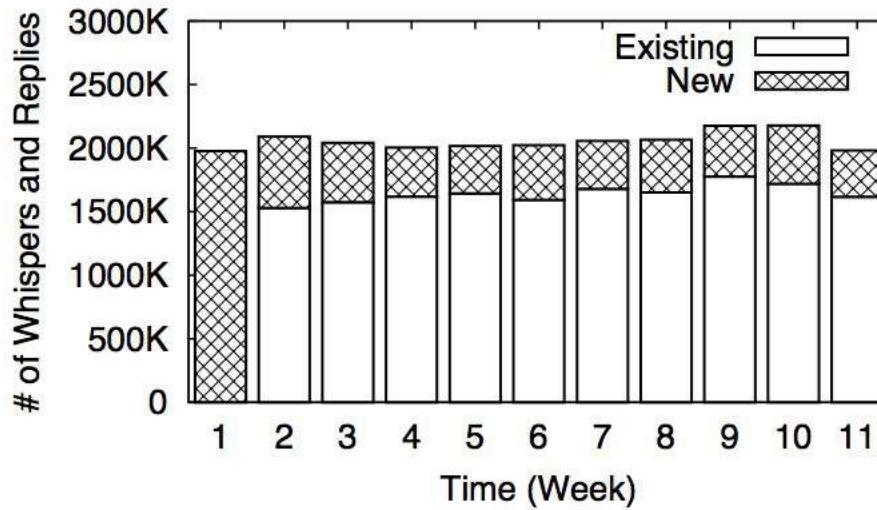
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- Roughly 80K users per week
- Daily new posts in the entire network remain stable, despite new users (earlier conclusion)
- Shows users “disengage”

# User engagement

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- # of whispers and replies by both new and old users
- New users make 20% contribution in the content
- Content by new users does not grow significantly

# Conclusions

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- Clearly different from traditional social networks
- Without strong user identities or persistent social links, users interact with strangers
- Moderation is necessary

# References

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- <http://www.cs.ucsb.edu/~ravenben/publications/pdf/whisper-imc14.pdf>

# Thank you

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