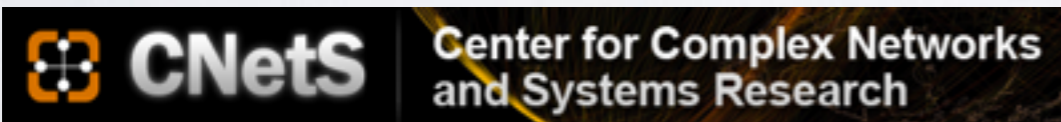


THE RISE OF SOCIAL BOTS

FIGHTING DECEPTION AND MISINFORMATION ON SOCIAL MEDIA

Emilio Ferrara (@jabawack)

Center for Complex Networks and Systems Research & Indiana University Network Institute
Indiana University, Bloomington (USA)



James S. McDonnell Foundation





Lincoln, ~1860



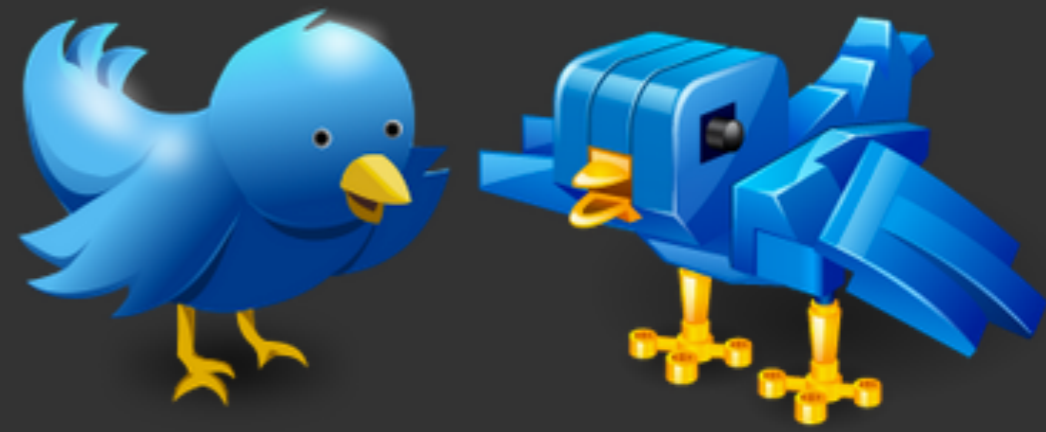
Truman, 1948



Nixon, 1972



Bot or Not?



A **Truthy** project

Social bot detection

TASK: verify the authenticity of users who participate in discussions and produce content in social media

<http://motherboard.vice.com/read/barack-obama-is-probably-a-robot>

<http://truthy.indiana.edu/botornot>

Bot or Not?



A **Truthy** project



<http://truthy.indiana.edu/botornot>

WHY DO WE CARE?

WHY DO WE CARE?

- **Some bots are harmful (by design)**
 - **Political smearing - astroturf - fake followers**

USelections2012

Results | President | Senate | House | Governor | Choose your state

Fake Twitter accounts may be driving up Mitt Romney's follower number

Digital investigators say they can't tell who is behind thousands of new followers, only that the accounts likely are not real people

Rory Carroll in Los Angeles

Follow @rorycarroll72 Follow @GuardianUS

theguardian.com, Thursday 9 August 2012 13.50 BST

Jump to comments (49)



Update: Only 92% of Newt Gingrich's Twitter Followers Are Fake

John Cook Filed to: POLITICS 8/02/11 2:40pm

74,834 2 ★



WATCH LIVE: Pelosi holds weekly press conference

Pols have a #fakefollower problem

Share 508 Tweet 740 LinkedIn Share 18 Share 36 325



Christie, Obama, Clinton and McCain draw some of the most fake followers.

WHY DO WE CARE?

- **Some bots are harmful (by design)**
 - **Political smearing - astroturf - fake followers**
 - **Stock market manipulation**

The Curious Case of Cynk, an Abandoned Tech Company Now Worth \$5 Billion

3.6k
SHARES

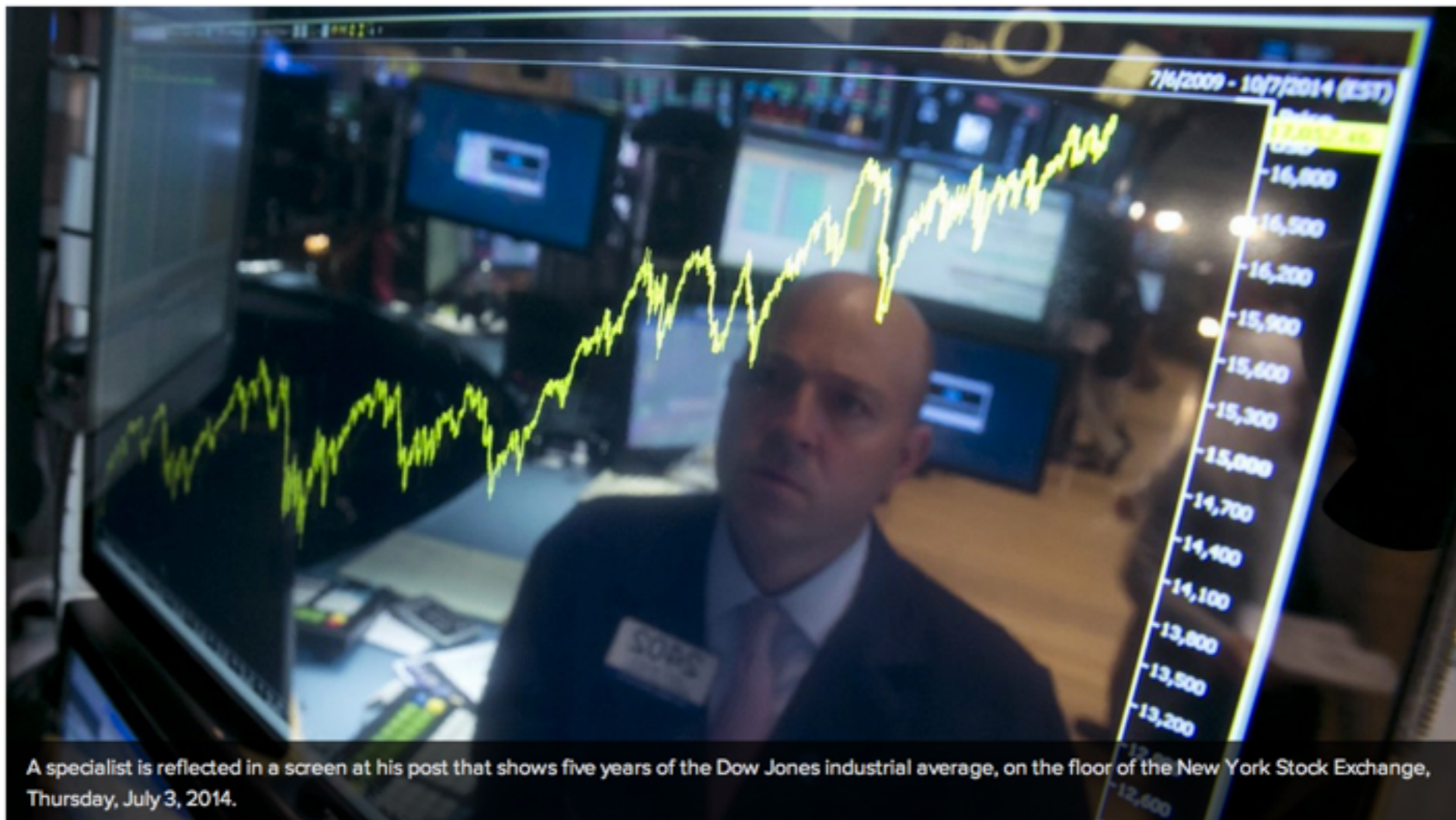
Share on Facebook

Share on Twitter



Ads by Google

[Undgå investeringsfejl](#) - 9 tips til bedre investeringer. Få råd fra kendt Forbes skribent!
www.fisherinvestments.dk



A specialist is reflected in a screen at his post that shows five years of the Dow Jones industrial average, on the floor of the New York Stock Exchange, Thursday, July 3, 2014.

• Sor

• I

• S

WHY DO WE CARE?

- **Some bots are harmful (by design)**
 - **Political smearing - astroturf - fake followers**
 - **Stock market manipulation**
 - **Malware - spam - “social pollution”**

Nielsen's New Twitter TV Ratings Are a Total Scam. Here's Why.



Beejoli Shah

Filed to: SECOND SCREEN BULLSHIT 10/08/13 5:23pm

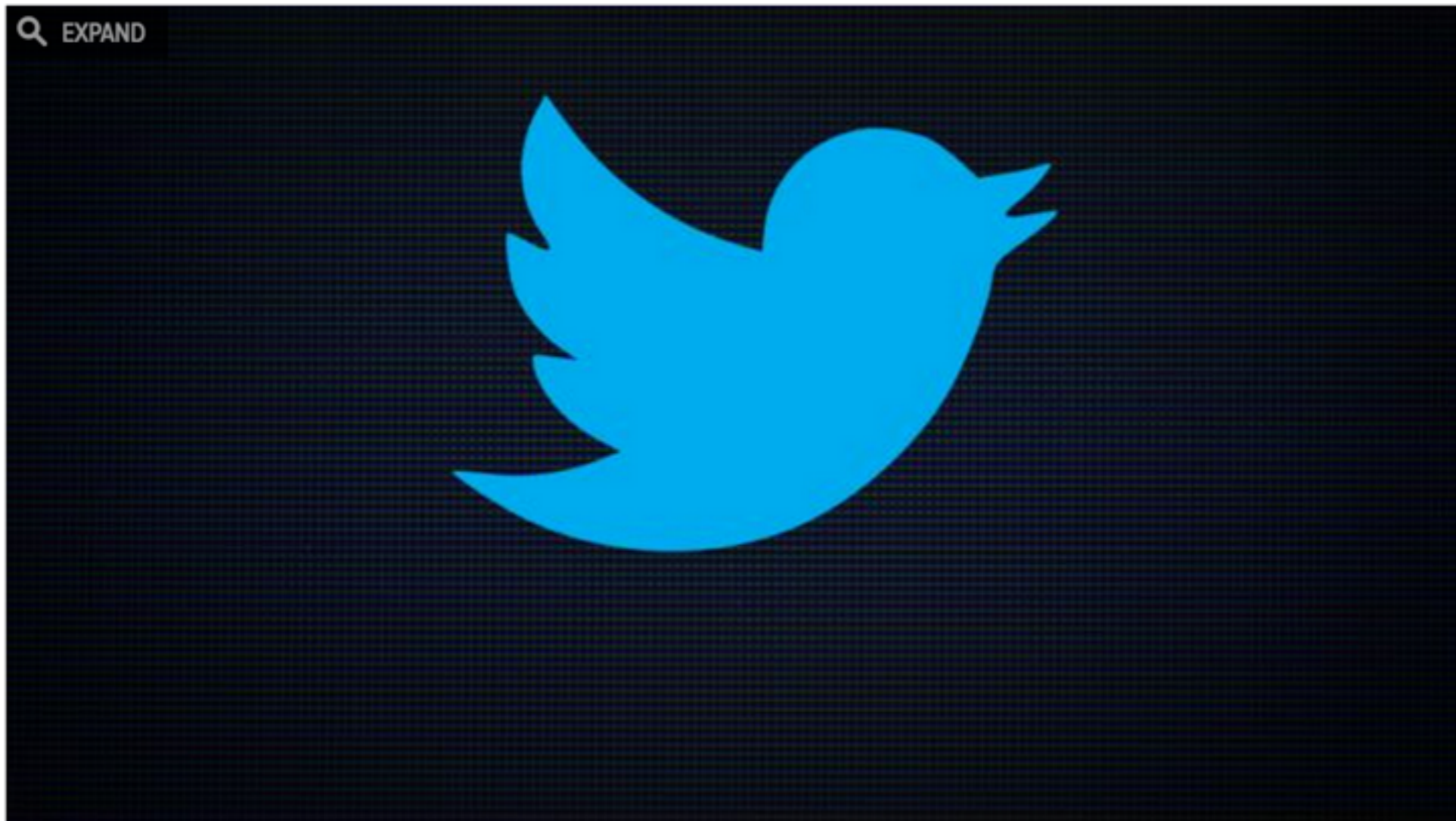
27,289 🔥 6 ★

- Some b

- Politi

- Stocl

- Malw



Nielsen, the ratings monitoring service that gives networks the ammo to charge exorbitant prices for commercials, released **their first "Twitter TV ratings"**—ratings metrics that take into account social-media activity—this Monday.

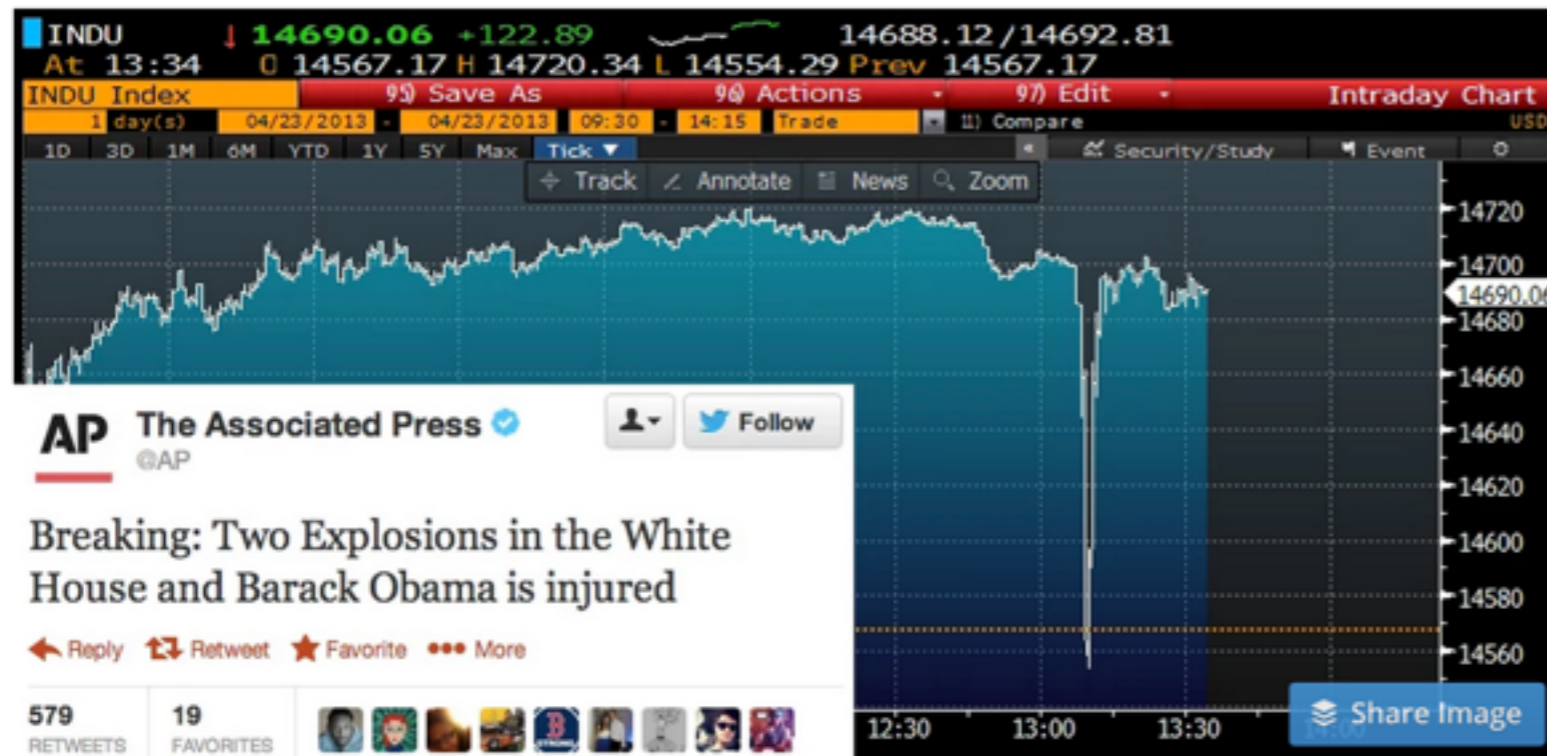
WHY DO WE CARE?

- **Some bots are harmful (by design)**
 - **Political smearing - astroturf - fake followers**
 - **Stock market manipulation**
 - **Malware - spam - “social pollution”**
- **Benign bot can be dangerous as well!**
 - **Spreading rumors from sources with unknown credibility**

Syrian hackers claim AP hack that tipped stock market by \$136 billion. Is it terrorism?



By Max Fisher April 23, 2013 [Follow @Max_Fisher](#)



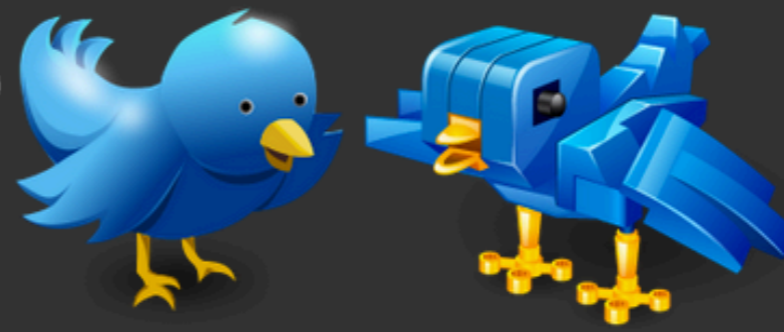
This chart shows the Dow Jones Industrial Average during Tuesday afternoon's drop, caused by a fake A.P. tweet, inset at left.

Advertisement

Thanks for the feedback! [Undo](#)

We'll use your feedback to review ads on site.

Bot or Not?



A **Truthy** project

Check User

Enter a screen name or try one of these examples

bots: @jusbieberphotos, @dtufreak, @lao232, @stanbieberfan

humans: @onurvarol, @jabawack

Retrieving basic user data from Twitter



Retrieving user timeline from Twitter



Retrieving retweets/mentions from Twitter



Analyzing data with Truthy



About ~ seconds!

Real-time query (Twitter search API)

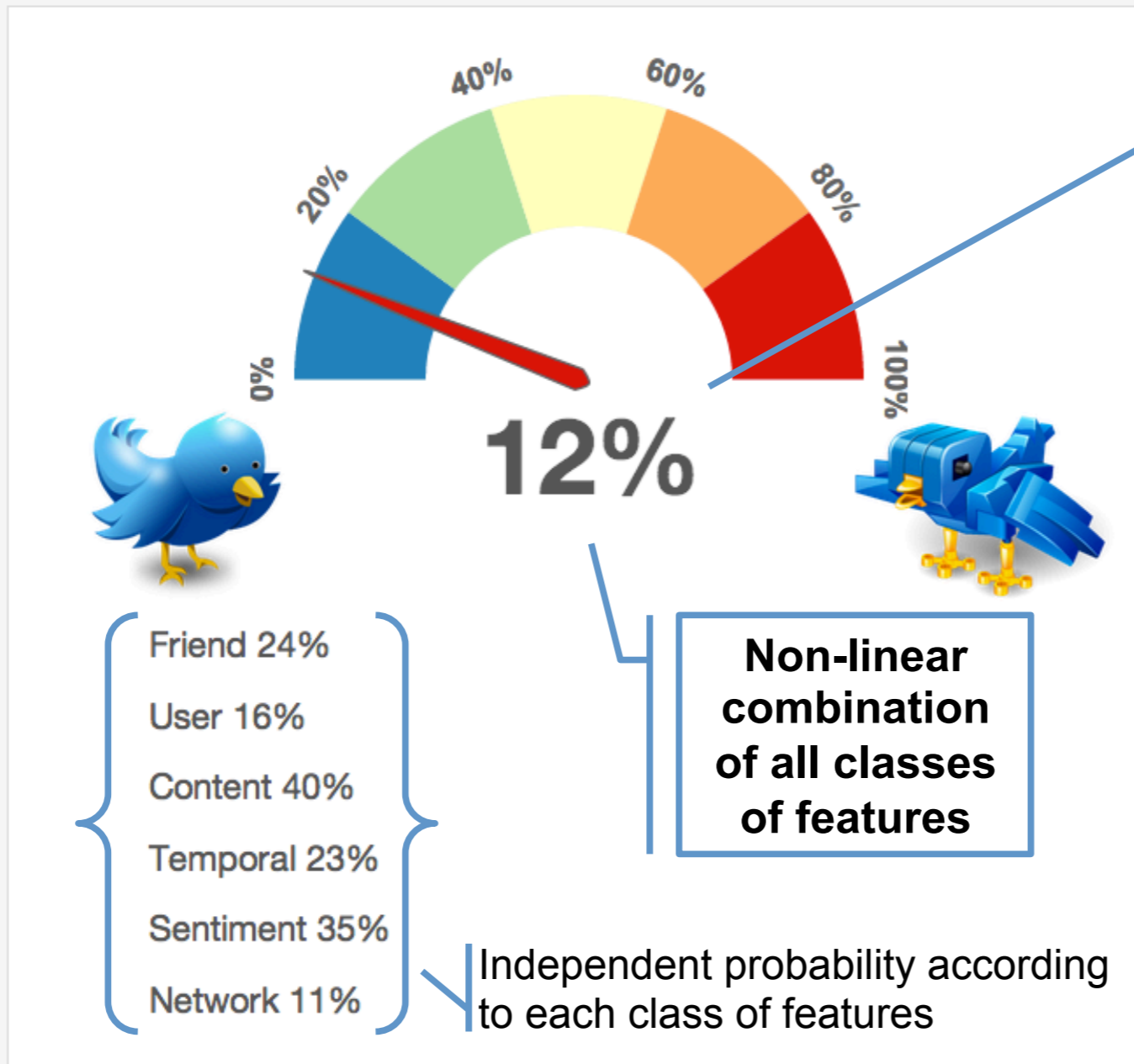
Real-time feature (>1K) extraction

Real-time analysis and classification

<http://truthy.indiana.edu/botornot>



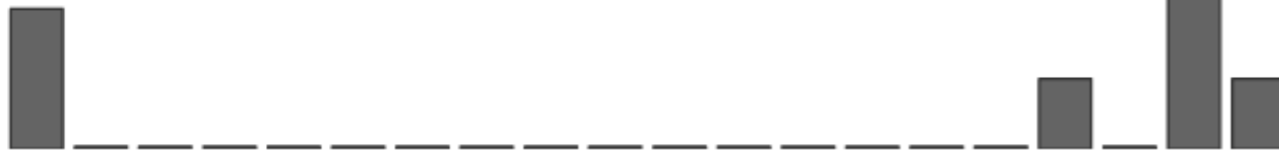
Classification



Probability that the selected user is a social bot

Usage : 23%

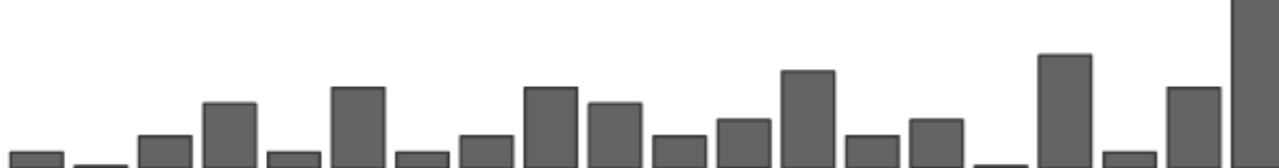
Temporal Mentioned Timestamps



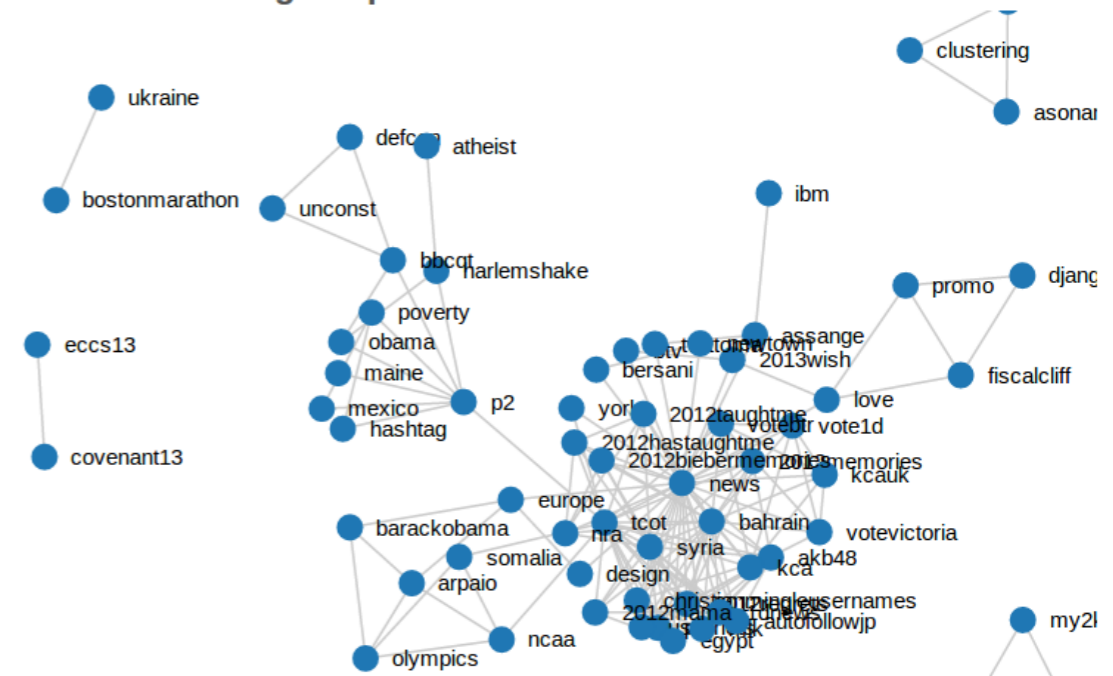
Temporal Retweet Timestamps



Temporal Tweet Timestamps



Network Hashtag Graph



Temporal patterns are compared to Poissonian processes

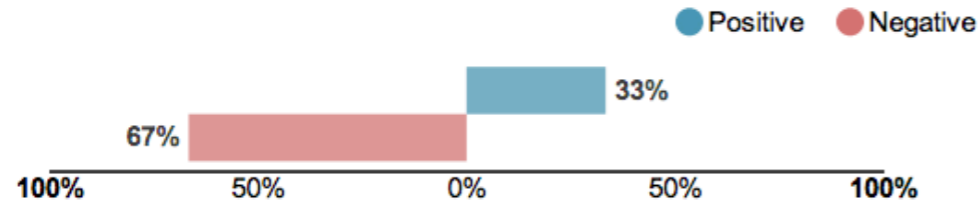
Networks are constructed for mention, retweets and topics of discussion

<http://truthy.indiana.edu/botornot>

Multiple Sentiment dimensions

Sentiment : 35%

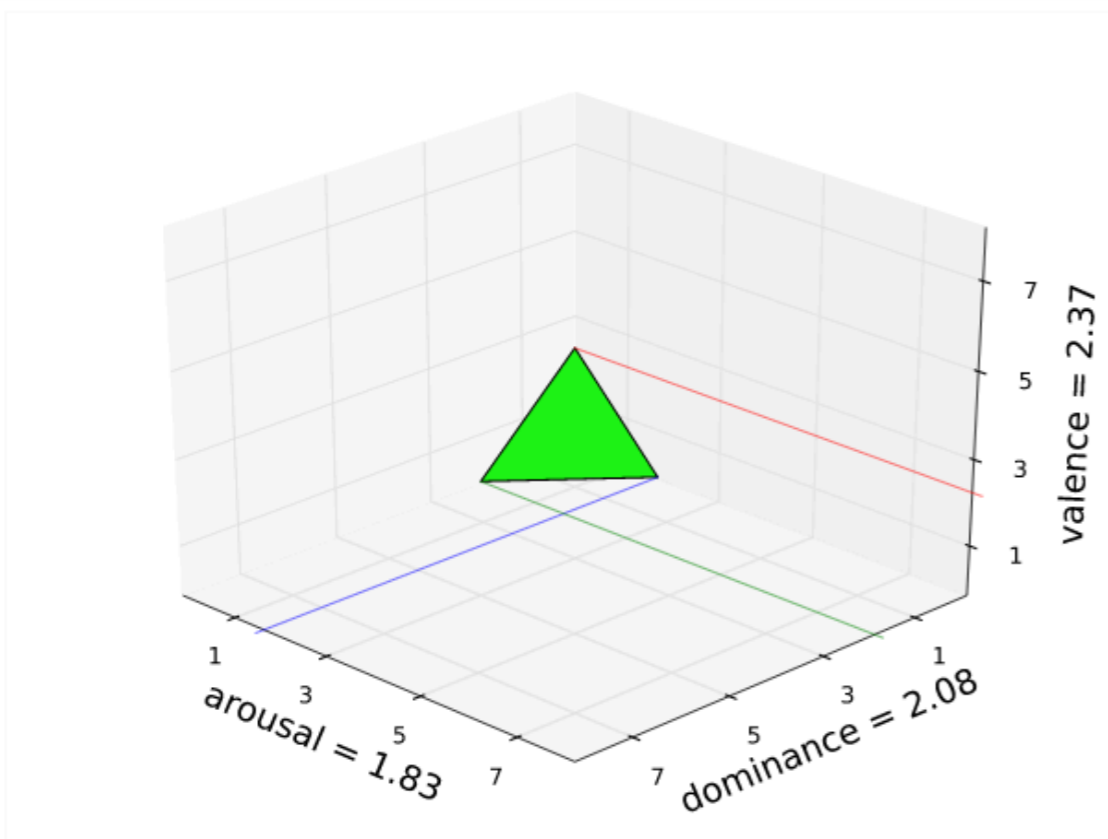
Sentiment Retweet Emoticon



Sentiment Retweet Happiness



Sentiment Retweet Methods

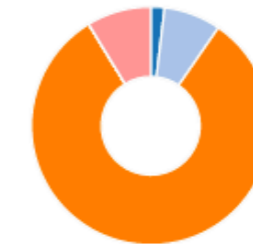


Part-of-Speech tagging and language analysis

Content : 40%

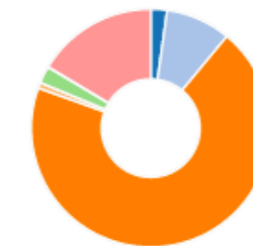
Content Mentioned Tag Proportions

Adverbs Verbs Nouns Modals Predeterminers
Pronouns Interjections Adjectives



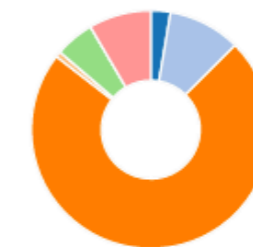
Content Retweet Tag Proportions

Adverbs Verbs Nouns Modals Predeterminers
Pronouns Interjections Adjectives

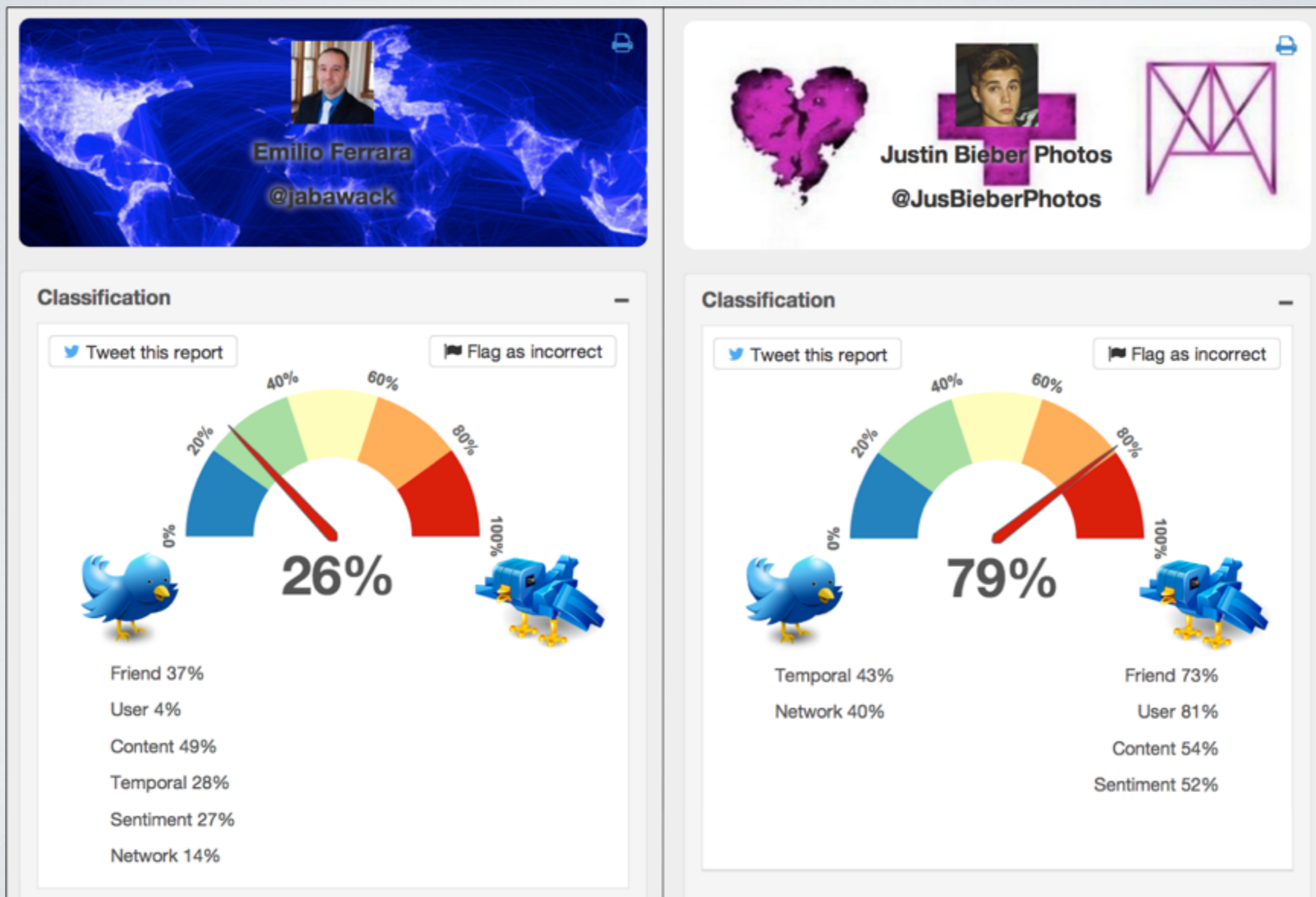


Content Tweet Tag Proportions

Adverbs Verbs Nouns Modals Predeterminers
Pronouns Interjections Adjectives



HUMAN OR SOCIAL BOT?



<http://truthy.indiana.edu/botornot>

HUMAN OR SOCIAL BOT?



<http://truthy.indiana.edu/botornot>

UNDER THE HOOD: FEATURE EXTRACTION

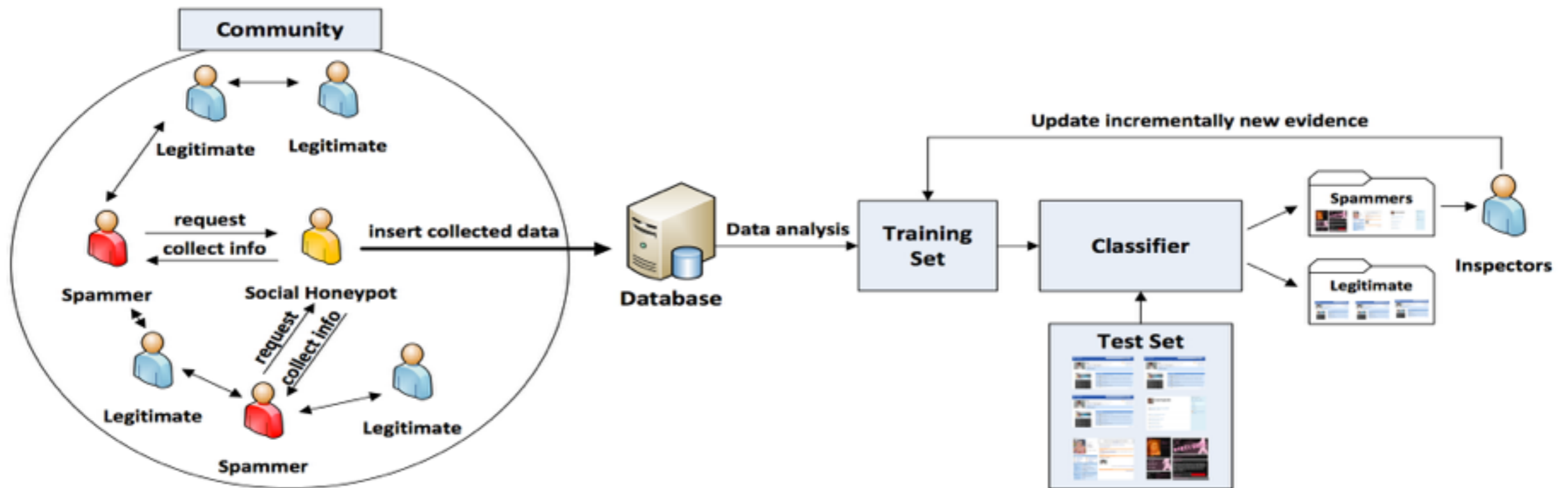
Class (# of features)	Description
Network (112)	Retweet, Mention, HT co-occurrence networks
User (56)	User meta-data
Friend (208)	Followees statistics
Timing (24)	Temporal information
Content (411)	Part of Speech (PoS) tags and meme information
Sentiment (339)	Sentiment Analysis features

TRAINING SET

15K humans

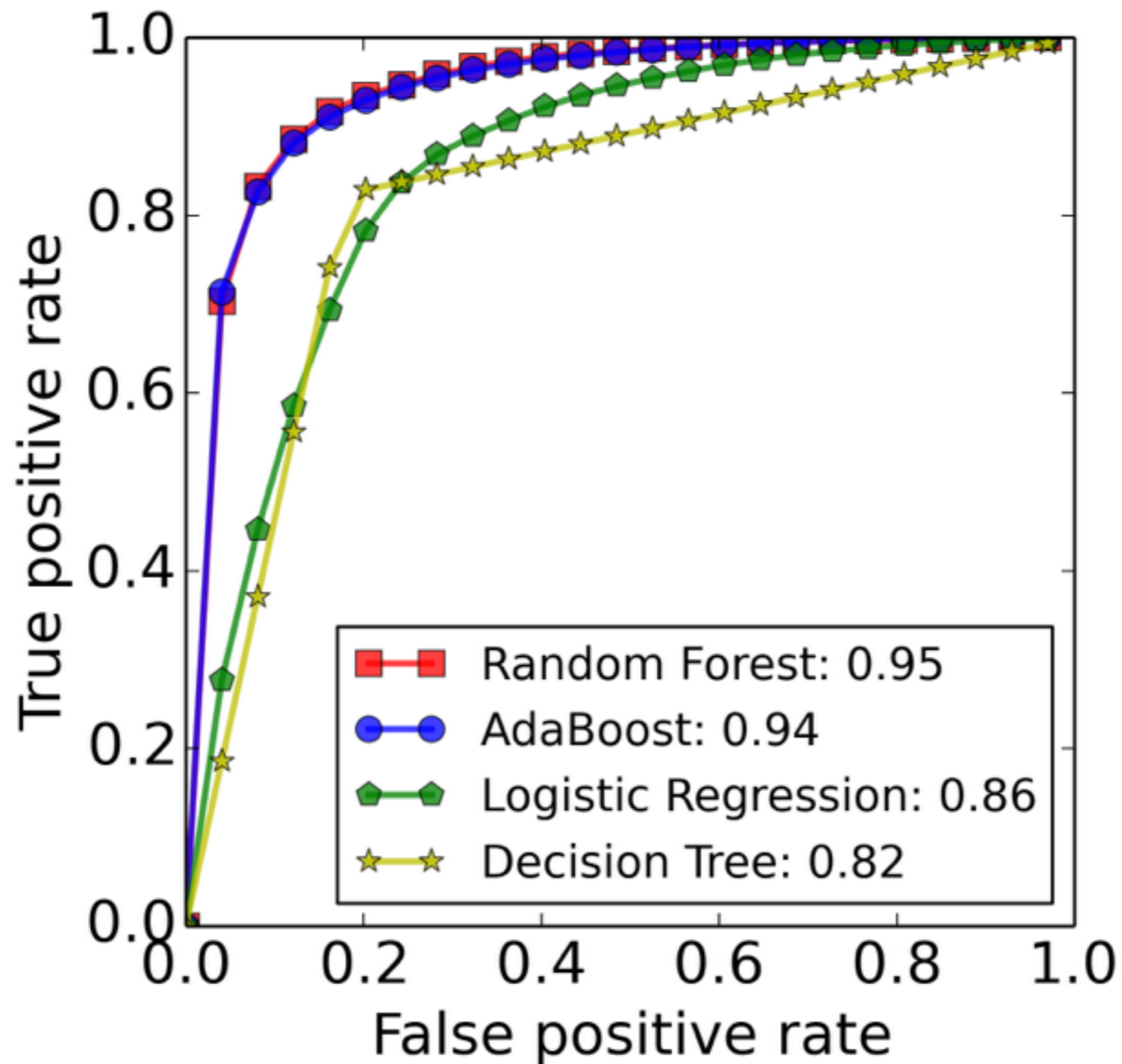


15K social bots

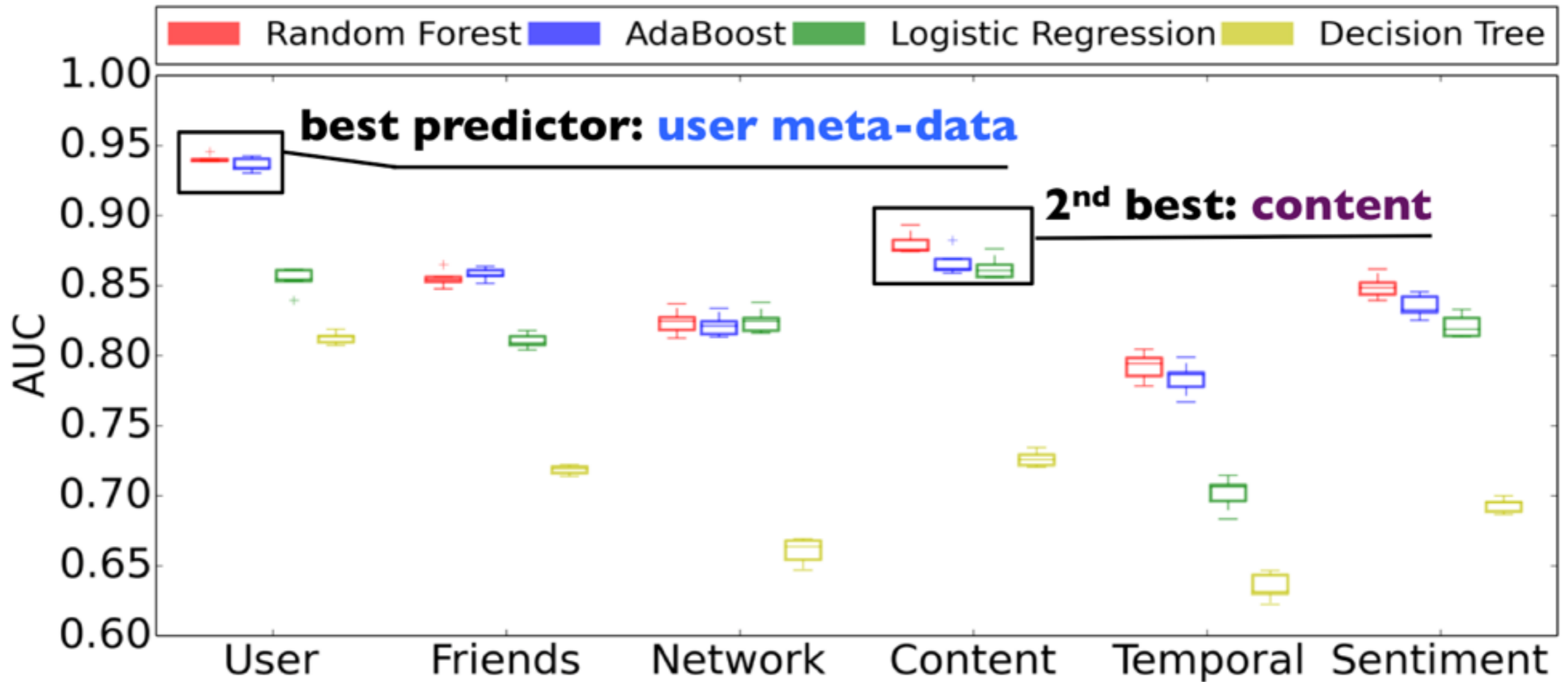


Lee, Kyumin, Brian David Eoff, and James Caverlee. "Seven Months with the Devils: A Long-Term Study of Content Polluters on Twitter." ICWSM 2011.

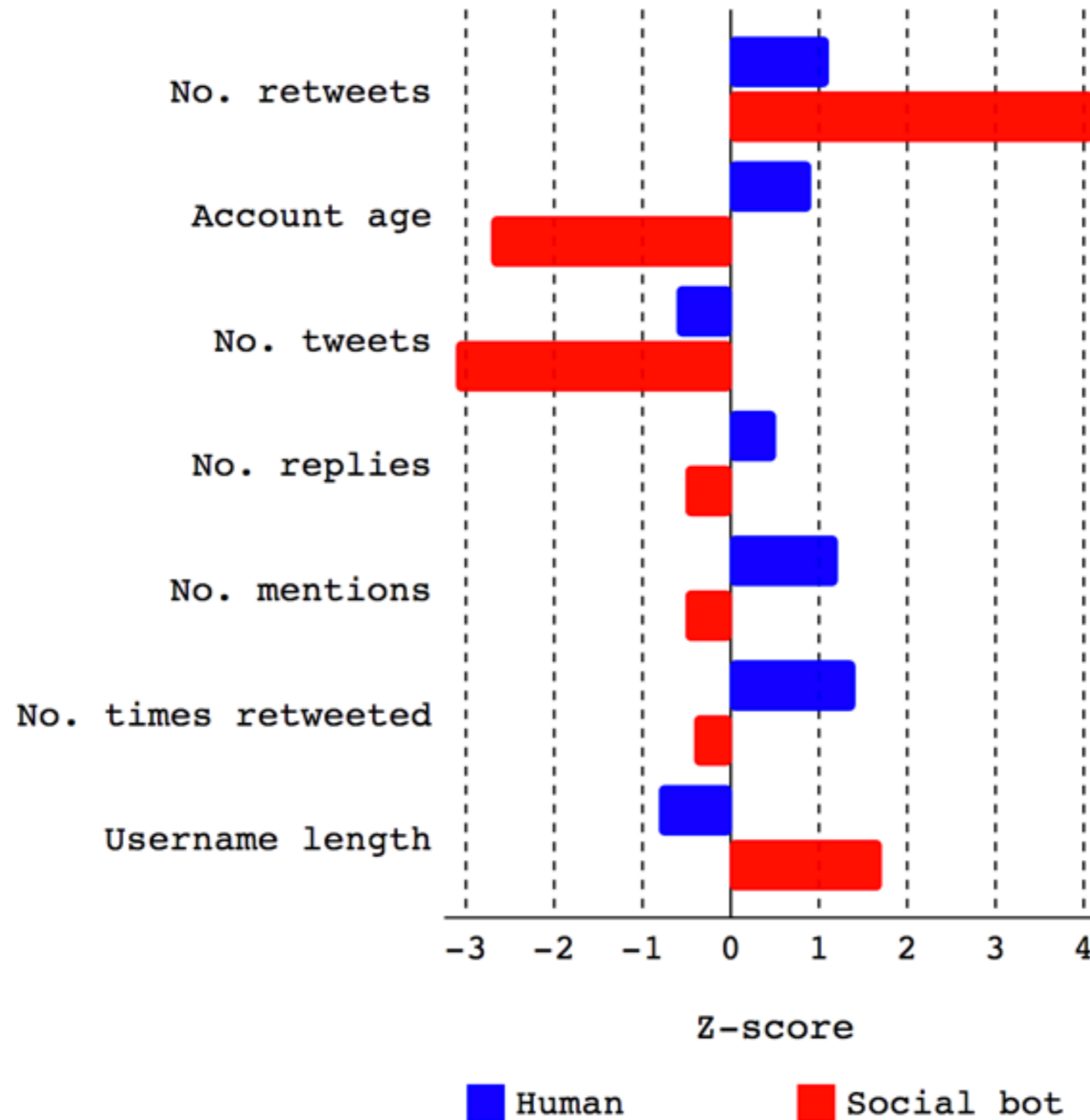
PERFORMANCE EVALUATION



BEST PREDICTORS



WHAT DID WE LEARN ABOUT BOTS?



SUMMARY

- Social bot detection is quickly becoming a task of **societal** and **economical** relevance!
- We leverage **content**, **sentiment**, **user** & **timing** **meta-data**, and **network** diffusion patterns.
- Framework designed to **classify** user accounts in real time.
- Large-scale Twitter “human census” in progress.

E Ferrara, O Varol, C Davis, F Menczer, A Flammini.
The rise of social bots. *arxiv:1407.5225*

FUTURE

Home Tech Science Health Columns **DISCOVER: Stunning**

How online 'chatbots' are already tricking you

By Chris Baranuk **Technology Science & Environment Artificial Intelligence**



(Getty Images) 'More sophisticated'

The ramifications of astroturfing are in fact so serious that the US Department of Defense has jointly funded research into software which can determine whether a Twitter account is run by a bot. The application, called **BotOrNot**, is available publicly online and provides a predictive analysis based on account activity and tweet semantics which suggest whether the account operator is likely to be a human or a bot.

But **Emilio Ferrara**, a lead researcher on the project, admits that the system may already be outdated. Trained on Twitter data which is now three years old, it's possible that today's best bots could still evade detection.

This Algorithm Tells You If A Twitter Account Is a Spam Bot

2.4k **Show on Facebook** **Show on Twitter**



Back in 2011, a team from Texas A&M University carried out a cyber sting to trap nonhuman Twitter users that were polluting the Twittersphere with spam. Their approach was to set up "honeypot" accounts which posted nonsensical content that no human user would ever be interested in. Any account that retweeted this content, or friended the owner, must surely be a nonhuman user known as a social bot.

The team set up 60 honeypots and harvested some 36,000 potential social bot accounts. The result surprised many observers because of the sheer number of nonhuman accounts that were active. These bots were generally unsophisticated and simply retweeted more or less any content they came across.

Since then, social bots have become significantly more advanced. They search social networks for popular and influential people, follow them and capture their attention by sending them messages. These bots can identify keywords and find content accordingly and some can even answer inquiries using natural language algorithms.

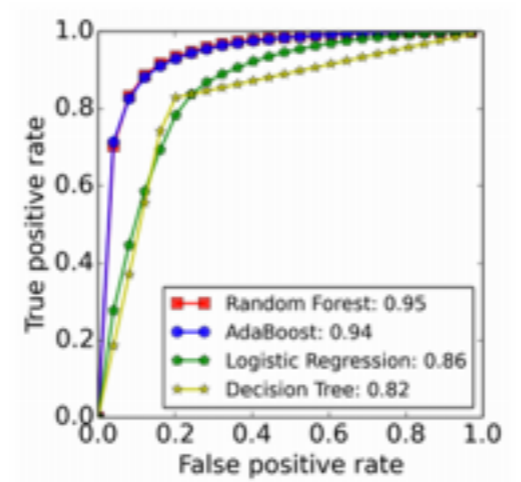
That makes identifying social bots much more difficult. But today, **Emilio Ferrara** and pals at Indiana University in Bloomington, say they have developed a way to spot sophisticated social bots and distinguish them from ordinary human users.

VIEW 1 COMMENT

Xb Emerging Technology From the arXiv July 28, 2014

How to Spot a Social Bot on Twitter

Social bots are sending a significant amount of information through the Twittersphere. Now there's a tool to help identify them.



Back in 2011, a team from Texas A&M University carried out a cyber sting to trap nonhuman Twitter users that were polluting the Twittersphere with spam. Their approach was to set up "honeypot" accounts which posted nonsensical content that no human user would ever be interested in. Any account that retweeted this content, or friended the owner, must surely be a nonhuman user known as a social bot.

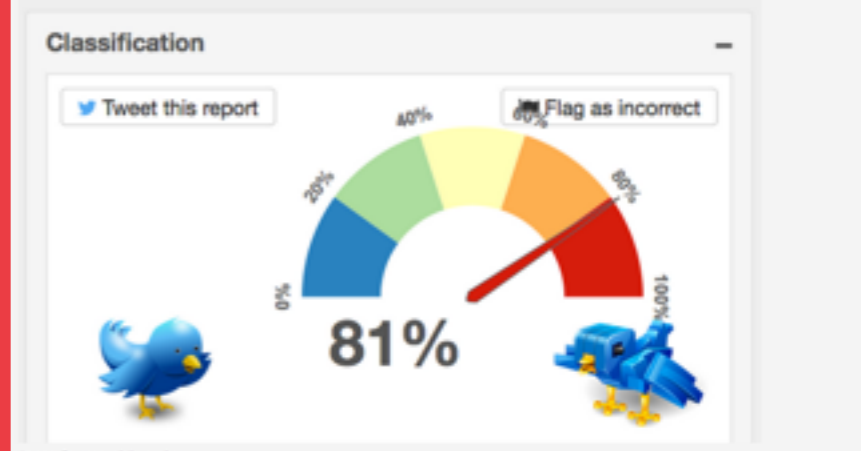
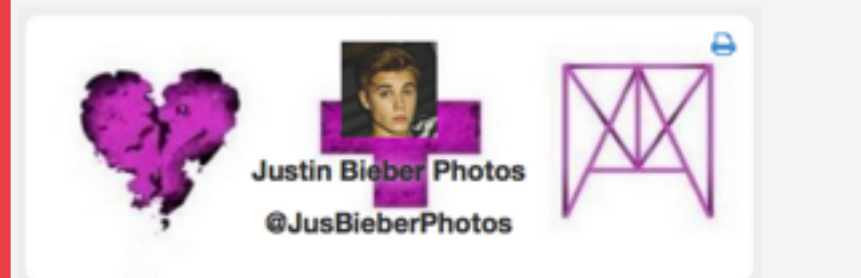
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That makes identifying social bots much more difficult. But today, **Emilio Ferrara** and pals at Indiana University in Bloomington, say they have developed a way to spot sophisticated social bots and distinguish them from ordinary human users.



Barack Obama Is Probably a Robot, and Other Lessons from 'Bot Or Not'



For demonstration purposes, Bot or Not? provides some examples of both bots and humans—the bot @JusBieberPhotos draws an 81 percent. Onur Varol, a human who worked on the project, comes in at 18 percent. Robama pulls a very suspicious 72 percent. You do the math.

You can imagine my shock. I mean, this makes Watergate look like water under a gate. It makes the birthers look even dumber, since it turns out Obama wasn't even born.

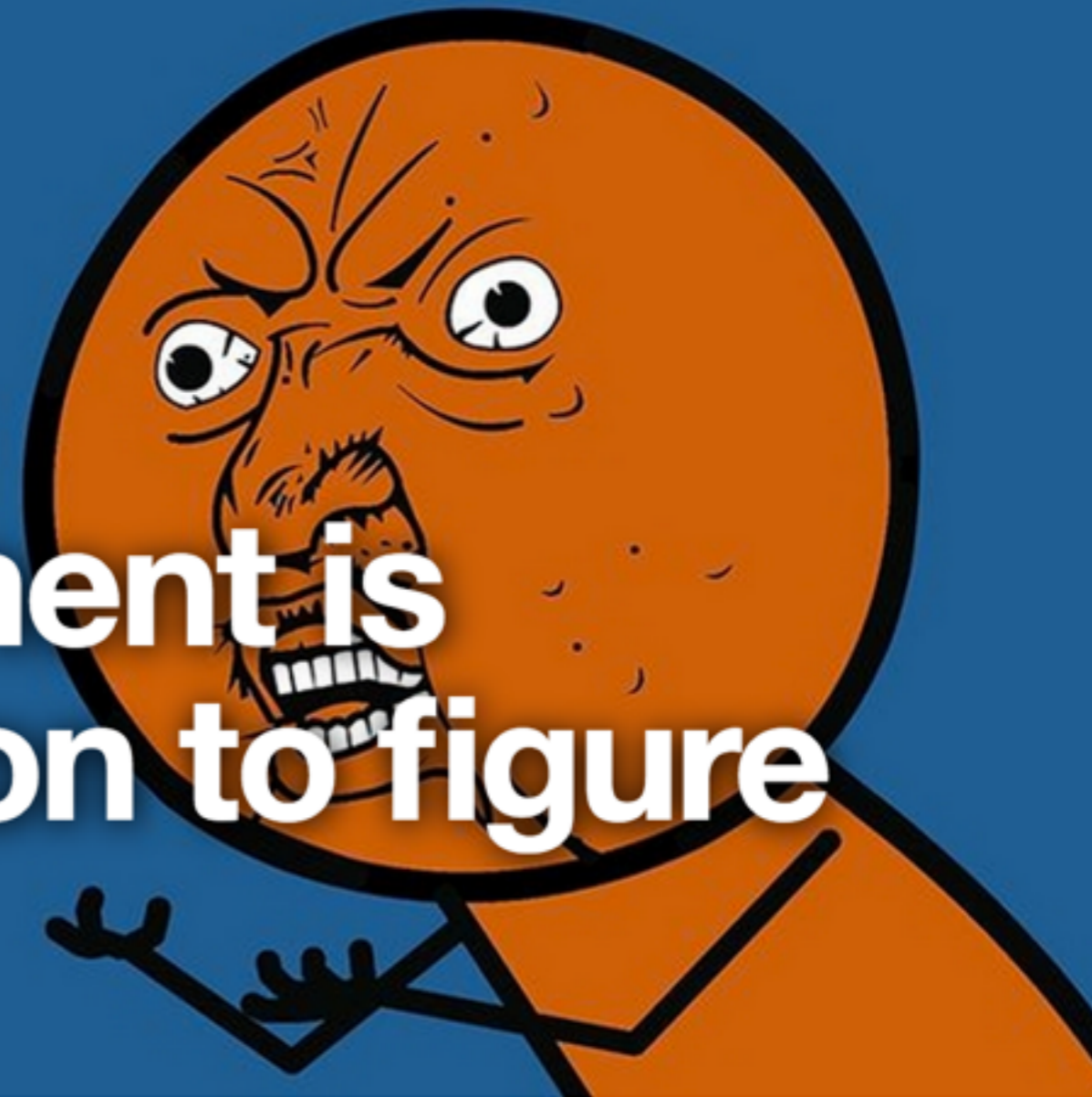
As my palms began to sweat, I wondered if Michelle knew. I ran a check on @Flotus. Her account drew an ambiguous 57 percent. Could go either way, but I'm thinking she knows.

Just to be sure, I also tested a known non-person, @bigbentheclock. It's a Twitter account that just tweets "BONG" on the hour. It only got 24 percent, and clocks are pretty much the most mechanical thing imaginable.

Already planning my Pulitzer Prize acceptance speech (working title: "I Sang the Body Electorate") I emailed the team behind Bot or Not?, knowing that, since they had done all the actual work, I'd have to share some credit with them.

Emilio Ferrara, a post-doc fellow at IU who worked on Bot or Not?, explained what was going on. "Highly influential profiles are more prone to be targeted by bots or fake followers (often bots seek to connect to highly popular accounts to 'inherit' some visibility). It's no surprise therefore that Mr. President's account followers (and other high profile accounts) might result as botlike from this perspective," he said.

The U.S. government is spending \$1 million to figure out memes



314

Shares ↗

👍 210

By [Eric Geller](#)   Follow on August 26, 2014

Indiana University is [receiving nearly \\$1 million](#) in federal grant money to investigate the genesis, spread, and demise of Internet memes.

The grant from the National Science Foundation awards four Indiana researchers \$919,917 to for a project called [Truthy](#) that will, as the grant's abstract explains, "explore why some ideas cause viral explosions while

MOST RECENT STORIES

16 MIN 16 SEC AGO



Expert: ISIS Could Pay Mexican Drug Cartel to Attack U.S. Power Grid

31 MIN 56 SEC AGO



Report: Obama Admin Planning 3-Year Campaign Against ISIS

1 HOUR 26 MIN AGO



'Window Into Hell': Filmmakers Describe Death-Defying Journey Into Volcano

1 HOUR 40 MIN AGO



Trump Slams Obama: 'He Likes Campaigning, That's About It'

2 HOURS 30 MIN AGO



Mysterious Respiratory Illness Sickens Kids in at Least 10 States

2 HOURS 43 MIN AGO



Prince William & Kate Middleton Expecting Baby #2

3 HOURS 29 MIN AGO



Parents Desperate to Find Daughter Who Vanished From Mall Parking Garage

4 HOURS 12 MIN AGO



The Battle Between Chris Kyle's Wife and Jesse Ventura Is Not Over

5 HOURS 11 MIN AGO



Remembering Joan Rivers: 'Hard to Be Relevant in Showbiz for 50 Seconds, Much Less 50 Years'

18 HOURS 10 MIN AGO



Serena Williams Wins Third

COMMENT // SHARE

Feds Creating Online Tracker to Search for 'Hate Speech' & 'Misinformation'



BY FOX NEWS INSIDER // AUG 26 2014 // 9:44PM

AS SEEN ON [THE KELLY FILE](#)

The federal government is spending close to \$1 million of your money on an online tracking program that will search for so-called "hate speech" or "misinformation" on Twitter.

Fox News digital politics editor Chris Stirewalt was on "The Kelly File" to discuss the "Truthy" database, which will monitor suspicious Internet memes as well as false or misleading ideas online.

The National Science Foundation is financing its creation, and researchers at Indiana University will maintain the database.

FOX NEWS [INSIDER]
AD PLACEHOLDER

MOST RECENT STORIES

16 MIN 29 SEC AGO



Expert: ISIS Could Pay Mexican Drug Cartel to Attack U.S. Power Grid

32 MIN 9 SEC AGO



Report: Obama Admin Planning 3-Year Campaign Against ISIS

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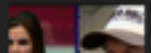
Prince William & Kate Middleton Expecting Baby #2

3 HOURS 29 MIN AGO



Parents Desperate to Find Daughter Who Vanished From Mall Parking Garage

4 HOURS 12 MIN AGO



The Battle Between Chris Kyle's Wife and the Military

COMMENT  // SHARE 

'1984' in 2014? Fed Gov't Funds 'Truthy' Database to Monitor Hate Speech, Suspicious Memes



BY FOX NEWS INSIDER // AUG 28 2014 // 9:46AM

AS SEEN ON FOX AND FRIENDS

The federal government is spending close to \$1 million of your money on an online tracking program that will supposedly search for so-called "hate speech" or "misinformation" on Twitter.

Behind the News CJR on the media

06:55 AM - September 3, 2014

How misinformation goes viral: a Truthy story

Conservative media's reaction to an Indiana University project shows how shoddy information can quickly become an online narrative

By David Uberti

[f](#) [t](#) [e](#) [g](#) More sharing [Single Page](#)

On August 26, Fox's Megyn Kelly aired a four-minute **segment** on an Indiana University project called **Truthy**, declaring sarcastically, "Some bureaucrat deciding whether you are being hateful or misinforming people — what could possibly go wrong?" *Fox & Friends* jumped onto the bandwagon two days later. During its four-minute **segment**, legal analyst Peter Johnson Jr. managed to squeeze in not only a comparison to Joseph McCarthy, but also a reference to George Orwell's *1984*. "Is the First Amendment going into the dumper?" he asks.



misleading

information content



astroturf



complex persuasion



grassroots conversation



advertisement

truthful

natural



orchestrated

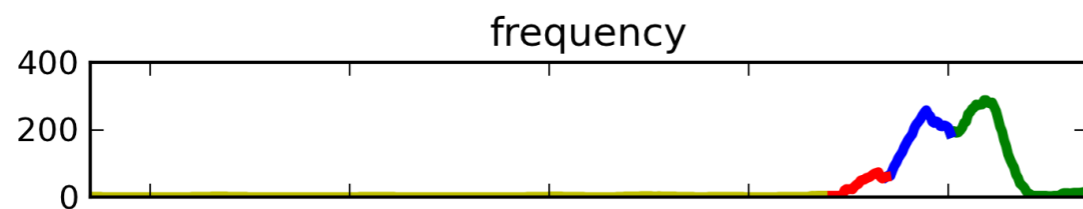
information diffusion

PROMOTED VS. ORGANIC TRENDS

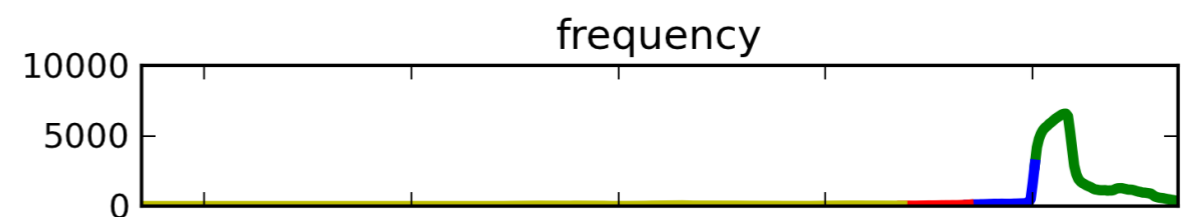
- ▶ We focus on the problem of **separating promoted content from organic trending** conversations.

Example: which one is promoted and which one is organic?

#GalaxyS4



#GalaxyFamily



DATASET DESCRIPTION

Source: 

No sampling: 100% data (Twitter API)

Promoted Content	Organic Trending Topics
Jan. 1 st – Mar. 15 th 2013	Mar 1 st – Mar. 15 th 2013
75 hashtags (1 per day)	850 hashtags (~55 per day)
260K total tweets	5.8M total tweets

Examples	Examples
#GetHappy	#FCB
#SurviveTheNight	#SymbionicTitans2
#MakeBoringBrilliant	#TheUndertaker
#ItsNotComplicated	#OnlyInWesteros

United States Trends · Change
[#The2020Experience](#)  Promoted
[#BreakingBad](#)
[#sfgiants](#)
[#GoodbyeBreakingBad](#)
[#selfiesunday](#)
[#oomf](#)
Halloween
Netflix
Dallas
Seahawks

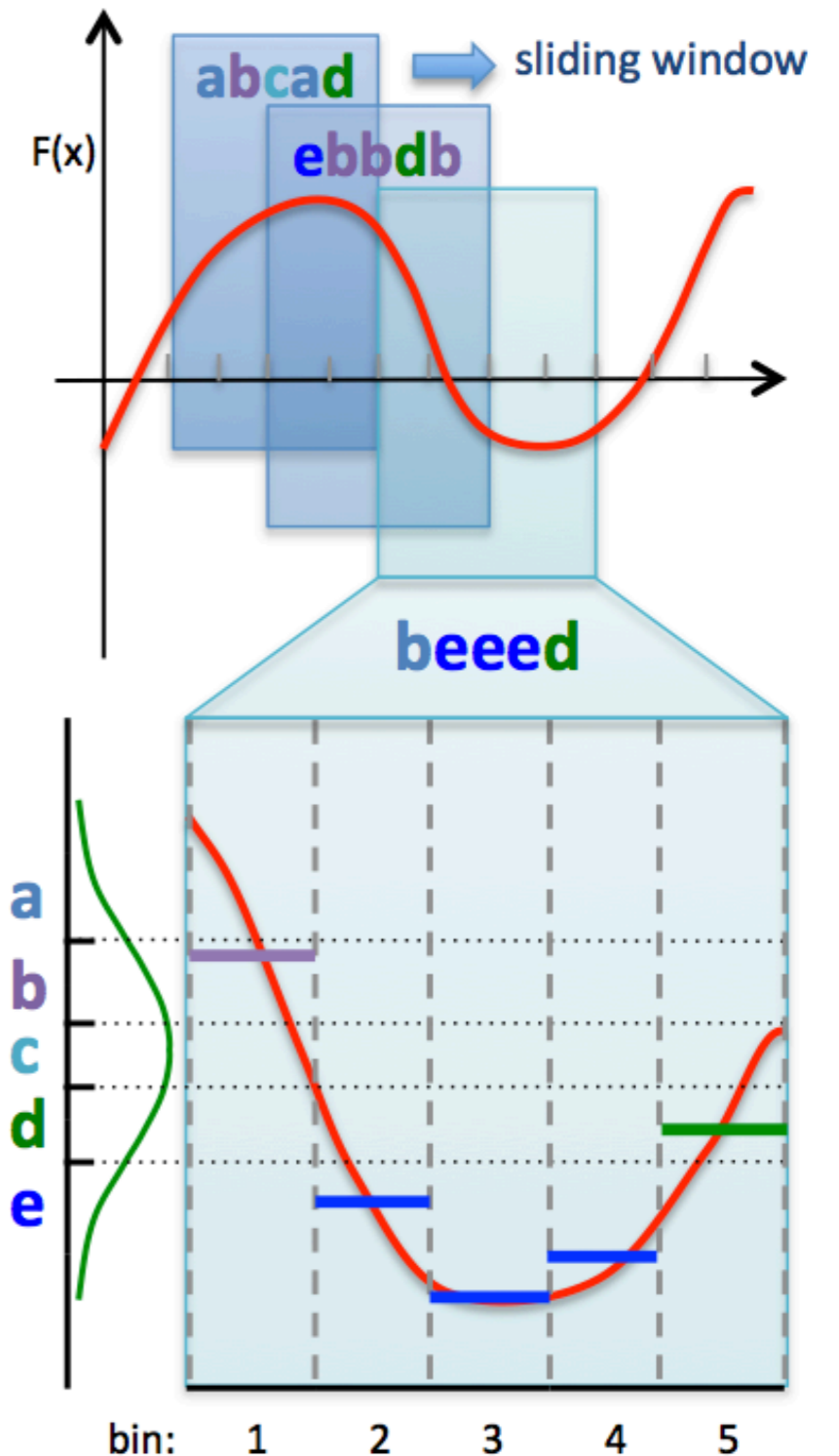
FEATURES AND FEATURE CLASSES

Class	Description	Examples	Tot
Network	Retweet, Mention and HT-co-occurrence networks	Diffusion network topology: no. nodes / edges, deg. Distr., clust. Coeff., density, etc.	37 features
User	User meta-data	no. Followers / Followees, no. Tweets, etc.	80 features
Timing	Temporal information	Frequency, Tweet / RT / MT intervals, etc.	25 features
Content	Part of Speech tagging and Meme information	Distribution of verbs, nouns, etc. Entropy of the text. HT, MT and URLs count.	168 features
Sentiment	Features representing the sentiment	Valence, Dominance, Arousal, Happiness, Polarization, Emotion scores.	113 features

- ▶ **Our framework generates more than 420 features!**
- ▶ **Features generation:**
 - ▶ 20 min intervals
 - ▶ 6h sliding window
 - ▶ 7 days before the trending point
- ▶ **Challenges:**
 - ▶ Overfitting
 - ▶ Feature selection
 - ▶ Class imbalance
 - ▶ Only 8% of positive instances

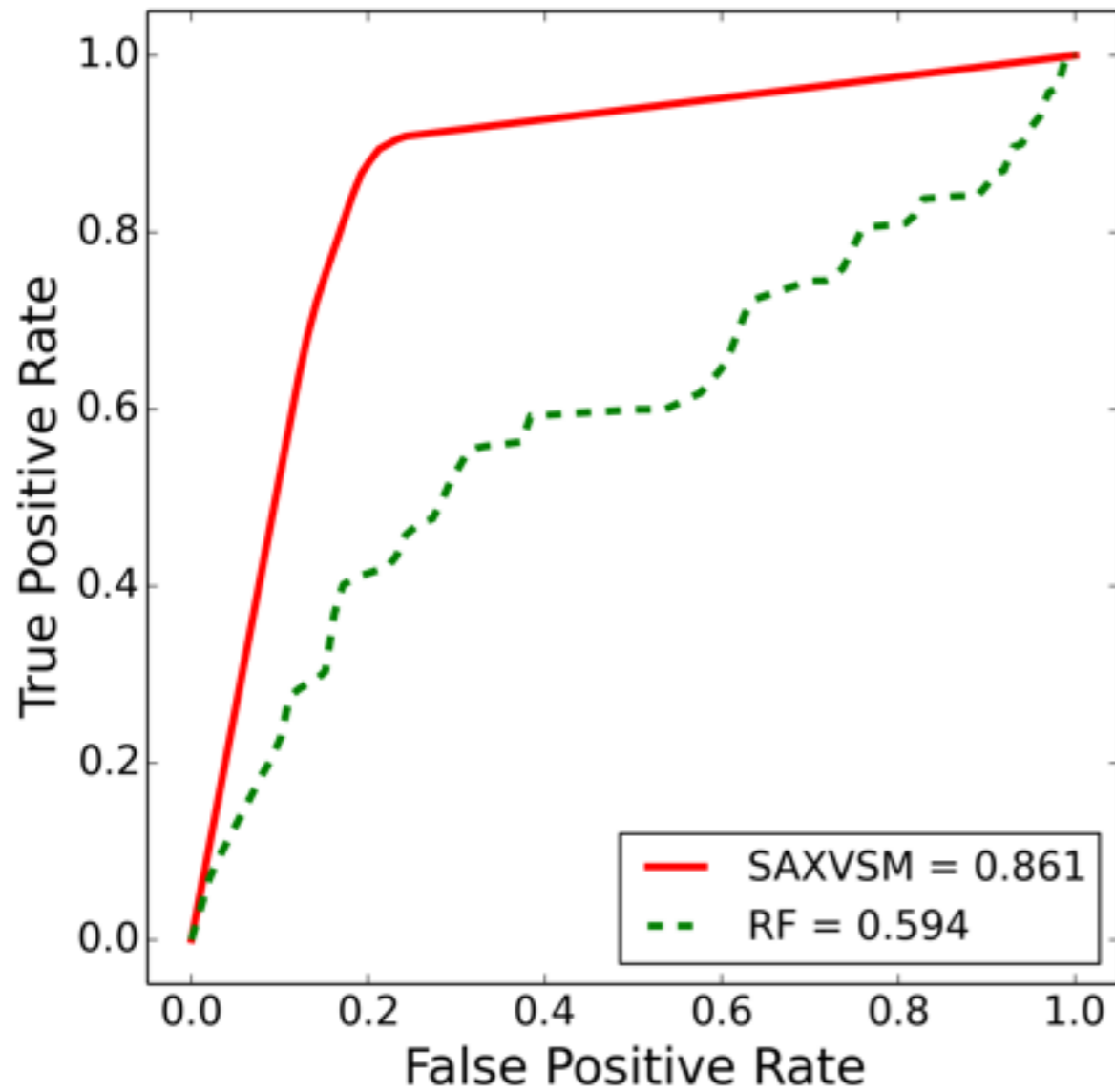
FEATURE TIME-SERIES REPRESENTATION

- ▶ Symbolic Aggregate Approximation (SAX)
- ▶ **Input:** a raw-valued feature time series
- ▶ **Output:** a string representation of the original time series
- ▶ **Advantages:**
 - ▶ Data compression & dimensionality reduction
 - ▶ Temporal sequence encoding via sliding windows
 - ▶ Computational efficiency

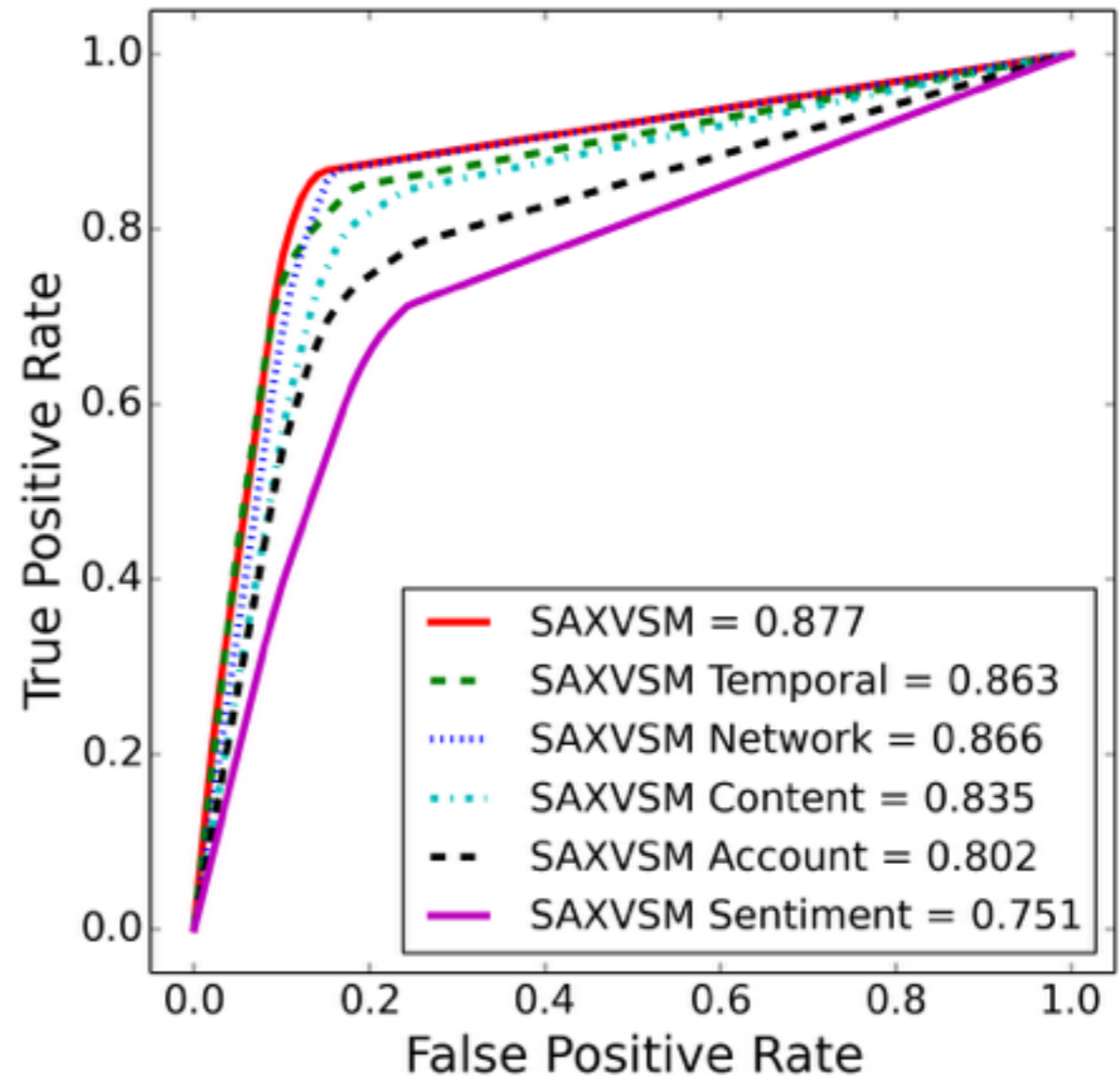


RESULTS: AUROC

SAX-VSM vs. baseline

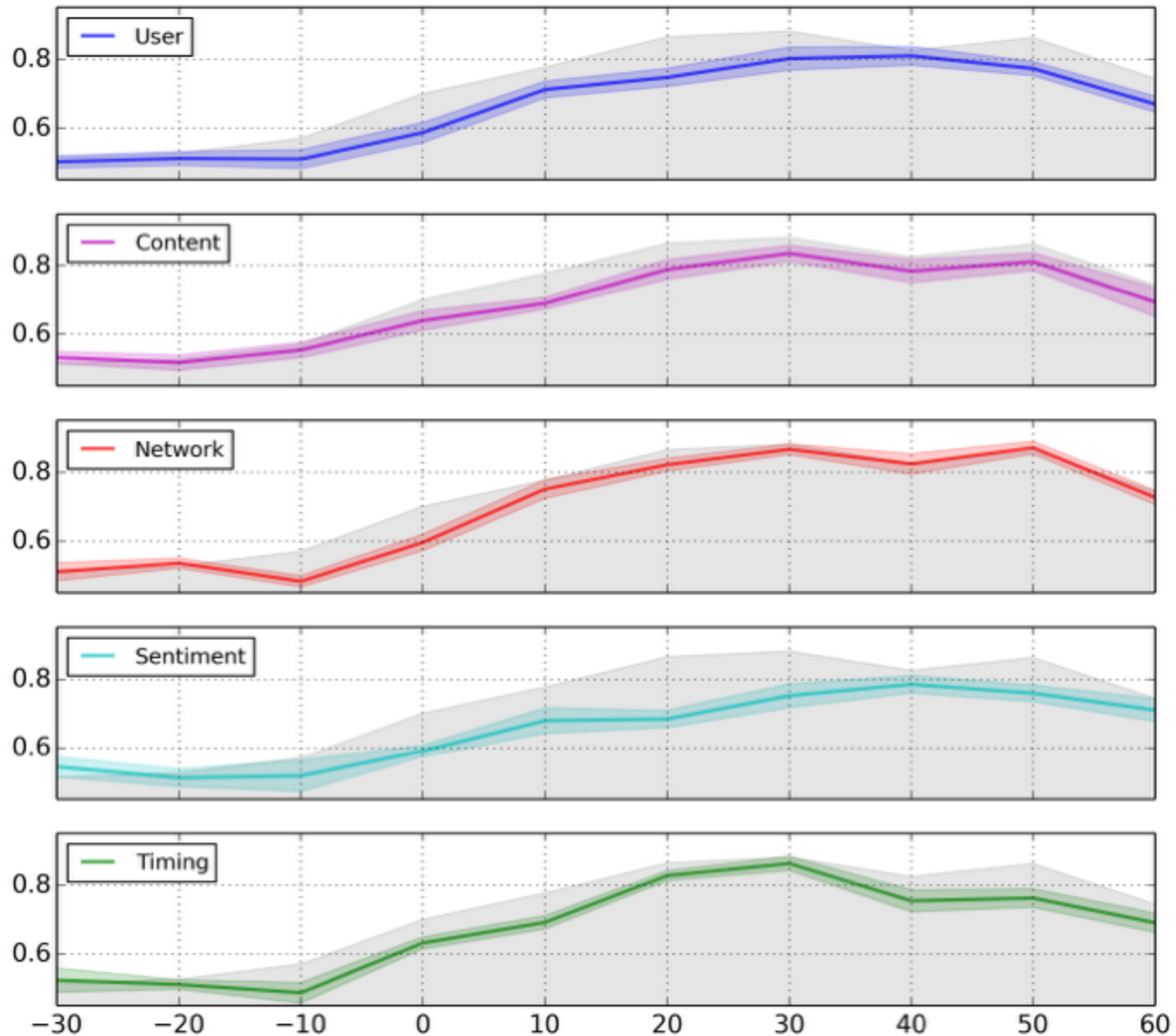


SAX-VSM feature classes



avg. of 10-fold cross validation

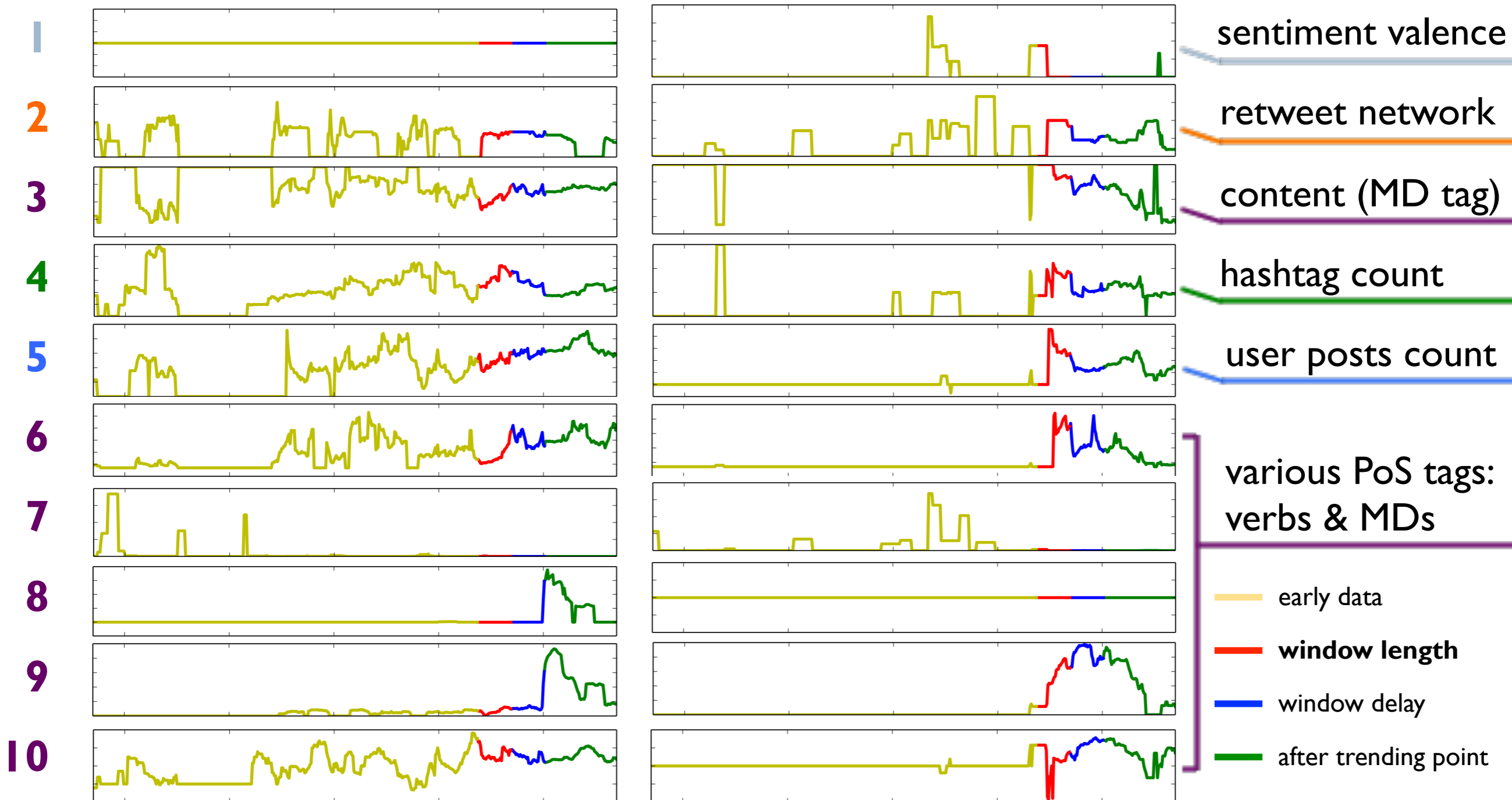
RESULTS: FEATURE CLASS SELECTION



RESULTS: TOP 10 PREDICTIVE FEATURES

#GalaxyS4 organic

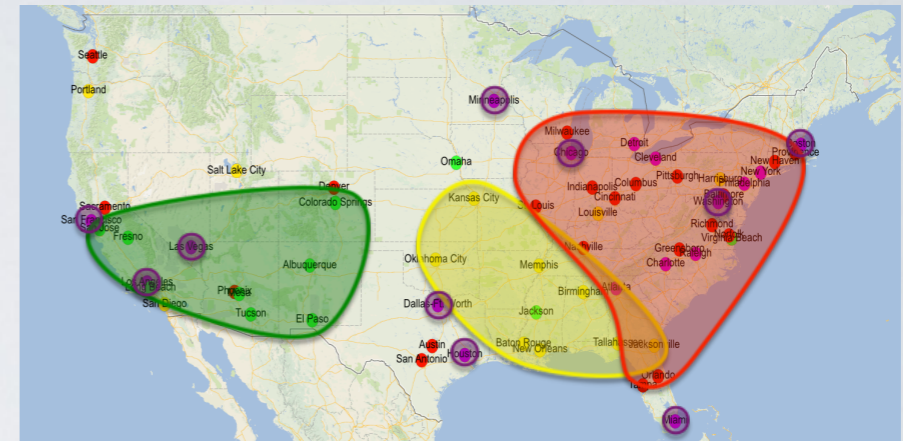
#GalaxyFamily promoted!



SUMMARY

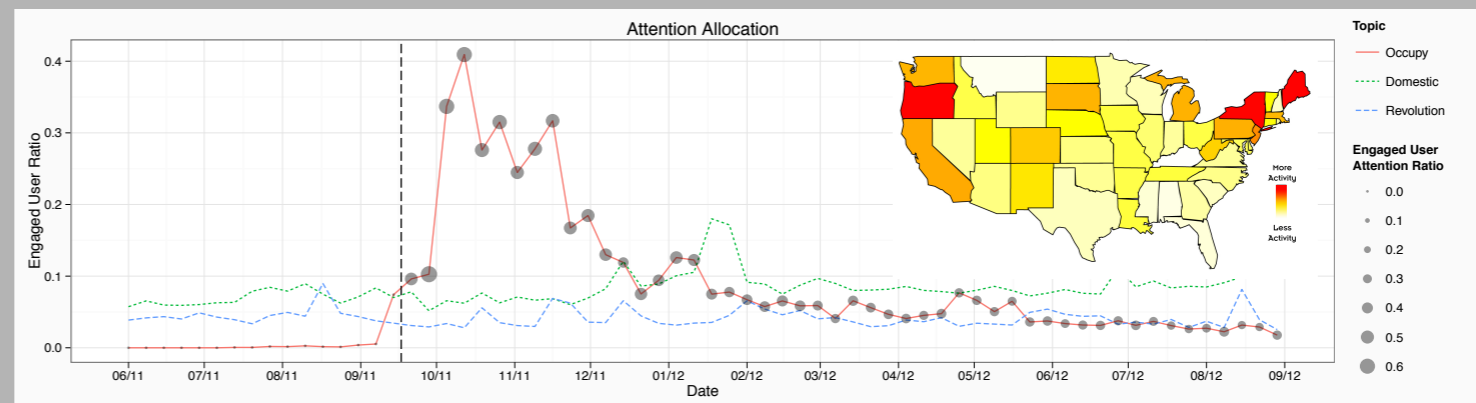
- Detecting persuasion campaigns in their early stage is hard!
- We leverage **content**, **sentiment**, **user** & **timing** **meta-data**, and **network** diffusion patterns (again!).
- We encode **time sequence** and **temporal patterns**.
- Framework designed to **detect**, **classify** and **predict** in a streaming scenario.

ASK ME ABOUT MY OTHER PROJECTS!



E Ferrara, O Varol, F Menczer, A Flammini.

Traveling trends: social butterflies or frequent fliers? *ACM Conference on Online Social Networks 2013*



1. M Conover, E Ferrara, F Menczer, A Flammini. **The digital evolution of Occupy Wall Street.** *PLoS One 2013*

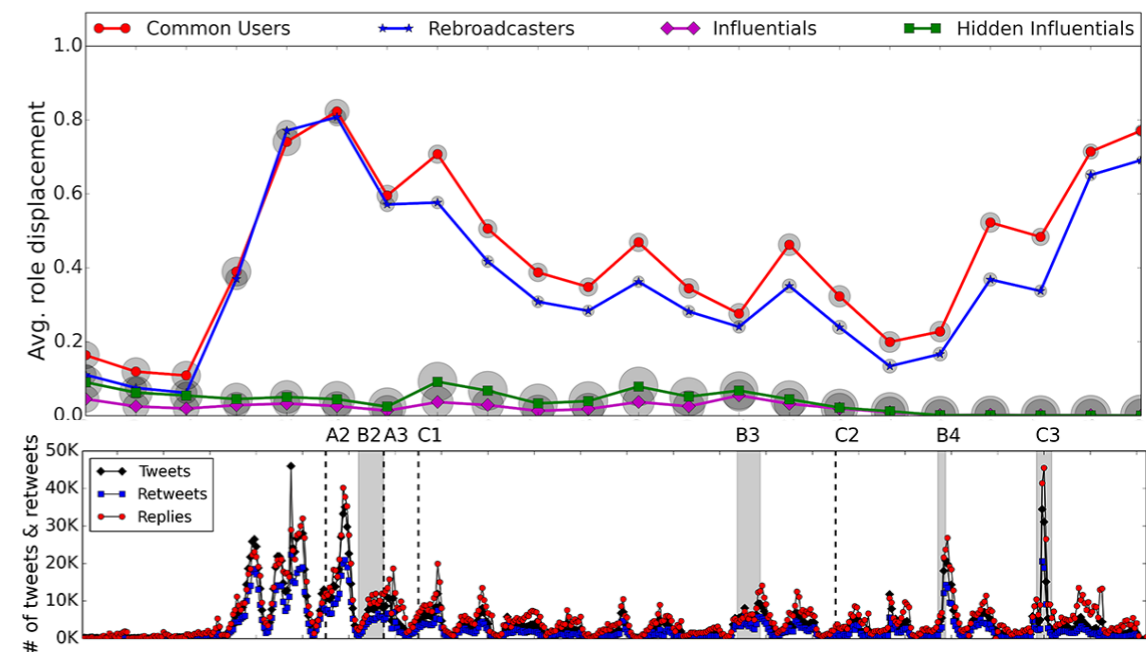
2. M Conover, CA Davis, E Ferrara, K McKelvey, F Menczer, A Flammini. **The geospatial characteristics of a social movement communication network.** *PLoS One 2013*



O Varol, E Ferrara, C Ogan, F Menczer, A Flammini.

Evolution of online user behavior during a social upheaval.

ACM Web Science 2014



The Switch

Where technology and policy connect



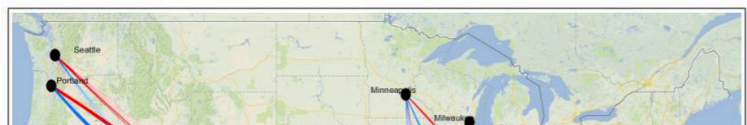
Authors Archives

Where do Twitter trends start? Try Cincinnati.

BY CAITLIN DEWEY October 24, 2013 at 9:17 am

If you want to be up on national Twitter trends before they happen, look to L.A., New York, D.C., Seattle ... and the bustling metropolis of Cincinnati, Ohio, says a head-scratching [new study](#) from researchers at Indiana University.

The study sought to measure how “trending topics” -- the popular hashtags and phrases in the left rail on Twitter -- grow and spread across the country. It found that users in some cities, termed “sinks,” adopt proportionately more national trends than they generate. Other cities, like New York and Los Angeles, seem to generate proportionally more trends than they adopt.



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FYI GUY

Seattle Times news librarian Gene Balk crunches the numbers

October 24, 2013 at 11:56 AM

Study: Seattle is top Twitter trendsetter in the U.S.

Posted by Gene Balk

Does it seem like Seattle hasn't spawned any pop-culture trends since the grunge era?

A new [study](#) says otherwise—at least in the realm of social media.

According to researchers at Indiana University, Seattle is the source of more trending topics on Twitter than any other U.S. city.

Take, for example, [#ICanAdmit](#). This “hashtag” is used when tweeting something confessional. First popularized in Seattle, it went on to trend globally.

Or how about [#YouWillNotBeTakenSeriouslyIf?](#) Used when calling out foolishness in others, it too is a Seattle gift to the Twittersphere.

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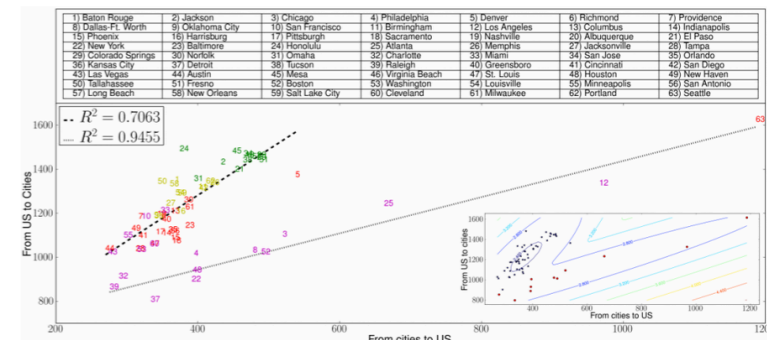
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Seattle generates more nationally-trending topics on Twitter than any other U.S. city, study says

by Taylor Soper on 10/28/2013 at 9:19 am | 3 Comments

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This graph shows Trendsetting (bottom line) vs. trend-following cities (dashed line). Seattle, No. 63, is all the way in the right corner with nearly 1,200 tweets that originated in the Emerald City and later trended nationally.

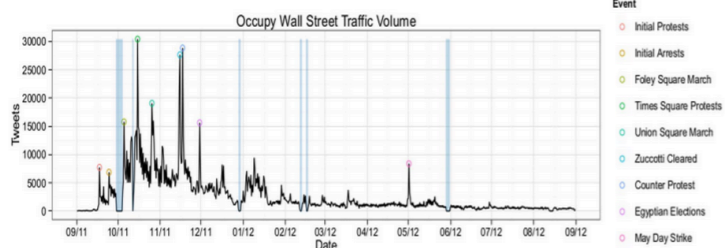
At least according to Twitter, Seattleites are trend-setters.

A [new study](#) out of the Indiana University shows that

HOME MENU INSIDER CONNECT

The Anatomy of the Occupy Wall Street Movement on Twitter

A study of the social network behind the Occupy movement shows that the most vocal participants were highly connected before the protests began but have now largely lost interest, say social network researchers

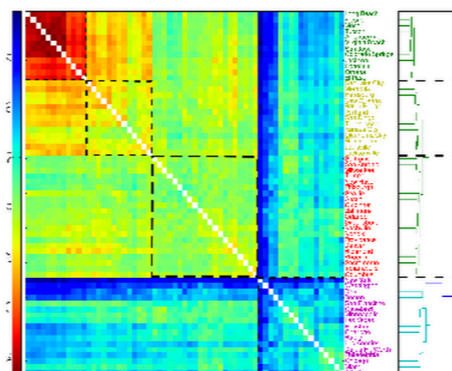


The Occupy Wall Street movement began in September 2011 as a grass roots protest against the inequality, greed and corruption associated with the financial sector of the economy. The movement adopted the slogan: “We are the 99%” which refers to the distribution of wealth in the US between the richest 1 per cent and the rest.

HOME MENU INSIDER CONNECT

The Top Five Trend-Setting Cities on Twitter

Twitter data reveals the cities that set trends and those that follow. And the difference may be in the way air passengers carry information across the country, by-passing the Internet, say network scientists.



One of the defining properties of social networks is the ease with which information can spread across them. This flow leads to information avalanches in which videos or photographs or other content becomes viral across entire countries, continents and even the globe.

It's easy to imagine that these trends are simply the result of the properties of the network. Indeed, there are plenty of

studies that seem to show this.

One Tweet if by Land



Similar studies have called into question the platform's ability to fuel protest movements. In July 2013, Indiana University researchers analyzed Twitter's role in Occupy Wall Street. They **found** that the major organizers of Occupy on Twitter tended to be activists who already knew each other, and that their tweets did little to create new Occupy leaders or followers. Michael Conover, one of the University of Indiana researchers (and now a data scientist at LinkedIn), says that, on the ground, “Occupy struggled with organizational

ASK ME ABOUT MY OTHER PROJECTS!



1. E Ferrara, S Catanese, P De Meo, G Fiumara. **Detecting criminal organizations in mobile phone networks.** *Expert Systems with Applications* (2014)
2. S Catanese, E Ferrara, G Fiumara. **Forensic analysis of phone call networks.** *Social Network Analysis and Mining* (2012)



FC

TECHNOLOGY

MAFIA WARS: HOW ITALY'S MILITARY POLICE USE METADATA TO TRACK ORGANIZED CRIME

THE CARABINIERI, ITALY'S MILITARY POLICE, USED A NEW SOFTWARE PLATFORM TO ANALYZE THE PHONE RECORDS OF ORGANIZED CRIME GROUPS. HERE'S WHAT HAPPENED.

BY NEAL UNGERLEIDER



There's a reason why the NSA likes metadata so much. Metadata--the auxiliary data generated by every digital move you make--can track a person's digital life in detail. Now a team of Italian academics are showing how metadata can reveal the structure of organized crime groups with a software tool called LogAnalysis, which combines information from mobile phone records with police databases. And among LogAnalysis's first users is the Carabinieri, the Italian military police.

Emilio Ferrara, a postdoc at Indiana University, created LogAnalysis with three researchers from the University of Messina in Sicily. Ferrara explains that their platform "infers, with pretty high confidence, the roles of individuals involved in criminal activity from communication data, simply looking at patterns and network features."

MIT Technology Review

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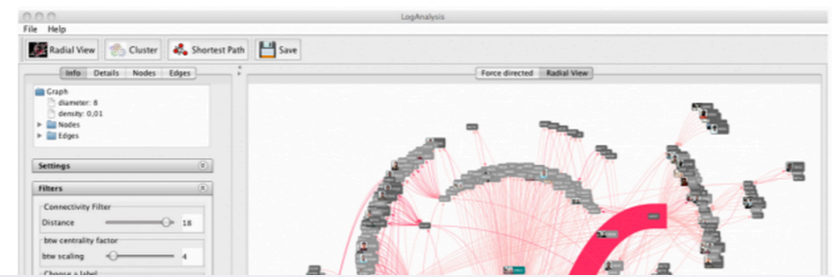
Emerging Technology From the arXiv
April 14, 2014

How to Detect Criminal Gangs Using Mobile Phone Data

Law enforcement agencies are turning to social network theory to better understand the behaviors and habits of criminal gangs. The study of social networks is providing dramatic insights into the nature of our society and how we are connected to one another. So it's no surprise that law enforcement agencies want to get in on the act.

Criminal networks are just as social as friendship or business networks. So the same techniques that can tease apart the links between our friends and colleagues should also work for thieves, drug dealers, and organized crime in general.

But how would your ordinary law enforcement officer go about collecting and analyzing data in this way? Today, we get an answer thanks to the work of Emilio Ferrara at Indiana University in Bloomington and a few pals.



Gangster science: How police use network theory to track gang members

By Kate Knibbs (Google+) on April 16, 2014 Email Follow

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It seems like there's always a brilliant, roguish cop on those TV procedurals surveying a pinboard overflowing with potential suspects and seemingly disconnected pieces of evidence. From the disorganized chaos, these white-toothed crusaders conjure epiphanies, and are never too far behind the suspect (who, of course, was underneath their nose the whole time). But real life doesn't work like that.

This is why researchers at Indiana University created LogAnalysis, a platform to help police analyze information to recreate criminal social networks. "LogAnalysis" is a boring name for a tool, but it could help police track down violent criminal organizations.

Law enforcement officials have used Facebook, Twitter, Instagram, and other social networks to track criminals and gather evidence against them for years; the New York Police Department has gone undercover on Facebook and tracked gun sales, Italian police have used it to snoop on mobsters. Florida police officers recently used Instagram to catch a burglar.

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Cell phone data analysis dials in crime networks

New program mines mobile provider records for incriminating patterns

BY RACHEL EHRENBERG 6:16PM, MARCH 19, 2013
Magazine issue: April 20, 2013

Sometimes not picking up the phone can be as incriminating as spilling the beans on a wiretapped call. After a recent string of robberies in Italy, a new forensic tool that makes it easy to explore reams of cell phone data revealed an incriminating pattern: Leading up to and after each robbery, there were flurries of calls between members of a gang suspected in a series of gun thefts, car thefts and supermarket stickups. But in the end, it was silence that betrayed the gang: There were no calls during the minutes when the crimes were being committed.

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ACM TECHNEWS

Criminal Gang Connections Mapped via Phone Metadata



Researchers have developed software that uses metadata from phones to map links between members of a criminal network.

Credit: Shutterstock

Researchers have developed software that uses metadata from phones to map links between members of a criminal network. Unlike the data-sifting methods employed by the U.S. National Security Agency, LogAnalysis "works on a small scale, focused on the analysis of small circles around these suspects." Ferrara thinks a future LogAnalysis iteration might predict the likelihood of crimes such as robberies, or determine if a law-abiding person with a connection to a criminal network is likely to eventually commit a crime.

LogAnalysis software developed by Indiana University researchers has been used to tap metadata from phones to map links between a criminal network in Sicily, enabling the police to determine who was involved, their collaborators, and even what role they may have played in crimes.

The researchers take suspects' phone records and feed the information into LogAnalysis. One person's data is sufficient for plotting out a viable map of their place within the network, while partners and leaders are identified by statistical algorithms.

Among the rules of thumb the researchers have outlined via their analyses is that lower-level lackeys send many short calls and texts at the time a crime occurs, while higher-ups tend not to receive too many calls, although they will frequently take one right after the commission of a crime.

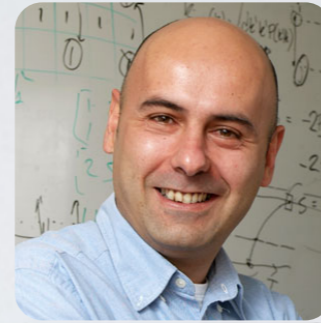
Indiana University's Emilio Ferrara notes that unlike the data-sifting methods employed by the U.S. National Security Agency, LogAnalysis "works on a small scale, focused on the analysis of small circles around these suspects." Ferrara thinks a future LogAnalysis iteration might predict the likelihood of crimes such as robberies, or determine if a law-abiding person with a connection to a criminal network is likely to eventually commit a crime.

Thanks!

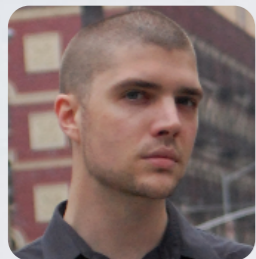


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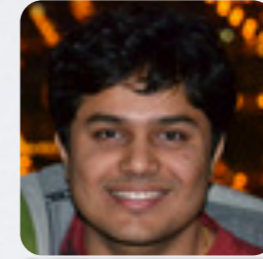
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