

Understanding Information Weaponization via Data-driven Analysis

Emiliano De Cristofaro
emilianodc.com



IDRAMA LAB



WARNING
CONTENT IN THIS TALK
IS OFFENSIVE
AND UNCENSORED

Heard of 4chan?

Heard of 4chan?

He

I CAN HAS
CHEEZBURGER?



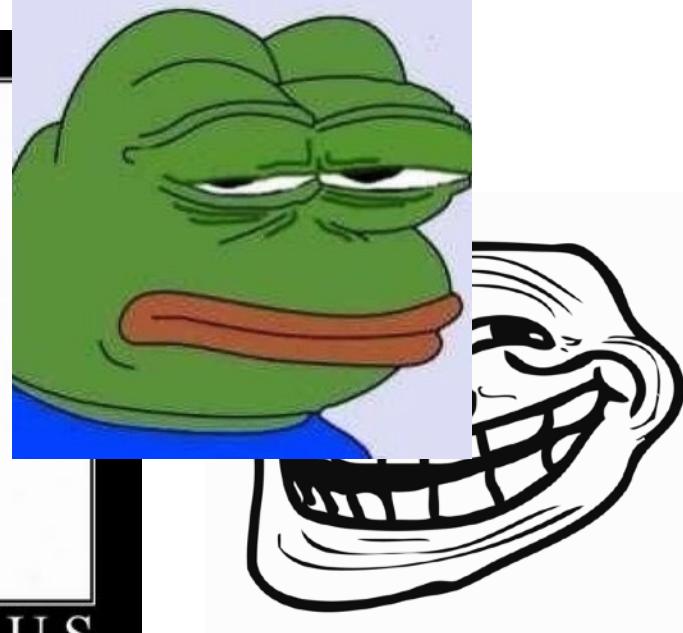
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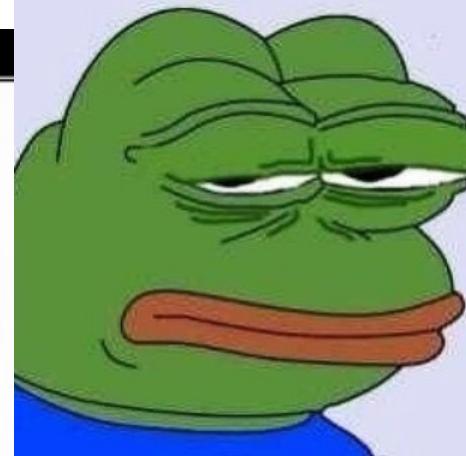
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WHERE DID EVERYTHING
GO SO REICH



Why Do We Care About 4Chan?

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

By Kristen V. Brown



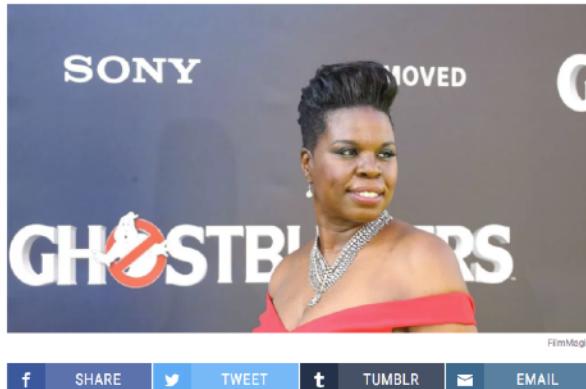
f SHARE | t TUMBLR | e EMAIL

Over the past 24 hours, Leslie Jones has been inundated with racist, hateful vitriol on Twitter.

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f SHARE t TUMBLR e EMAIL

TAYWARD YOUTH 3/24/16 3:10 PM

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

By Ethan Chiel

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VB

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BUSINESS

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

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

TAYWARD YOUTH 3/24/16 3:10 PM

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What is 4chan?



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An image-board forum

Organized in boards (70 at the moment)

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

Single image attached

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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?



An image-board

Organized in boards

An “original post”

Single image attached

Other users can reply

With or without moderation

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		

/pol/ – Politically Incorrect Board

/pol/ – Politically Incorrect Board



Welcome to /pol/ - Politically Incorrect

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

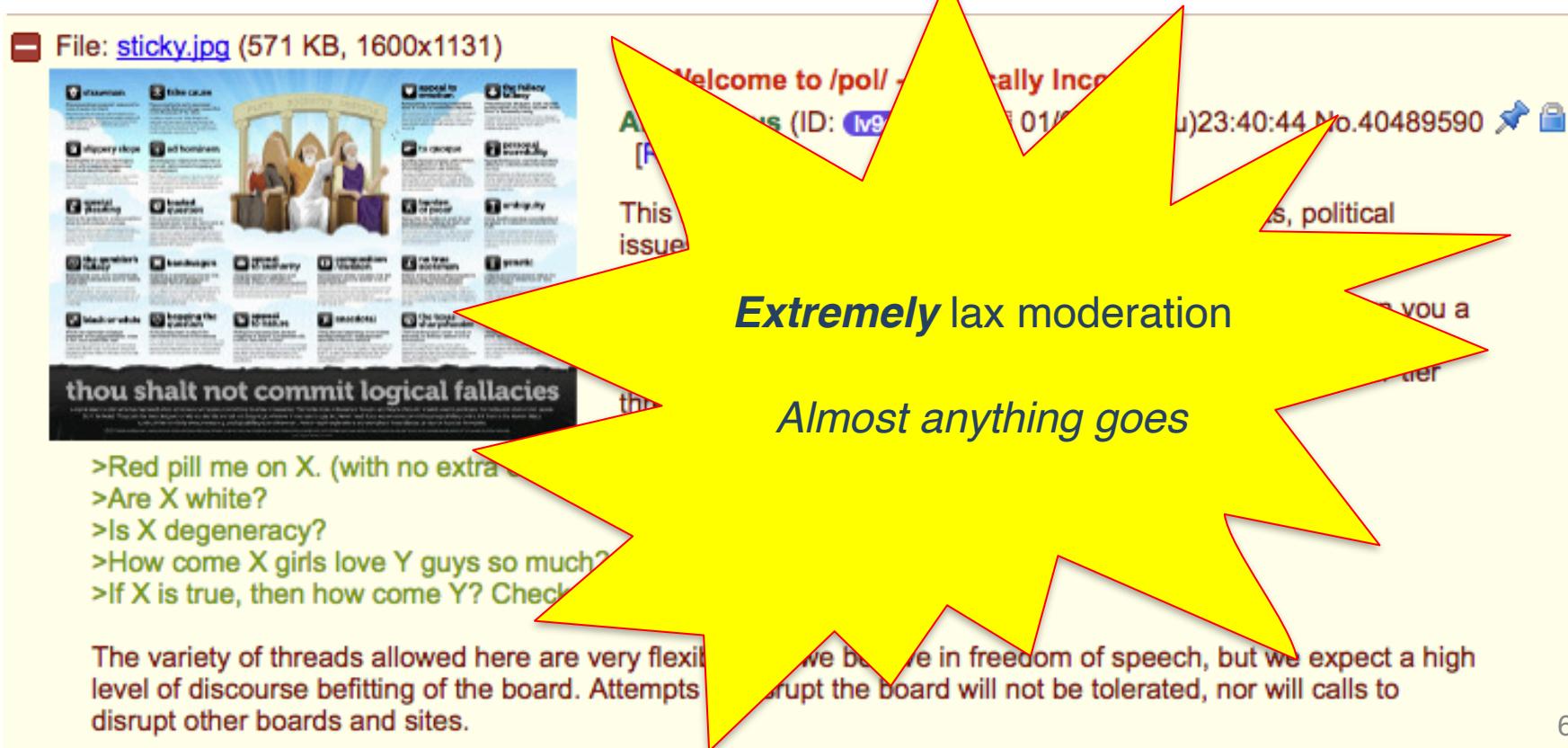
This board is for the discussion of news, world events, political issues, and other related topics.

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



Anonymity & Ephemerality

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Users do not need to register an account to participate

Anonymity is the default (and preferred) behavior

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

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Threads get “archived” after a while

Actually all posts deleted after a week

Challenges of Measuring 4chan (and other fringe communities)

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3. Knowing what they're talking about is not easy
4. You might get attacked, doxxed, etc.

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				

Datasets

Methodology:

Visit the “catalog”

Snapshot every 5 mins

Once a thread is archived, retrieve full/final contents from 4plebs.org

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We're still crawling...

Hate Speech?



Crowdsourced dictionary
Manually filtered a bit

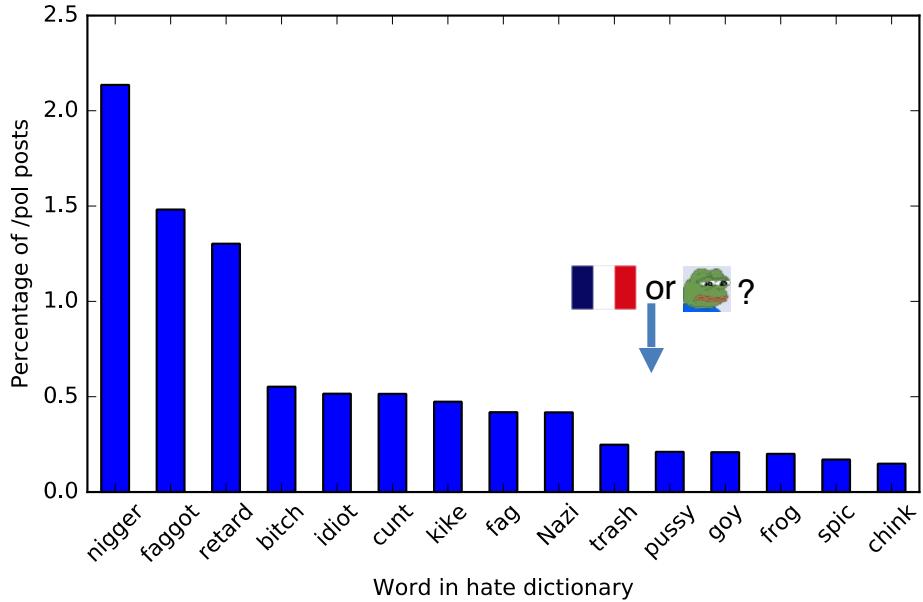
/pol/ by far most
hate speech use

/pol/ 12%

/sp/ 7.3%

/int/ 6.3%

Twitter 2.2%



Raids on other platforms (e.g., YouTube)

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Someone posts a YouTube link

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

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If raid is taking place:

Peak in YouTube comments while thread alive?

/pol/ thread and YT comments *synchronized*?

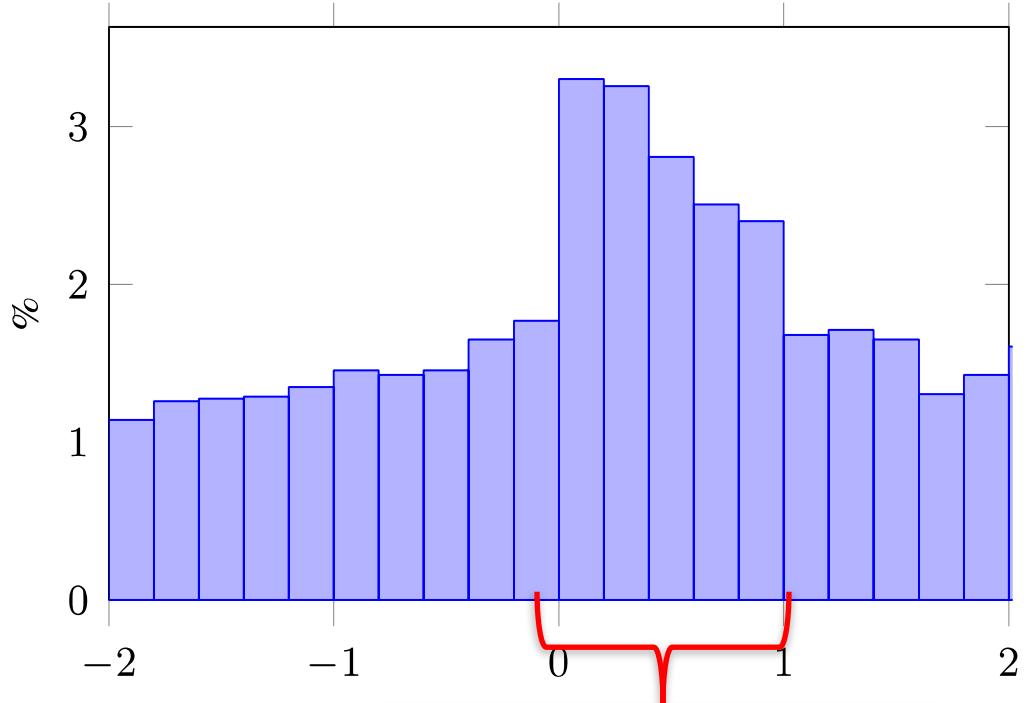
Raids on other platforms (e.g., YouTube)

Raids on other platforms



- 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 ▾
- Sz 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



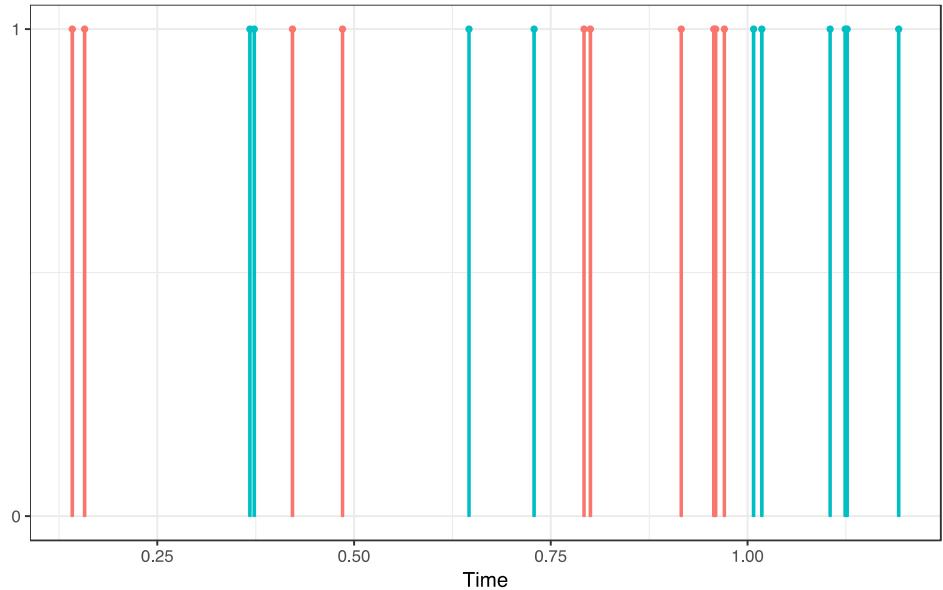
YT videos with peaks
during 4chan thread

Determined via PDF of
commenting timeseries

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

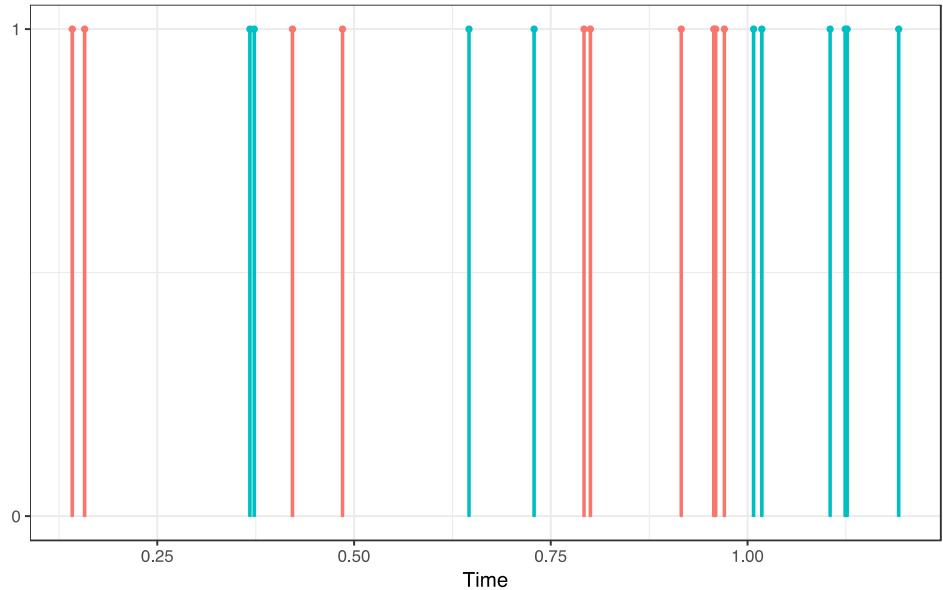
Synchronization

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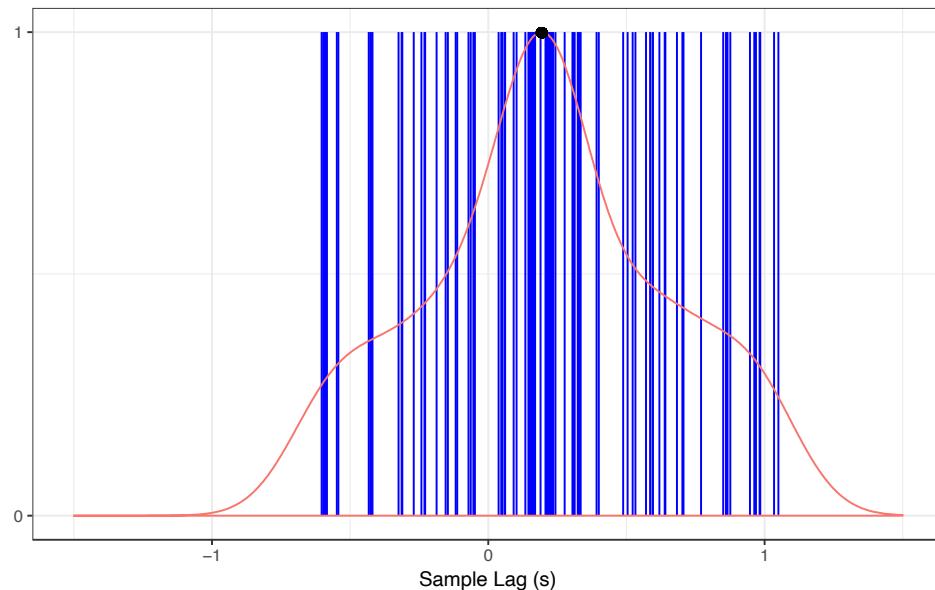


Two series, second randomly shifted from
first by 0.2s on avg

Synchronization

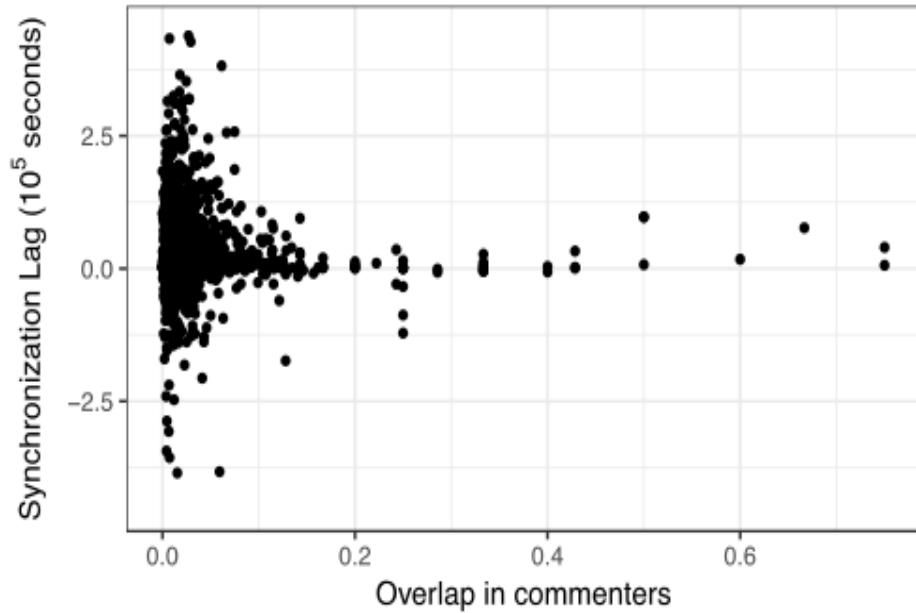
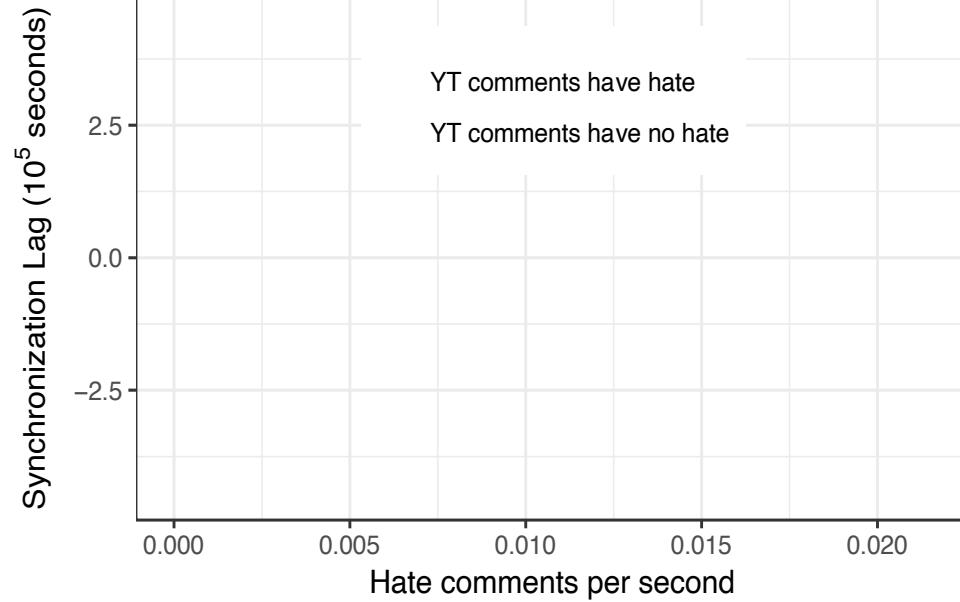


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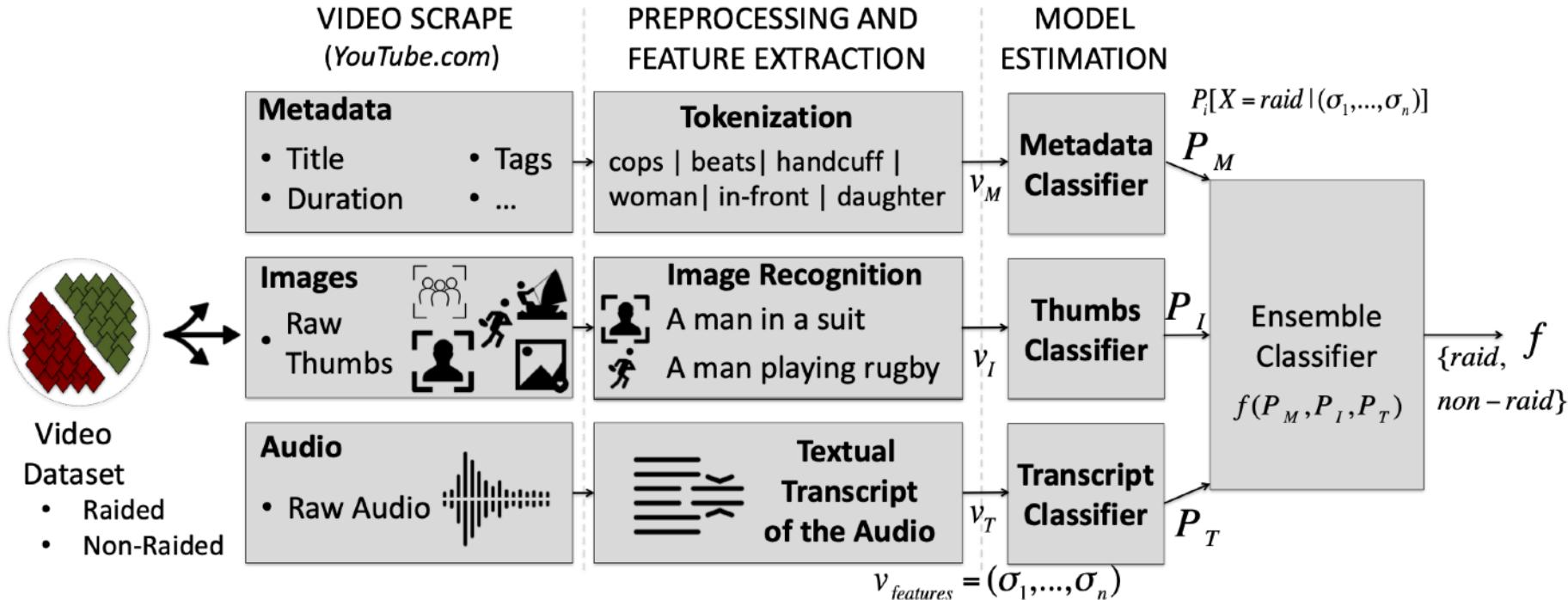


Blue lines → per-sample lag
Red area → density of the lags
Peak of density curve = 0.2s

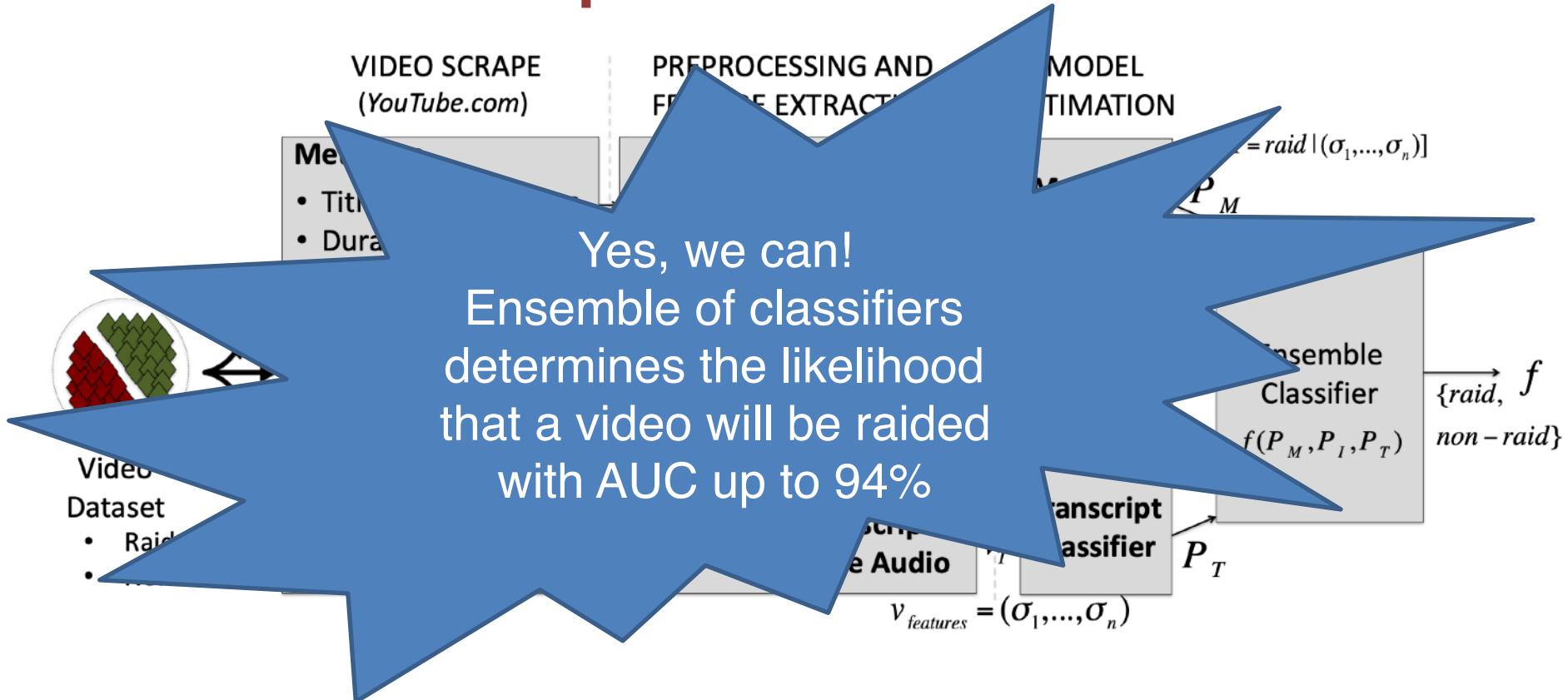
Validation



In fact... can we predict?



In fact... can we predict?



What About Cyberbullying?

70.6% of young people say they have seen bullying in their schools

9% of students in grades 6–12 experienced cyberbullying

15% of high school students (grades 9–12) were electronically bullied in the past year

Cyberaggression vs Cyberbullying

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Cyberbullying: intentionally aggressive behavior, repeated over time, which involves an imbalance of power

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Can we detect it?

Building a Classifier

Crawling data from Twitter from June to August 2016

Baseline: 1M random tweets

Hate-related: 650K tweets based on 309 bully- and hate-related hashtags

#GamerGate + 308 co-appeared ones

(GamerGate was a coordinated campaign of harassment in the online gaming world, revolving around sentiments of sexism, feminism, and “social justice”)

Pre-processing: removing spam, stop words, punctuation marks, etc.

Crowdsourced labeling

How do you characterize the following user?

1/10

User profile description: -

Tweet 1 your profile pic sucks! U should wear a mask to hide from the sun 😒 😒 😒 😒

Tweet 2 Our class prom night just got ruined because u showed up. Who invited u anyway?

Tweet 3 Some1 should stalk u and have fun with u.;)

Tweet 4 Don't cry... U can do shit about it...No matter what u do, your pics are out there.:D

Tweet 5 Why do you even show up at school?Nobody cares and neither should u!

- Aggressive user
- Bullying user
- Spammer
- Normal user

NEXT

Aggressive

Someone who posts at least one tweet or retweet with negative meaning, with the intent to harm or insult other users (e.g., the original poster of a tweet, a group of users, etc.).

Bullying

Someone who posts multiple (at least two) tweets or retweets with negative meaning for the same topic and in a repeated fashion, with the intent to harm or insult other users (e.g., the original poster of a tweet, a minor, a group of users, etc.) who may not be able to easily defend themselves during the postings.

Spammer

Someone who posts tweets or retweets of advertising/marketing or other suspicious nature, such as to sell products of adult nature, phishing attempts, etc.

Ground Truth & Features

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9,484 tweets, 1,307 users (4.5% bullies, 3.4% aggressors, 31.8% spammers, 60.3% normal)

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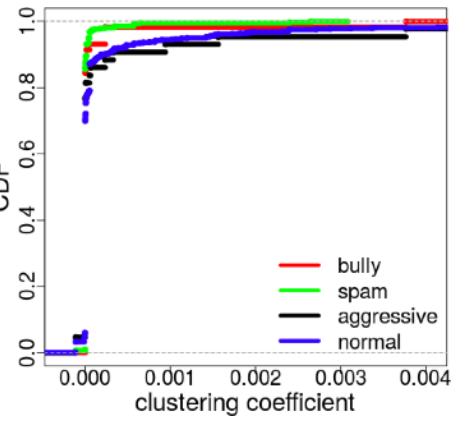
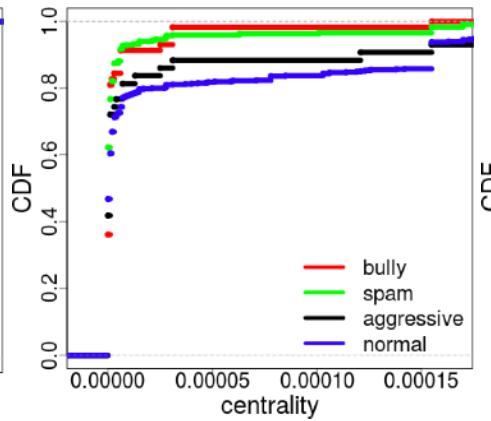
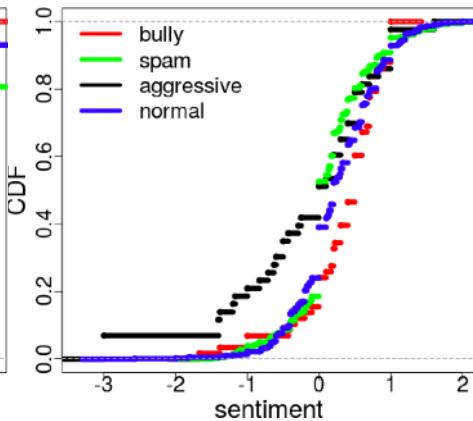
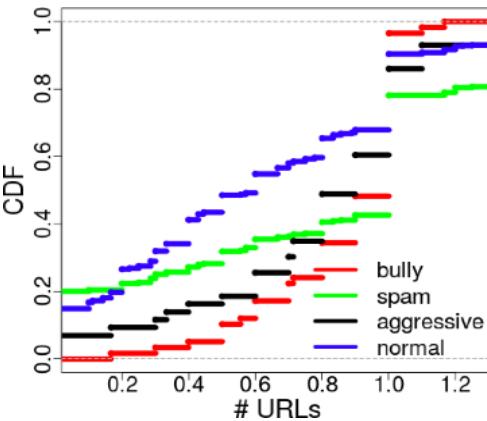
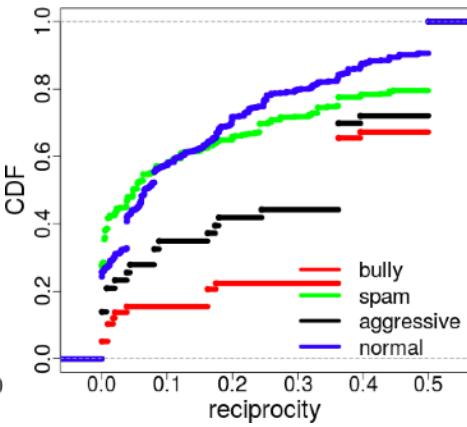
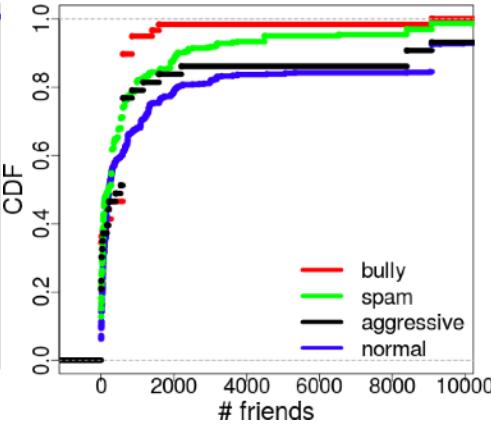
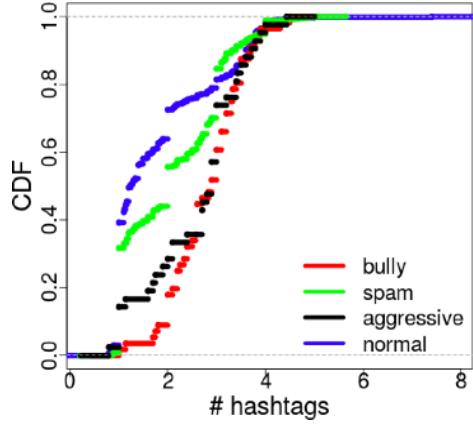
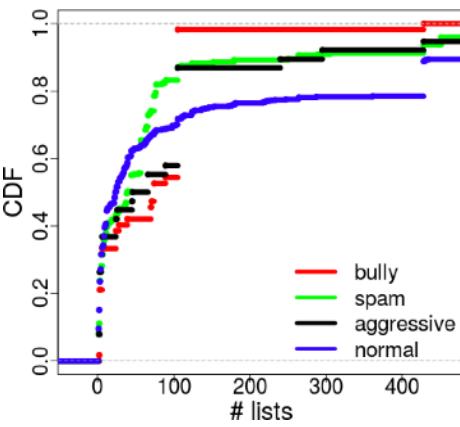
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Network Features: popularity (#follower, #friends), reciprocity, avg. power difference with mentioned users, hubs and authority, influence (eigenvector centrality, closeness centrality), communities (clustering coefficient, louvain modularity)

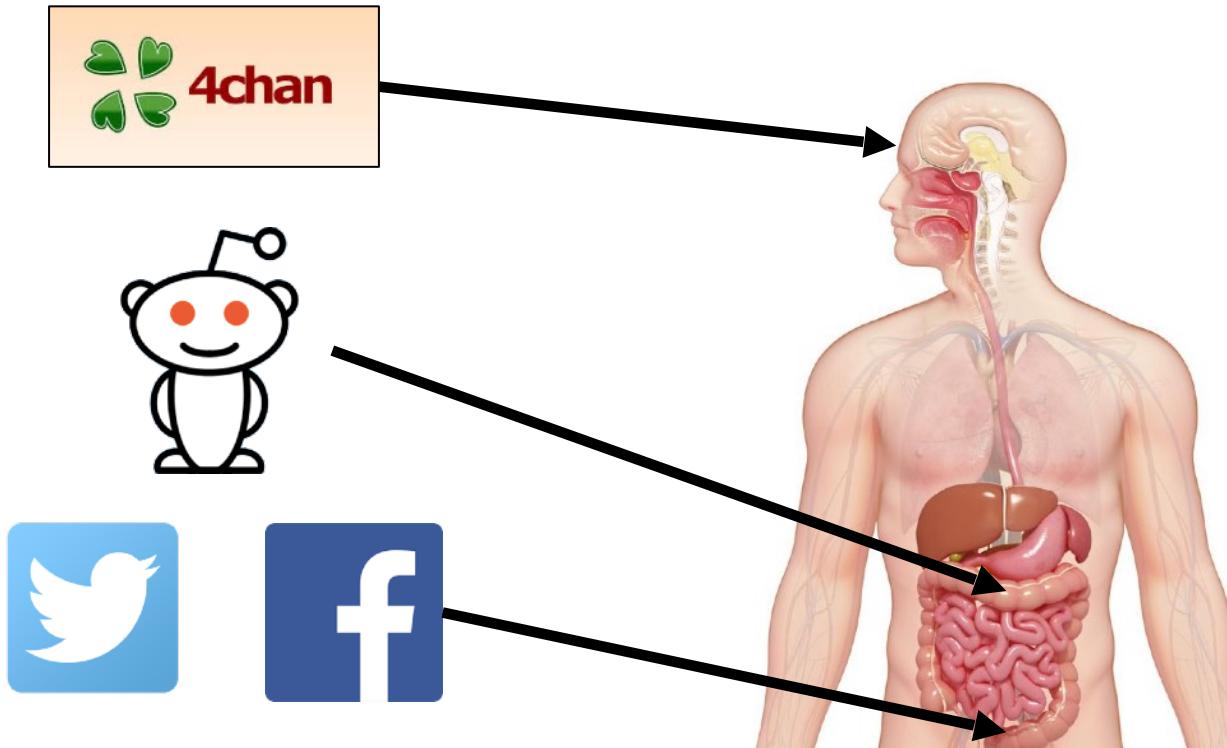


Results

	Prec.	Rec.	ROC
bully	0.555	0.609	0.912
(STD)	0.018	0.029	0.009
aggressive	0.304	0.114	0.812
(STD)	0.039	0.012	0.015
normal	0.951	0.976	0.911
(STD)	0.018	0.029	0.009
overall (avg.)	0.899	0.917	0.907
(STD)	0.016	0.019	0.005

	Prec.	Rec.	ROC
bully	1	0.667	0.833
aggressive	0.5	0.4	0.757
normal	0.931	0.971	0.82
overall (avg.)	0.909	0.913	0.817

How do communities influence each other?



4chan →
Twitter



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





Donald J. Trump 
@realDonaldTrump

 Follow

#FraudNewsCNN #FNN

4:21 PM - Jul 2, 2017

 141,936  368,969  605,362



Donald J. Trump 
@realDonaldTrump

#FraudNewsCNN #FNN

4:21 PM - Jul 2, 2017

 141,936  368,969  605,362



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

Reddit →
Twitter

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



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**Data
Provider**

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Data Provider



Theory Generator

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Theory Generator



Theory Incubators & Gateway to mainstream “world”

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Data Provider



Theory Generator



Theory Incubators & Gateway to mainstream “world”



Large-scale Disseminator

Idea...

Idea...

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

Idea...

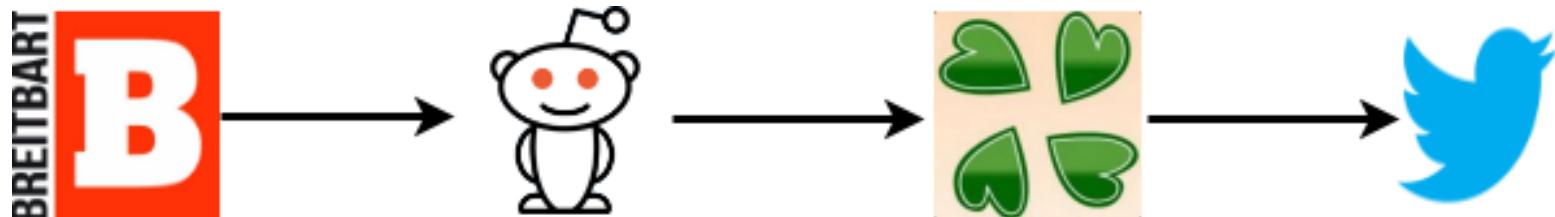
Study the appearance of alternative and mainstream news URLs within the platforms

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

Idea...

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

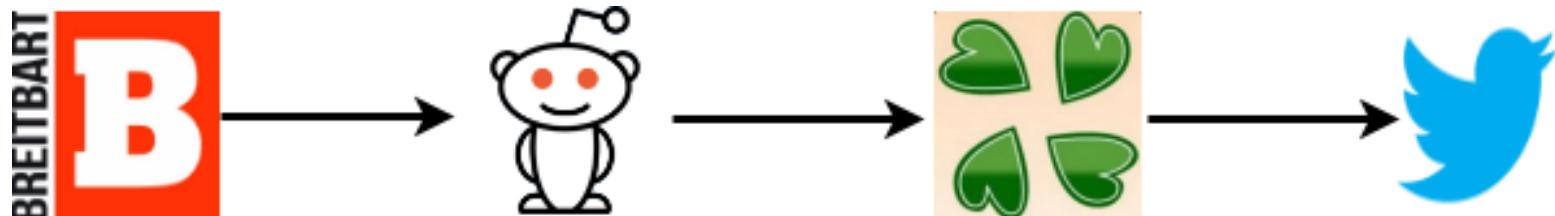
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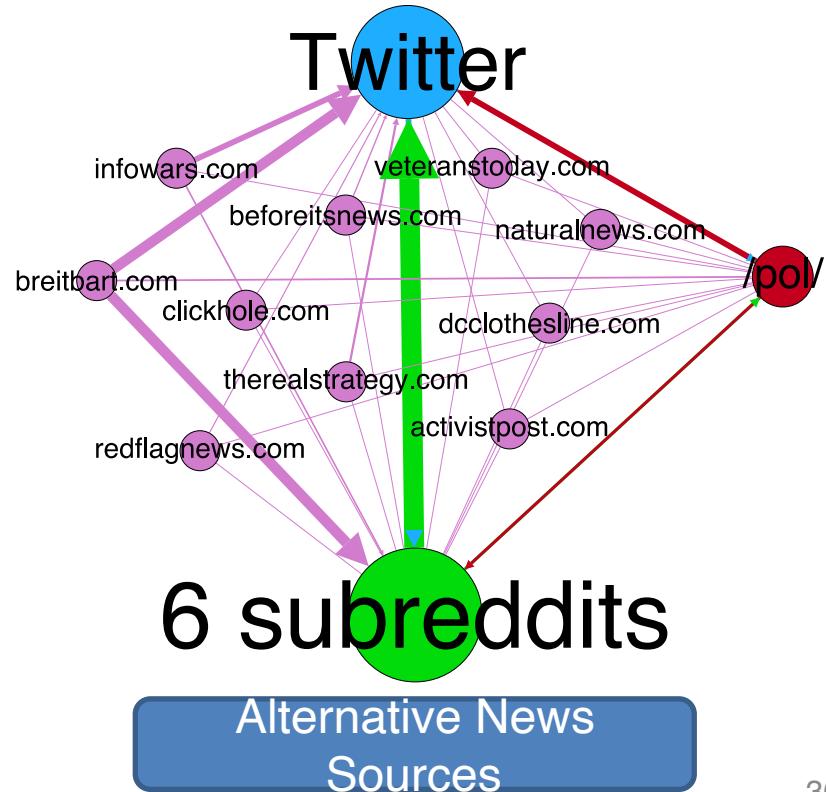
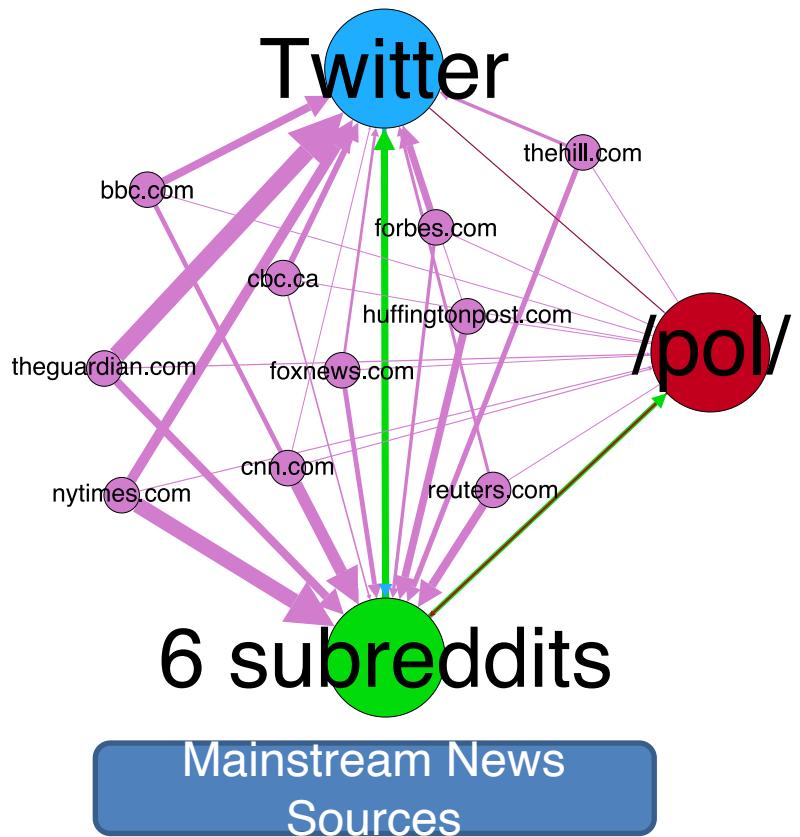
Build a graph with the sequences

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!

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Assume K processes

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

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

Increases the rates of other processes for a period of time

Quantify Influence? Hawkes Processes!

Assume K processes

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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

Hawkes Processes Example

Reddit

Hawkes Processes Example

Reddit

Twitter

Hawkes Processes Example

Reddit

Twitter

/pol/

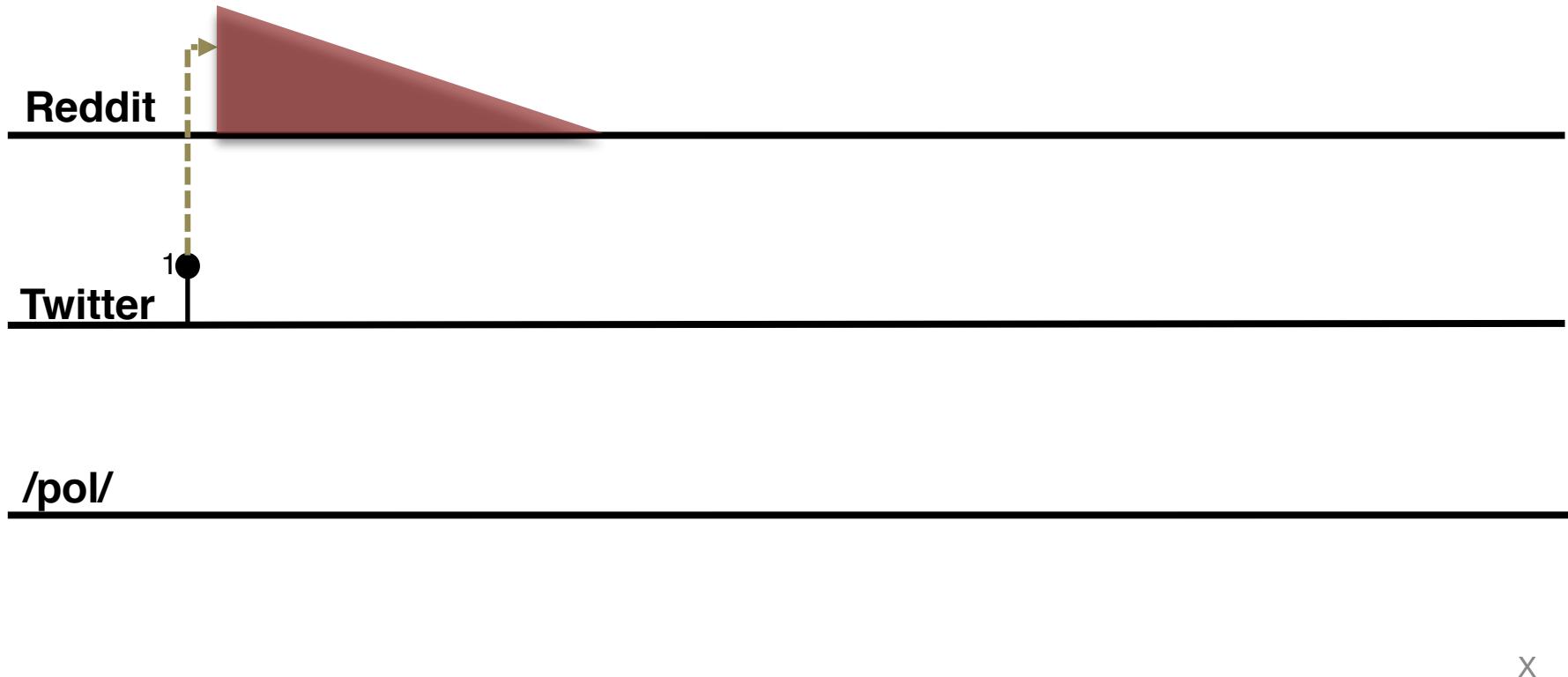
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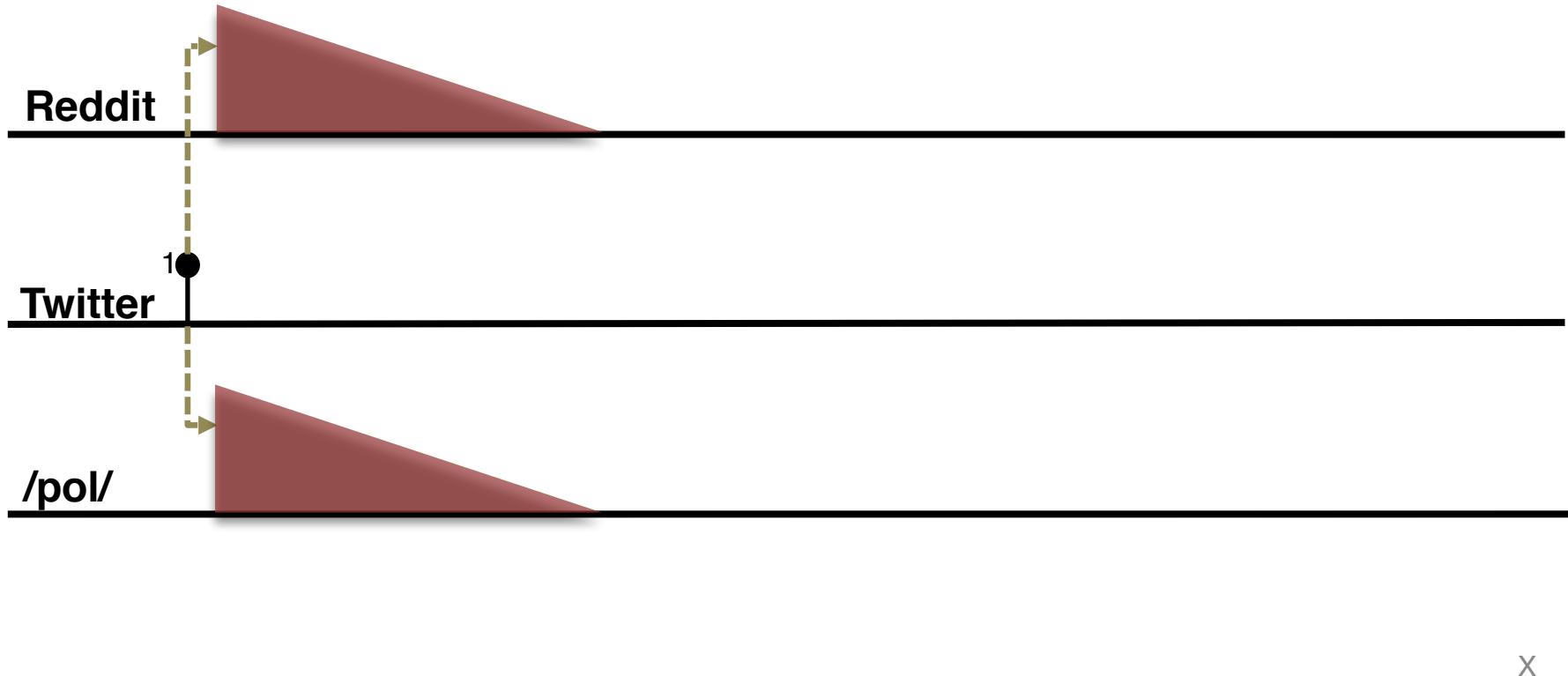
Twitter¹

/pol/

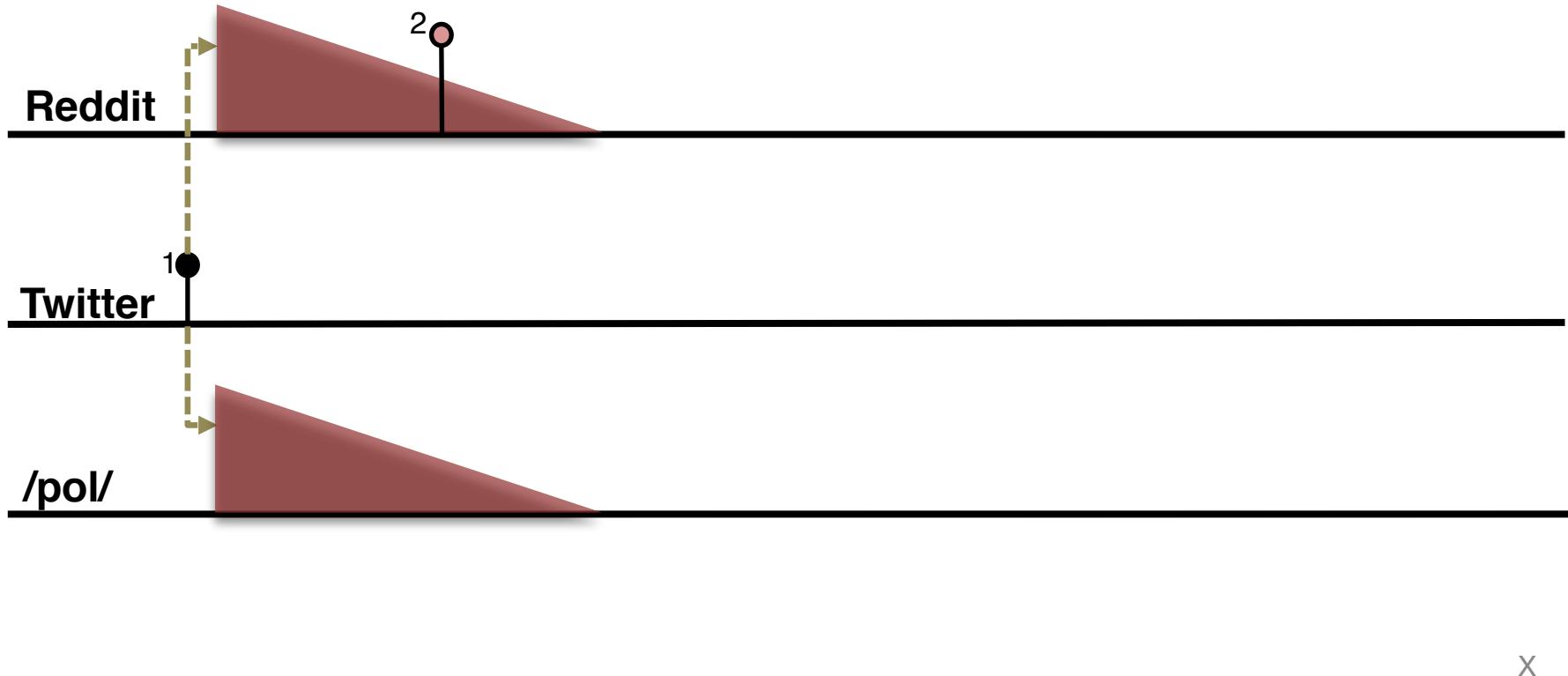
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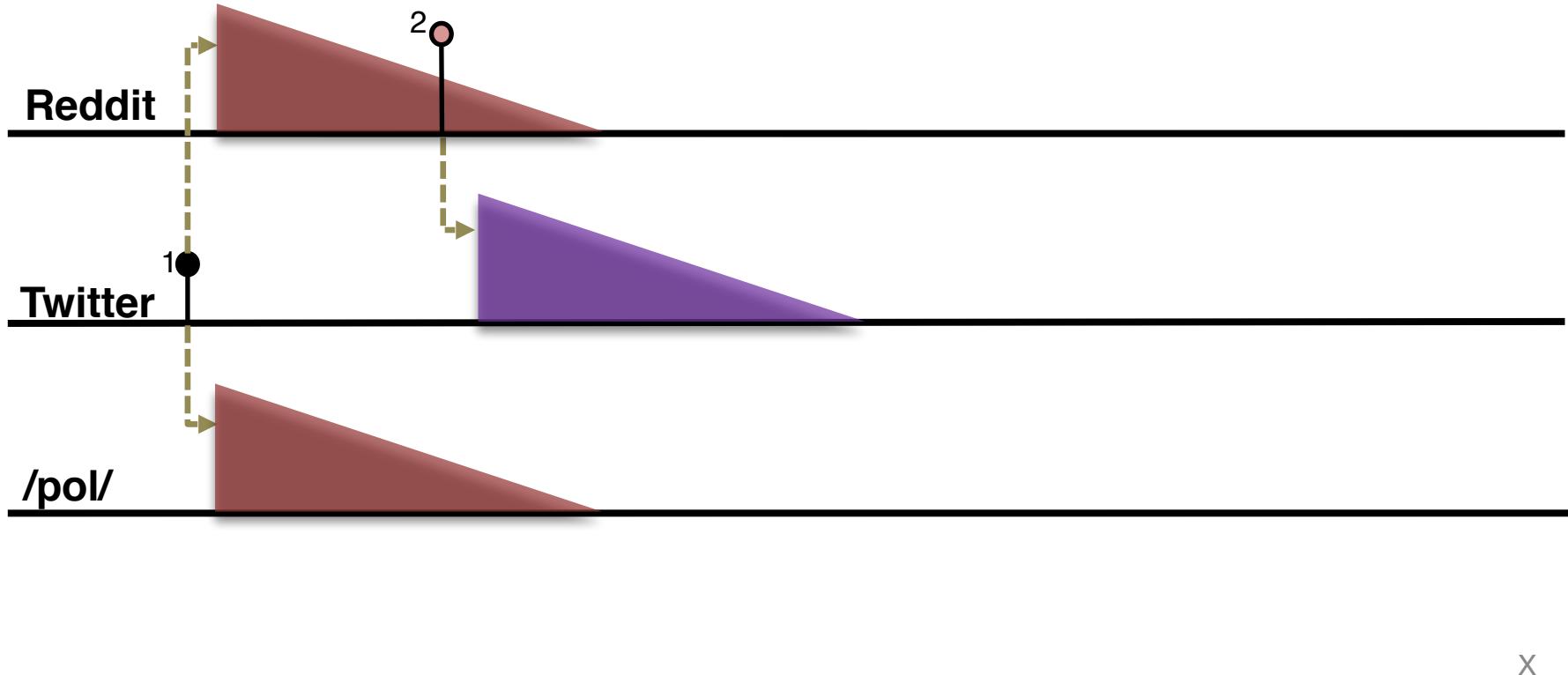
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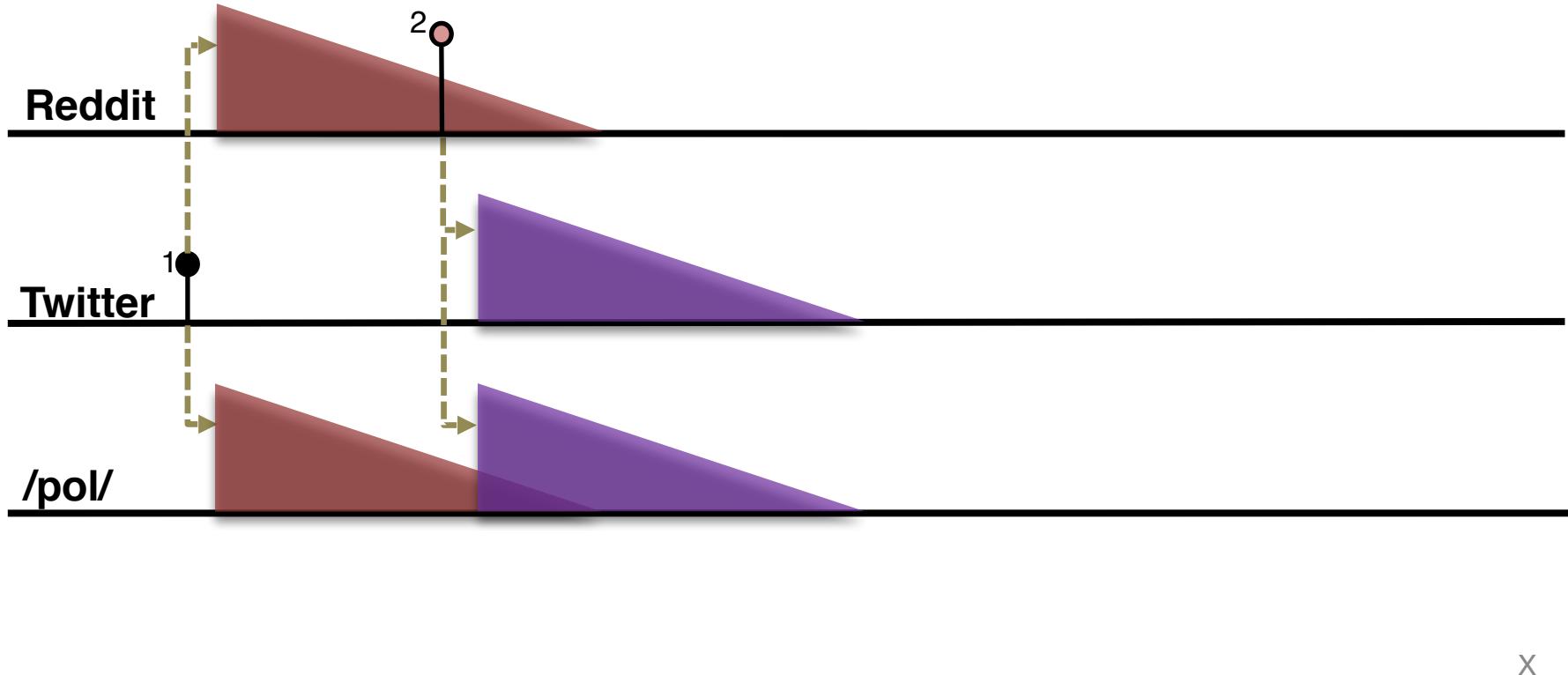
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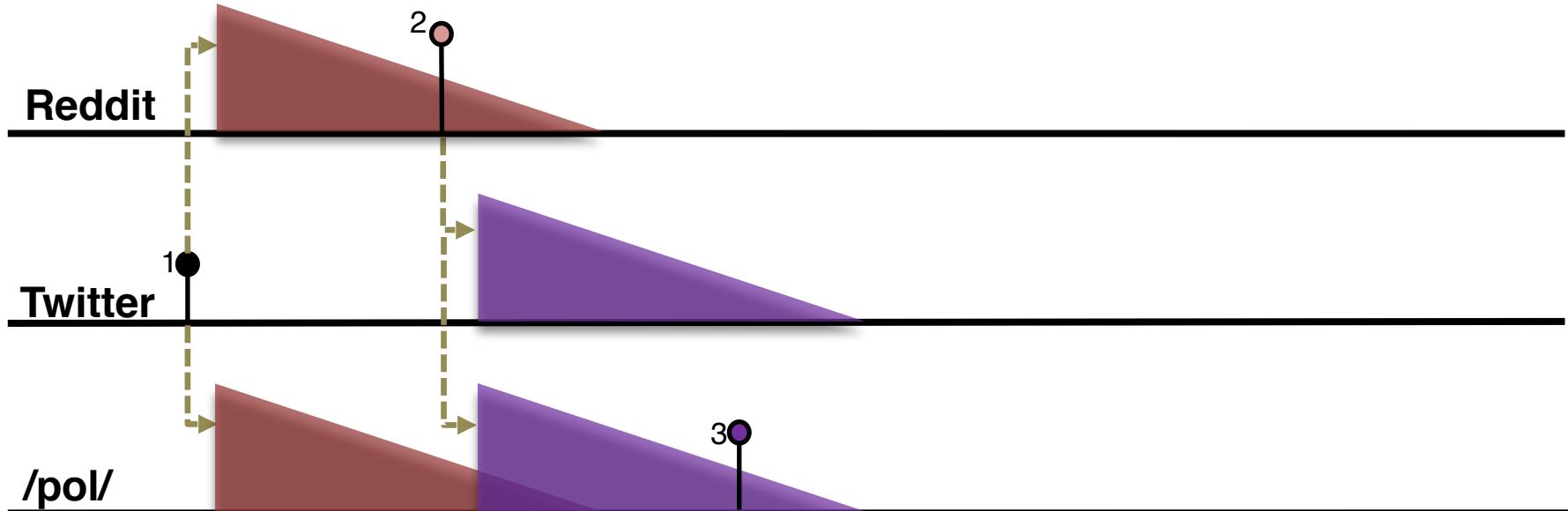
Hawkes Processes Example



Hawkes Processes Example

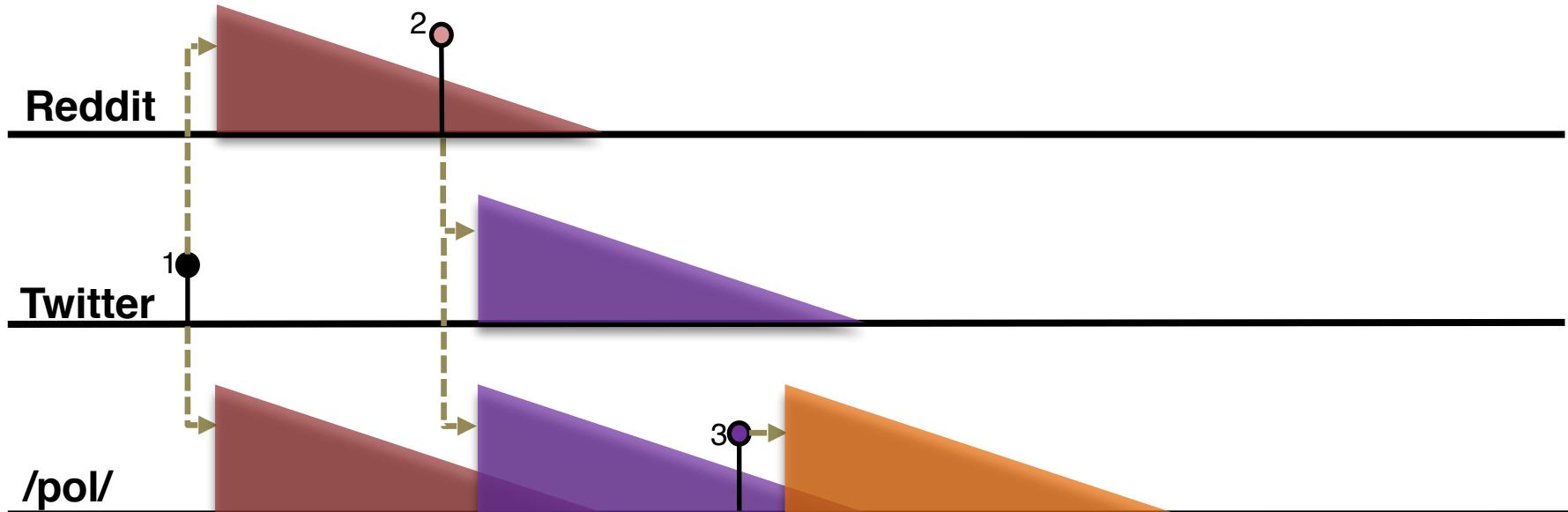


Hawkes Processes Example

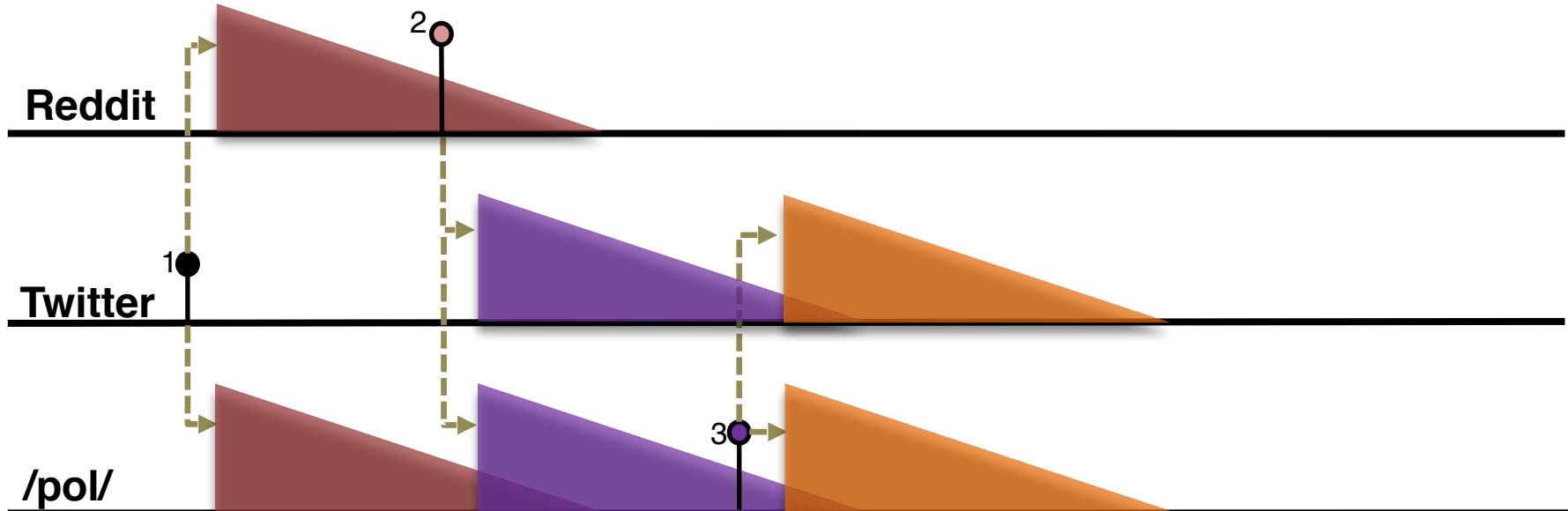


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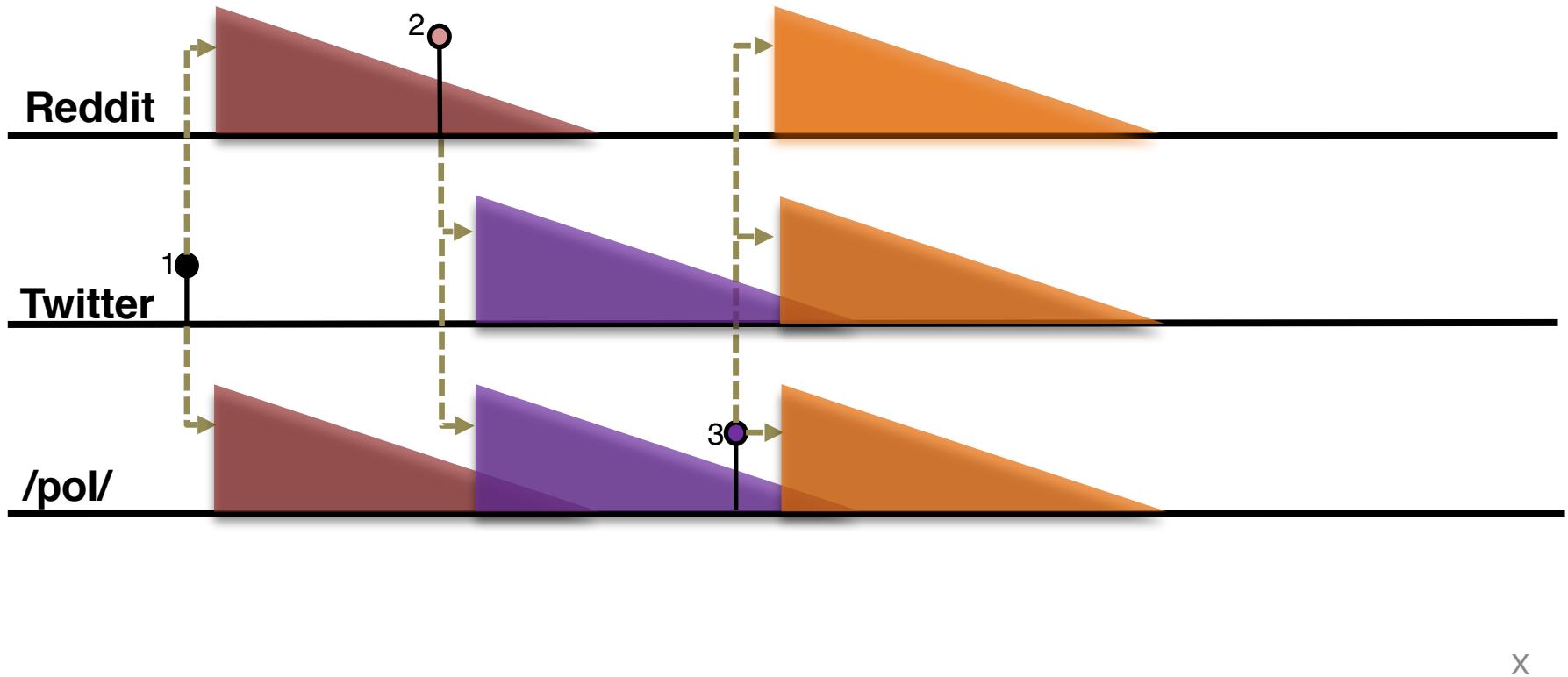
Hawkes Processes Example



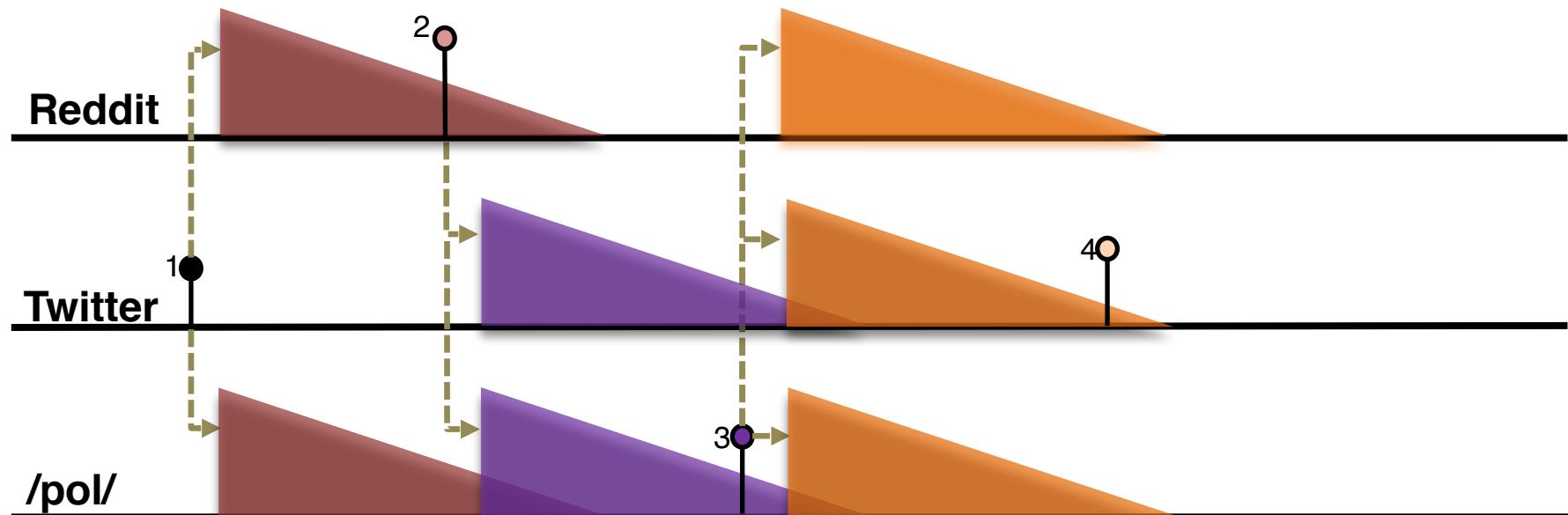
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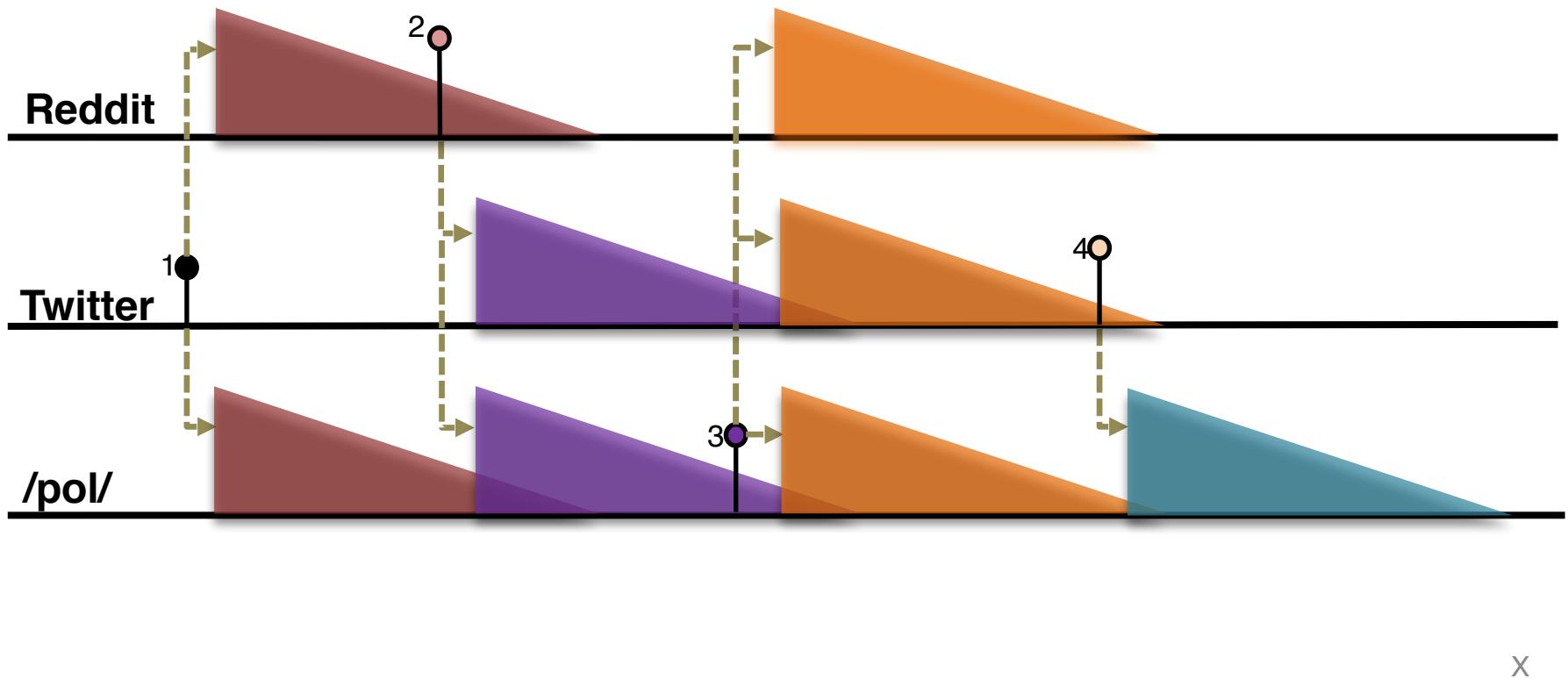
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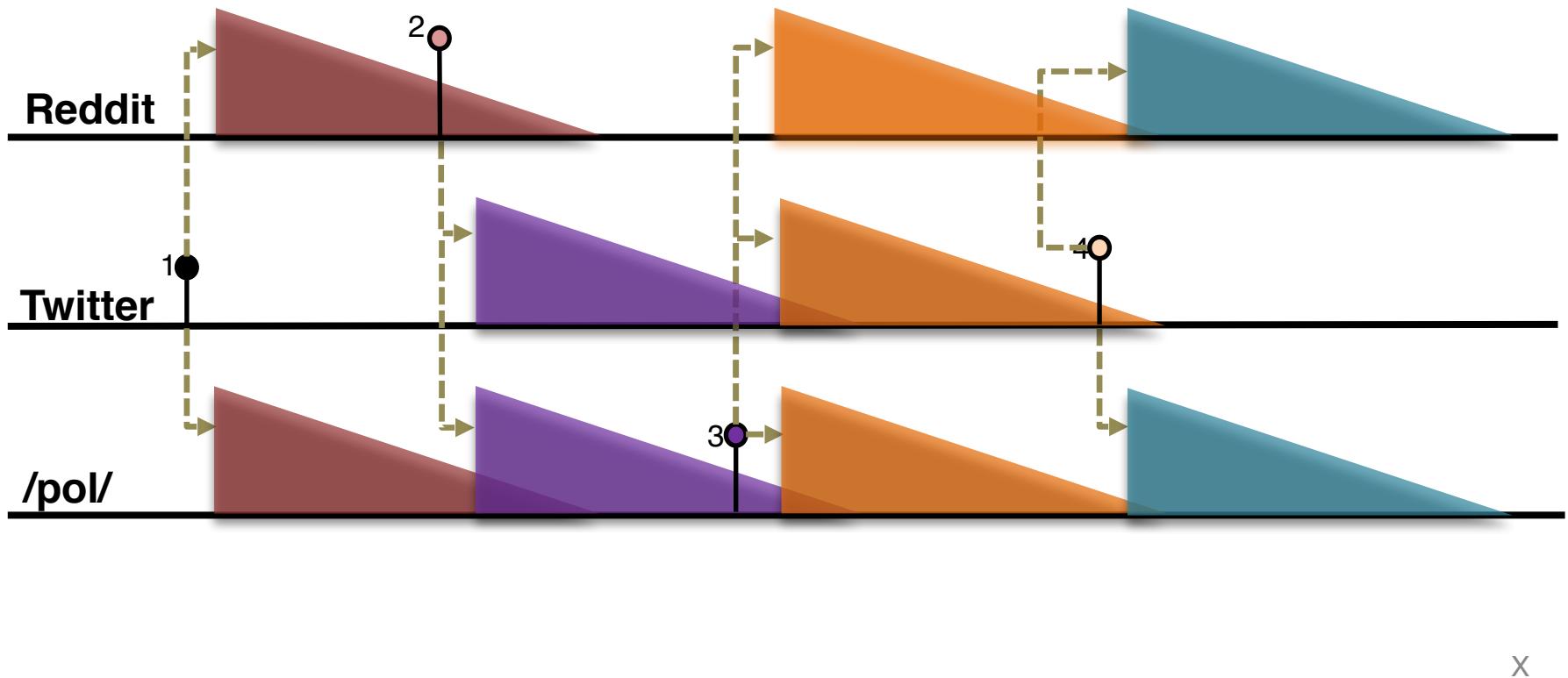
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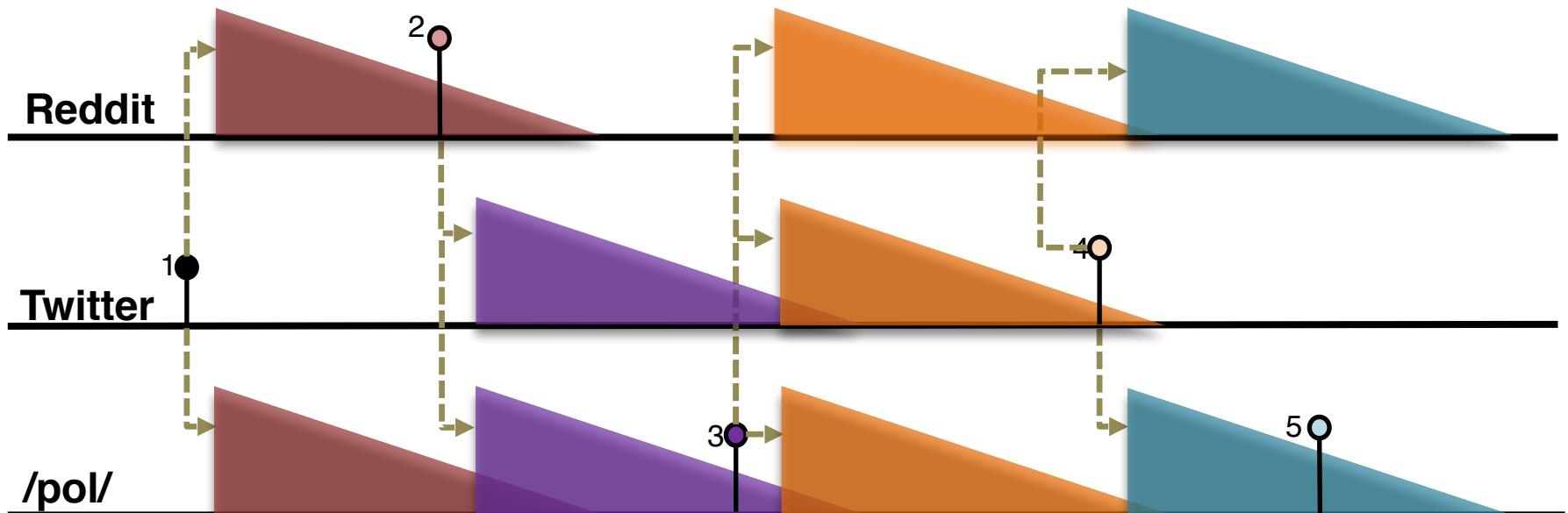
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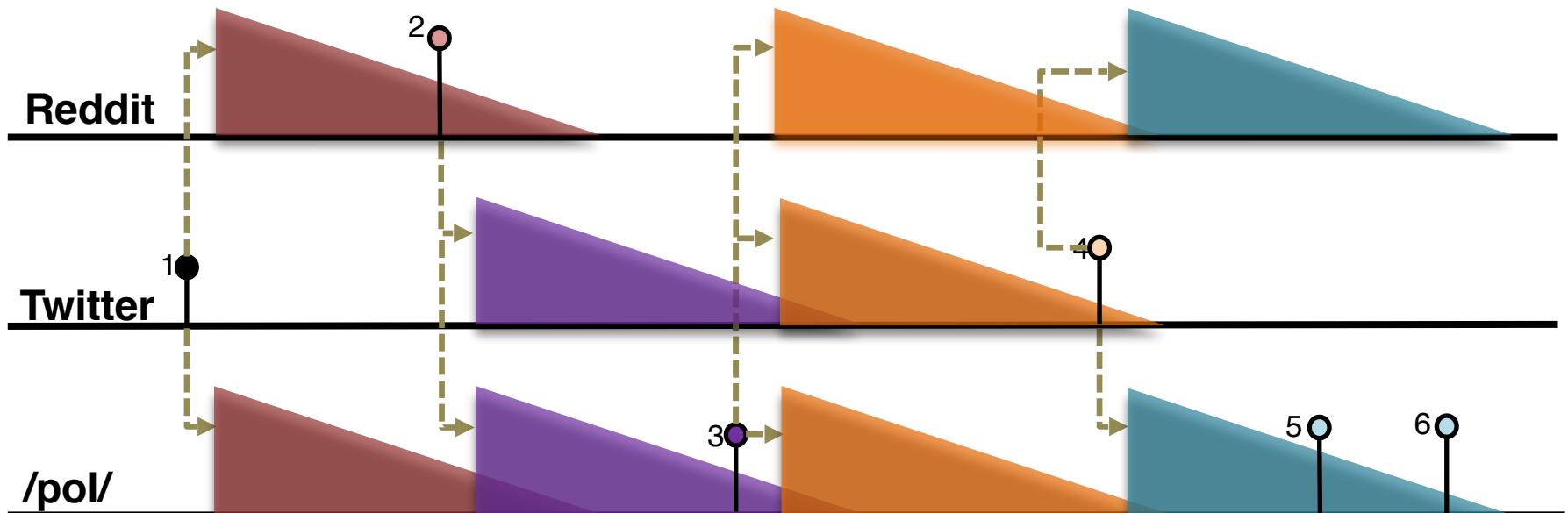
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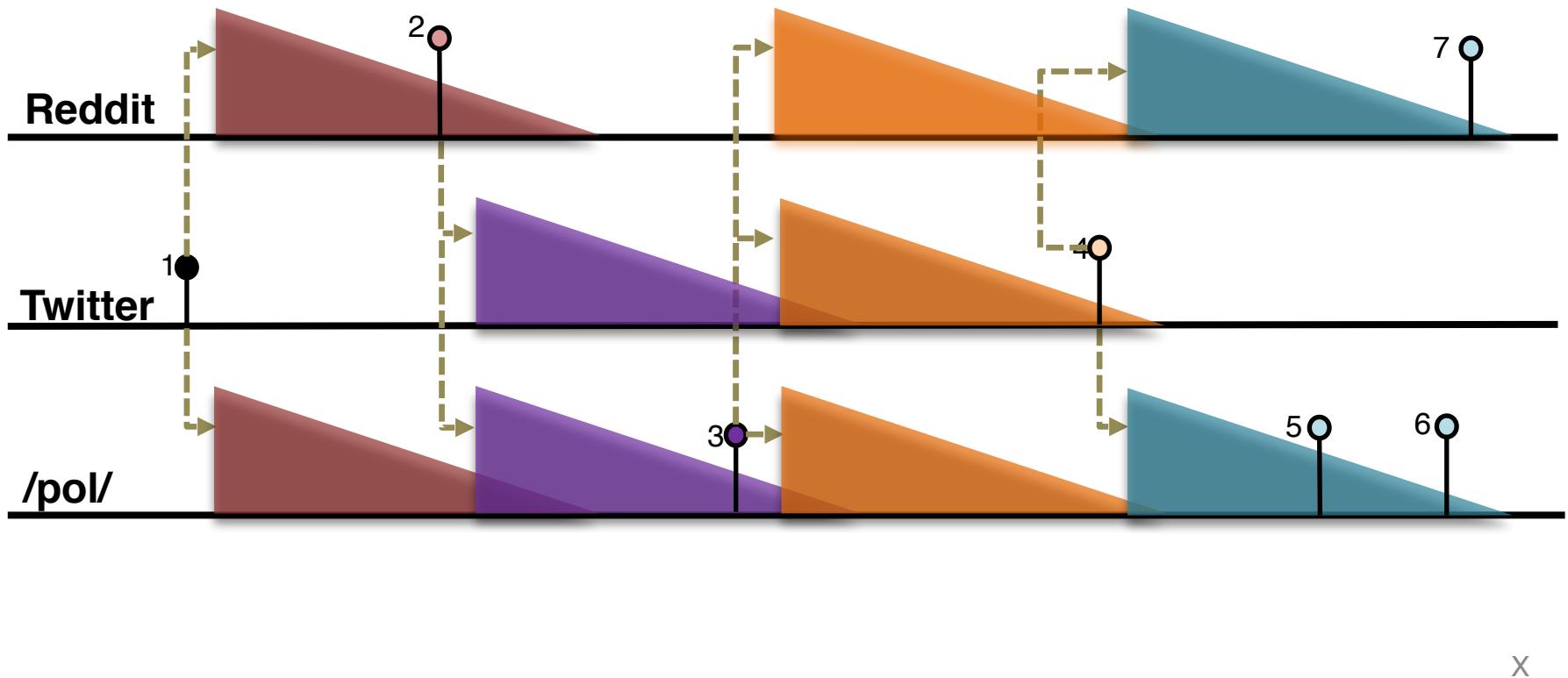
Hawkes Processes Example



Hawkes Processes Example



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

How 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%)

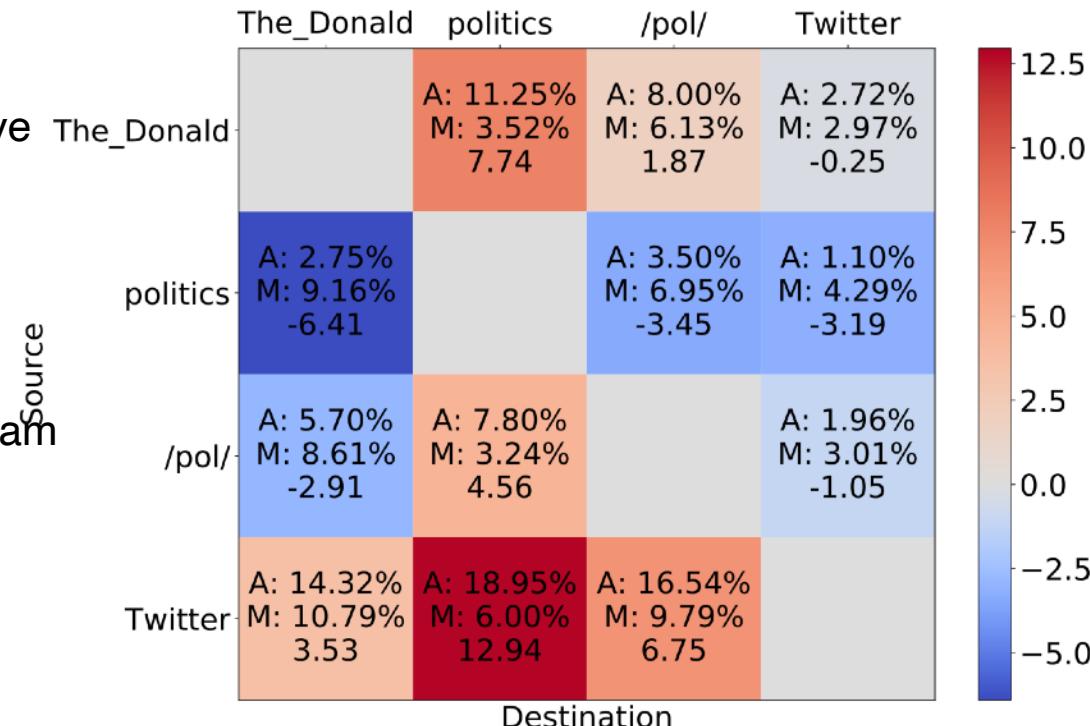
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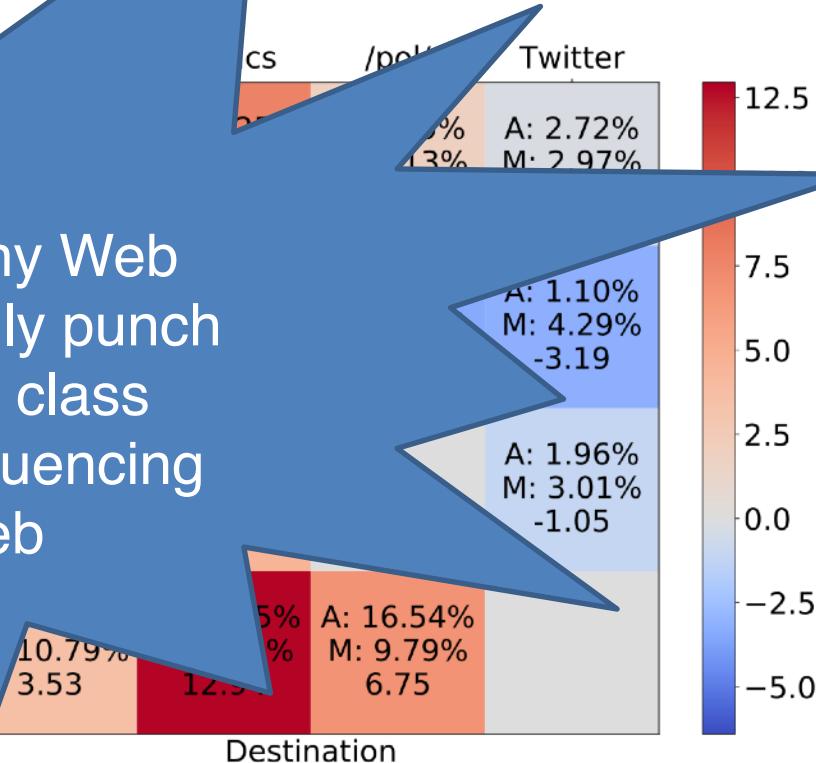
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How Communities Influence Each Other?

Twitter top influencer URLs

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



Memes are fun!



Memes are fun!



Shay T
@AthenaOTartar

Macron Antoinette memes, you say? @Sargon_of_Akkad, your wish is my command.

11:43 PM - 24 Apr 2017

1 1 1

No Open Borders
@AngDionlon

The French people HATE Maria Antoinette.she represents snobbish élitism. Let's meme Macron-Antoinette into existent reddit.com/r/The_Donald/c...

12:07 AM - 27 Apr 2017

The French people HATE Maria Antoinette...
16 points and 0 comments so far on reddit.com

Terrorism will part of our daily lives for the years to come
Le terrorisme fera partie de nos vies quotidiennes

Columba Iavia
@_Columba_Iavia

@Sargon_of_Akkad Emmanuel "Antoinette"
MacronFrenchlection
11:02 PM - 24 Apr 2017

La Marjolaine
@galswynthe_

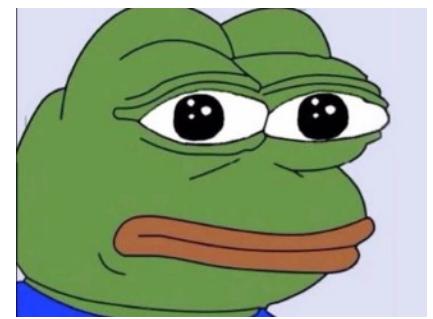
Voici le template et le site de meme :
imgflip.com/memegenerator



Camel Demilo
@EmescoDemilo

Macron Antoinette. #MemeWar @Sargon_of_Akkad

3:25 PM - 24 Apr 2017







Not always though...



Memes in politics

[US midterms 2018](#) [Business](#) [Tech](#) [Science](#)

Annotated: the Trump memes stuck to Cesar Sayoc's van

The vehicle seized by law enforcement in Florida was covered in strange propaganda



▲ Cesar Sayoc's van is seen in Boca Raton, Florida, on 18 October 2018 in this picture obtained from social media. Photograph: Social Media/Ed Kennedy via Reuters

most viewed in US



Pittsburgh synagogue shooting: suspect held after at least four killed



'I bet \$500 they are lying': Trump fans sceptical about pipe bomb arrest



'Why is that racist?' Trump greets young black leaders with freewheeling rant



Barack Obama takes aim at Donald Trump for 'making stuff up'



Muncy hits walk-off homer as Dodgers win longest ever World Series game



US midterms 2018 Business Tech Science

Annotated
to Cesar Sayoc

Trump m

Memes have become a popular,
and seemingly effective, method
to transmit ideology.

Memes have been *weaponized*

The
Guardian

▲ Cesar Sayoc's van is seen in Boca Raton, Florida, on 18 October 2018 in this picture obtained from social media.
Photograph: Social Media/Ed Kennedy via Reuters



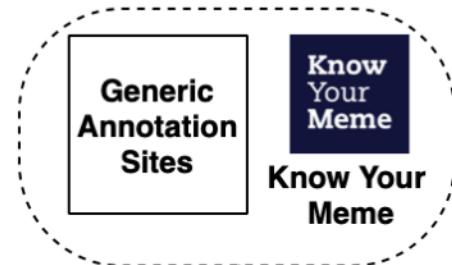
Donald Trump: 'I'm going
stuff up'

Muncy hits walk-off homer as
Dodgers win longest ever
World Series game

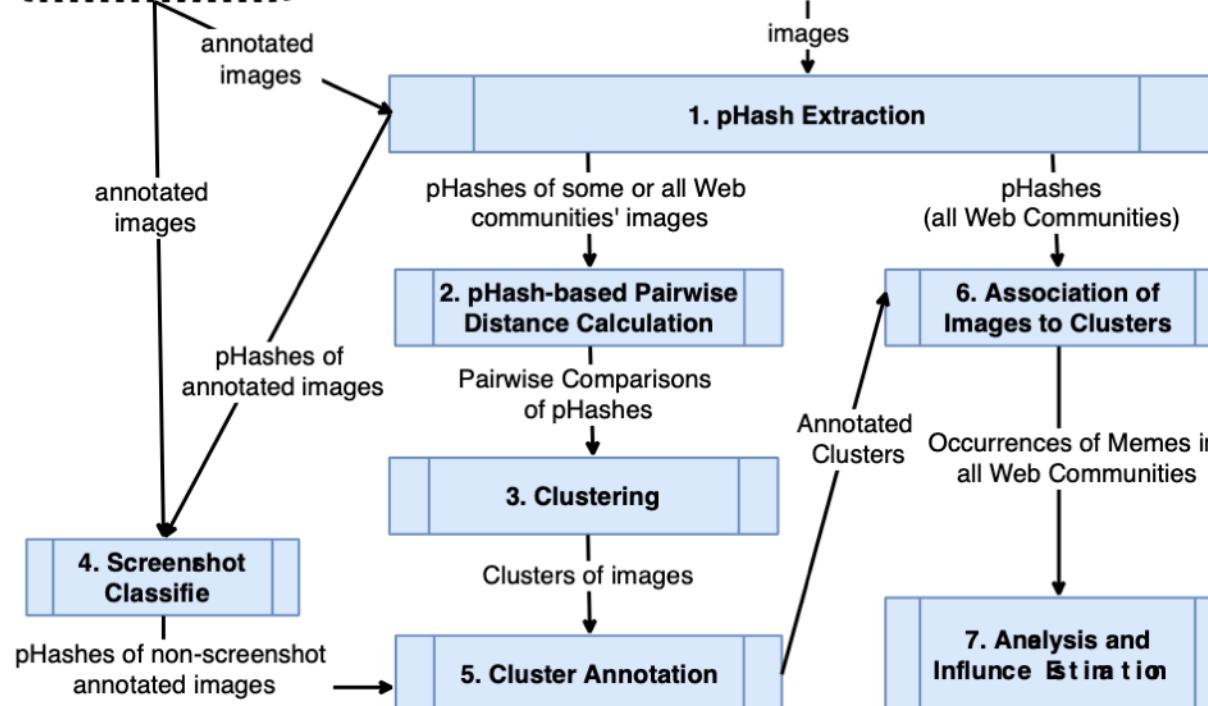
Memes processing pipeline

Memes

Meme Annotation Sites



Web Communities posting Memes



Datasets



# of posts	1.4B	1.0B	48M	12M	15K
# of posts with images	242M	62M	13M	955K	15K
# of Images	114M	40M	4M	235K	706K
# of unique pHashes	74M	30M	3M	193K	597K

Top memes per Web community

/pol/		Reddit		Gab		Twitter	
Entry	Posts (%)	Entry	Posts (%)	Entry	Posts (%)	Entry	Posts (%)
Feels Bad Man/Sad Frog	64,367 (4.9%)	Manning Face	12,540 (2.2%)	Jesusland (P)	454 (1.6%)	Roll Safe	55,010 (5.9%)
Smug Frog	63,290 (4.8%)	That's the Joke	7,626 (1.3%)	Demotivational Posters	414 (1.5%)	Evil Kermit	50,642 (5.4%)
Happy Merchant (R)	49,608 (3.8%)	Feels Bad Man/ Sad Frog	7,240 (1.3%)	Smug Frog	392 (1.4%)	Arthur's Fist	37,591 (4.0%)
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Make America Great Again (P)	21,229 (1.6%)	Smug Frog	4,642 (0.8%)	Happy Merchant (R)	297 (1.1%)	Reaction Images	9,387 (1.0%)
Angry Pepe	20,485 (1.5%)	Roll Safe	4,523 (0.8%)	Murica	274 (1.0%)	Conceited Reaction	9,106 (1.0%)
Bait this is Bait	16,686 (1.2%)	Rage Guy	4,491 (0.8%)	And Its Gone	235 (0.9%)	Expanding Brain	8,701 (0.9%)
I Know that Feel Bro	14,490 (1.1%)	Make America Great Again (P)	4,440 (0.8%)	Make America Great Again (P)	207 (0.8%)	Demotivational Posters	7,781 (0.8%)
Cult of Kek	14,428 (1.1%)	Fake CCG Cards	4,438 (0.8%)	Feels Bad Man/ Sad Frog	206 (0.8%)	Cash Me Ousside/Howbow Dah	5,972 (0.6%)
Laughing Tom Cruise	14,312 (1.1%)	Confused Nick Young	4,024 (0.7%)	Trump's First Order of Business (P)	192 (0.7%)	Salt Bae	5,375 (0.6%)
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Wojak / Feels Guy	11,682 (0.9%)	Absolutely Disgusting	2,674 (0.5%)	Most Interesting Man in World	140 (0.5%)	Harambe the Gorilla	3,164 (0.3%)
Absolutely Disgusting	11,436 (0.8%)	Pepe the Frog	2,672 (0.5%)	Chuck Norris Facts	131 (0.4%)	I Know that Feel Bro	3,137 (0.3%)
Spurdo Sparde	9,581 (0.7%)	Pretending to be Retarded	2,462 (0.4%)	Roll Safe	131 (0.4%)	This is Fine	3,094 (0.3%)
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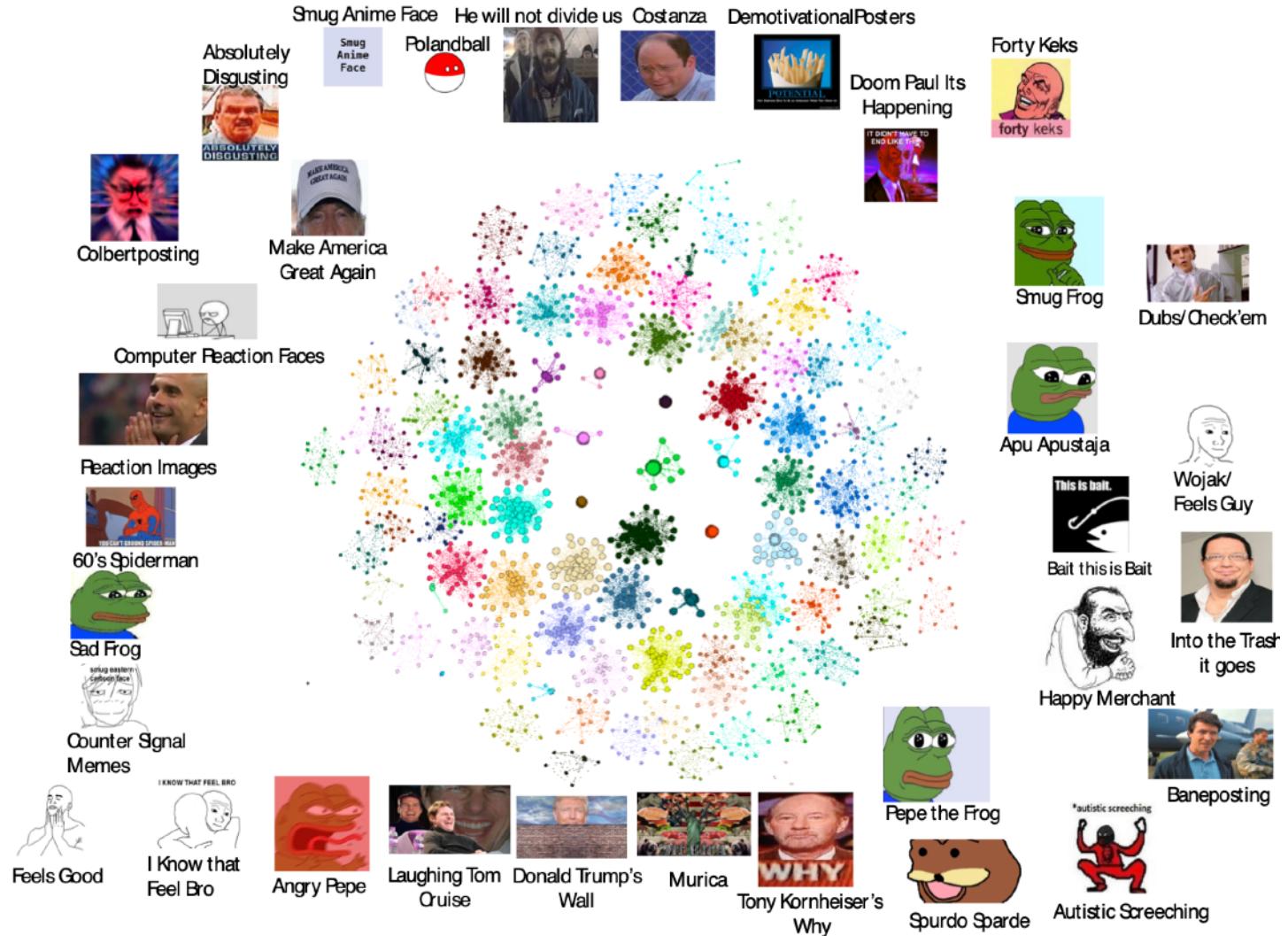
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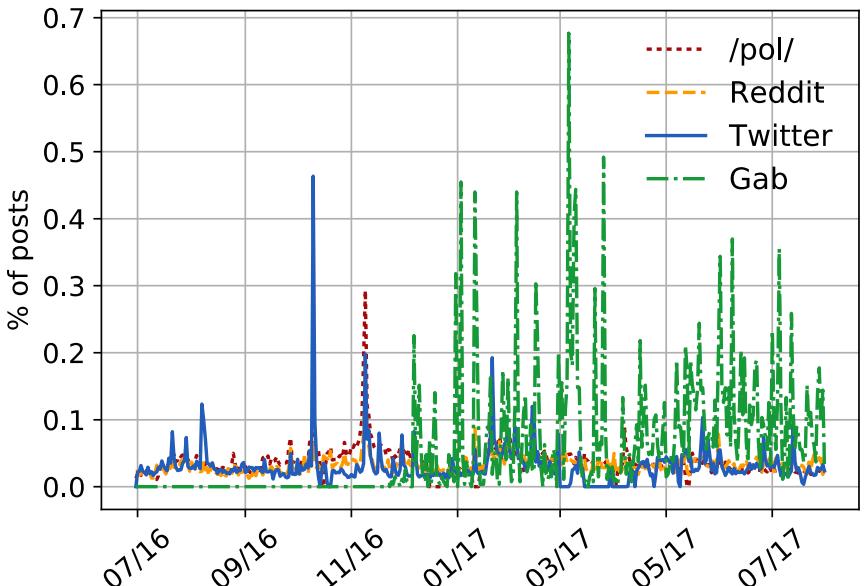
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Bait this is Bait	16,686 (1.2%)	Rage Guy	4,491 (0.8%)	And Its Gone	235 (0.9%)	Expanding Brain	8,701 (0.9%)
I Know that Feel Bro	14,490 (1.1%)	Make America Great Again (P)	4,440 (0.8%)	Make America Great Again (P)	207 (0.8%)	Demotivational Posters	7,781 (0.8%)
Cult of Kek	14,428 (1.1%)	Fake CCG Cards	4,438 (0.8%)	Feels Bad Man/ Sad Frog	206 (0.8%)	Cash Me Ousside/Howbow Dah	5,972 (0.6%)
Laughing Tom Cruise	14,312 (1.1%)	Confused Nick Young	4,024 (0.7%)	Trump's First Order of Business (P)	192 (0.7%)	Salt Bae	5,375 (0.6%)
Awoo	13,767 (1.0%)	Daily Struggle	4,015 (0.7%)	Kekistan	186 (0.6%)	Feels Bad Man/ Sad Frog	4,991 (0.5%)
Tony Kornheiser's Why	13,577 (1.0%)	Expanding Brain	3,757 (0.7%)	Picardia (P)	183 (0.6%)	Math Lady/Confused Lady	4,722 (0.5%)
Picardia (P)	13,540 (1.0%)	Demotivational Posters	3,419 (0.6%)	Things with Faces (Pareidolia)	156 (0.5%)	Computer Reaction Faces	4,720 (0.5%)
Big Grin / Never Ever	12,893 (1.0%)	Actual Advice Mallard	3,293 (0.6%)	Serbia Strong/Remove Kebab	149 (0.5%)	Clinton Trump Duet (P)	3,901 (0.4%)
Reaction Images	12,608 (0.9%)	Reaction Images	2,959 (0.5%)	Riot Hipster	148 (0.5%)	Kendrick Lamar Damn Album Cover	3,656 (0.4%)
Computer Reaction Faces	12,247 (0.9%)	Handsome Face	2,675 (0.5%)	Colorized History	144 (0.5%)	What in tarnation	3,363 (0.3%)
Wojak / Feels Guy	11,682 (0.9%)	Absolutely Disgusting	2,674 (0.5%)	Most Interesting Man in World	140 (0.5%)	Harambe the Gorilla	3,164 (0.3%)
Absolutely Disgusting	11,436 (0.8%)	Pepe the Frog	2,672 (0.5%)	Chuck Norris Facts	131 (0.4%)	I Know that Feel Bro	3,137 (0.3%)
Spurdo Sparde	9,581 (0.7%)	Pretending to be Retarded	2,462 (0.4%)	Roll Safe	131 (0.4%)	This is Fine	3,094 (0.3%)
Total	445,179 (33.4%)		94,069 (16.7%)		4,808 (17.0%)		249,047 (26.4%)

Who are the most popular people in memes?

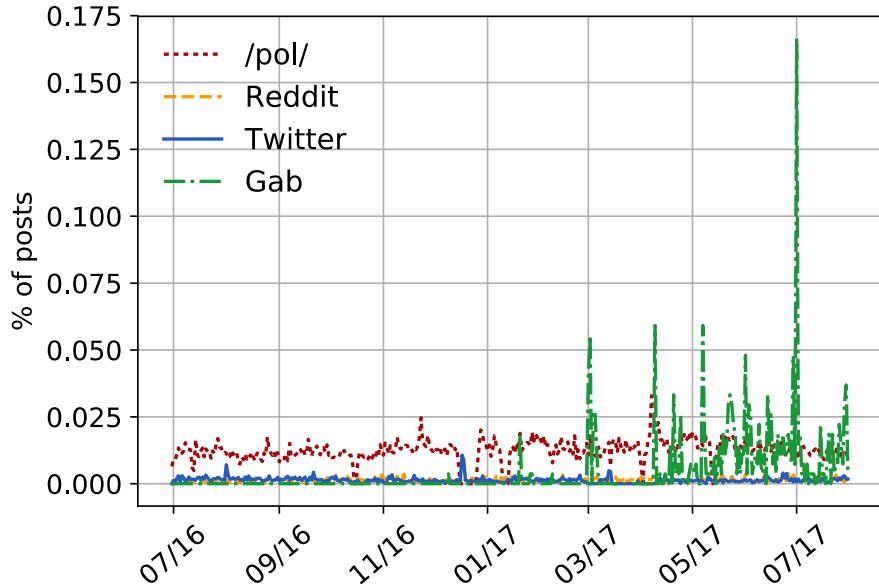
/pol/		Reddit		Gab		Twitter	
Entry	Posts (%)	Entry	Posts (%)	Entry	Posts (%)	Entry	Posts (%)
Donald Trump	60,611 (4.6%)	Donald Trump	34,533 (6.1%)	Donald Trump	1,665 (6.1%)	Donald Trump	10,208 (1.3%)
Adolf Hitler	8,759 (0.6%)	Steve Bannon	3,733 (0.6%)	Mitt Romney	455 (1.7%)	Barack Obama	5,187 (0.6%)
Mike Pence	4,738 (0.3%)	Stephen Colbert	3,121 (0.6%)	Bill Nye	370 (1.3%)	Chelsea Manning	4,173 (0.5%)
Jeb Bush	4,217 (0.3%)	Chelsea Manning	2,261 (0.4%)	Adolf Hitler	106 (0.4%)	Kim Jong Un	3,271 (0.4%)
Vladimir Putin	3,218 (0.2%)	Ben Carson	2,148 (0.4%)	Barack Obama	104 (0.4%)	Anita Sarkeesian	2,764 (0.3%)
Alex Jones	3,206 (0.2%)	Bernie Sanders	1,757 (0.3%)	Isis Daesh	92 (0.3%)	Bernie Sanders	2,277 (0.3%)
Ron Paul	3,116 (0.2%)	Ajit Pai	1,658 (0.3%)	Death Grips	91 (0.3%)	Vladimir Putin	1,733 (0.2%)
Bernie Sanders	3,022 (0.2%)	Barack Obama	1,628 (0.3%)	Eminem	89 (0.3%)	Billy Mays	1,454 (0.2%)
Massimo D'alema	2,725 (0.2%)	Gabe Newell	1,518 (0.3%)	Kim Jong Un	87 (0.3%)	Adolf Hitler	1,304 (0.2%)
Mitt Romney	2,468 (0.2%)	Bill Nye	1,478 (0.3%)	Ajit Pai	76 (0.3%)	Kanye West	1,261 (0.2%)
Chelsea Manning	2,403 (0.2%)	Hillary Clinton	1,468 (0.3%)	Pewdiepie	73 (0.3%)	Bill Nye	968 (0.2%)
Hillary Clinton	2,378 (0.2%)	Death Grips	1,463 (0.3%)	Bernie Sanders	71 (0.3%)	Mitt Romney	923 (0.1%)
A. Wyatt Mann	2,110 (0.2%)	Adolf Hitler	1,449 (0.3%)	Alex Jones	70 (0.3%)	Filthy Frank	777 (0.1%)
Ben Carson	1,780 (0.1%)	Mitt Romney	1,294 (0.2%)	Hillary Clinton	59 (0.2%)	Hillary Clinton	758 (0.1%)
Filthy Frank	1,598 (0.1%)	Eminem	1,274 (0.2%)	Anita Sarkeesian	54 (0.2%)	Ajit Pai	715 (0.1%)



How are memes shared over time?

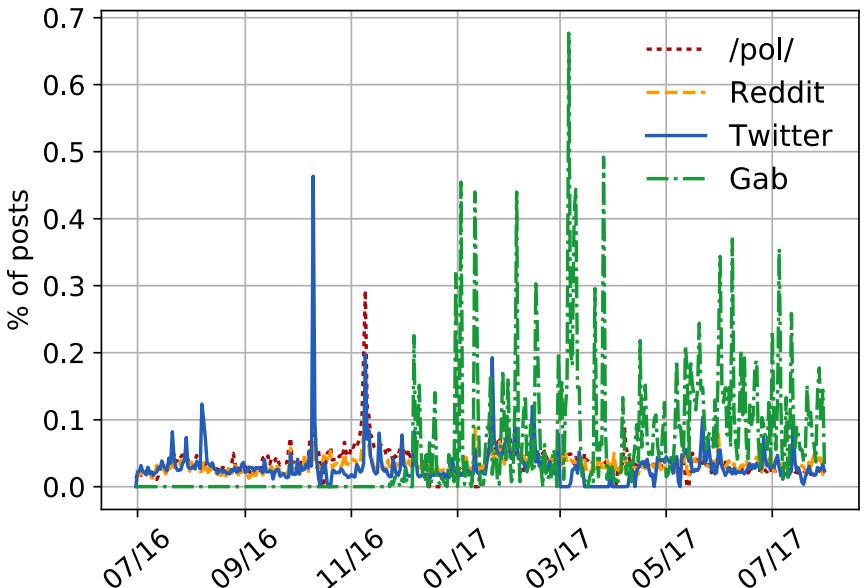


Political Memes

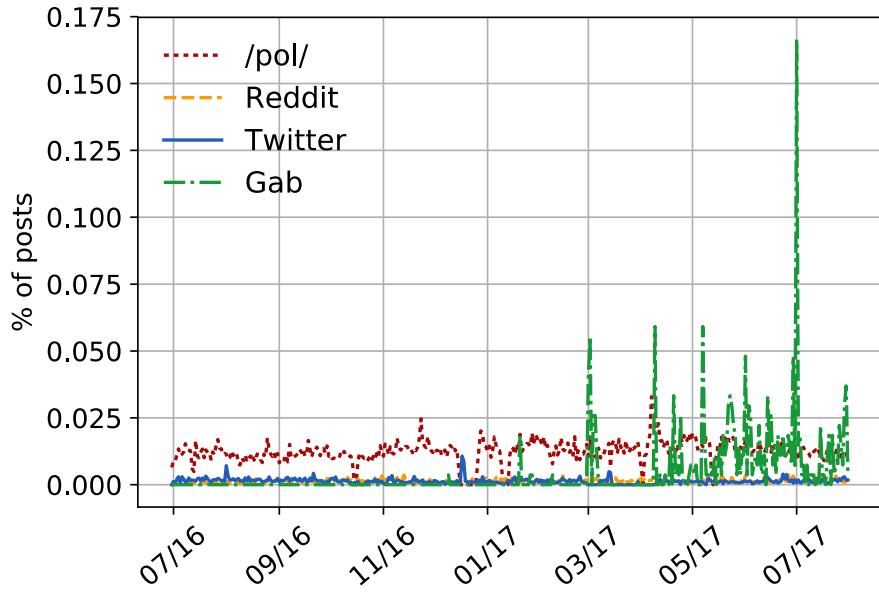


Racist Memes

How are memes shared over time?

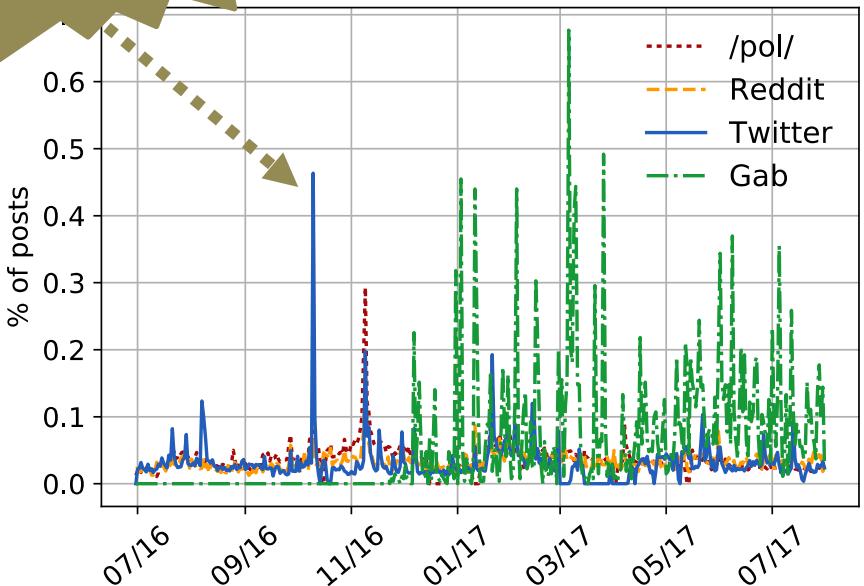


Political Memes

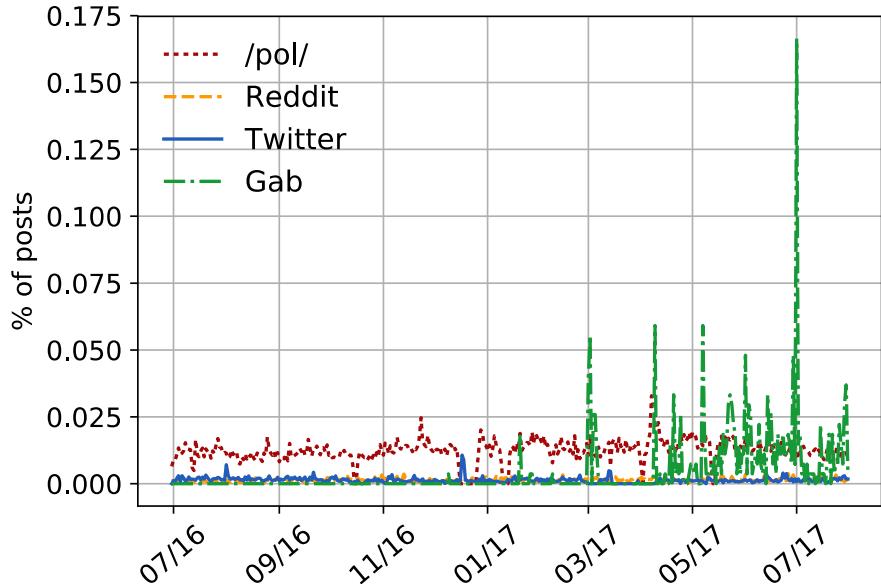


Racist Memes

How are memes shared over time?

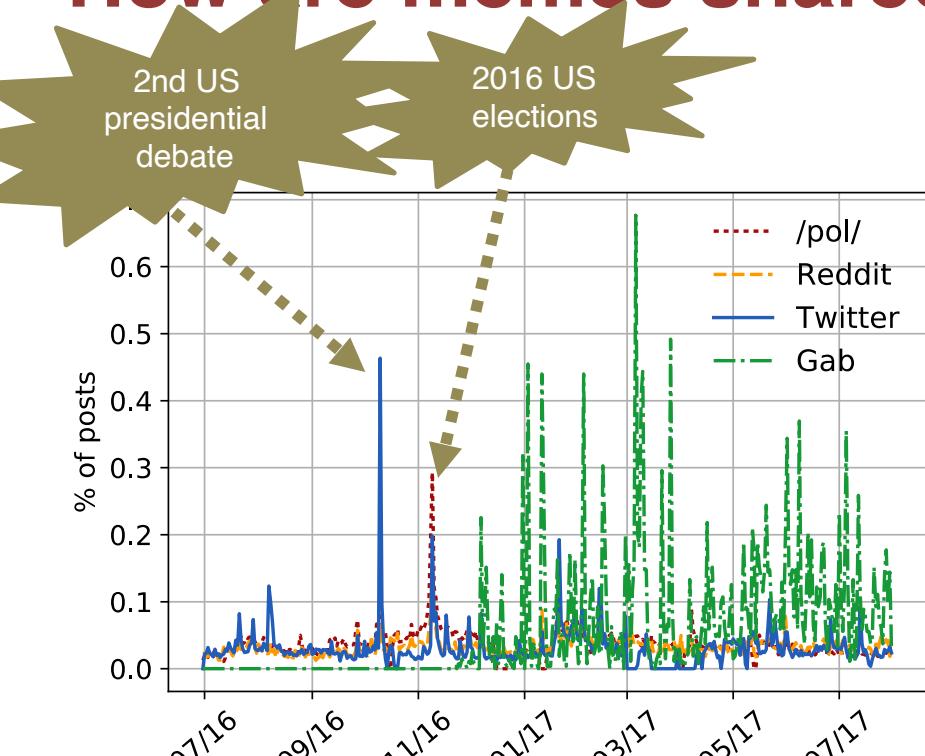


Political Memes

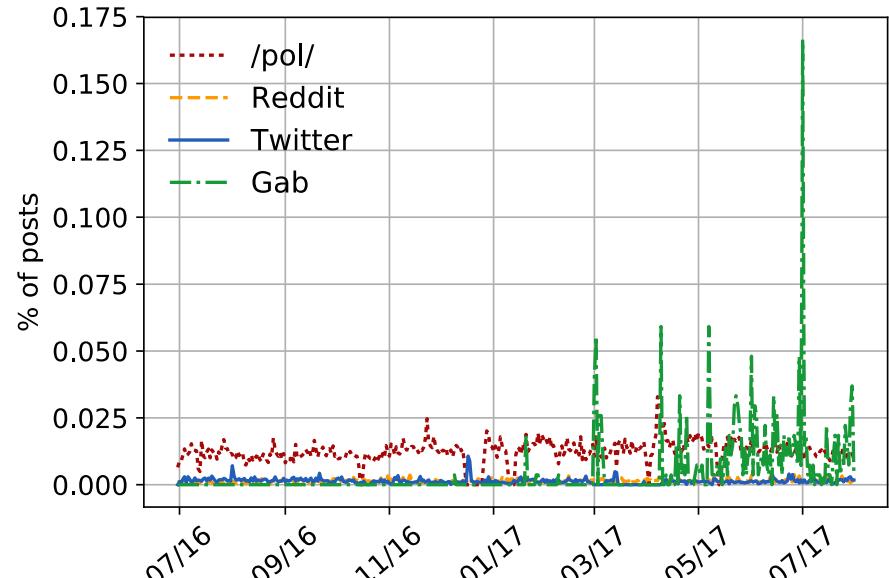


Racist Memes

How are memes shared over time?

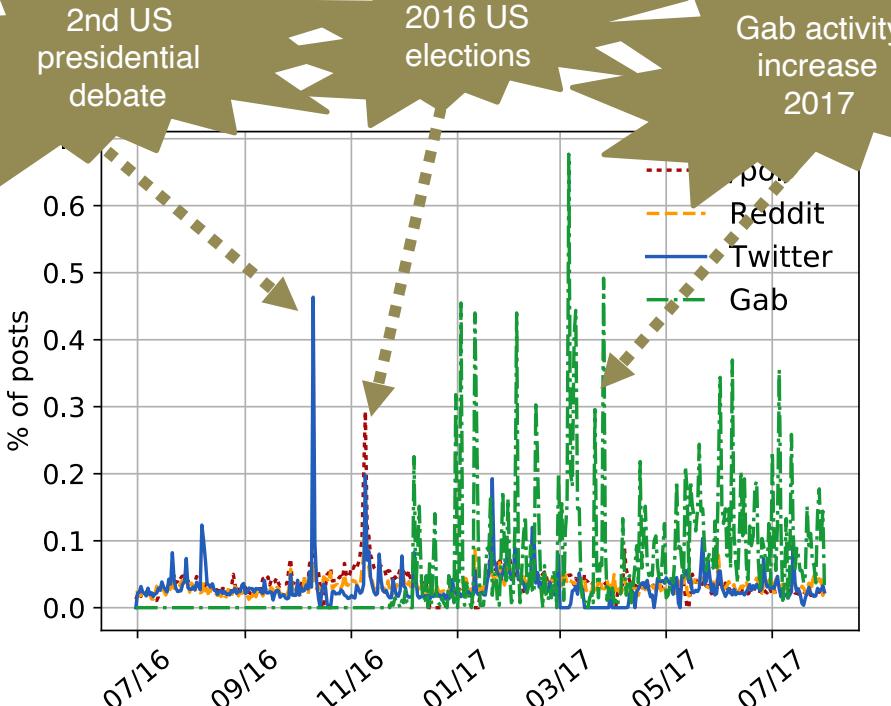


Political Memes

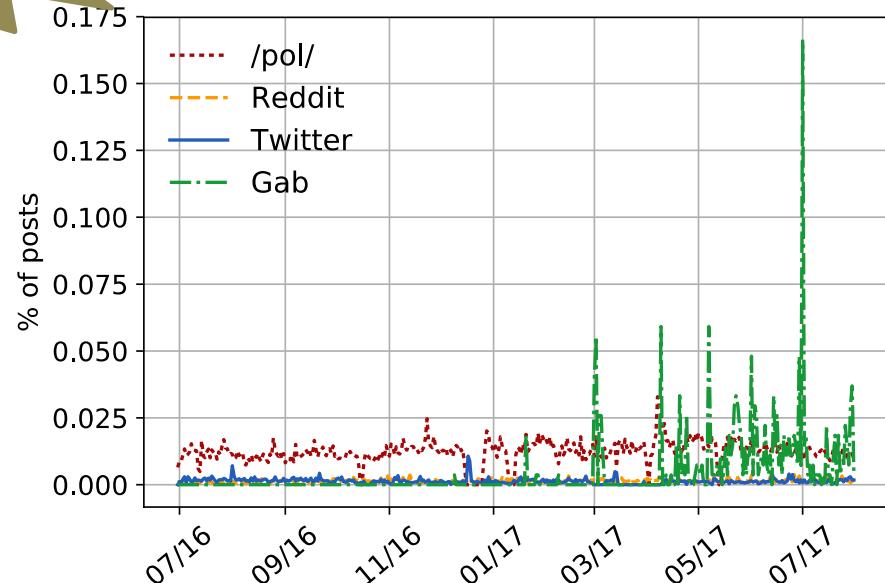


Racist Memes

How are memes shared over time?

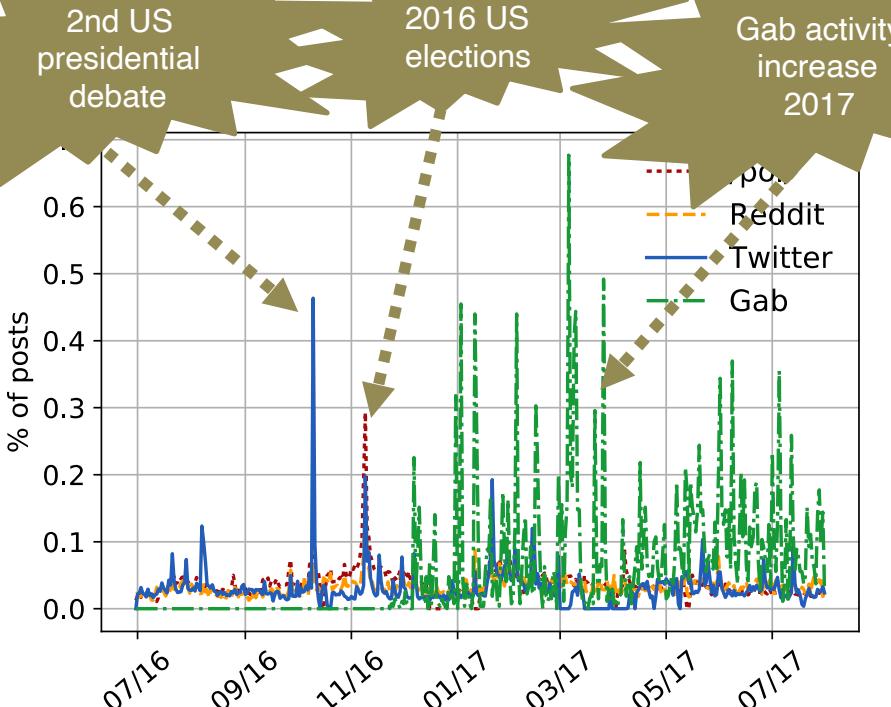


Political Memes

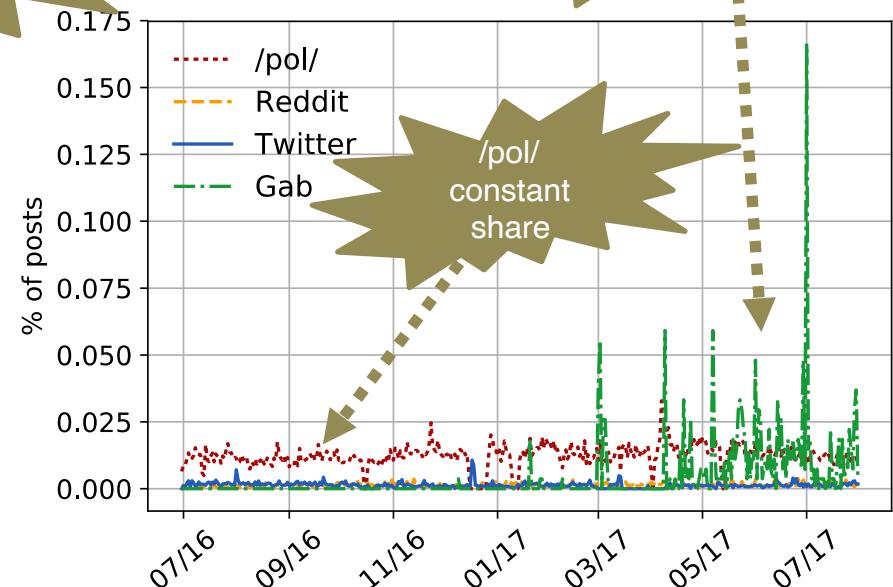


Racist Memes

How are memes shared over time?



Political Memes



Racist Memes

Communities' influence (racist memes)

/pol/ is most influential in terms of spreading racist memes

		/pol/	Reddit	Twitter	Gab	T_D
Source	/pol/	R: 99.44% NR: 97.12%*	R: 6.89% NR: 3.95%*	R: 3.94% NR: 2.93%*	R: 18.93% NR: 12.91%	R: 14.17% NR: 16.41%*
	Reddit	R: 0.29% NR: 1.28%*	R: 88.95% NR: 90.87%*	R: 2.79% NR: 4.64%*	R: 1.25% NR: 9.42%	R: 9.84% NR: 9.02%*
	Twitter	R: 0.15% NR: 0.79%	R: 1.75% NR: 2.85%*	R: 92.95% NR: 90.96%*	R: 0.66% NR: 8.16%	R: 1.37% NR: 3.66%*
	Gab	R: 0.04% NR: 0.09%	R: 0.65% NR: 0.16%	R: 0.10% NR: 0.20%	R: 76.67% NR: 59.72%	R: 0.08% NR: 0.58%
	T_D	R: 0.07% NR: 0.73%*	R: 1.75% NR: 2.18%*	R: 0.23% NR: 1.27%*	R: 2.49% NR: 9.79%	R: 74.53% NR: 70.32%*

Destination

Communities' efficiency (racist memes)

If we look at the influence normalized to the number of memes posted, the The_Donald is most *efficient* in terms of disseminating memes

		/pol/	Reddit	Twitter	Gab	T_D	Total Ext
Source	/pol/	R: 99.4 NR: 97.1*	R: 0.5 NR: 1.5*	R: 0.3 NR: 1.4*	R: 0.2 NR: 0.4	R: 0.1 NR: 0.9*	R: 1.1 NR: 4.2
	Reddit	R: 4.2 NR: 3.3*	R: 89.0 NR: 90.9*	R: 2.7 NR: 5.7*	R: 0.2 NR: 0.7	R: 1.4 NR: 1.3*	R: 8.5 NR: 11.1
	Twitter	R: 2.2 NR: 1.7	R: 1.8 NR: 2.3*	R: 92.9 NR: 91.0*	R: 0.1 NR: 0.5	R: 0.2 NR: 0.4*	R: 4.4 NR: 4.9
	Gab	R: 4.5 NR: 3.0	R: 4.9 NR: 2.0	R: 0.7 NR: 3.2	R: 76.7 NR: 59.7	R: 0.1 NR: 1.1	R: 10.3 NR: 9.3
	T_D	R: 7.5 NR: 13.6*	R: 12.1 NR: 15.5*	R: 1.5 NR: 11.1*	R: 2.3 NR: 5.3	R: 74.5 NR: 70.3*	R: 23.4 NR: 45.6

What about state-level adversaries?

What about state-level adversaries?

Raise your hand if you're under investigation!



a)



b)



c)

Research Questions

- How do state-sponsored actors operate and evolve?
- How does the behavior of state-sponsored trolls compare to random users?
- More importantly, what was their influence on the Web with respect to the dissemination of news?

What are they posing as?

News accounts?

Nudging users to follow them

Trump supporters

Word	Description	
	(%)	Word bigram
news	10.7%	follow me
follow	10.7%	breaking news
conservative	8.1%	news aus
trump	7.8%	uns in
und	6.2%	deiner stdt
maga	5.9%	die news
love	5.8%	wichtige und
us	5.3%	nachrichten aus
die	5.0%	aus deiner
nachrichten	4.3%	die dn

Where are they allegedly posting from?



What hashtags they shared?

Hashtag	Trolls		Hashtag	Baseline	
	(%)	Hashtag	(%)	(%)	Hashtag
news	7.2%	US	0.7%	iHeartAwards	1.8%
politics	2.6%	tcot	0.6%	BestFanArmy	1.6%
sports	2.1%	PJNET	0.6%	Harmonizers	1.0%
business	1.4%	entertainment	0.5%	iOSApp	0.9%
money	1.3%	top	0.5%	JouwBaan	0.9%
world	1.2%	topNews	0.5%	vacature	0.9%
MAGA	0.8%	ISIS	0.4%	KCA	0.9%
health	0.8%	Merkelmussbleiben	0.4%	Psychic	0.8%
local	0.7%	IslamKills	0.4%	RT	0.8%
BlackLivesMatter	0.7%	breaking	0.4%	Libertad2016	0.6%
				dts	0.4%

Do Russian trolls change their screen names?

9% of the Russian troll accounts changed their screen name

Up to 4 times per account

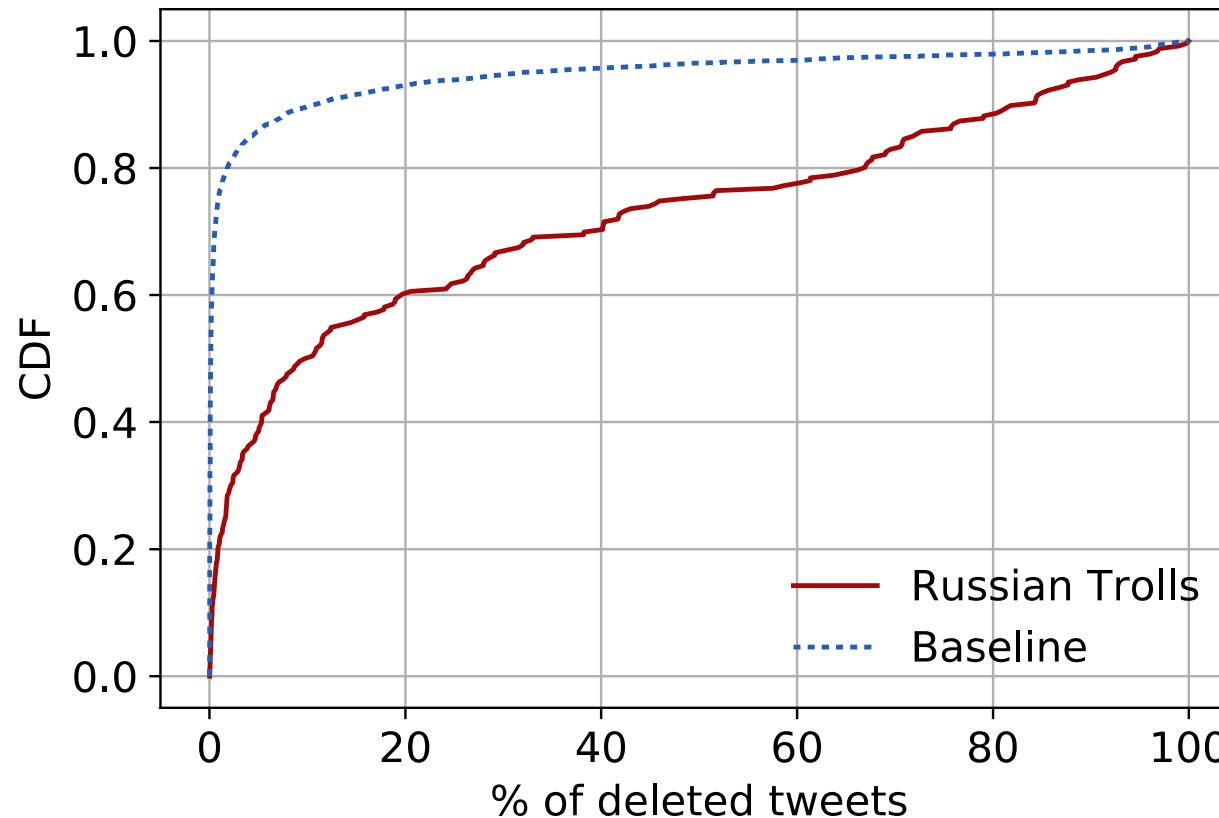
E.g., from “OnlineHouston” to “HoustonTopNews”

Clear attempt to pose as local news outlet

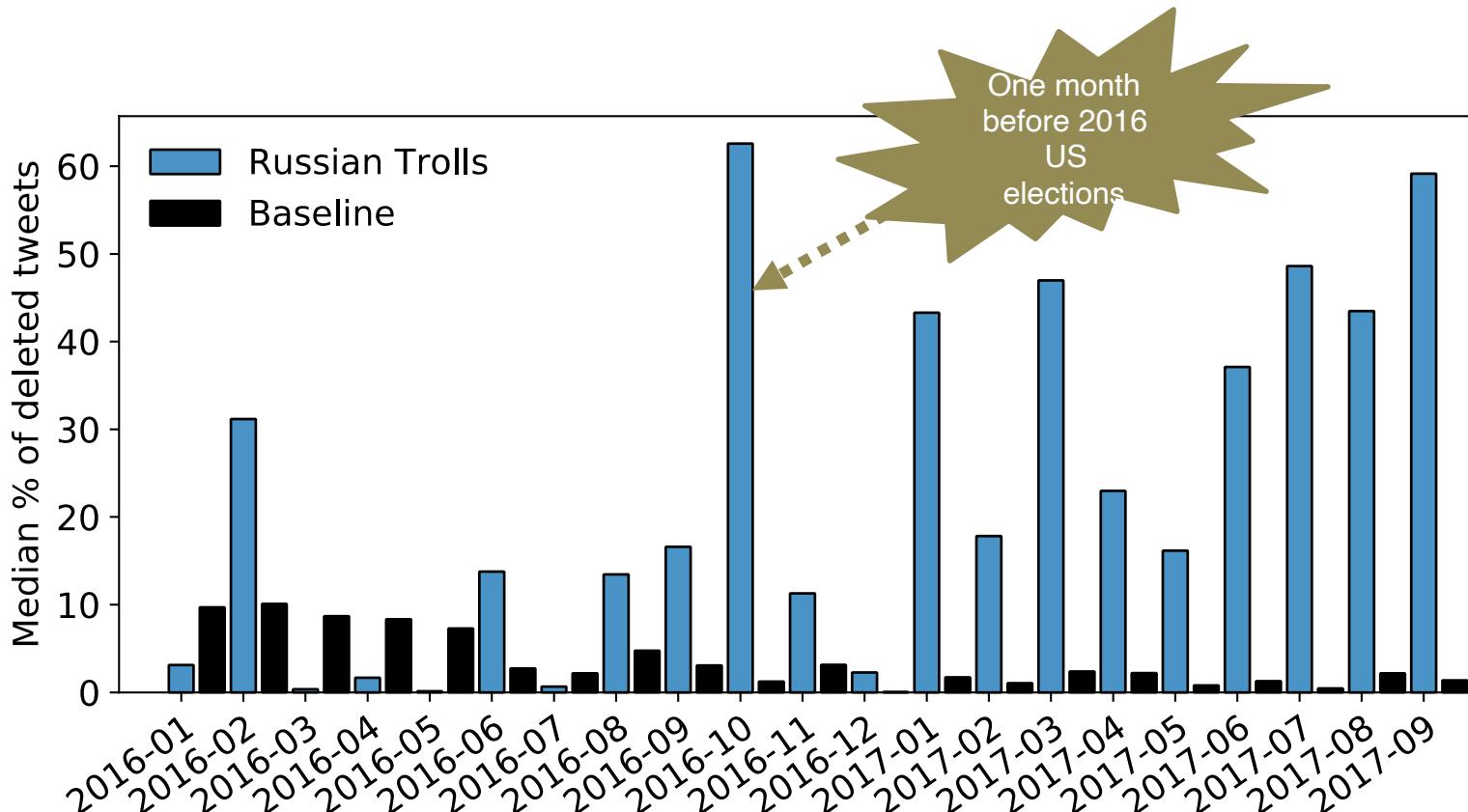
In our baseline dataset 19% of the accounts changed their screen name

Up to 11 times per account

Do Russian trolls delete their tweets?



When did Russian trolls deleted their tweets?



Influence

1K trolls caused 2.6% of all Russian state-sponsored news outlets URLs (i.e., RT) on Twitter's 1%.

1K trolls caused 0.6% of all other news outlets URLs on Twitter's 1%.

		/pol/	Reddit	Twitter	Trolls
		R: 5.74% O: 8.15% -2.41	R: 0.71% O: 1.17% -0.46	R: 5.32% O: 9.07% -3.75	
/pol/		R: 4.78% O: 46.78% -41.99		R: 5.57% O: 12.22% -6.64	R: 13.20% O: 57.15% -43.95
Reddit	Twitter	R: 24.90% O: 9.14% 15.75	R: 16.66% O: 10.49% 6.17		R: 43.84% O: 51.53% -7.68
Trolls		R: 1.38% O: 0.72% 0.66	R: 3.13% O: 0.62% 2.51	R: 2.69% O: 0.61% 2.07	
Destination					

Main Findings

We find differences in the use of the Twitter platform between trolls and random users

Trolls seem to reset their “personas” by changing names and deleting tweets

Particularly influential in spreading Russian state-sponsored URLs on Twitter and other platforms

In conclusion, we developed methodologies...

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Crawling 4chan, Reddit, Gab, Twitter, YouTube

Processing, cleaning, storing, indexing, etc.

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Data Analysis

Statistical tools to study distributions, behaviors, etc.

Longitudinal analysis, understanding trends and change points

Influence estimation

Image analysis

Clustering, contextual analysis, unsupervised learning

Language modeling, topic extraction

Classification and prediction

[...]

Exploratory & hypotheses-driven

In conclusion, we developed methodologies...

Data Collection

Crawling 4chan, Reddit, Gab, Twitter, YouTube
Processing, cleaning, storing, indexing, etc.

Data Sharing

Everything open source
Easy to use, facilitate qualitative/
social science research

Data Analysis

Statistical tools to study distributions,
behaviors, etc.

Longitudinal analysis, understanding
trends and change points

Influence estimation

Image analysis

Clustering, contextual analysis,
unsupervised learning

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Moving Forward

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There are still many problems remaining in the broad space

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We have made a lot of progress into gaining a quantitative understanding

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There are still many problems remaining in the broad space

We have made a lot of progress into gaining a quantitative understanding

We now need to deploy **proactive systems in production**

Real time detection of harassment and online attacks

Actively fight weaponized information

Policy

Accountability

Thank you!

