

Studying jerks on the Internet: A Data-Driven Approach

Emiliano De Cristofaro

(Thanks to Jeremy Blackburn and
Savvas Zannettou for most of the slides)



Outline

1. Hate on and “raids” from fringe communities like 4chan [ICWSM 2017]
2. Influence of fringe communities on misinformation [IMC 2017]
3. Misuse of Web archiving services [ICWSM 2018]

More work on online hate, cyberbullying, etc:

<https://encase.socialcomputing.eu/publications>

WARNING

CONTENT IN THIS TALK IS

OFFENSIVE

AND UNCENSORED

What is 4chan?



An image-board forum

Organized in boards (70 at the moment)

An “original poster” (OP) creates a new thread by making a post

Single image attached

Other users can reply:

With or without images, possibly add references to previous posts, quote text, etc.

What is 4chan?



Boards					filter ▼
<u>Japanese Culture</u>	<u>Interests</u>	<u>Creative</u>	<u>Other</u>	<u>Adult (NSFW)</u>	
Anime & Manga	Comics & Cartoons	Oekaki	Business & Finance	Sexy Beautiful Women	
Anime/Cute	Technology	Papercraft & Origami	Travel	Hardcore	
Anime/Wallpapers	Television & Film	Photography	Fitness	Handsome Men	
Mecha	Weapons	Food & Cooking	Paranormal	Hentai	
Cosplay & EGL	Auto	Artwork/Critique	Advice	Ecchi	
Cute/Male	Animals & Nature	Wallpapers/General	LGBT	Yuri	
Flash	Traditional Games	Literature	Pony	Hentai/Alternative	
Transportation	Sports	Music	Current News	Yaoi	
Otaku Culture	Alternative Sports	Fashion	Worksafe Requests	Torrents	
<u>Video Games</u>	Science & Math	3DCG	Very Important Posts	High Resolution	
Video Games	History & Humanities	Graphic Design	<u>Misc. (NSFW)</u>	Adult GIF	
Video Game Generals	International	Do-It-Yourself	Random	Adult Cartoons	
Pokémon	Outdoors	Worksafe GIF	ROBOT9001	Adult Requests	
Retro Games	Toys	Quests	Politically Incorrect		
			International/Random		
			Cams & Meetups		
			Shit 4chan Says		

What is 4chan?

A

Anonymous (ID: 9jBLod1) 09/11/16(Sun)22:27:40 No.88456696 #

HILLAREEEEE
115 KB JPG
>>88456696 #

Anonymous (ID: pBZ5QvTV) 09/11/16(Sun)22:31:21 No.88456696 #
>>88456217 #
Get this fuck outta here. He isn't a man of conviction and virility like Cruz. He's just a sad little man who slobbers the spit of Hillary's shoes. I love Trump but I respect people who have true beliefs and a moral compass and stand up for themselves.
>>88457099 #

Anonymous (ID: v3o8XuzJ) 09/12/16(Mon)03:24:29 No.88514099 #
Clinton Gone = Trump's Worst Ni(...) 09/12/16(Mon)03:24:29 No.88514099 #

You faggots realize that Clinton being ill/dying isn't a good thing for Trump, right?
If she decides to drop out of the race then what? The Dems put up Kaine, Biden, or maybe even Sanders.
Then Trump gets BTFO in a landslide loss because the Dem's formerly utterly hated and untrustworthy candidate is gone and replaced by someone much more likable.
It's as if you're all actually shortsighted and retarded and you're not all pretending.

B

Anonymous (ID: EwOd/vsa) 09/12/16(Mon)06:49:28 No.88514002 #
New World Order

If you could reorganize the world, what would you do?
drift in to the abyss
433 KB PNG

C

Anonymous (ID: mwscH3IG) 09/12/16(Mon)07:02:57 No.88514002 #
>>88512762 (OP) #
Gas the Kikes, race war now.

1.41 MB PNG
>>88514099 # >>88514299 #

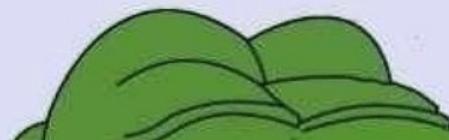
Anonymous (ID: 15q2UlcL) 09/12/16(Mon)07:03:58 No.88514099 #
>>88514002 #
First post tits post.

D

Anonymous (ID: tUz3Ymz) 09/09/16(Fri)07:25:20 No.8157... 6 #

JJJKSLdd.jpg
64 KB JPG
This is a holy thread. Please pay respects to Kek and your post will be blessed.

He



WHERE DID EVERYTHING
GO SO REICH



Why Do We Care About 4Chan?

“4chan is niche and irrelevant” – Anonymous WWW’17 Reviewer

How a racist, sexist hate mob forced Leslie Jones off Twitter

By Kristen V. Brown



Leslie Jones hack: Inside the alt-right's racist celebration of Jones' humiliation

THE VERGE



LONGFORM REVIEWS VIDEO TECH CIRCUIT BREAKER SCIENCE ENTERTAINMENT CARS TL;DR MO

APPLE US & WORLD CYBERSECURITY

4chan may have remotely wiped a Clinton official's iPhone and iPad

Related: 4chan is the worst

by Russell Brandom · @russellbrandom · Oct 13, 2016, 3:23p



VB

BUSINESS

French fear Putin and Trump followers are using 4chan to disrupt presidential election

CHRIS O'BRIEN @OBRIEN MAY 5, 2017 3:40 AM

#MediasNextTrumpLie: Inside 4chan's pro-Trump spam campaign to derail the media

TAYWARD YOUTH

3/24/16 3:10 PM



By Melanie Ehrenkranz
October 14, 2016

GET MI
DAILY:

Who turned Microsoft's chatbot racist? Surprise, it was 4chan and 8chan

By Ethan Chiel

/pol/ – Politically Incorrect Board

 File: [sticky.jpg](#) (571 KB, 1600x1131)



Welcome to /pol/ - Politically Incorrect

Anonymous (ID: lv9eTFJC) 01/08/15(Thu)23:40:44 No.40489590 ➤ 🔒
[Reply] ►

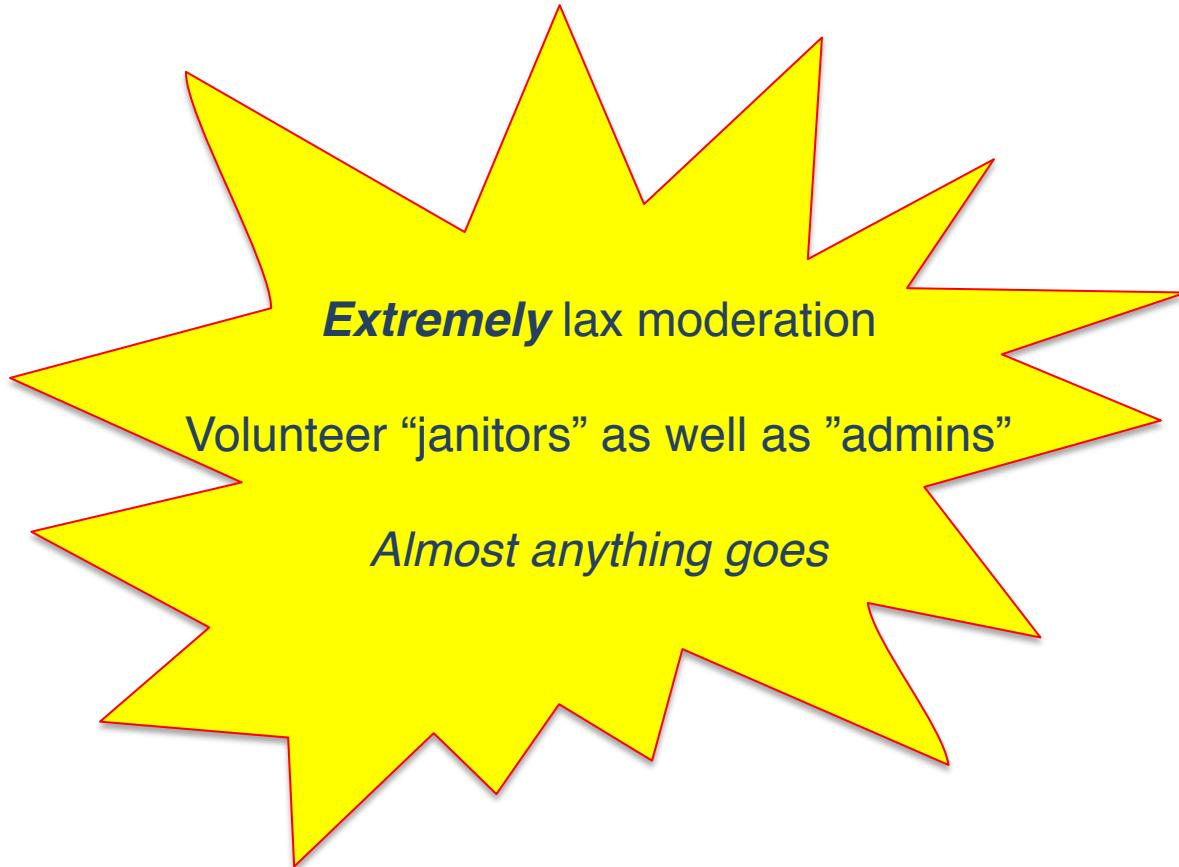
This board is for the discussion of news, world events, political issues, and other related topics.

Off-topic and /b/-tier threads will be deleted (and possibly earn you a ban, if you persist). Unless they are quality, well thought out, well written posts, the following are examples of off-topic and/or /b/-tier threads:

>Red pill me on X. (with no extra content or input of your own)
>Are X white?
>Is X degeneracy?
>How come X girls love Y guys so much?
>If X is true, then how come Y? Checkmate Z.

The variety of threads allowed here are very flexible and we believe in freedom of speech, but we expect a high level of discourse befitting of the board. Attempts to disrupt the board will not be tolerated, nor will calls to disrupt other boards and sites.

/pol/ – Politically Incorrect Board



In This Talk: Challenges of Measuring 4chan

1. Not your typical social network (anonymous/ephemeral)
2. Their actions not limited to 4chan, need to look at other platforms to measure their impact
3. Knowing what they're talking about is not easy
4. You get raided
5. You might get “redpilled”

Anonymity & Ephemerality

Users do not need to register an account to participate

Anonymity is the default (and preferred) behavior

“Some” degree of permanence and identifiability is supported

Can enter a name along with their posts (no authentication though)

Threads get “archived” after a while

Actually all posts deleted after a week

(More later)

Datasets

	/pol/	/sp/	/int/	Total
Threads	217K	14.4K	24.9K	256K
Posts	8.3M	1.2M	1.4M	10.9M
June 30 to September 12, 2016				

Methodology:

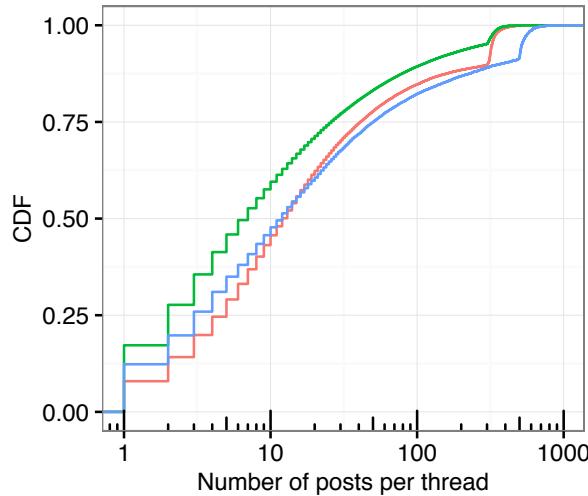
Visit the “catalog”

Take a snapshot every 5 minutes

Once a thread is pruned, retrieve full/final contents from archive

We're still crawling...

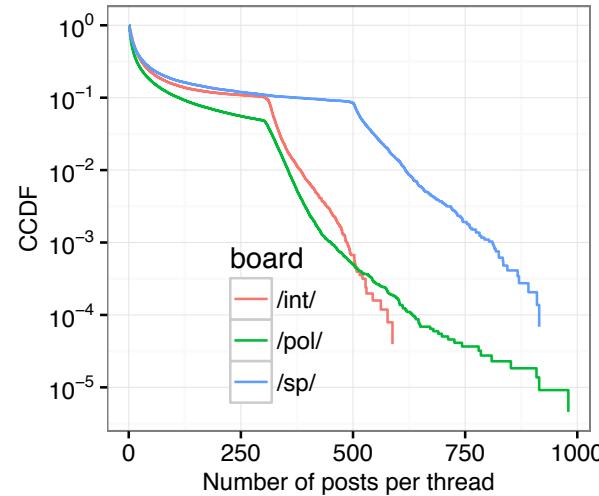
Ephemerality: The Bump System



Limit boards to N live threads

Threads ordered by MRU

A new post in a thread “bumps” it up to the top



Create new thread → Old thread dies

Bump limit

Max times thread can be bumped
No discussion will dominate forever

Geographic Distribution of Users



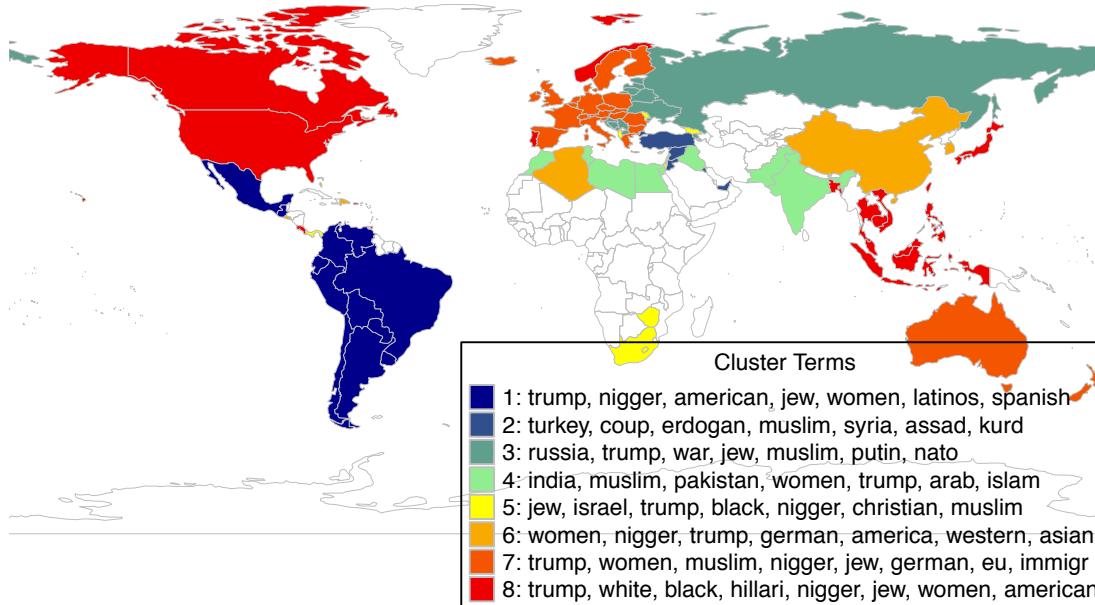
09/11/17(Mon)07:17:26

/pol/ users seems well distributed

Native English speaking countries most highly represented

Plenty of other countries really well represented too though!

Are Flags Trustworthy?



Use spectral clustering of the topics that each country posts about

The clusters follow real world socio-political blocks

While flags are not perfect, they seem reasonable

Hate Speech?



Crowdsourced dictionary

Manually filtered a bit

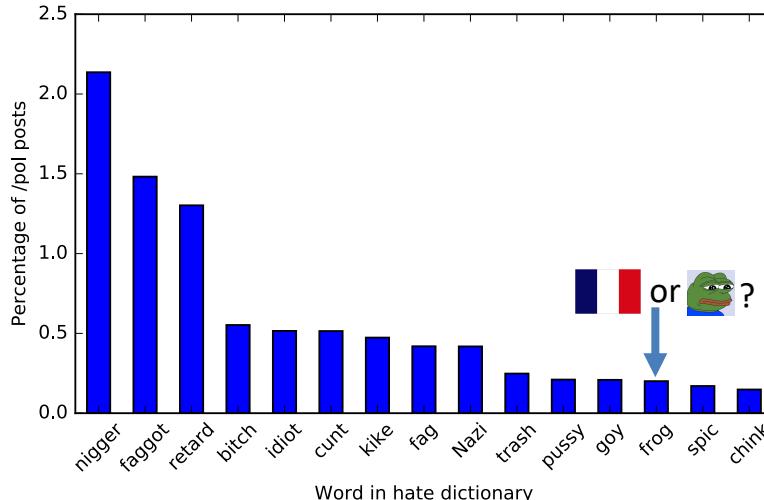
/pol/ by far most
hate speech use

/pol/ 12%

/sp/ 7.3%

/int/ 6.3%

Twitter 2.2%



Raids

Attempts to disrupt another site

Not a DDoS

Disrupts *community* that calls service home, not the service itself

Raids are a favorite past time on 4chan

“Pool’s closed!”

Have become less “funny” and more “scary” lately

It’s a *socio-technical* problem

YouTube Raids

Someone posts a YouTube link

Maybe with a prompt like “you know what to do”

Thread is an aggregation point for raiders

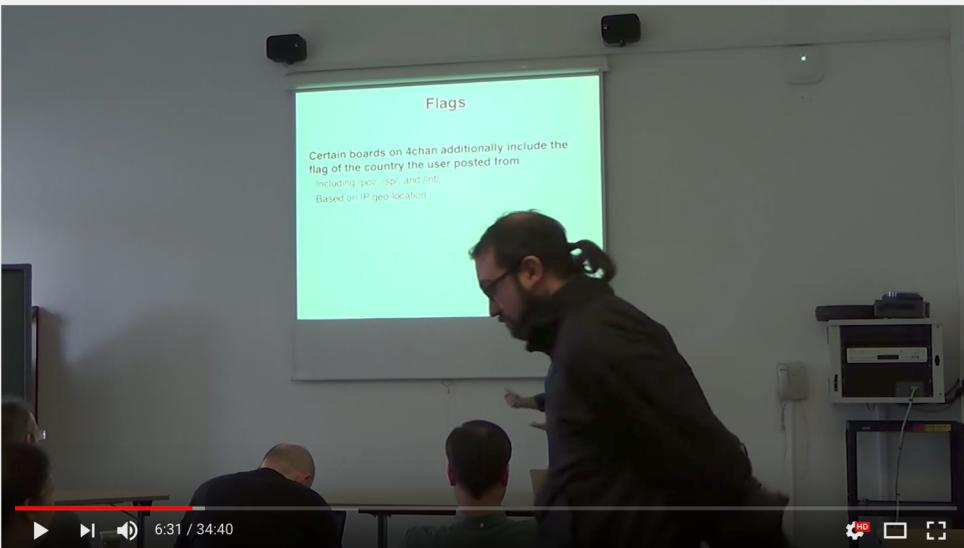
E.g., “Hah! I called that person a nigger!”

If raid is taking place:

Peak in YouTube comments while thread alive?

/pol/ thread and YT comments *synchronized*?

Raids



Hans2k4ever 1 month ago
When will the normies learn?

Reply • 181

[View all 3 replies](#)



Jack Harper 1 month ago

mfw he accidentally redpills his whole class, they all found the memes funny even the so called "hate speech" he talks about

Reply • 13



Jack Harper 1 month ago

I guess I haven't tightened my fedora enough to be as enlightened by my own enlightenment as you sir. Carry on brave knight!

Reply •



Adem Adiyaman 1 month ago

23:21 "the victory of donald trump and the rise of ultra nazi people"
you dense fuck, nice brain washing

Reply • 227

[View all 16 replies](#)



Szgerle 1 month ago

Not even just your regular nazi but ULTRA NAZI!

Reply • 1



Drakewood 1 month ago

+Potato Jenova A FUCKING LEAF!

Reply •

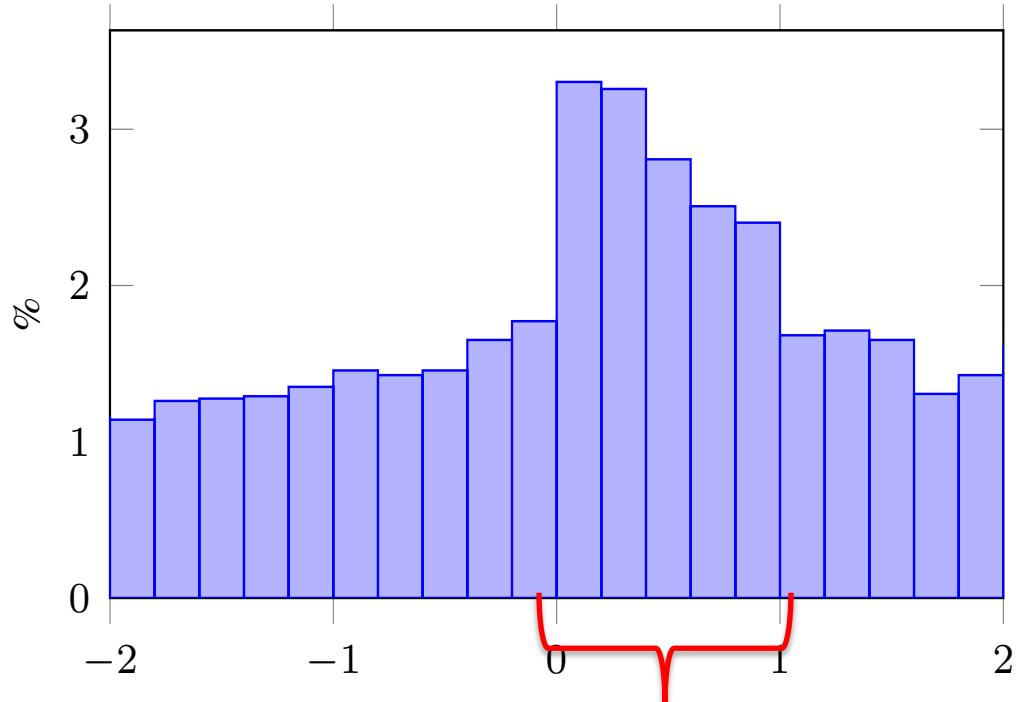


Thought Criminal 1 month ago

Holy fuck, (((they))) are actually intimidated by the powers of Kek.

Reply • 169

Activity Peaks

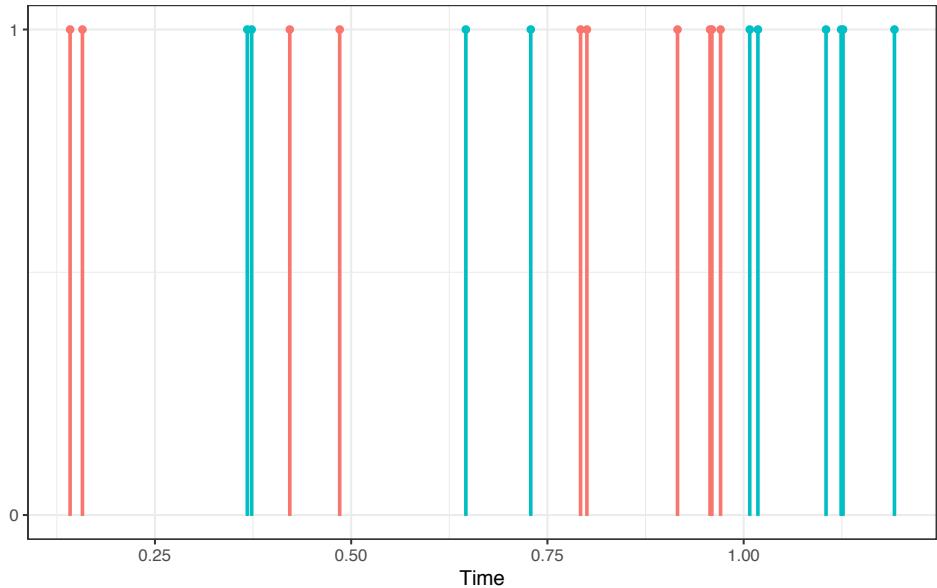


YT videos with peaks
during 4chan thread

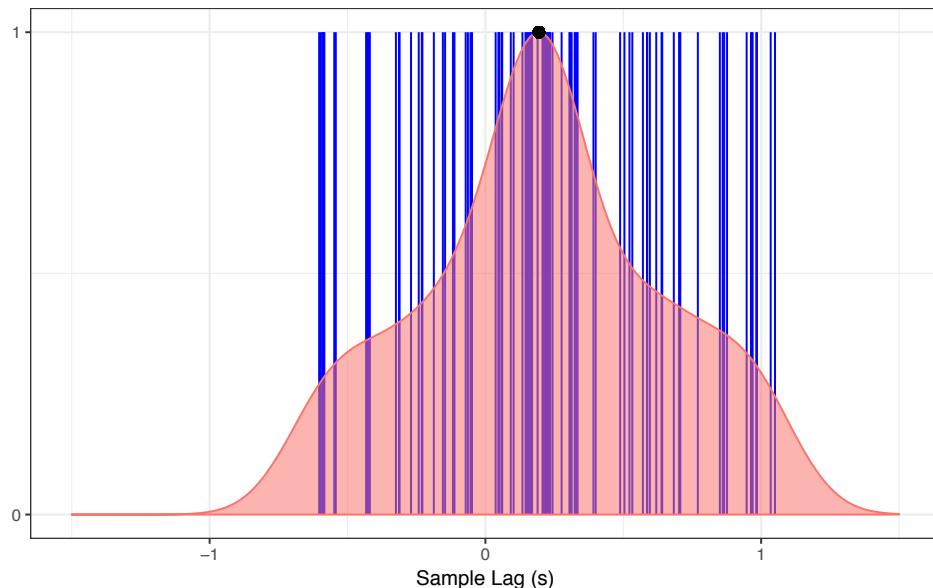
Determined via PDF of
commenting timeseries

14% of videos see peak
commenting activity during
/pol/ thread lifetime

Synchronization

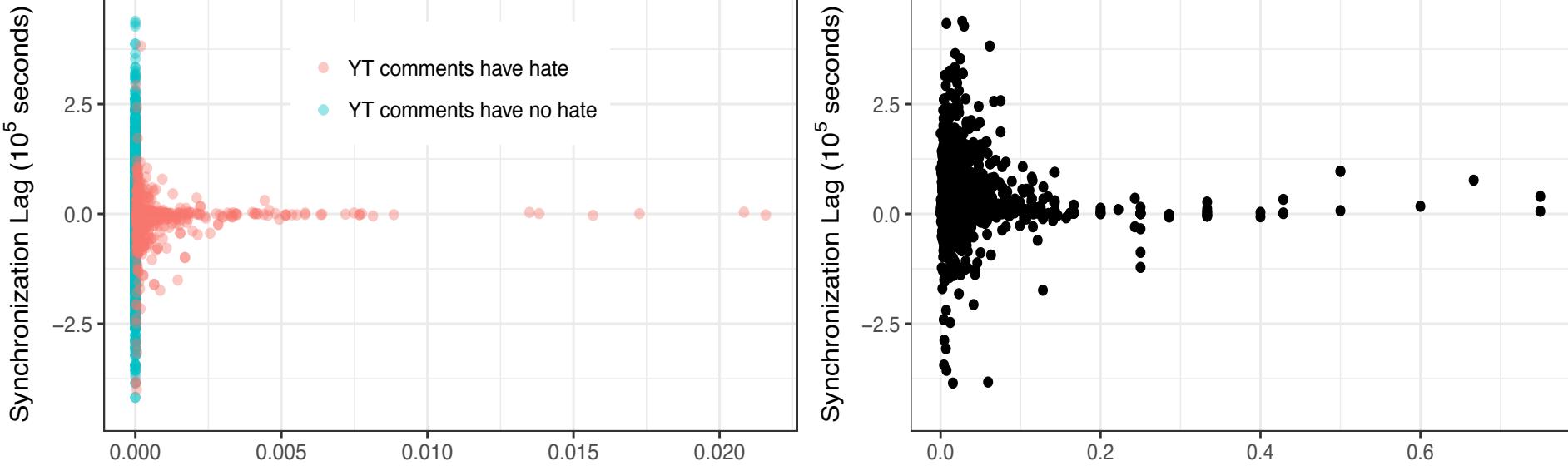


Two series, second randomly shifted from first by 0.2s on avg



Blue lines → per-sample lag
Red area → density of the lags
Peak of density curve = 0.2s

Validation



Anonymous (ID: DaWZlbeh)

10/13/16(Thu)20:08:55 No.92772435 ►

>>92765569

Physicist finalist here, can confirm the maths is legitimate. Holy fuck

A Longitudinal Measurement Study of 4chan's Politically Incorrect Forum and its Effect on the Web

Gabriel Erdö-Házi*, Jánosch Chastapov, Enrico De Dominicis, Nicolas Poujollet,
Flor Lombarini, Régis Seznec, Giacomo Stranghetti, Jeremy Blackburn
*Vrije Universiteit, University College London
**Research Institute, Cyprus University of Technology

ABSTRACT

Although it has been a part of the digital media ecology of the Japanese diaspora since the 1990s, research on the 4chan forum has been limited. In particular, no study has examined the longitudinal development of the forum's political discourse. This paper aims to address this gap by conducting a longitudinal study of the forum's political discourse from 2009 to 2014. We collected data from the forum's homepage and analyzed the posts made by users. The results show that the political discourse on 4chan has changed over time, with a shift from more general topics to more specific ones. The analysis also revealed that the political discourse on 4chan has become more polarized, with users becoming more divided into pro- and anti-political groups.

get in here fellow niggers, post your least rare Pepes



Sam Hyde

2016-11-17 at 22:05 UTC

When U.N. sends its Pepes, they're not sending their best. They're not sending Kek, they're not sending rares. They're sending Pepes that have lots of copies, and they're bringing those copies with us. They're bringing tumblr. They're bringing facebook. They're common. And some, I assume, are rare Pepes.

UN WASTED MONEY ON A /pol/ STUDY Anonymous (ID: lYtnR5XJ)

10/13/16(Thu)07:31:17 No.92707709 ► >>92708226 >>92708494 >>92708807 >>92708920
>>92708964 >>92709004 >>92709055 >>92709458 >>92709504 >>92709671 >>92709689 >>92709707
>>92709752 >>92709763 >>92709772 >>92709836 >>92709859 >>92709901 >>92710035 >>92710191
>>92710347 >>92710410 >>92710492 >>92710713 >>92711326 >>92711414 >>92711436 >>92711936
>>92712405 >>92713026 >>92713224 >>92713468 >>92713749 >>92713994 >>92714051 >>92714304
>>92714890 >>92714945 >>92715027 >>92715081 >>92715163 >>92715226 >>92715425 >>92715526
>>92716103 >>92716697 >>92717080 >>92717254 >>92717388 >>92717738 >>92718263

<https://arxiv.org/pdf/1610.03452v1.pdf>

[Return] [Catalog] [Bottom]

File: Cucks.png (209 KB, 1181x535)

The Cuckademics, A Study Anonymous (ID: zw8wNrfR) 10/13/16(Thu)06:18:21 No.92700473 ▶

Jeremy Blackburn
>his work on the contagious aspects of cheating and understanding and learning about cyberbullying/toxic behavior in online games represent the largest scale studies of such behavior, providing insite useful not just for the gaming community, but in understanding anti-social behavior in the real-world as well.
<http://www.tid.es/research/researchers/j-blackburn>

Gianluca Stringhini
>Twitter Cuck e.g. "But #brexit has nothing to do with xenophobia, right?"
>Retweets Hillary
https://twitter.com/gianluca_string

Riginos Samaras
>actually seems ok and quite attractive so ill give him a pass

Ilias Leontiadis
>bizarre that they would include this guy because his papers are all related to internet privacy and ad revenue.
>Oh wait... Two factors that may have an influence on such interactions are cultural differences between individuals in highly multicultural workplaces, and the layout and physical spaces of the workplace itself. In this work, we investigate how these two factors may facilitate or hinder inter-group interactions in the workplace.
<http://www.tid.es/research/researchers/ilias-leontiadis>

>> Anonymous (ID: zw8wNrfR) 10/13/16(Thu)06:18:40 No.92700514 ▶

Nicolas Kourtellis
>Just a henchman

Emiliano De Cristofaro
>globalist
>Italian national Dr Emiliano De Cristofaro, a senior lecturer in computer science at University College London, criticised the comments.
>"Quite frankly, I am very upset. It inherently discriminates against a portion of the population living in this country, making us feel like second-class individuals. Nobody should be used as a negotiating chip, let alone people who are working hard, paying taxes and strongly contributing to the country," he said.
>"I also fear that statements like this will further encourage hate crime, discrimination and racism against EU citizens."
<https://news.co.uk/essentials/news/politics/eu-citizens-living-uk-express-upset-liam-fox-describes-negotiating-card/>

Jeremiah Onaolapo
>Just a henchman but...
>Recent or forthcoming papers: "What Happens After You Are Pwned: Understanding The Use Of Leaked Webmail Credentials In The Wild."
>In that paper: "We leaked 100 honey accounts on paste sites, underground forums, and virtual machines infected with malware, and provided detailed statistics of the activity of cybercriminals on the accounts, together with a taxonomy of the criminals. Our findings help the research community to get a better understanding of the ecosystem of stolen online accounts, and potentially help researchers to develop better detection systems against this malicious activity."
<http://www0.cs.ucl.ac.uk/staff/J.Onaolapo/papers/imc16gmail.pdf>

Gabriel Emile Hine
>no juice

In conclusion my research indicates that the three most responsible Jews for this vicious hate crime against our culture are:
>Jeremy Blackburn
https://twitter.com/jblackb?ref_src=twsr%5Egoogle%7Ctwcamp%5Eserp%7Ctwgr%5Eauthor
>Emiliano De Cristofaro
https://twitter.com/emilianode_
>Gianluca Stringhini
https://twitter.com/gianluca_string

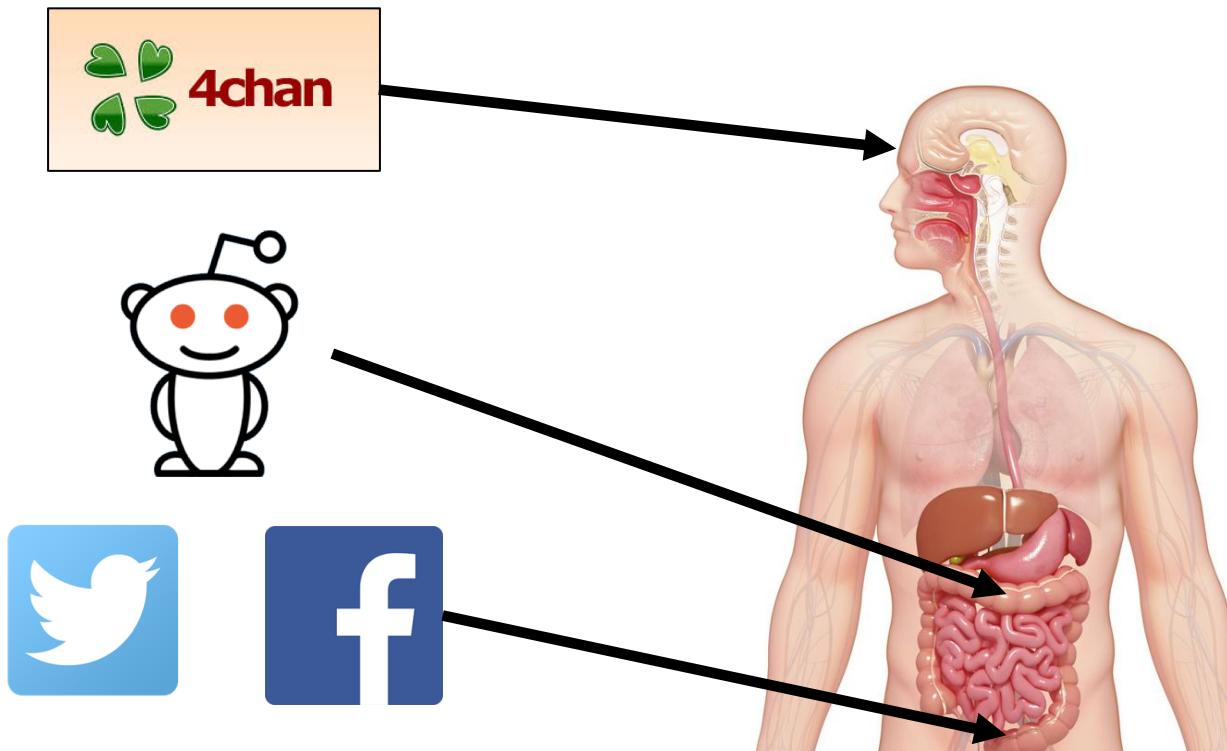
Archived / 1 / 0

27

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1. Hate on and “raids” from fringe communities like 4chan
[ICWSM 2017]
2. **Influence of fringe communities on misinformation**
[IMC 2017]
3. Misuse of Web archiving services
[ICWSM 2018]

Can We Quantify How Rest of Web is Affected?



The Information Ecosystem



the guardian



4chan → Twitter

[View Same](#) [Google](#) [iqdb](#) [SauceNAO](#) [C58mabBXEAEm6iY.jpg, 46KiB, 497x503](#)

Anonymous ID:Cgs1YKTD Fri 03 Mar 2017 00:38:09 No.114985529 [View](#)

Here is picture of Senator Chuck Schumer having coffee and donuts with Vladimir Putin.

We need to investigate this meeting and any Russian ties with Chuck.

Donald J. Trump @realDonaldTrump Following ▼

We should start an immediate investigation into [@SenSchumer](#) and his ties to Russia and Putin. A total hypocrite!

9:54 AM - 3 Mar 2017

54,218 Retweets 148,062 Likes

31



Donald J. Trump 
@realDonaldTrump

#FraudNewsCNN #FNN

4:21 PM - Jul 2, 2017

141,936 368,969 605,362

Reddit → Twitter



EXPLAINERS POLITICS & POLICY WORLD CULTURE SCIENCE & HEALTH IDENTITIES MORE ▾



Trump's anti-CNN tweet originated from Reddit's largest right-wing extremist forum

Regardless of his intentions, Trump's tweet aligned him with violent hate speech.

Updated by Aja Romano | @ajaromano | Jul 3, 2017, 5:00pm EDT

The Pizzagate Conspiracy Theory

The saga of 'Pizzagate': The fake story that shows how conspiracy theories spread



By BBC Trending
What's popular and why

⌚ 2 December 2016



Data Provider



Theory Generator



Theory Incubators & Gateway
to mainstream “world”



Large-scale
Disseminator

Oh Hey... It's 4chan Again...

OUR PICKS LATEST POPULAR

QUARTZ

OBSessions

PROOF OF LIFE

Fake news of a fatal car crash wiped out \$4 billion in ethereum's market value yesterday



Alive and well. (John Phillips/Getty Images for TechCrunch)

SHARE [Twitter](#) [Facebook](#) [LinkedIn](#) [Email](#)

WRITTEN BY [Joon Ian Wong](#)

"Vitalik Buterin confirmed dead. Insiders unloading ETH" read the [title of the post](#) on 4Chan, the notorious online message board frequented by internet trolls. "Fatal car crash," it went on. "Now we have our answer. He was the glue."

OCTOBER 3 2017 [SAVE](#) [PRINT](#)

Las Vegas shooting: How 4Chan, far-right trolls named the wrong man

Abby Ohlheiser

[SHARE](#) [TWEET](#) [EMAIL](#) [MORE](#)

Geary Danley was not the gunman in Las Vegas who killed at least 50 people late Sunday. But for hours on the far-right internet, would-be sleuths scoured Danley's Facebook likes, family photographs and maritime records for evidence.

MOST POPULAR

1 Mystery space object may be first confirmed interstellar visitor

GOOGLE SEARCH

geary danley

All Maps News Images Shopping More Settings Tools

About 76,300 results (0.23 seconds)

Top stories

Geary Danley

/pol/ - GEARY DANLEY!! - Politically Incorrect - 4chan

4Chan · 1 hour ago

50 dead, 200 injured in Las Vegas shooting

Press TV · 19 mins ago

/pol/ - Vegas happening thread scannersstreams: https:// - Politically...

4Chan · 2 hours ago

→ More for geary danley

Idea...

Study the appearance of alternative and mainstream news URLs within the platforms

Build a sequence of appearance for each URL according to the timestamps



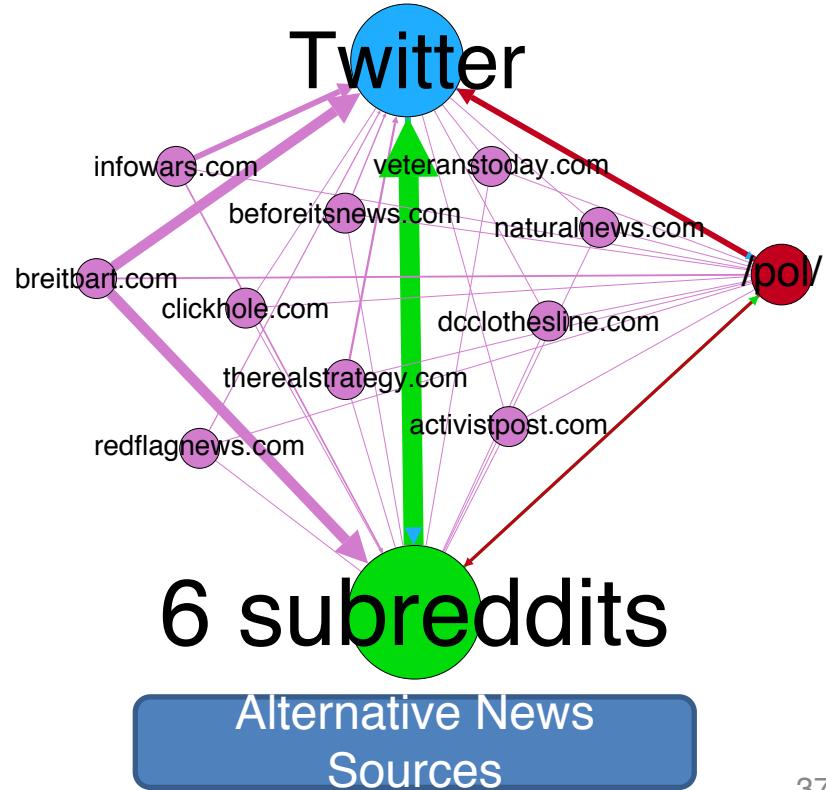
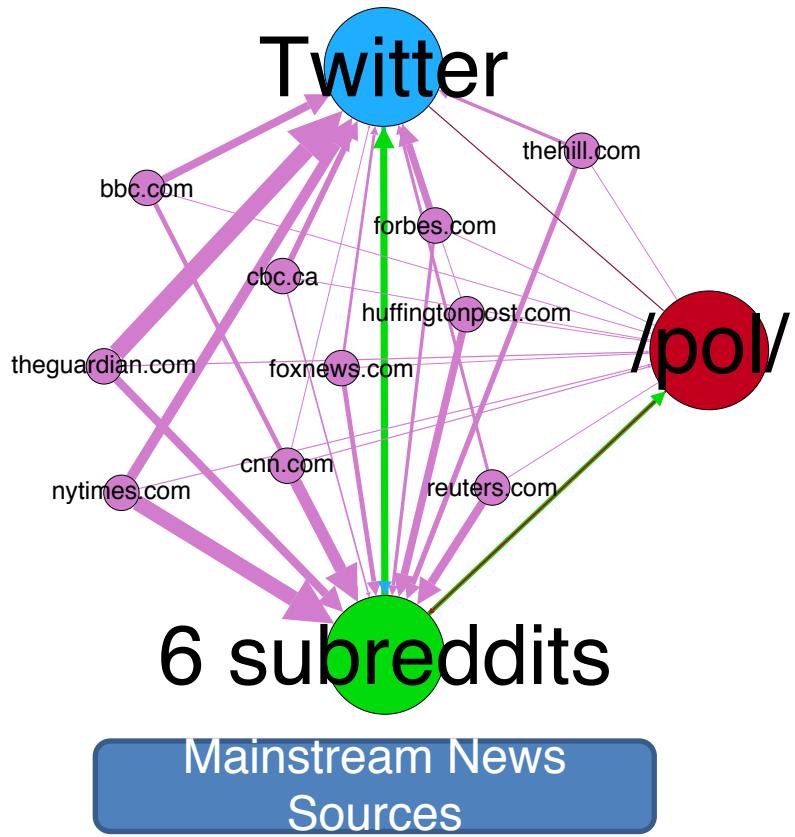
Build a graph with the sequences

The Data

99 mainstream and alternative (“fake”) news sources

Platform	Posts/Comments	Alternative URLs	Mainstream URLs
Twitter	486K	42K	236K
Reddit (six selected subreddits)	620K	40K	301K
4chan (/pol/)	90K	9K	40K

Here's What The Graph Looks Like



Quantify Influence? Hawkes Processes!

Assume K processes

Each with a rate of events (i.e., posting of a URL), called the *background rate*

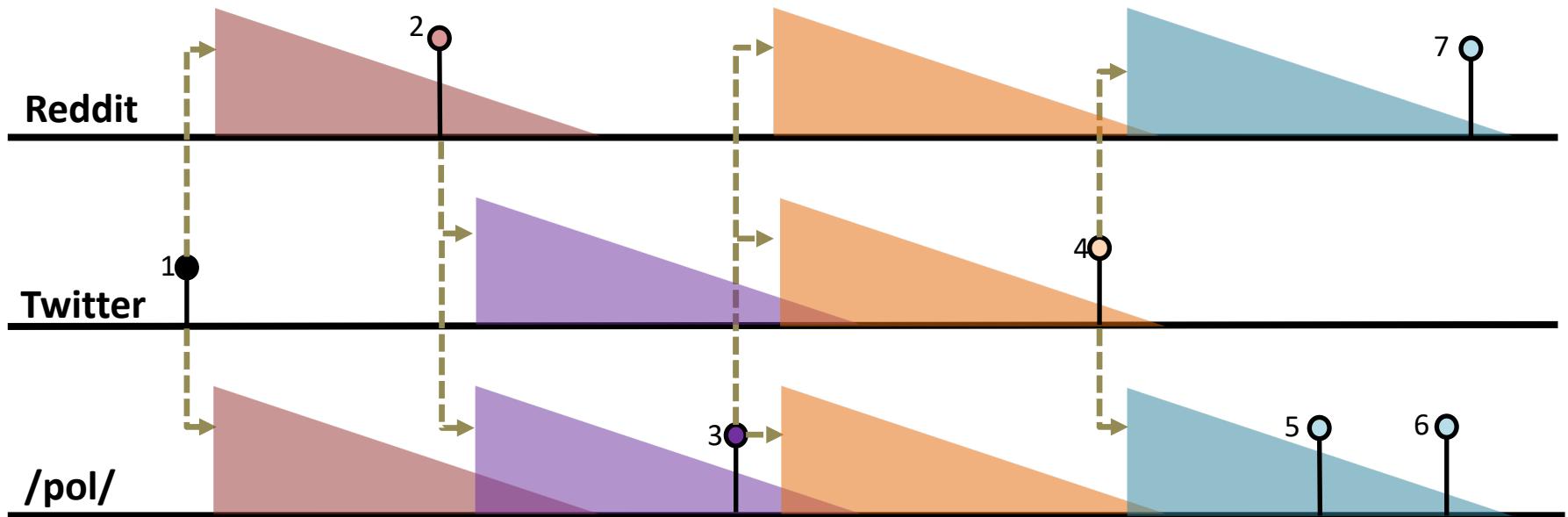
An event can cause **impulse responses** in other processes

Increases the rates of other processes for a period of time

Enables us to be confident about the number of events caused by another event on the source process (weight)

Reveals causal relationships

Hawkes Processes Example



For Our Purposes...

Hawkes model with 8 processes

One for each platform/community

Distinct model for each URL

Fit each model with Gibbs sampling

Calculate the percentage of events **created because** of events happened in each of the other processes

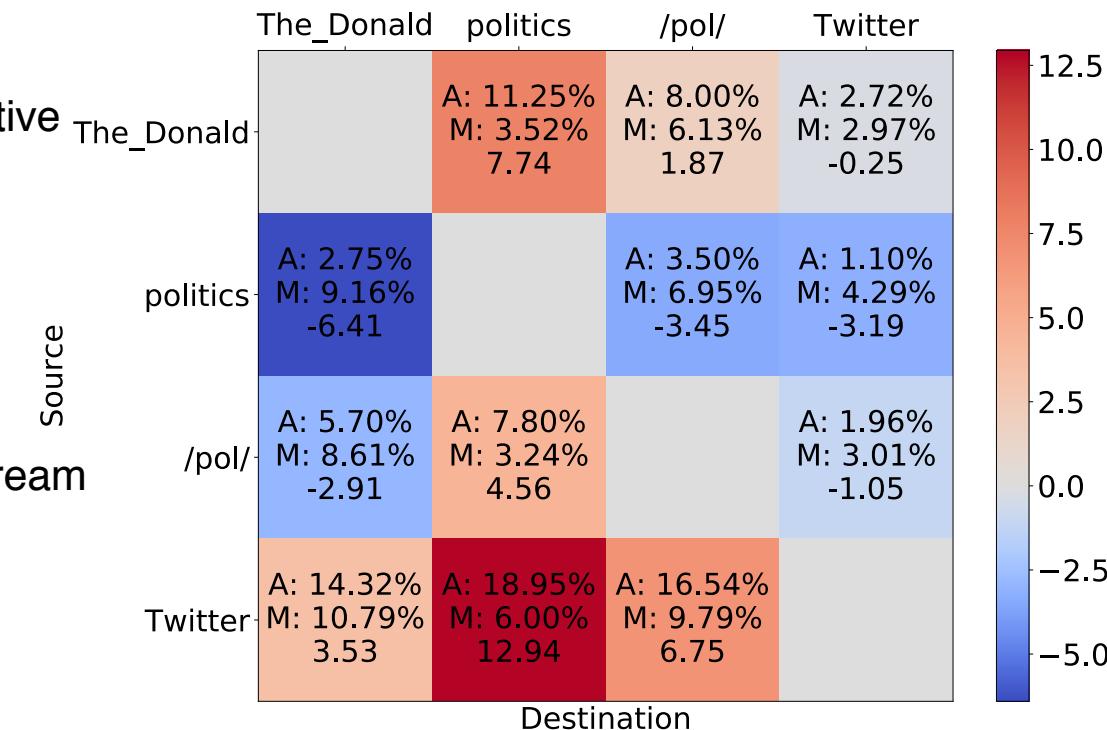
What Communities Influence Each Other?

Twitter top influencers for alternative URLs

- /r/The_Donald (2.72%)
- /pol/ (1.96%)
- /r/politics (1.1%)

Twitter top influencers for mainstream URLs

- /r/politics (4.29%)
- /pol/ (3.01%)
- /r/The_Donald (2.97%)



What Communities Influence Each Other?



These seemingly tiny Web communities can really punch above their weight class when it comes to influencing the greater Web

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[ICWSM 2018]

Web archiving

Archive.is

On-demand archiving service

Generates 5-character archive URLs

E.g., www.google.de becomes archive.is/HVbU



Wayback Machine

Works mainly through a proactive crawler

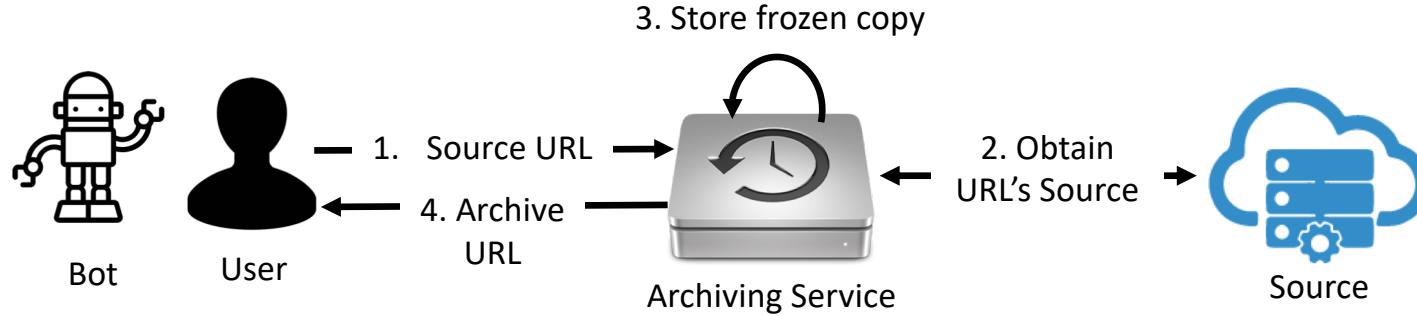
Supports also on-demand archival

E.g., www.google.com becomes
<https://web.archive.org/web/20100205062719/http://www.google.com/>

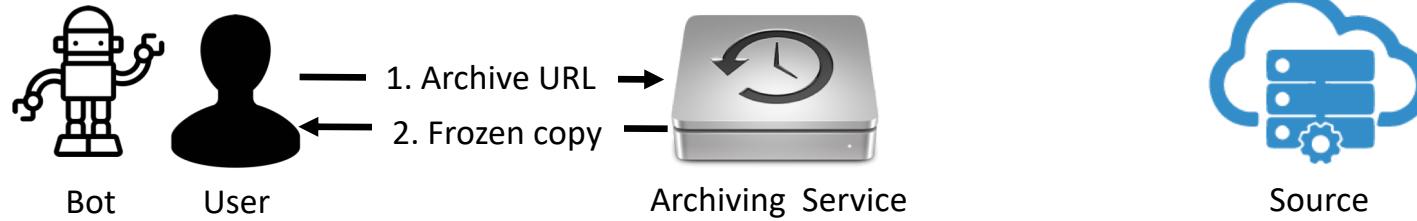


How do Web archiving services work?

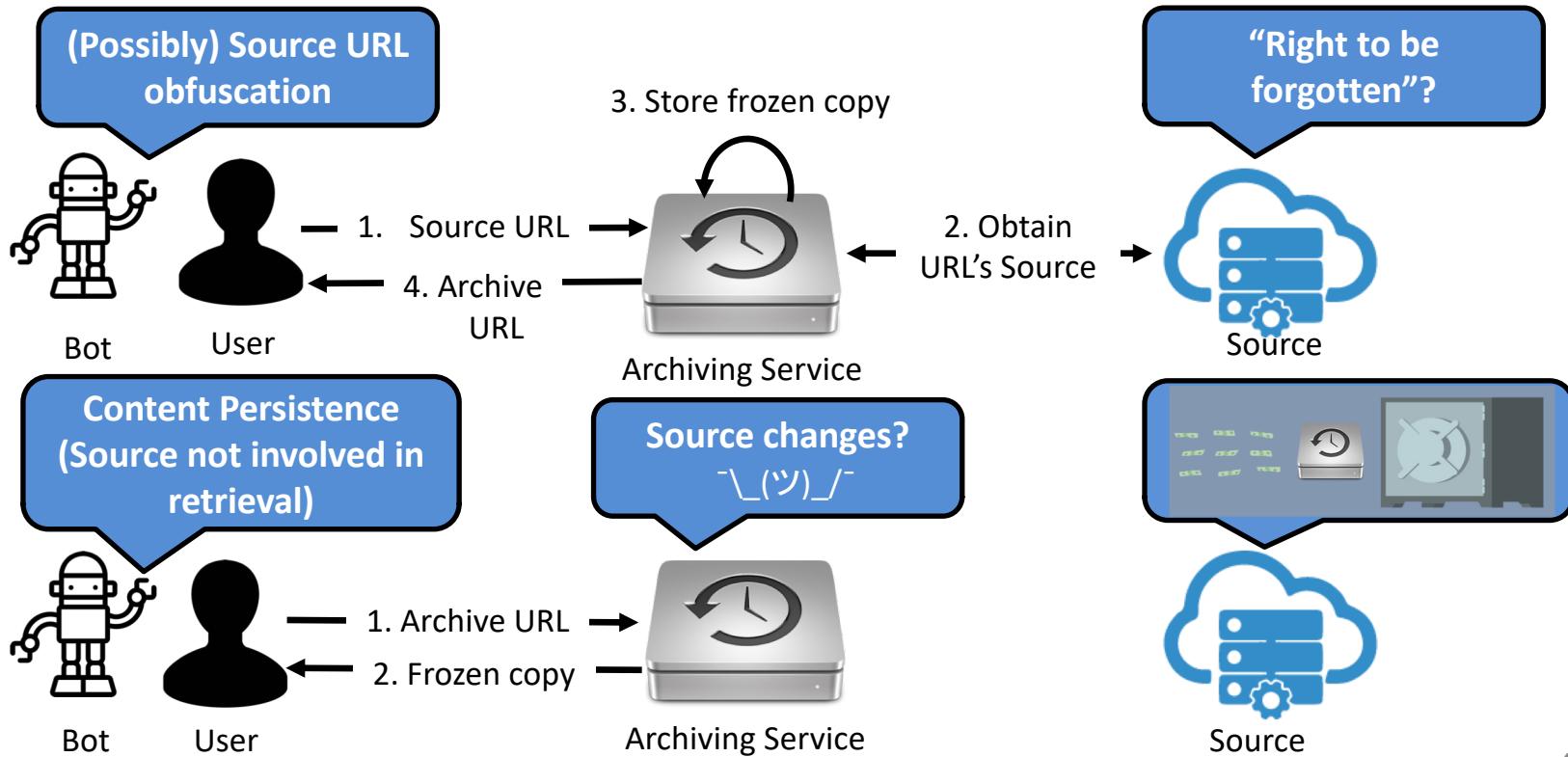
A. Archival



B. Retrieval



How do Web archiving services work?



Research Questions

1. What kind of content get archived, by whom, and why?
2. How are archive URLs disseminated on the Web?
3. Are archiving services misused?



Datasets

1. Live Feed archive.is dataset
2. Archive.is and Wayback Machine URLs posted on Reddit, /pol/, Gab, Twitter

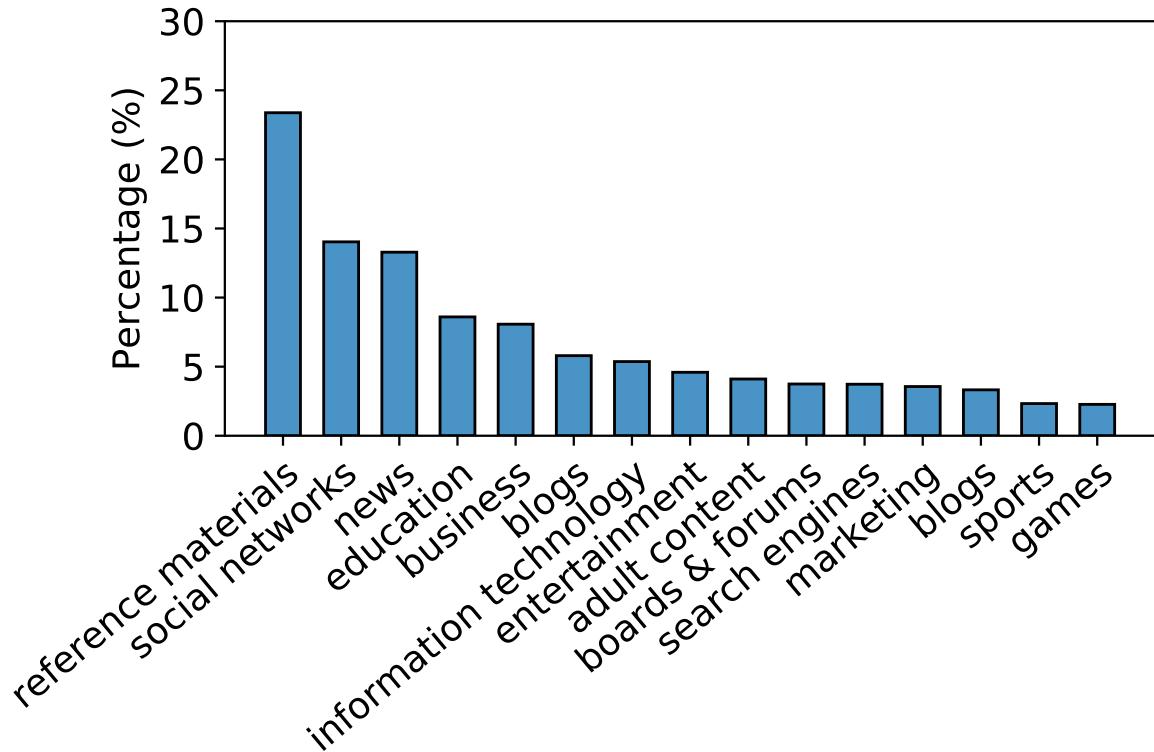
	platform	Archive URLs	Source URLs	Source Domains
Live Feed	Archive.is	21M	20.6M	5.3M
Reddit	Archive.is	310K	291K	15.9K
	Wayback	387K	343K	21K
/pol/	Archive.is	36K	33K	3.9K
	Wayback	2K	2K	0.9K
Gab	Archive.is	5.9K	5.7K	1.3K
	Wayback	0.3K	0.3K	0.2K
Twitter	Archive.is	3.7K	3.6K	0.8K
	Wayback	1.2K	1.2K	0.8K

What kind of content gets archived?

Get categories for domains using Virus Total API

Live feed dataset has 5.3M domains

Select top 100K domains for categorization



What kind of content gets archived? (OSNs)



OSN posts among the top two categories in all
Web Communities



News among the top five categories in all
Web Communities



WayBack Machine



Platform-specific censorship

Some domains exclusively shared via archiving services. Why?

8chan and Facebook considered spam (rejected) on /pol/

Users utilize archive.is to circumvent this platform-specific censorship

Evidence of accidental news source censorship because of substitution filters (used for fun)

smh becomes baka (smh.com.au becomes baka.com.au)

Original content availability

	platform	% of unavailable URLs
Reddit	Archive.is	7%
	Wayback	11%
/pol/	Archive.is	18%
	Wayback	34%
Gab	Archive.is	13%
	Wayback	52%
Twitter	Archive.is	24%
	Wayback	51%

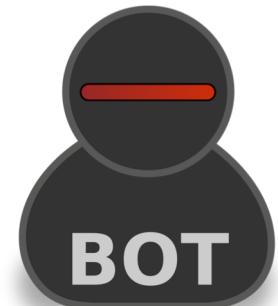
Who is archiving URLs? Reddit

31% and 82% of archive.is and Wayback Machine URLs, resp., are posted by “SnapshillBot”



44% of archive.is URLs are shared by bots, 85% for Wayback Machine

→ Content persistence within subreddits?



Speaking of subreddits.....



Ad-Revenue Deprivation

post reply [REDACTED]

from AutoModerator [M] via /r/The_Donald sent 5 days ago

Your submission was removed because it is from washingtonpost.com, which has been identified as a severely anti-Trump domain. Please submit a cached link or screenshot when submitting content from this domain. We recommend using <http://www.archive.is> for this purpose.

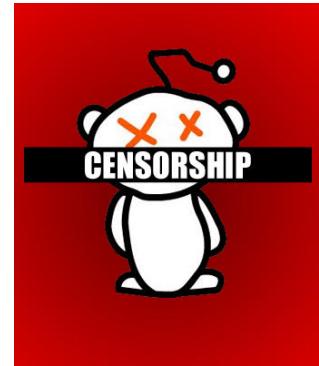
I am a bot, and this action was performed automatically. Please [contact the moderators of this subreddit](#) if you have any questions or concerns.

[context](#) [full comments \(1\)](#) [report](#) [block user](#) [mark unread](#) [reply](#)

News “Censorship”

13K submissions removed from The_Donald subreddit

In total 23 “anti-Trump” news sources censored



News Source	# of submissions removed	Percentage
washingtonpost.com	3.8K	44%
cnn.com	3.3K	40%
nydailynews.com	1.0K	46%
huffingtonpost.com	0.9K	43%
nationalreview.com	0.7K	45%

Thank you!



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