

Fake News, Social Media, and Bots

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Outline

- Research @ COSMOS?
- Fake News – Why and How?
- Bots – What and How?
- Methods and Tools
- Looking ahead

Mobilization And Collective Action



Flash Mob in a shopping mall



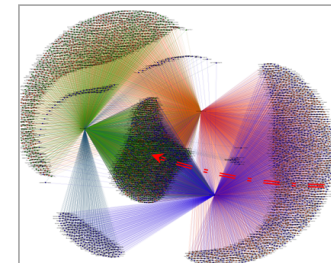
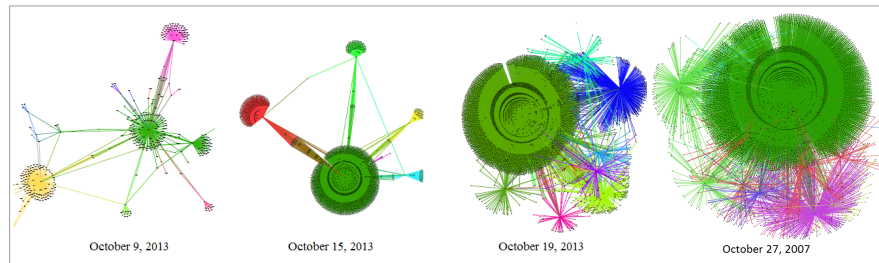
Saudi Women's Right to Drive protest



Autism Awareness Campaign



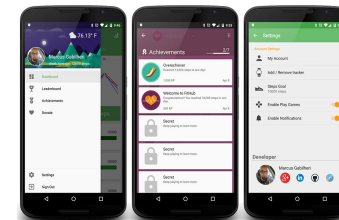
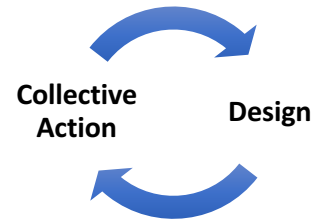
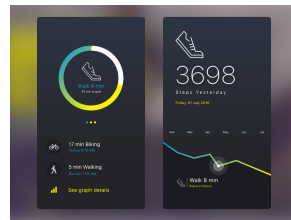
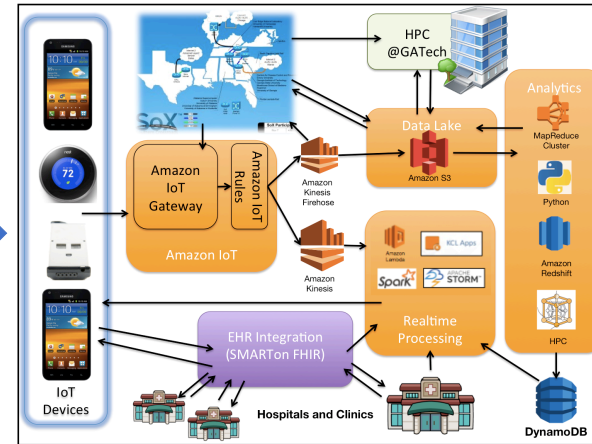
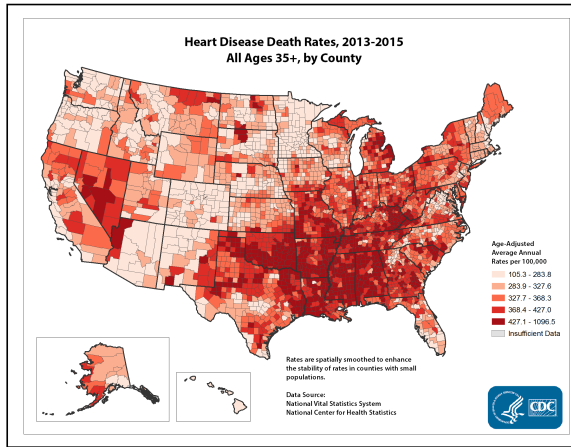
2011 Arab Spring Social Movement



NSF-funded 4-year study (\$750,000) on advancing understanding of cyber-collective actions



Health Informatics



NSF-funded 3-year study (\$1,000,000) on Big Data approach to address health disparities in the southern U.S.

Fake News Examples

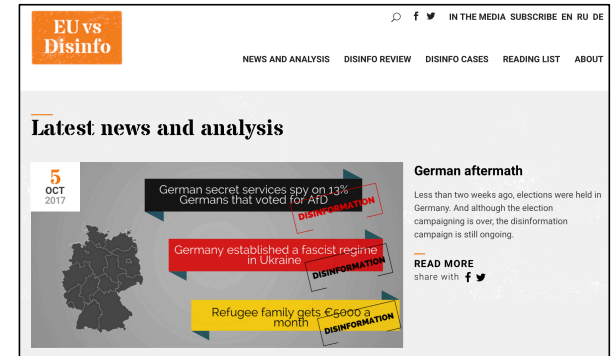
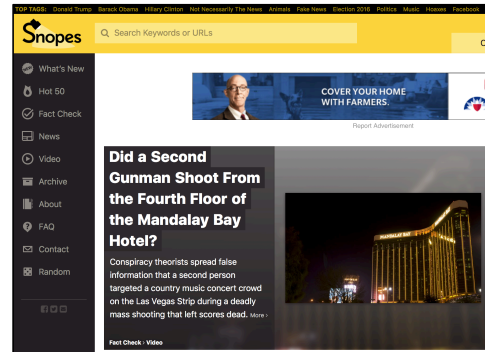
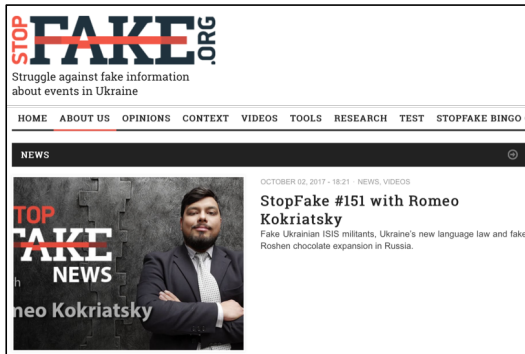
FAKE NEWS EXAMPLES

Michelle Was Caught Cheating with Eric Holder - OBAMA IS FURIOUS!!!
POLITICSPAPER.COM

Bill Clinton loses it in interview - admits he's a murderer
POLITICSPAPER.COM

JUST IN: Sarah Palin Hospitalized After Being Hit By Car
POLITICSPAPER.COM

BREAKING: Donna Brazille dies in fiery car crash
POLITICSPAPER.COM

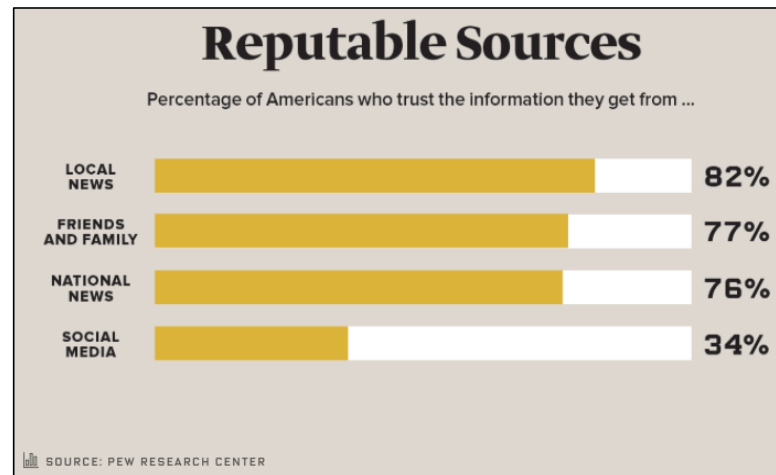


- Examples of crowdsourcing efforts
 - Stopfake.org
 - Snopes
 - Euvdisinfo
- Severely limited and easily outnumbered by the vast troll armies

Crowdsourcing Efforts

Why does it matter?

- Many people trust news that comes from their friends circle on social media channels
 - 34% Americans trust the information they get from social media (Pew Research Center, 2016).
 - 14% Americans consider social media as the most important source of information (the National Bureau of Economic Research (NBER), 2017).



Fake News Factories – The Business Model

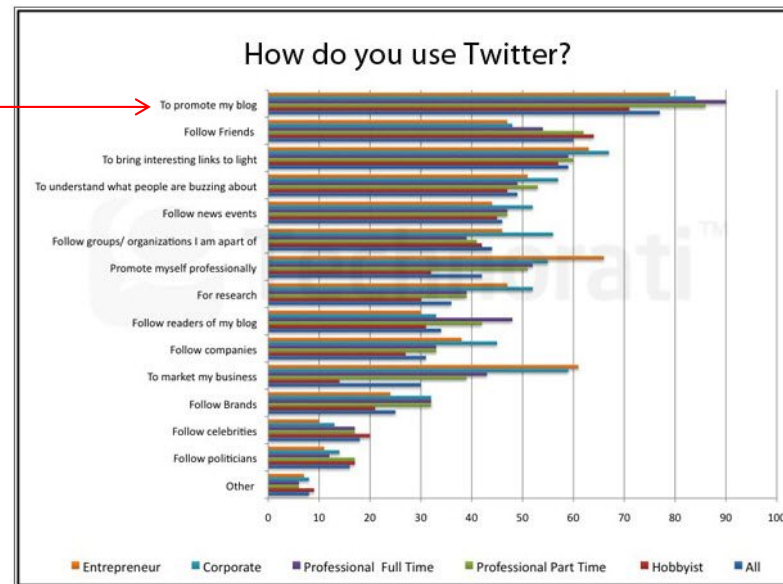
- **Running a fake-news campaign is cheap:**
 - For \$55,000 you could discredit a journalist;
 - For \$200,000 you might instigate a street protest.
 - For \$30 an 800-word fake news article, written by *Chinese* content marketer **Xiezuobang**
 - For \$621 a video appears in YouTube's main page for two minutes, created by *Russian* firm **SMOService**
 - For \$25 to have 2,500 Twitter followers all retweet a link for you, using the *English-language* firm **Quick Follow Now**.



Source : Cyber security firm Trend Micro, 2017

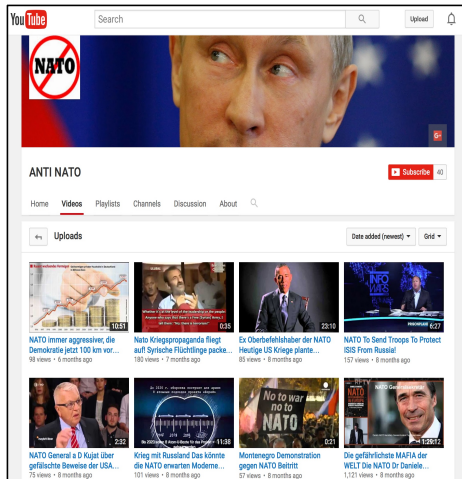
Motivation to Study the Blogosphere

- Blogosphere gives citizens the power and freedom to express their opinion, frame narratives more effectively than any other social media platform
- Because blogs:
 - Have no characters limit.
 - Have no censorship.
 - And provide digital town halls.

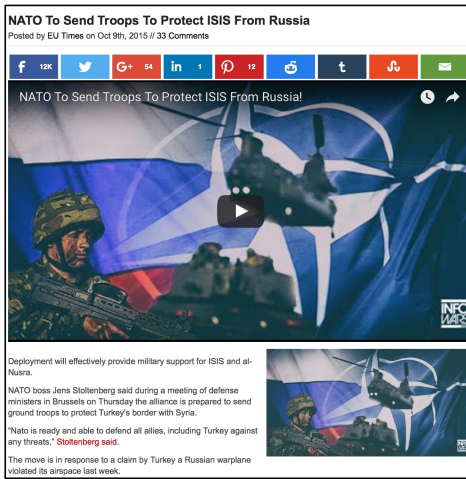


Technorati, 2011

Cross-Media Dissemination



A YouTube channel with several Anti-NATO propaganda videos. The channel is called, "ANTI NATO".



A blog using YouTube video to spread anti-NATO propaganda suggesting NATO's troops obstructing Russian operations in Syria thereby helping ISIS.



A blog using YouTube video to spread anti-NATO propaganda by suggesting NATO is waging war against Syrian refugees.

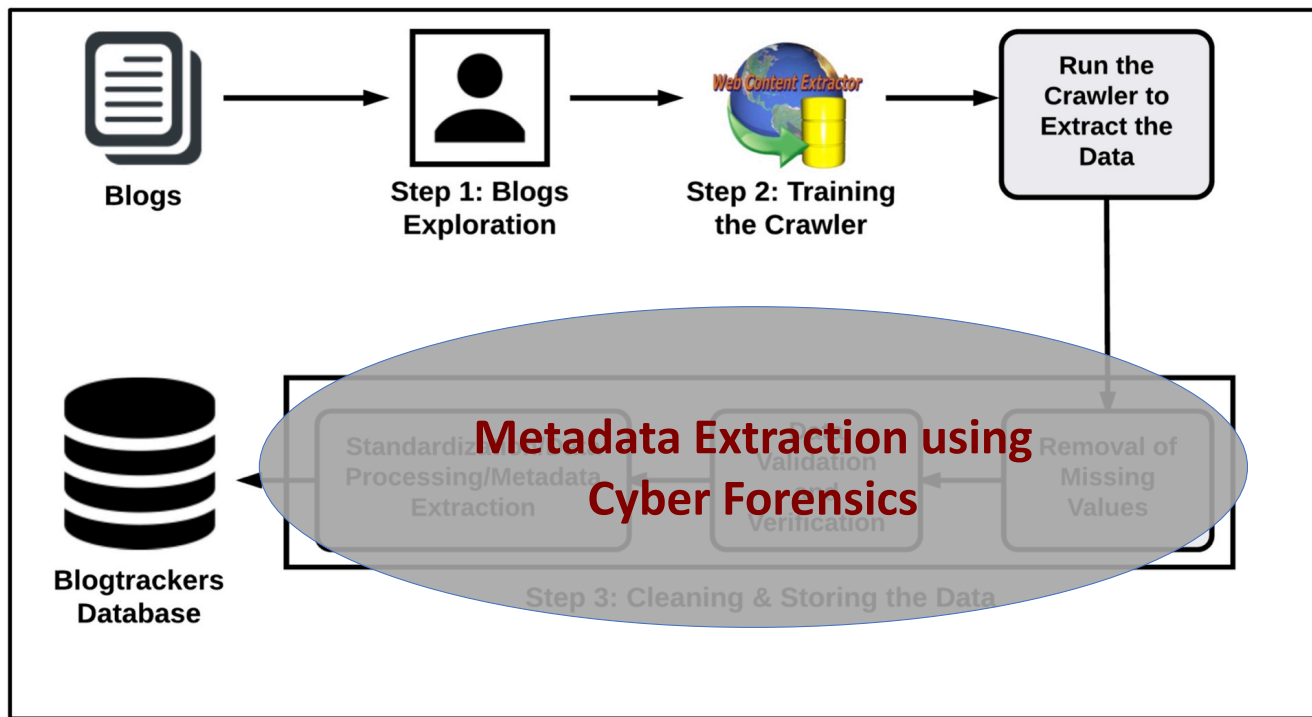


Agarwal, COSMOS, UALR

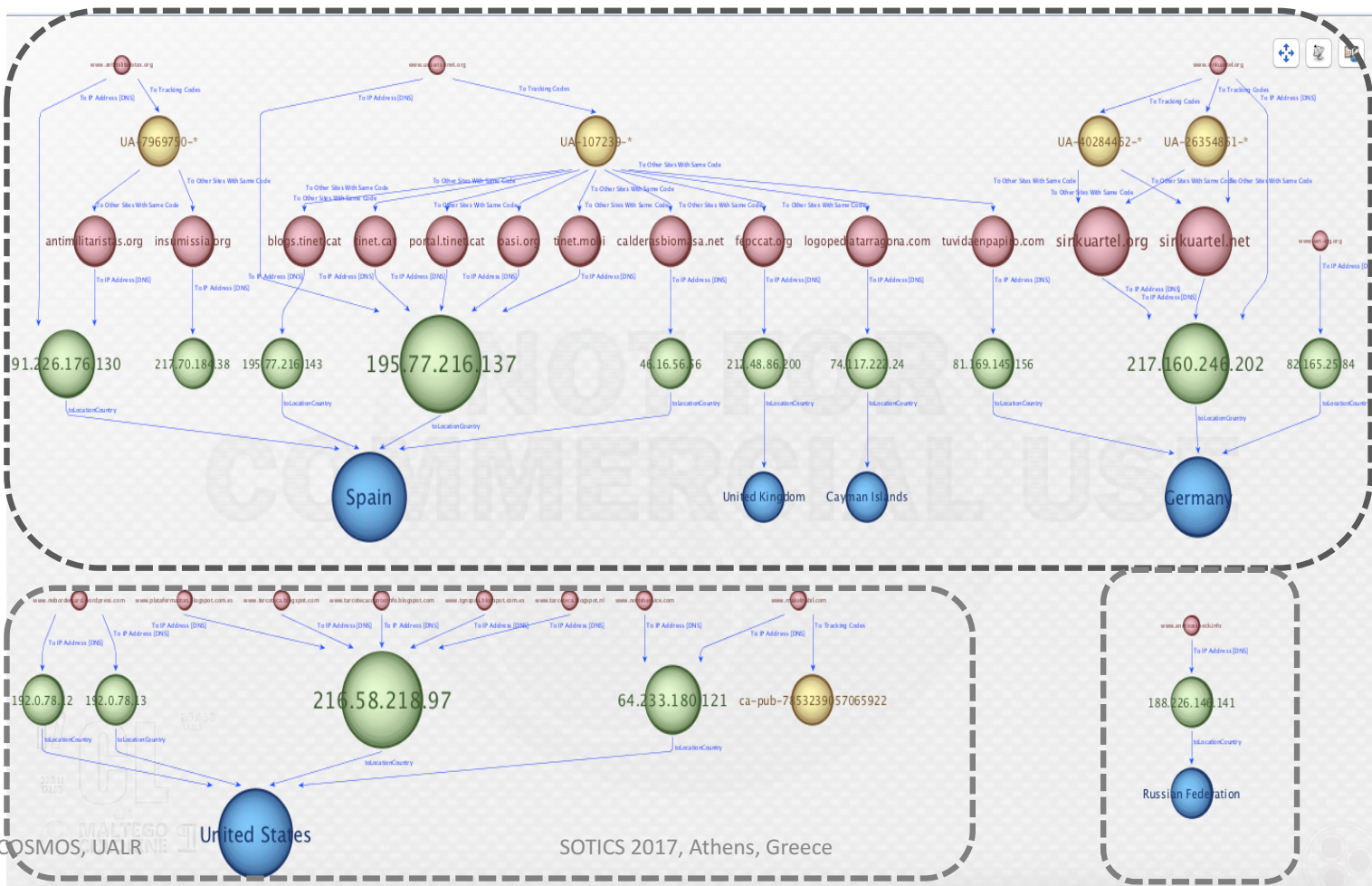


SOTICS 2017, Athens, Greece

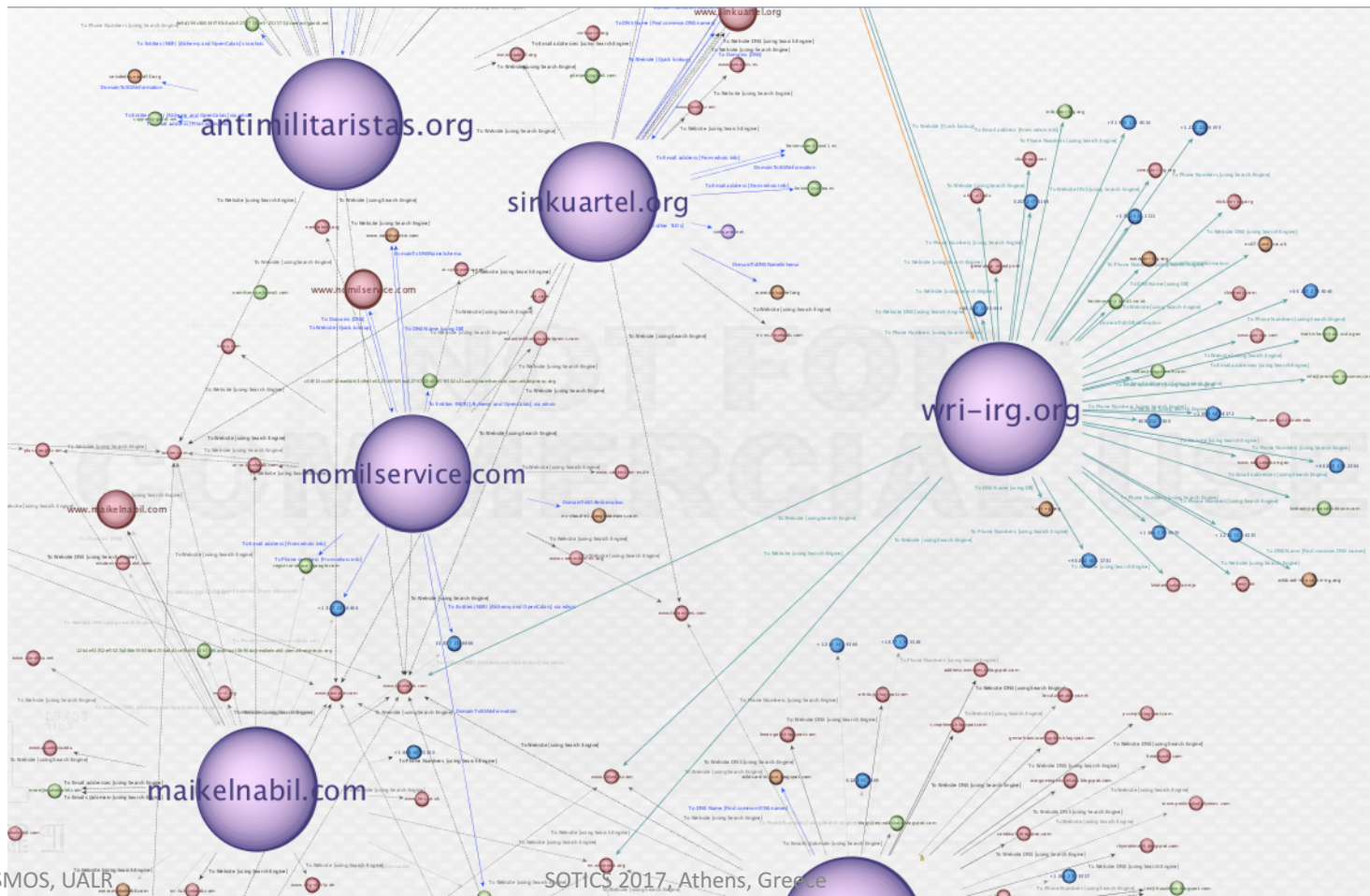
Data Collection Methodology



Metadata Extraction - Cyber Forensics



Metadata Extraction - Cyber Forensics



Cross Media Affiliations



Maikel Nabil Sanad
@maikelnabil
Liberal and Atheist Blogger, Peace Activist, Founder of @NoMilService
Washington, DC
maikelnabil.com
Joined July 2008

TWEETS 8,552 FOLLOWING 326 FOLLOWERS 18.9K FAVORITES 13

Tweets Tweets & replies Photos & videos

Maikel Nabil Sanad retweeted @NoMilService لا للتجنيد الإجباري 9h Support Conscientious Objection Movements!... fb.me/6Q13YRvEE

Maikel Nabil Sanad @maikelnabil · 10h "Police and army officers who abused people were not put on trial. I was put on

Founder of

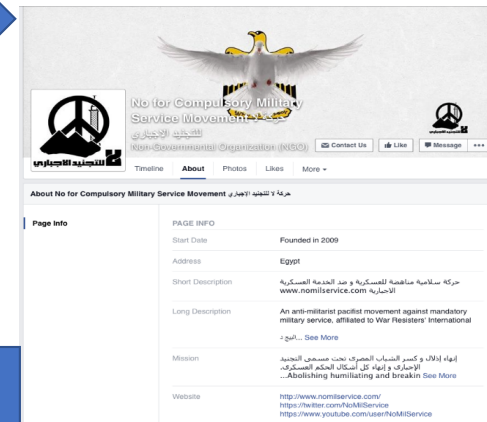


@nomilservice
لا للتجنيد الإجباري
TWEETS 1,511 FOLLOWING 6 FOLLOWERS 458 FAVORITES 52

War Resisters' Int'l @warresistersint · Sep 6 Peace communities in #Colombia are a collective taking sides, refusing all violence. #COSymposium

War Resisters' Int'l @warresistersint · Sep 6 Germany executed more than 10,000 deserters in #COSymposium | #VidaniRetDER

Founder of



No for Compulsory Military Service Movement
الحركة المصرية لمتابعة معارضة التجنيد الإجباري
Non-Governmental Organization (NGO)

About No for Compulsory Military Service Movement لا للتجنيد الإجباري

Page Info	PAGE INFO
Start Date	Founded in 2009
Address	Egypt
Short Description	حركة سلامية معارضة للتجنيد الإجباري و مع الخدمة العسكرية www.nomilservice.com
Long Description	An anti-militarist pacifist movement against mandatory military service, affiliated to War Resisters International
Mission	إنهاء الأذى وكسر العنقود العنصرية تحت مسمى التجنيد الإجباري وإلغاء كل أشكال العنف العسكري... ...Abolishing humiliating and break in See More
Website	http://www.nomilservice.com/ https://twitter.com/NoMilService https://www.youtube.com/user/NoMilService

affiliated to



War Resisters' Int'l
@warresistersint
War Resisters' International works for a world without war. We are a global anti-militarist network, with eighty member organizations in over forty countries.
Joined April 2011

Tweets Tweets & replies Photos & videos

Conscientious objectors from #Turkey #Greece #Italy #Cyprus #Israel #Egypt publish joint statement: facebook.com/warresistersin... @MuratKanati

@warresistant

Agarwal, COSMOS, UALR

SOTICS 2017, Athens, Greece

No Military Service Facebook page

Bridge Bloggers

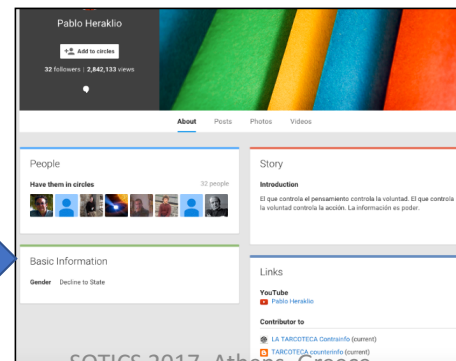


Blog in Spanish

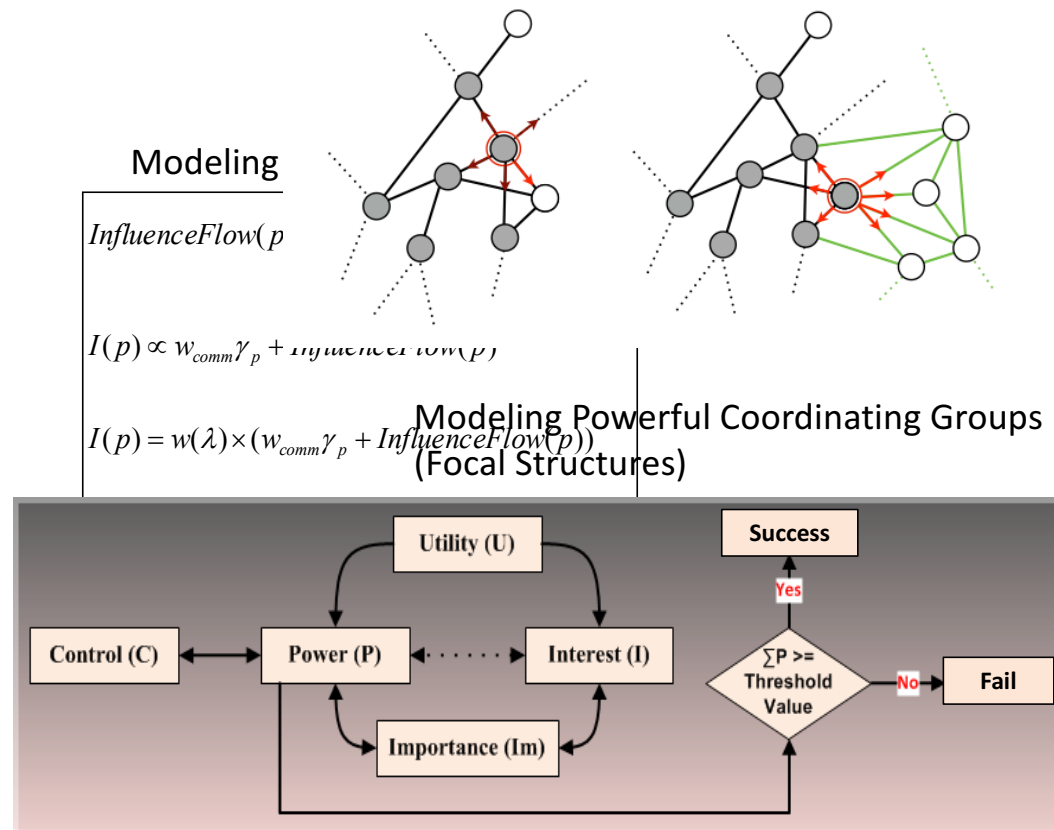
Same Blog in English



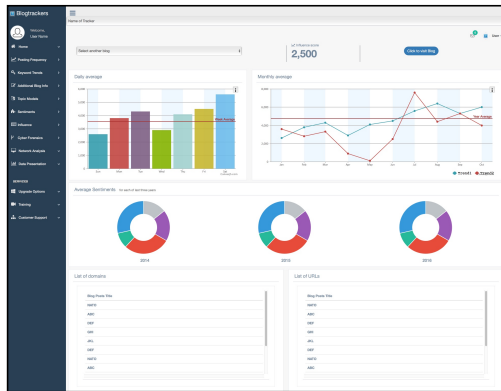
Blogger's Google Plus Profile



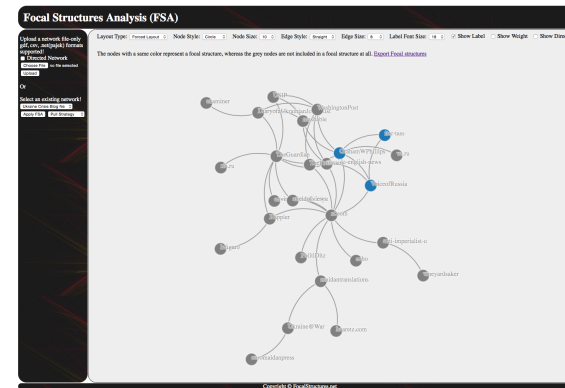
Models for Influence Assessment



Tools Developed



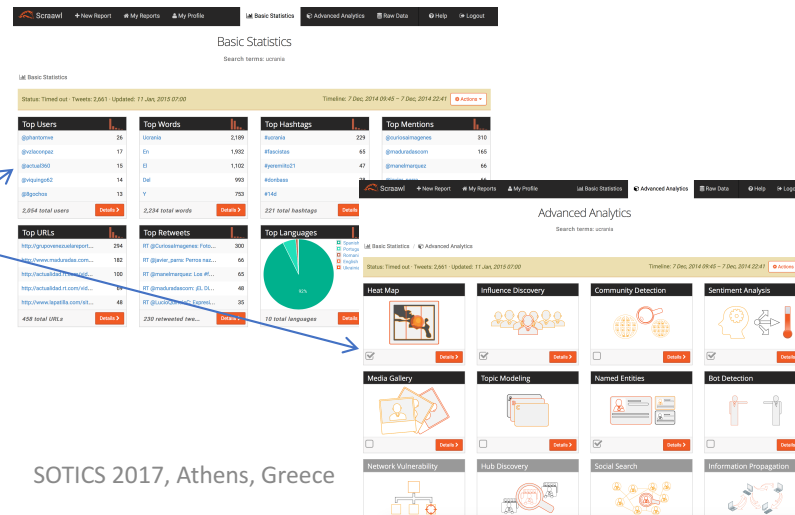
Blogtrackers (blogtrackers.host.ualr.edu)



Focal Structures Analysis (focalstructures.net)



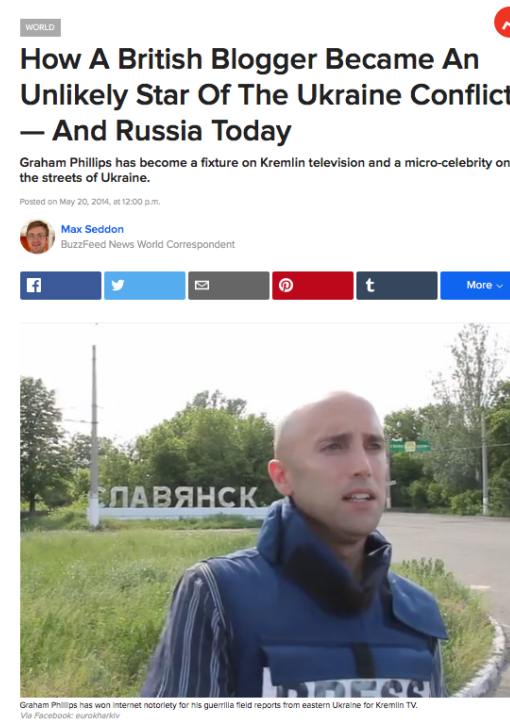
Scraawl (scraawl.com)



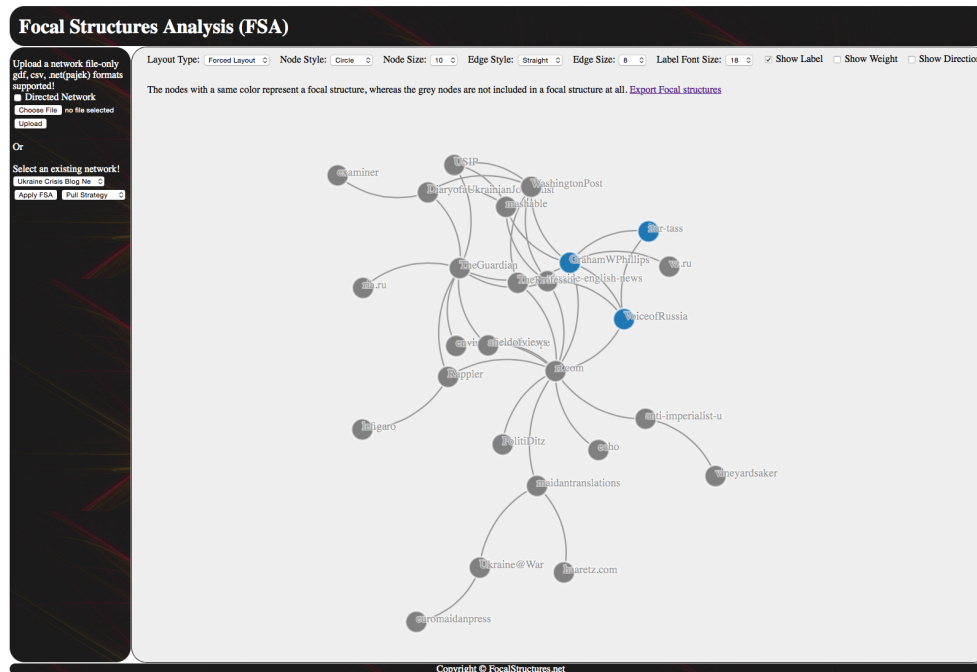
SOTICS 2017, Athens, Greece

Case Study 1: 2014 Ukraine-Russia Conflict

- Graham W. Phillips is a British journalist and blogger.
- He went to Ukraine to cover the voice of Ukrainians during Euromaidan.
- He reported that Ukrainians are “happy” with the previous pro-Russian government of Ukraine.
- He used Vlogging to cover the events.
- His Vlogs made him an influential blogger & an enemy to the current Ukrainian government so they banned him from entering Ukraine for three years.
- Once he was banned from entering Ukraine he went to Russia instead of going back to England.



Coordinating Structures in Ukraine-Russia Conflict Blogosphere



- A tiny sample of blog network for Russia-Ukraine conflict.
- **Nodes** represent blogs and **Edges** represent link between blogs (out-links).
- The structure with **blue nodes** is identified as a focal/coordinating structure.
- Although RT.COM is the most central node, the triad “**Graham Phillips – Russian News Agency – Voice of Russia**” is a more influential coordinating structure for information dissemination.

- Blogs were identified using **TweetTracker**, an online tool developed by Arizona State University, by finding the sites that have been tweeted and retweeted the most during the conflict and have propagated messages.
- Those sites are manually classified as blogs or non- blogs.
- Blogs are then further subdivided into categories of:
 - Ukraine focused blogs
 - News blogs
 - Non-Ukraine focused blogs.
- Web Content Extractor, or WCE, is used to crawl through each of the identified sites.
- We obtained 18,000 blog posts from 26 different blog sites.

SNAM 2016

Case Study 2: The 2015 Trident Juncture Exercise

Influential Blog Posts

Blog Post Title	Blog Post Content
CAMPEGGIO ANTIMILITARISTA A CAGLIARI – PROGRAMMA!!!	Programma campeggio: OGGI 11 OTTOBRE 2015 MANIFESTAZIONE ANTIMILITARISTA ALLE 18 A CAGLIARI. CONCENTRAMENTO PIAZZA D'ARMI. IL CAMPEGGIO SI TROVA NELLA EX CAVA DI MONTE URPINU (VICINO AGLI ORTI URBANI) VIA RAFFA GARZIA. PER CHI VOLESSE RIMANE L'APPUNTAMENTO STAMANI 9 OTTOBRE, FINO ALLE 11 IN PIAZZA DEL CARMINE. Venerdì 9 ottobre: Dalle 9 alle 11 accoglienza in piazza del carmine – apertura del campeggio nella ex cava a Monte Urpinu- Nel pomeriggio iniziative in citta' 21.00 cena – assemblea del campeggio Sabato 10 ottobre 18.00 assemblea sulle prospettive di lotta antimilitarista e contro la trident juncture – PRESENTAZIONE DEL NUOVO CALENDARIO DELLE ESERCITAZIONI IN SARDEGNA A seguire cena Domenica 11 ottobre Mattina Assemblea conclusiva Pomeriggio corteo Il programma potra' subire variazioni per questioni meteo, per colpa degli sbirri o per imprevisti. PORTA TENDA, SACCO A PELO, PIATTO E POSATE. IL LUOGO DEL
OTAN Disolución! Hollande Presidente-Terrorista!	
قصائد مجنوننة	
Sabato 19 manifestazione a Domusnovas CONTRO LA FABBRICA DI BOMBE	
Donations	
How Egypt's Conscription Generates Unemployment and Refugees!	

We identified the most influential posts using Blogtrackers that happened to have a lot of propaganda and a clear call for civil unrest against NATO forces.

The most influential post is written in **Italian language**. We used Google Translation service to find the post to be highly propaganda-riddled.

AGITPROP - Astroturfing

camp program: TODAY October 11, 2015 EVENT Antimilitarist TO 18 IN CAGLIARI. CONCENTRATION PIAZZA D'ARMI. THE CAMP IS LOCATED IN THE FORMER QUARRY OF MONTE URPINU (NEAR THE URBAN GARDENS) VIA RAFFA GARZIA. For visitors REMAINS THE APPOINTMENT this morning on October 9, UP TO 11 IN PIAZZA DEL CARMINE. Friday, October 9: From 9 to 11 reception in the square of the carmine - the opening of the camp in the former quarry at Monte Urpinu- afternoon initiatives in the city '21.00 dinner - Assembly of the camp Saturday, October 10 18:00 meeting on the prospects for anti-militarist struggle and against the trident juncture - PRESENTATION OF THE NEW CALENDAR OF EXERCISES IN SARDINIA following dinner Sunday, October 11 Morning conclusive Assembly Afternoon parade The program potra 'vary due to weather issues, because of the cops or contingency. PORT TENT, SLEEPING BAG, FLAT AND SERVERS. THE LOCATION OF THE CAMP WILL 'PUBLISHED TOMORROW MORNING, THEN Meet RECEPTION !! CAMPING Antimilitarist FIGHT - AROUND CAGLIARI 9-10-11 October 2015 Out of the mobilization against the Capo Frasca polygon of 13 September 2014, initiatives and actions directed against the military presence in Sardinia have multiplied and diversified to try to jam the mechanism of the war. Cuts of networks, slowing the means and blocking exercises have taken the "necessary serenity" to the conduct of military activities. Thanks to its experience and in the wake of the procession of 11 June 2015 in Decimomannu, as No Bases Network here or elsewhere we decided to call for the second weekend of October an anti-militarist struggle camping. These three days they want to continue and refine the forms of struggle practiced until now, with the aim of sabotaging the military and everything revolves around us. For this we would like active participation and contribution by all and all, then it can be a starting point for a reproducibility of the practices in their contexts and territories. The campground also wants to act as a springboard for international mobilization, called for the second half of October, against the exercise Trident Juncture 2015. With this exercise, NATO intends to test its intervention force in the short term, to prepare for the increasingly Possible conflict on Middle East fronts, North African and Russian. 36000 men, hundreds of vehicles, aircraft and ships will fire in Sardinia, Sicily, Spain and Portugal. For this exercise, the largest since 2002. NATO once again a tribute in terms of pollution, resource exploitation and militarization of the territories to train for war. As it has been for the exercises of Aries brigade, the brigade of Aosta and STAREX, we can not make ourselves complicit in all of this, do not let them rest assured. Proposal mobilization against the Trident DOWNLOAD INFORMATION MEMORANDUM ON TRIDENT Juncture 2015.

camp program: TODAY **October 11, 2015** EVENT Antimilitarist TO 18 IN CAGLIARI. CONCENTRATION PIAZZA D'ARMI. **THE CAMP IS LOCATED IN THE FORMER QUARRY OF MONTE URPINU (NEAR THE URBAN GARDENS) VIA RAFFA GARZIA.**

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NATO once again a tribute in terms of pollution, resource exploitation and militarization of the territories to train for war.

Case Study 3: The 2016 Anakonda Exercise

GBlog
Under no circumstances should you make an attempt to restrain ass thinkers on head thinking

NATO Porn: My anaconda do not My anaconda do not My anaconda do not want none Unless you got buns, hun. - Or: Capybara Staring into the abyss

Amazing: If you in great truth machine Enter "Anaconda", you get **1A-hardcore-porn** displayed : In 1 the Focus with "NATO United maneuvers" Anaconda": Upon doing so the West's reluctance from' and on 3 Nicki Minaj performing **Anaconda**. Let's start with 3, - but I push precaution times Fischers latest commentary on the current fuss around the Sexualstrafrecht a (Fischer in law / TIME online, June 7, 2016); - Not that I me einhandle by referring to the video the accusation that I encouraged men - their origin is their Anaconda also - on sexual violence. (Pop & Porn is actually also another problem, since Cher began in the '70s, performing in underwear.) View on YouTube - you must be the not view all: daily only once! This raises the question of what buns the NATO make so hot that they can get out the Anaconda ; - Especially as: **The Great Anaconda moves ashore rather lazy ... it moves sinuously ... and geared using its forked tongue** . What still raises the question of what NATO under assistant westcoast promotional one to this because not unproblematic, if has not thought even treasonous name for the maneuver!?! this will not be clarified. He will not think about sex for the conqueror , but maybe he had this in mind: anaconda devouring capybara The answer is more likely in 1: **NATO United maneuvers "Anaconda" - now puts the West his hesitancy from Wednesday, 08.06. 2016 19:54** - from FOCUS online expert Klaus trowel (media magnate) A fine example of **cross-media-fuck** (... as we daily experience it in the news: the search network of ... how Funke Mediengruppe reports ...) - if the ass is large enough, in which one wants to crawl: the "media mogul" who runs a blog (*Think desired - the trowel blog way for common sense and a bit more freedom!*) where he as **Jesse Hughes** ("Eagles of Death Metal") for its right-wing Bratze praises (*from one who falls off the grid, because it is not a good person*), is an expert on international relations by! That is nevertheless amazing. As I said on 1 in search engine for keyword **Anaconda** ! **Fuck me running!** Quite apart from the grubby NATO Porn is useful to take a larger context in the view: **Who is the fucking capybara ??**

The post mocks and ridicules the exercise, by comparing it with the Nicki Minaj's raunchy music video titled "anaconda". Here are some excerpts: "This raises the question of what buns the NATO make so hot that they can get out the Anaconda" "using its forked tongue" "A fine example of cross-media-fuck" and many others..

Video of Nicki Minaj's Anaconda song on the blog mocking the exercise Anakonda 2016.



A picture of Anaconda eating an animal

Biased or Offensive Contents

Most influential blog during Anakonda 2016 exercise period was marucha.wordpress.com.

- The blog is ridiculing Polish government's policy on accepting refugees.
- And further calls US Army participation in Anakonda exercise as **INVASION**.

Judeo-Ukrainian T.Sakiewicz Organizes More In "Imeniu Polish Community" In The Adventurous Washington said



2016-06-06 (Monday) @ 8:29:46 p.m.

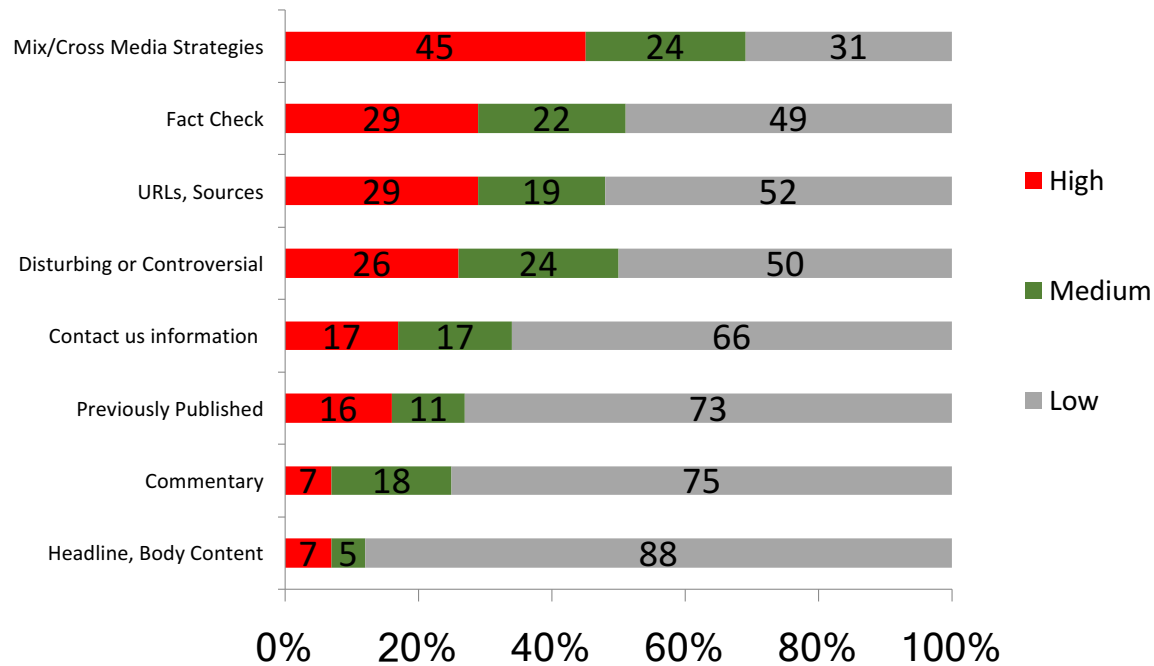
the so-called. "Polish newspaper club" in Washington CONTRACT Judeo-Ukrainian T.Sakiewiczza banderowską hired by the secret police and the CIA organized Jewish propaganda roundup UKRÓW Polish speakers living in the US, so that you may gather June 11, 2016, in Washington pm. 14:30 to 16:00 before the Jewish Melina "white house" and its manifestation of "supported" ALLEGEDLY on behalf "of the entire Polish community" INVASION 14 thousand soldiers -zabijaków US Army on Poland!

Look here:

<http://niezalezna.pl/81455-mocny-glos-polonii-amerykanskiej-wiec-poparcia-dla-obecnosci-wojsk-nato-w-polsce>

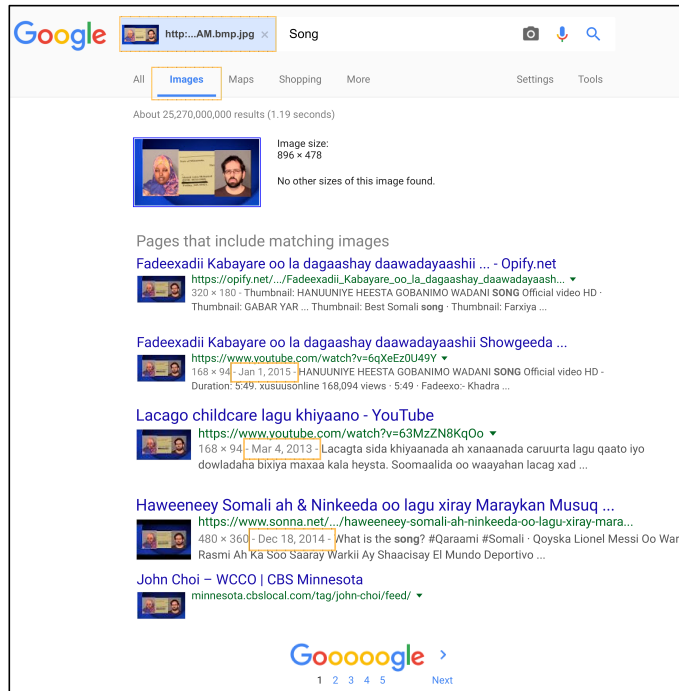


Typical Characteristics - Disinformation riddled blogs

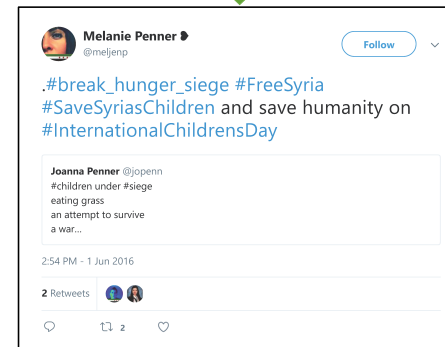


- Effectiveness of each of the 8 criteria in identifying misinformation-riddled blog.
- The criteria are sorted in decreasing order of effectiveness.
- The smaller the gray bar the more effective the criterion is.
- Numbers on the colored bars indicate the number of blog sites identified as containing misinformation with a confidence of High, Medium, and Low.

Tracking the origins of the content on these blogs

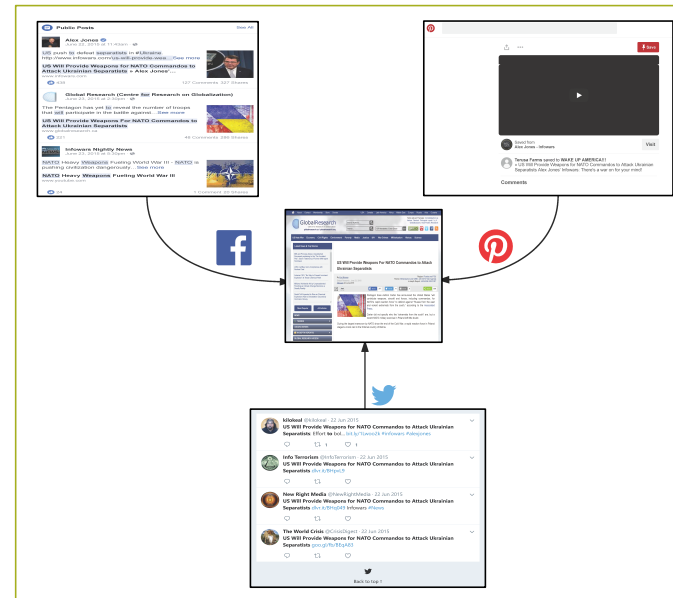
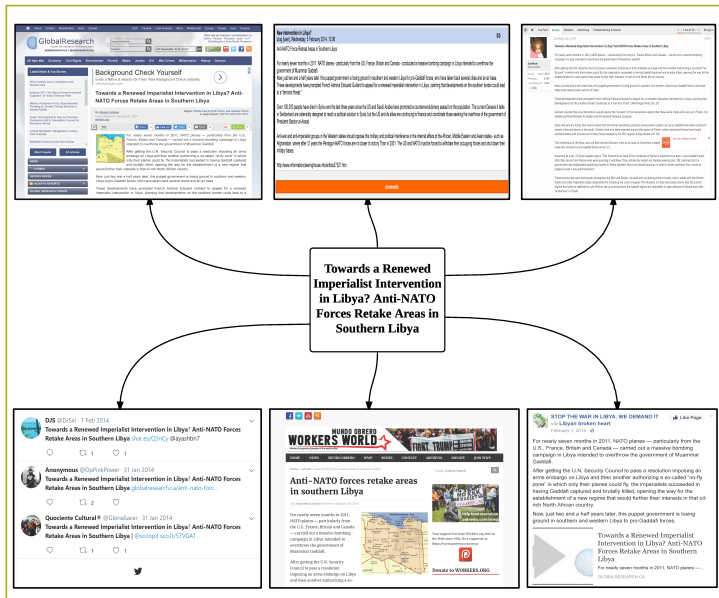


Pattern 1: Reverse Image Search - The images were not unique for each article and not relevant with the context it was used for. The same image was reused with different narratives.



Pattern 2: The use of hashtags and links in blog posts serve as the vehicle connecting other social media channels.

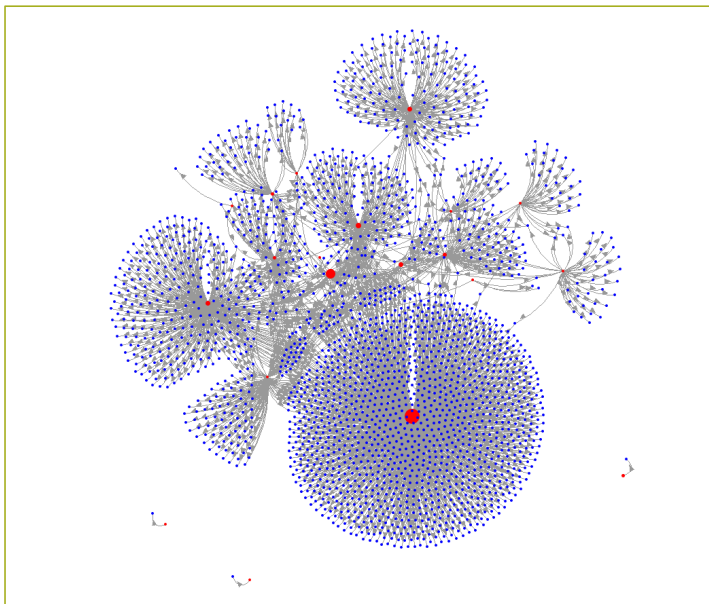
Mix Media and Cross Media Dissemination Approaches



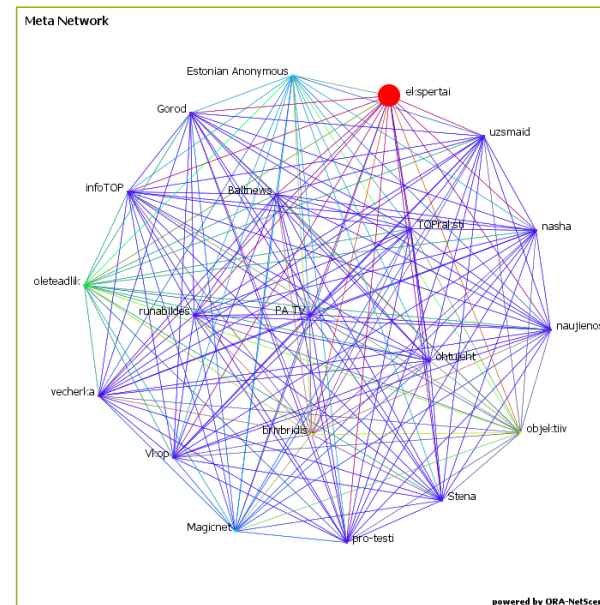
- Mix media information dissemination campaign refers to the use of multiple social media channels to diffuse a narrative.
- More precisely, the information campaign can be observed on multiple social media sites with text, images, audio and video content.
- The content may not be identical on the various social media channels, but it pertains to a particular information campaign

- A cross-media information dissemination campaign orchestrates the use of specific media channels.
- More precisely, the information is hosted on a website (e.g., a blog site, video on a YouTube channel) and is widely distributed through other social media channels that provide established social network structures, such as Twitter, Facebook, etc.

Disinformation Campaign Coordination

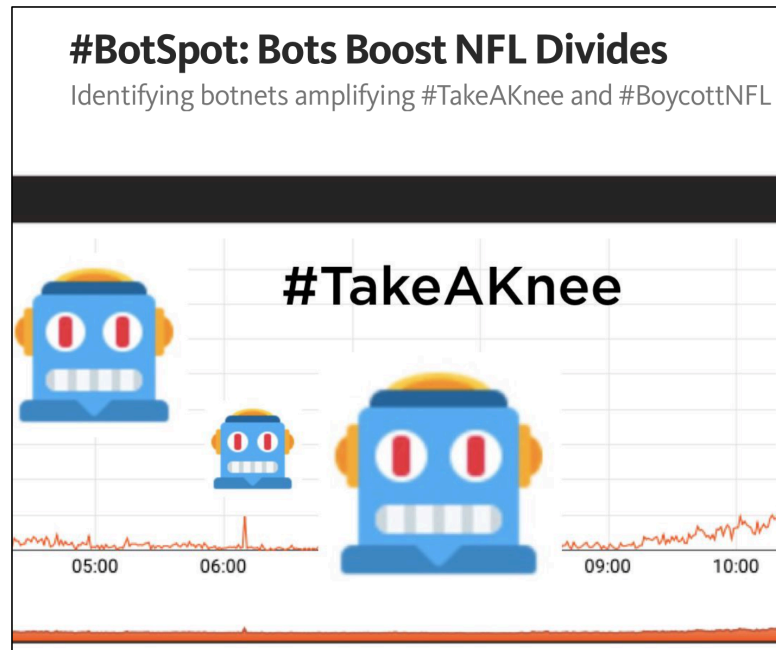


- The above figure is a network of blogsites and shared hyperlinks.
- The network contains 21 blogs (red nodes) and 2321 hyperlinks (blue nodes).
- Size of a node is proportional to the number of shared hyperlinks (i.e., out-degree centrality).
- Edge thickness is proportional to the number of times a blogsite shared a hyperlink.



- The above figure is a network of blogs based on commonly shared hyperlinks.
- The network is fully connected, i.e., a clique, where every blog is connected with every other blog.
- This depicts massively coordinated information campaign

What are Bots?



The Alt-Right and Antifa Are Waging a New Kind of Internet Warfare















Intelligence and surveillance powers that once belonged only to militaries and state spooks are now available to anyone with a high-speed internet connection.

SHARE TWEET

JACOB SIEGEL
Aug 30 2017, 5:25pm

Computational propaganda
Machine Driven Communications (MADCOMs)


Spotting Bots

<input type="checkbox"/>	 djfjfu @djfjfu2 · 1w RT @joeyglenn_twt: It's interesting #dotard how you say they should be fired when you #TakeAKnee everyday of your term, milking the clock. ↩️ 168 ❤️		2017-09-23T12:11:02
<input type="checkbox"/>	 jdjdjfb @jdjdjfb2 · 1w RT @joeyglenn_twt: It's interesting #dotard how you say they should be fired when you #TakeAKnee everyday of your term, milking the clock. ↩️ 168 ❤️		2017-09-23T12:11:02
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<input type="checkbox"/>	 djfjfbfhf @djfjfbfhf · 1w RT @joeyglenn_twt: It's interesting #dotard how you say they should be fired when you #TakeAKnee everyday of your term, milking the clock. ↩️ 168 ❤️		2017-09-23T12:11:02
<input type="checkbox"/>	 djfjfg @djfjfg21071898 · 1w RT @joeyglenn_twt: It's interesting #dotard how you say they should be fired when you #TakeAKnee everyday of your term, milking the clock. ↩️ 168 ❤️		2017-09-23T12:11:02
<input type="checkbox"/>	 jdjdj @jdjdj54161303 · 1w RT @joeyglenn_twt: It's interesting #dotard how you say they should be fired when you #TakeAKnee everyday of your term, milking the clock.		2017-09-23T12:11:02


What are Botnets?

Is this spontaneous crowd action or a computer-engineered “story push”?


Tweets from [twitter.com](#)




France Travel francevoyages · December 24
After the attacks, the executive seeks the right words bit.ly/1rglDeX
↩ Reply ↻ Retweet ★ Favorite




France56 @ France562 · December 24
After the attacks, the executive seeks the right words bit.ly/1rglDeX
↩ Reply ↻ Retweet ★ Favorite




Federico Baler federicobaler · December 24
After the attacks, the executive seeks the right words bit.ly/1rglDeX
↩ Reply ↻ Retweet ★ Favorite




FansdeNadal FansdeNadal · December 24
After the attacks, the executive seeks the right words bit.ly/1rglDeX
↩ Reply ↻ Retweet ★ Favorite




Expogays Magazine @ expogays2011 · December 24
After the attacks, the executive seeks the right words bit.ly/1rglDeX
↩ Reply ↻ Retweet ★ Favorite




Jean-Pierre Dupont mayracjp · December 24
RT [ydekerdel](#) 2 attacks #islamistes in 24 hours, but officially this st unbalan
↩ Reply ↻ Retweet ★ Favorite



Expogays expogays · December 24
After the attacks, the executive seeks the right words bit.ly/1rglDeX
↩ Reply ↻ Retweet ★ Favorite



Evagarcia EvagarciaEva · December 24
After the attacks, the executive seeks the right words bit.ly/1rglDeX
↩ Reply ↻ Retweet ★ Favorite



Eurovisiongay eurovisiongay · December 24
After the attacks, the executive seeks the right words bit.ly/1rglDeX
↩ Reply ↻ Retweet ★ Favorite

Identical text plus identical “bit.ly” shortener.

What are Botnets?



Time: correct for a spontaneous push from real-world audience

BUT: Europe Presse does not support a “push button” for Twitter or any social media platform.

The URL shortener would have to be initiated over and over, providing a different bit.ly address for each person.

What are Botnets?

Yes, they are all bots. Primarily commercial in nature. Most normally tweet in Spanish, on Spanish texts, to push commercial products. By one person / agency.



More accounts are created for commercial uses from 2010-2011



Commercial accounts for blogs and companies created. Focus on gay niche market.

Influence Bots on Darknet Marketplace

	Huge Bot Pack (Google, Facebook, Youtube, Twitter) And Much More! DrunkDragon [+7149 -87] ★ Level 12 (10000+)	USD 5.50 ₿ 0.0022	Buy Now Views: 5889
	2000 HQ USA TWITTER LIKES DigitalPablo [+484 -14] ★ Level 8 (600+)	USD 6.00 ₿ 0.0024	Buy Now Views: 15
	2000 HQ USA TWITTER RETWEETS DigitalPablo [+484 -14] ★ Level 8 (600+)	USD 6.30 ₿ 0.0025	Buy Now Views: 11

Vendors are selling social media bots for profit on the “Darknet”

- You can buy Twitter, Facebook, YouTube, Clientele, or Instagram bots from the darknet such as Hansa Market. Some botnets are also available for sale on standard Internet.
- These bots promise to deliver thousands of retweets, likes for your posts, thousands of followers, high quality views, channels subscribers, and thousands of Instagram likes. The cost of these bots within the price range of \$1.79 - \$6.48 USD.

How Botnets Change the Information Environment

Used by botnets to disseminate propaganda

Misdirection: The bot would tweet unrelated news that is happening somewhere else but mention a hashtag related to the crises

Hashtag-Latching: strategically associating unrelated but popular or trending hashtags to target a broader, or in some cases a very specific audience. For example using the #WorldCup then include a URL of beheading video.

Smoke Screening: The bot would mention something about ISIS but not necessary related to the beheading. Similar techniques have been used in the Syrian Social Bot (SSB) to raise awareness of the Syrian civil war.

Thread-Jacking: the change of topic in a “thread” of discussion in an open forum. For example using a hashtag of #ISIL but the tweet has a link to a US elections

Four Strategies
used to
disseminate
content.

Case Studies



Crimean Invasion 2014



Dragoon Ride 2015



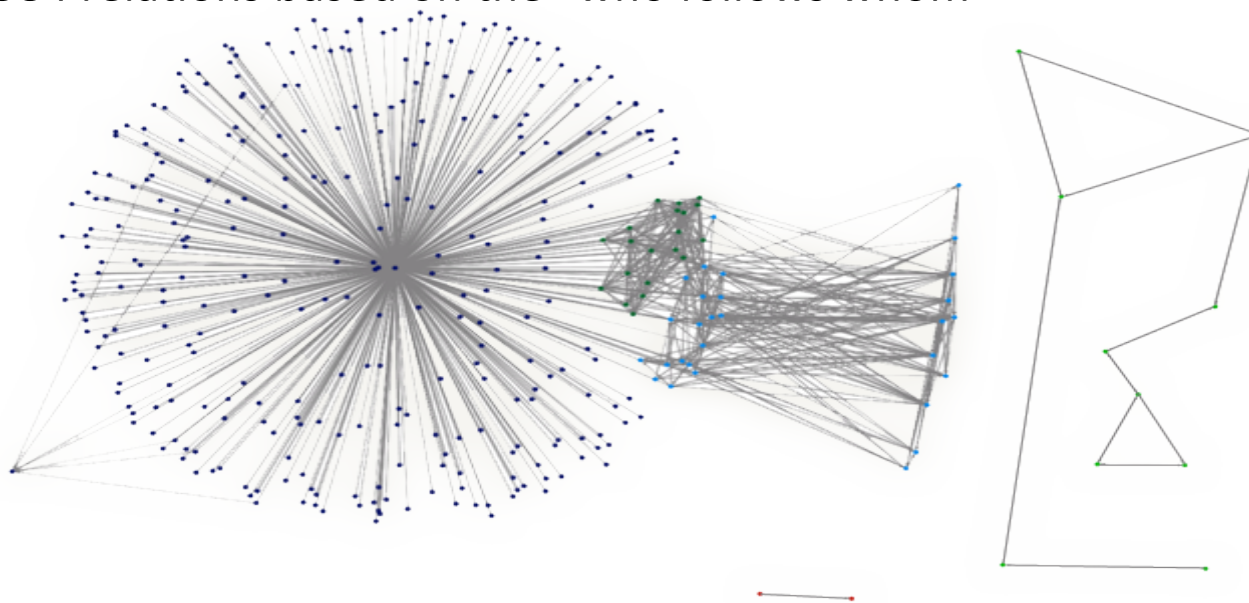
Trident Juncture 2015



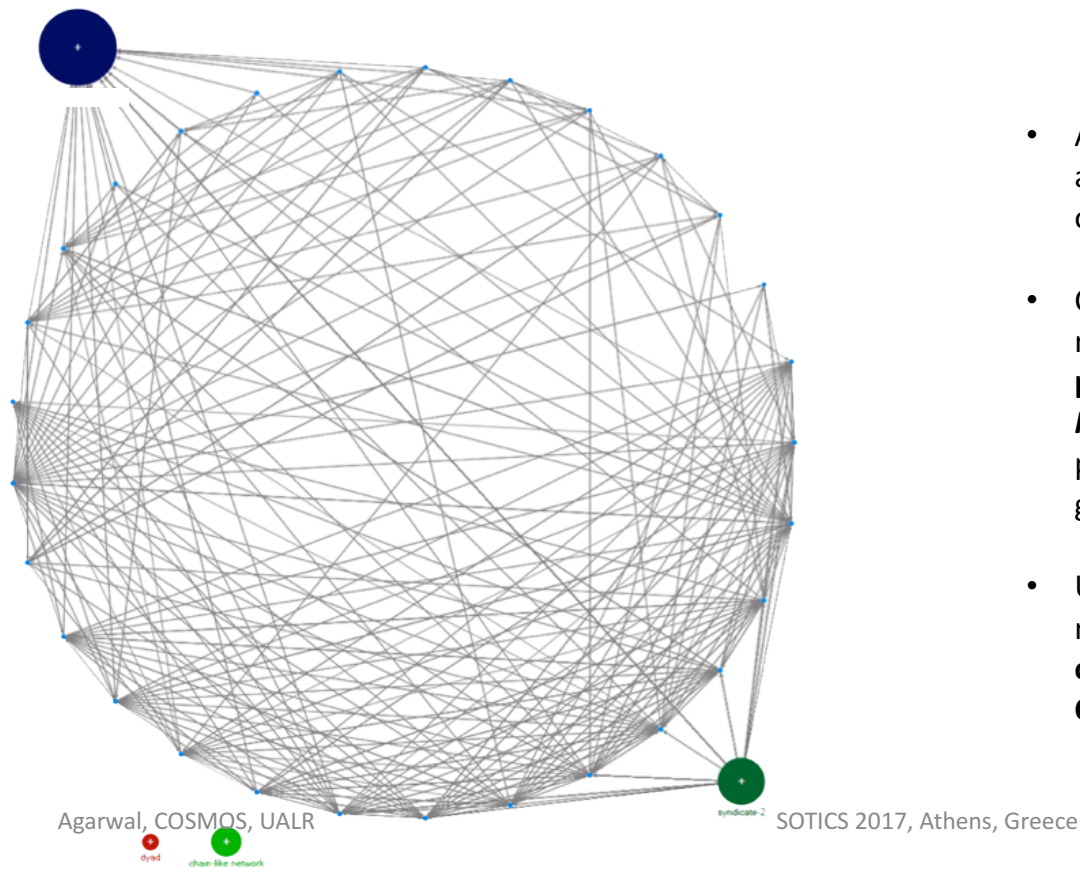
ISIS Propaganda Study 2015

Coordination Structures in Botnets

- Social bot network disseminating Russian propaganda on Twitter during Crimean water crisis (2014).
- 118,601 relations were found among 588 users. We start with 1584 relations based on the “who follows whom”

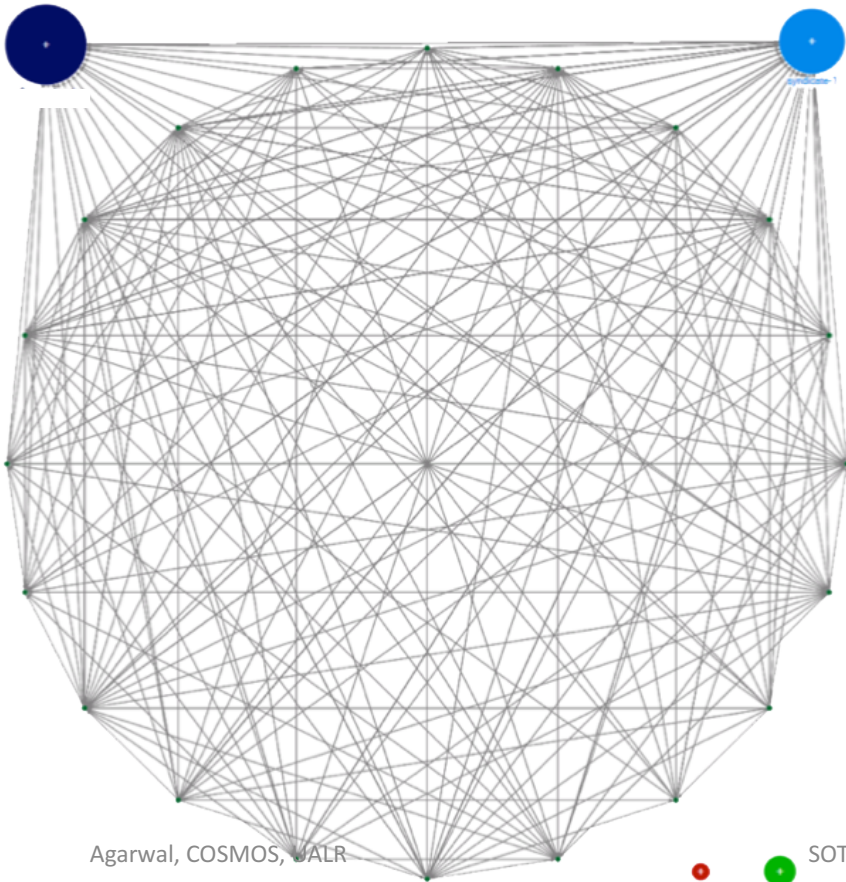


Analyzing Structure-1 Network



- Analyzing structure-1 network, reveals dense connections among its members and inter-group connections with the other groups, viz., 'Real Person-network' and 'structure-2'.
- Closer examination of the within group ties, reveals a mutually reciprocative relationship, suggesting the **principles of 'Follow Me and I Follow You' (FMIFY) and 'I Follow You, Follow Me' (IFYFM) in practice** - a well known practice by Twitter spammers for link farming or quickly gaining followers.
- Unlike 'Real Person-network', there is no single most central node in this network, indicating an **absence of a hierarchical organization structure in 'structure-1' network** → **Characteristic property of a botnet**

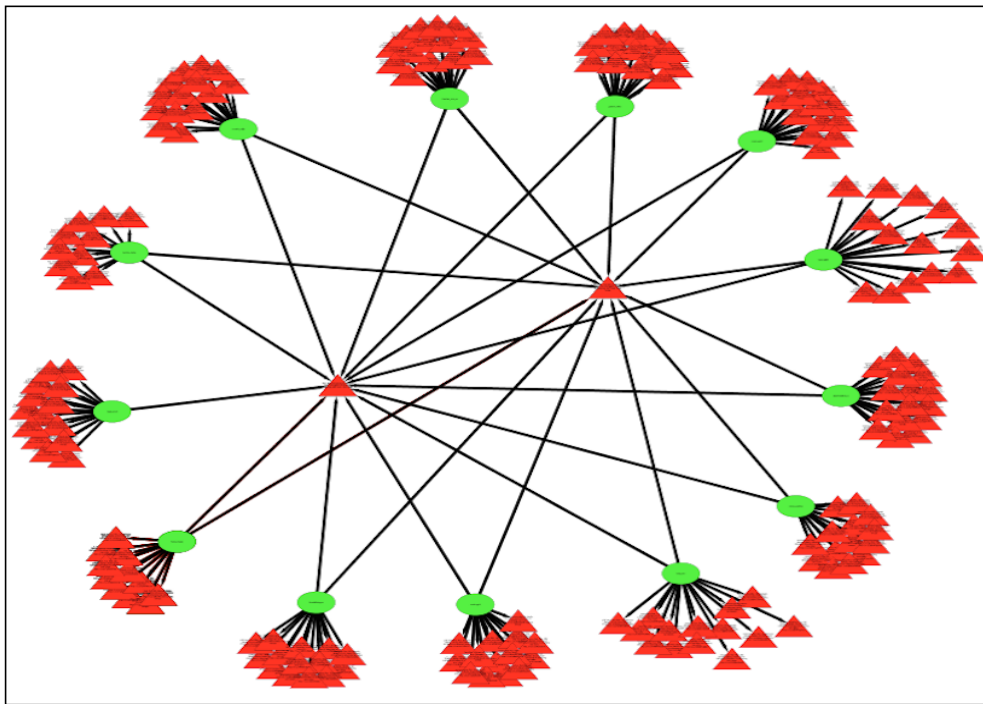
Analyzing Structure-2 Network



- Analyzing structure-2 network, reveals dense connections among its members and inter-group connections with the other groups, viz., 'Real Person-network' and 'structure-1'.
- Closer examination of the within group ties, reveal a mutually reciprocative relationship, suggesting the **principles of 'Follow Me and I Follow You' (FMIFY) and 'I Follow You, Follow Me' (IFYFM) in practice** - a well known practice by Twitter spammers for link farming or quickly gaining followers.
- Like the 'structure-1' network, there is no single most central node in this network, indicating **an absence of a hierarchical organization structure in 'structure-2' network** → **Characteristic property of a botnet**

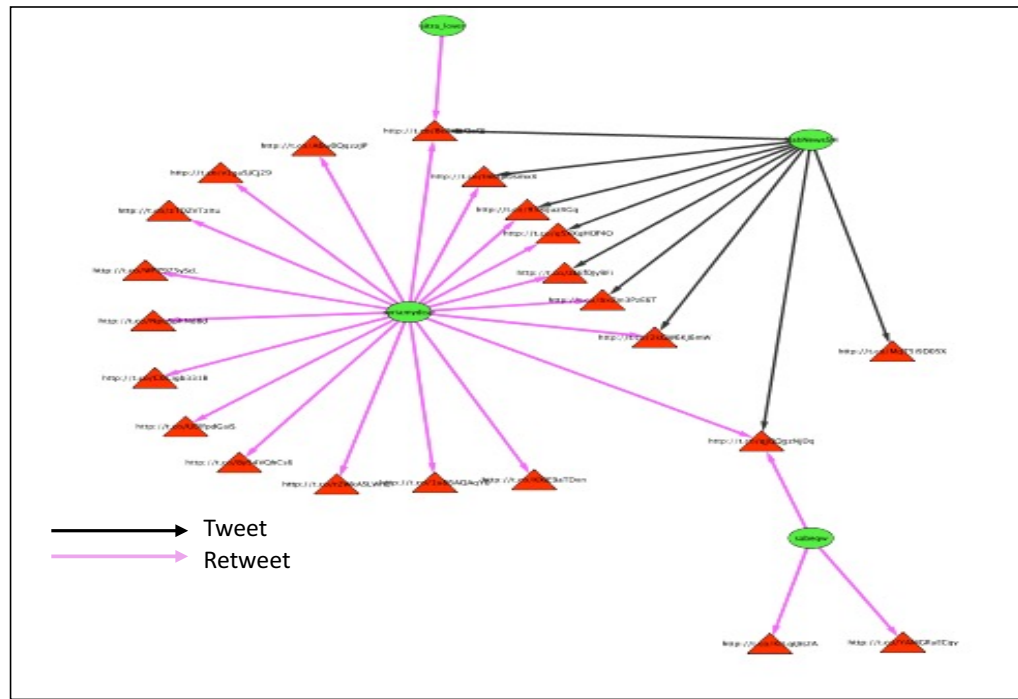
Network Structures of Botnets

Two different bot behaviors observed in the propaganda dataset.



Core/Generator bots

Agarwal, COSMOS, UALR



Peripheral bots

SOTICS 2017, Athens, Greece

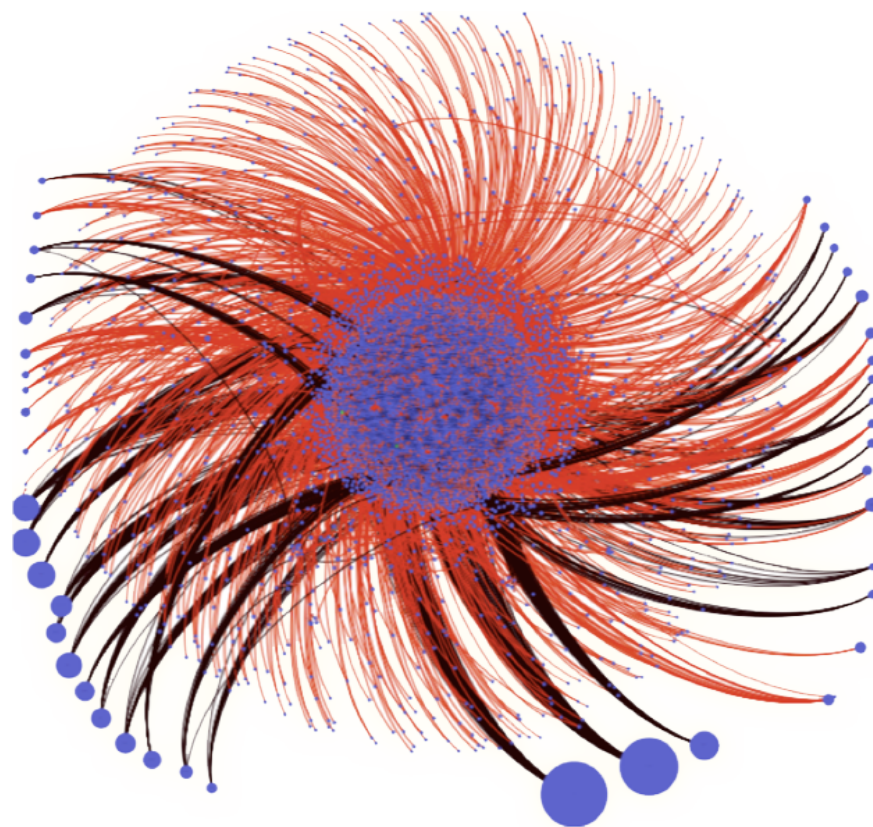
Core and Peripheral Bots acting together

Blue Nodes represent accounts

Size of a node represents outdegree of the node

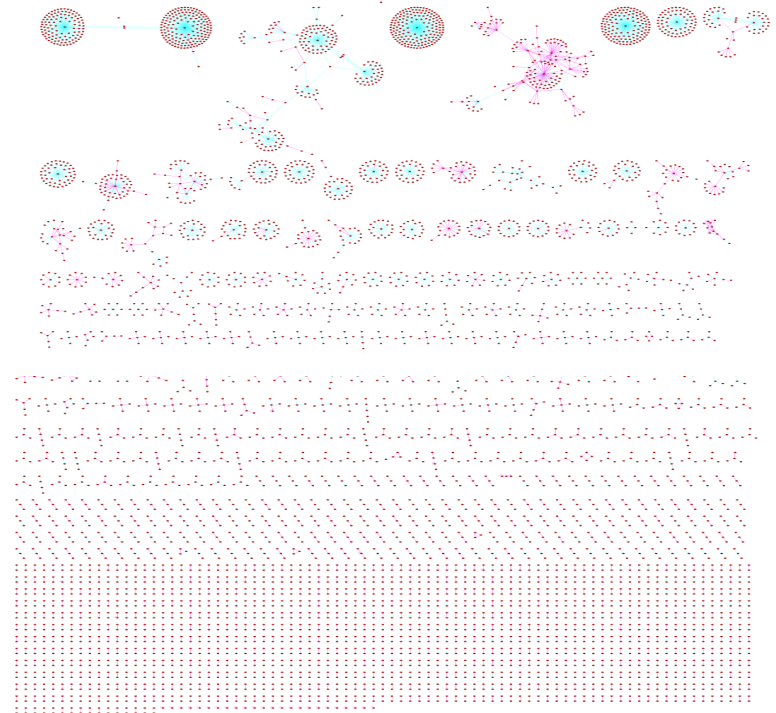
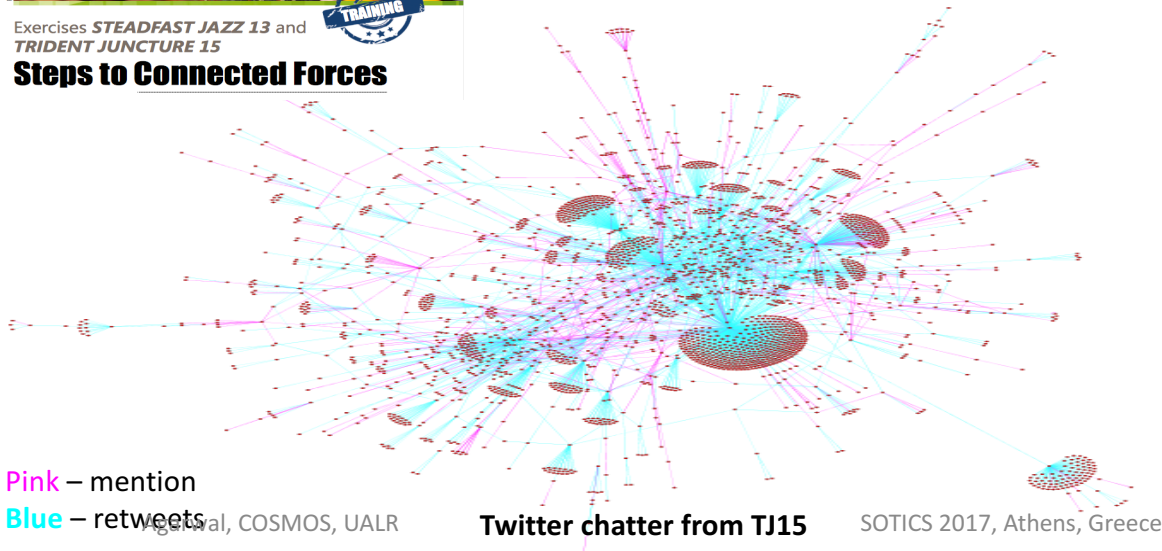
Black edges represent tweets

Red edges represent retweets



Trident Juncture Exercise (TJ15)

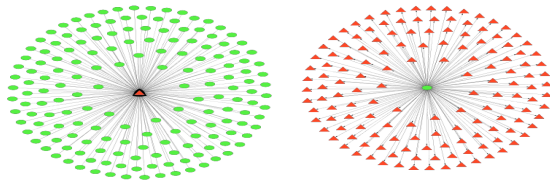
"SFJZ 13 was only the first step of a process that will continue throughout this and next year with **TRJE 15** on the path to full implementation of NATO's latest Command Structure."



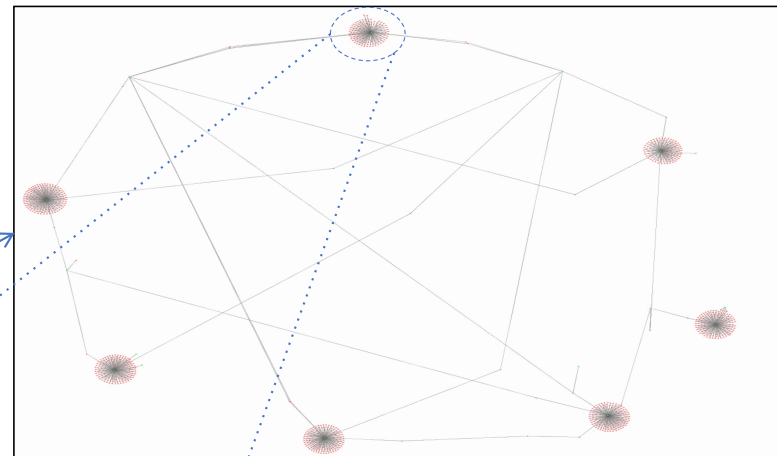
A user-user network extracted from Twitter chatter on TRJE

Transforming to User-URL Graph

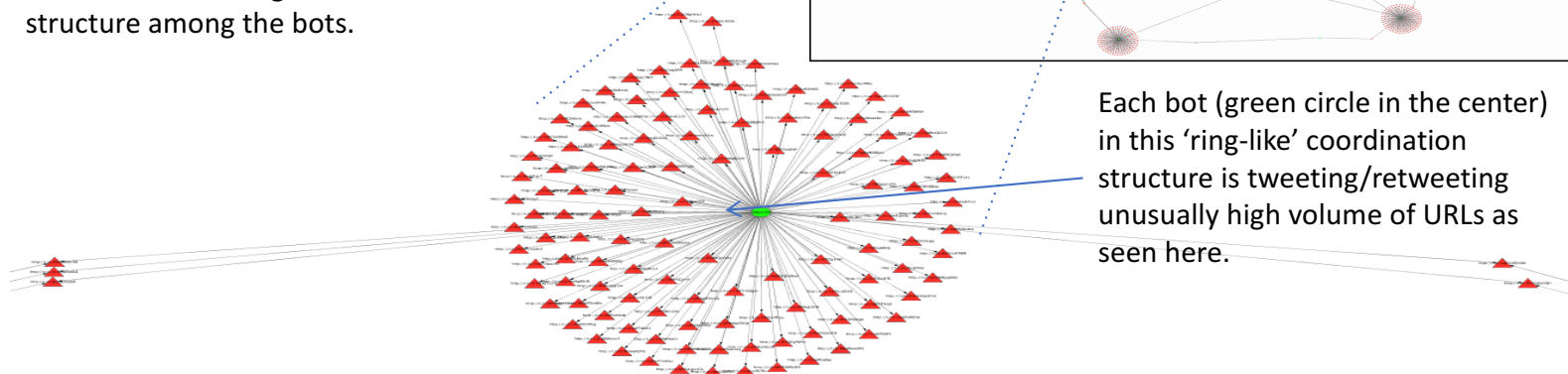
▲ URL
● User



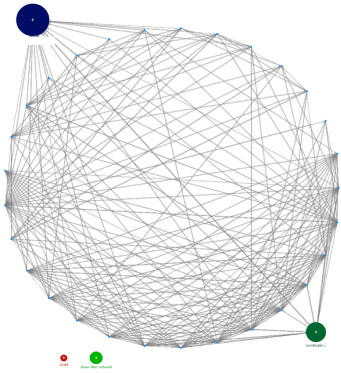
Transforming communication network to user-URL (bipartite) graph, enables detection of the ring-like coordination structure among the bots.



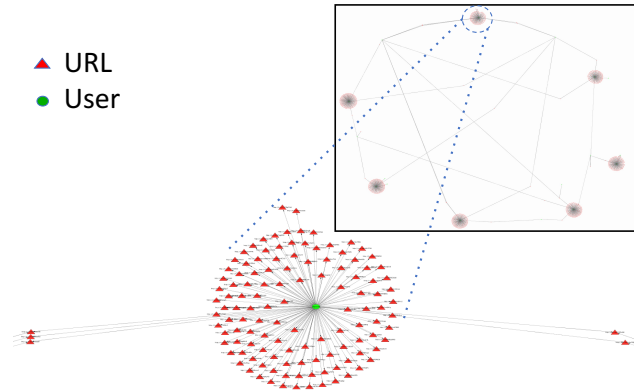
Each bot (green circle in the center) in this 'ring-like' coordination structure is tweeting/retweeting unusually high volume of URLs as seen here.



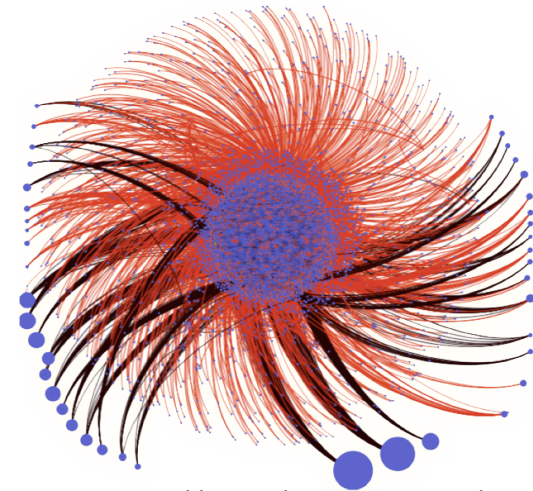
Botnets Behavioral Evolution



Mutual reciprocity. *IFYFM & FMIFY*



No mutual reciprocity. Coordination in information network



Organizational hierarchy. Core & peripheral bots

COORDINATION/BEHAVIOR COMPLEXITY



Crimean Invasion 2014

Agarwal, COSMOS, UALR



Dragoon Ride 2015

SOTICS 2017, Athens, Greece



Trident Juncture 2015



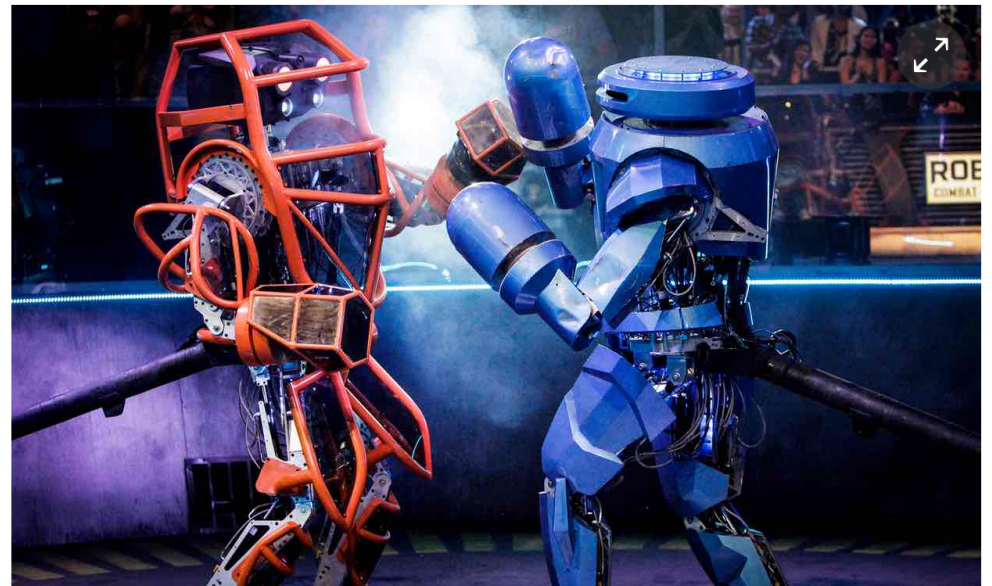
ISIS Propaganda 2016

What Can be Done?

- DARPA Bot detection challenge 2016
- Bots fighting bots
- Honey pots



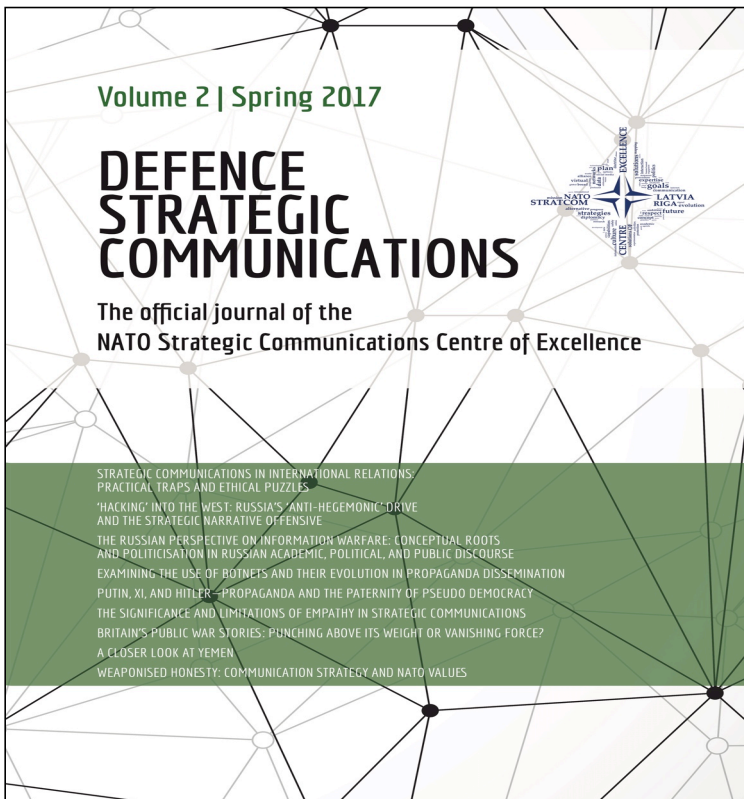
Over time, the encyclopedia's software robots can become locked in combat, undoing each other's edits and changing links, say researchers



Bot-on-bot wars raging on Wikipedia pages, 23-Feb-2017

<https://www.theguardian.com/technology/2017/feb/23/wikipedia-bot-editing-war-study>

Resources



Samer Al-khateeb, Nitin Agarwal, Rick Galeano, and Rebecca Goolsby.
Examining the Use of Botnets and their Evolution in Propaganda Dissemination. *Journal of NATO Defence Strategic Communications*, Vol. 2, pp. 87-112. 2017.

Available at: <http://www.stratcomcoe.org/academic-journal-defence-strategic-communications-vol2>

Looking Ahead

- Strategies for misinformation propagation are rapidly evolving
- Cross-media dissemination strategies are widely adopted
- Automated AI programs (bots) quite intensively used
- Smarter information filtering algorithm (avoid information bubbles)
- Stronger media literacy programs (IREX, Ukraine)

Social Media Course

- Developed and taught a social media analysis course for NATO officers, sponsored by the **NATO Strategic Communications Center of Excellence**. 20-25 March 2017 in Riga, Latvia.
- Developed a technical demonstration and hands-on course on social media analysis for **US CyberCommand's CyberSchool**, 3-6 August 2016. Preparations are currently underway to develop and teach this course to US information operations analysts at Ft Bragg in the 2017-2018 time frame.



Thank you!

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