

Understanding Sociotechnical Behaviors in Social Media Good, Bad, and Ugly

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SOTICS 2015, Barcelona, November 19

The Group



Serpil Yuce



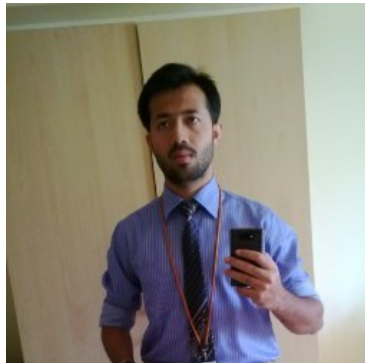
Samer Al-Khateeb



Amit Saha



Therese Williams



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Ashequl Huq

Graduated: Masood Mir (PhD), Ismail Guvenc Yuce (PhD), Fatih Sen (PhD), Faysal Ahmed (PhD)

Acknowledgments

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Outline

- Social Media and Healthcare Communities
- Social Media and Cyber Campaigns
- Social Media and Cyber Warfare

SOCIAL MEDIA - AUTISM AWARENESS & SUPPORT IN HEALTH COMMUNITIES

Published in: SOTICS 2015 (Spain); ASONAM 2015 (France); SBP 2015 (Washington D.C.); AAAI Spring Symposium 2015 (Stanford University);

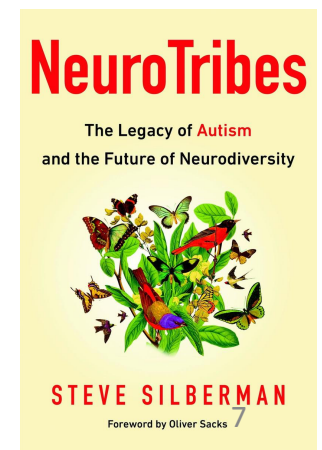
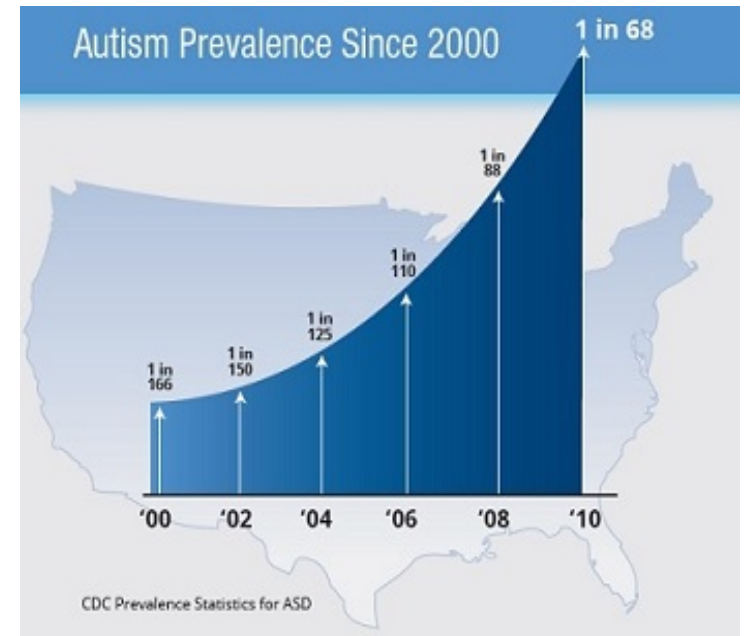
What is Autism?



- Very complex, often baffling developmental disability.
- First described by Leo Kanner in 1943 as *early infantile autism*.
- “Auto” – children are “locked within themselves.”
- For next 30 years, considered to be an *emotional disturbance*.
- Today, autism is a **severe form of a broader group of disorders**.
- These are referred to as **pervasive developmental disorders**.
- Typically appears during the first 3 years of life.

AUTISM ...

- About 1 in 68 children identified with ASD according to estimates from CDC (2014).
- ASD is reported to occur in all racial, ethnic, and socioeconomic groups.
- ASD is almost 5 times more common among boys (1 in 42) than among girls (1 in 189).
- Parents who have a child with ASD have a 2%–18% chance of having a second child who is also affected.
- Almost half (46%) of children identified with ASD have average to above average intellectual ability.
- Children born to older parents are at a higher risk for having ASD.



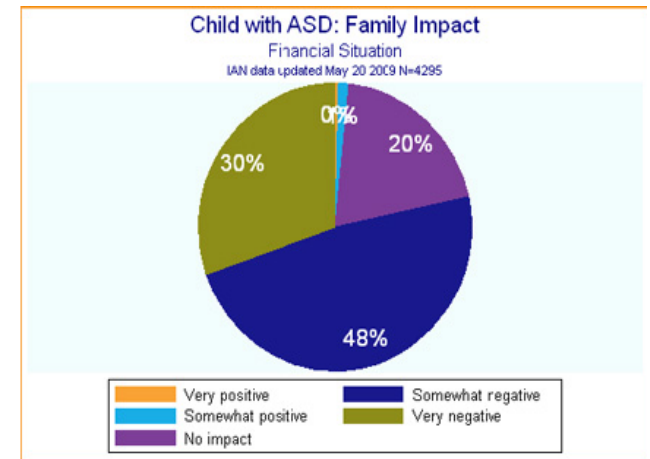
What causes (and doesn't cause) autism?

- Good agreement in general that autism is caused by abnormalities in brain development, neurochemistry, and genetic factors
- Problems in Early Development
 - Sometimes problems during pregnancy, at birth, or immediately following birth
- Controversial proposal links autism to vaccinations



Autism Cost Factor

- Costs include health care, education, ASD-related therapy, family-coordinated services, and caregiver time.
- It is estimated to cost at least \$17,000 more per year to care for a child with ASD compared to a child without ASD.
- For a child with more severe ASD, costs per year increase to over \$21,000.
- In addition to above costs, intensive behavioral interventions for children with ASD cost \$40,000 to \$60,000 per child per year.
- Total societal costs of caring for children with ASD estimated over \$9 billion in 2011.
- That is 4.1–6.2 times greater than for those without ASD.



Autism - Research Activities

- Lot of clinical research has been done to evaluate the effectiveness of various therapy options.
- Only a few researchers have looked at the *social media interactions on ASD*.
- In a study on social media, Carlisle Gretchen from University of Missouri found that using dogs as pets can help improve the life of ASD kids (2014).
- **Need for studying social media-based interactions among autism communities for knowledge extraction.**

Social Support and Online Health Communities

- Online health communities are characterized by ***Social Support*** to its community members.
- Social Support - “***Information leading the subject to believe that he is cared for and loved, esteemed, and a member of a network of mutual obligations***” .
- Social Support types :
 - **Informational Support:** e.g., providing information on a treatment
 - **Instrumental Support:** e.g., offering financial assistance
 - **Nurturant Support:** e.g., comforting stressed individual without direct efforts to solve problems
- Most online health communities provide Information & Nurturant Support.

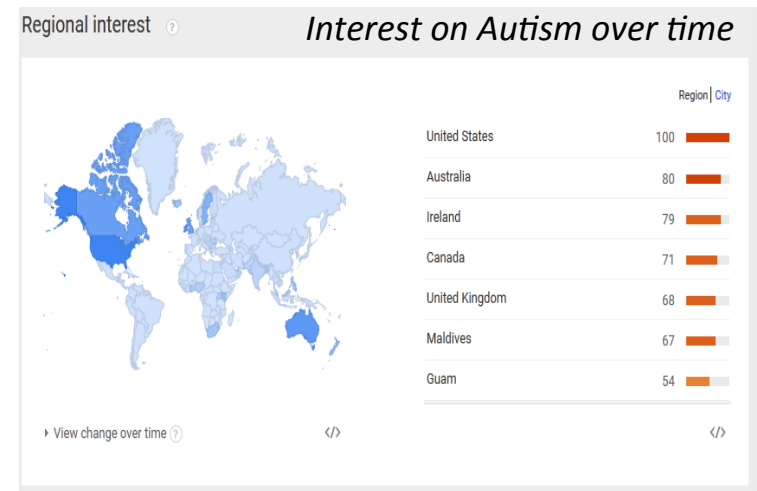
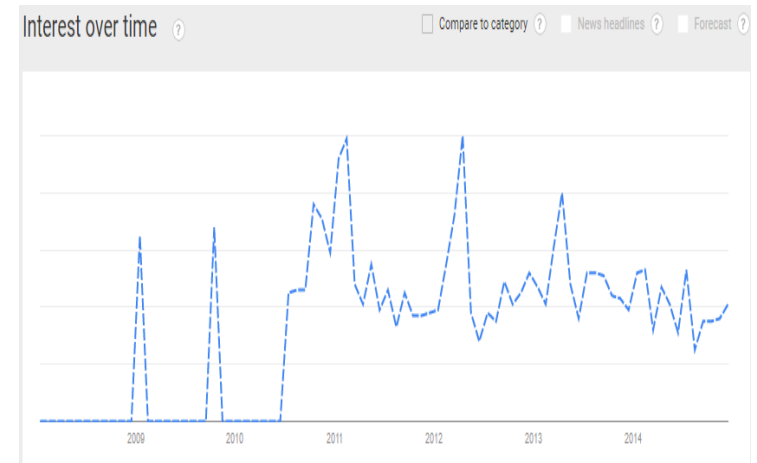


Social Support: Research Activities

- Social support plays a positive role in **reducing depression**, anxiety in mothers of children with autism (Wess 2002)
- Formal and informal social support **reduces stress** among parents of children with autism (Boyd 2011)
- Peer communications are important in **facilitating new health habits** like quitting smoking (Ancker 2009)
- Social media platform like blogs, Twitter are **convenient platforms of communication** within healthcare communities (Gallent 2011)

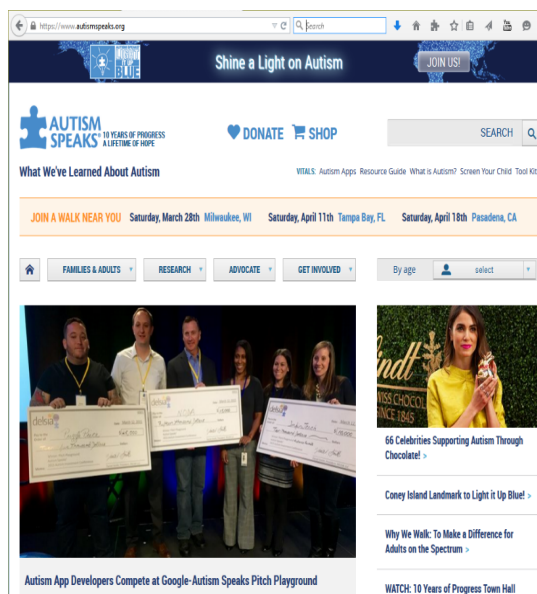
Autism and Social Media

- Growing interest about autism on social media
- Social media has become a critical means to gather and share information about autism for families dealing with ASD
- Families with autistic kids share detailed accounts of daily life experiences and tips on social media like blogs, facebook, Twitter
- There are at present thousands of blogs about autism by individuals dealing with autism
- These open and free online information serves as **excellent sources of knowledge** for other families dealing with autism



Autism and Social Media (Cont.)

- Autism blogs share their viewpoints on what needs to be heard in the Autism community and raise awareness on those issues.
- As a part of raising autism awareness Autism Speaks publishes top 30 autism blogs each year and Babble publishes top 10 blogs.
- Among the bloggers there is quiet a race and prestige to be listed by Autism Speaks.
- Selection of the top bogs is based on the recommendation of parents of Autistic kids who get invaluable practical advice and support from the blogs.




Autism Speaks was founded in February 2005 by Bob and Suzanne Wright, grandparents of a child with autism. Their longtime friend Bernie Marcus donated \$25 million to help financially launch the organization. Since then, Autism Speaks has grown into the world's leading autism science and advocacy organization, dedicated to funding research into the causes, prevention, treatments and a cure for autism; increasing awareness of autism spectrum disorders; and advocating for the needs of individuals with autism and their families. We are proud of what we've been able to accomplish and look forward to continued successes in the years ahead.

Blogging Awards and Recognition



Top 30 Autism Spectrum Blogs of 2013

 babble.com

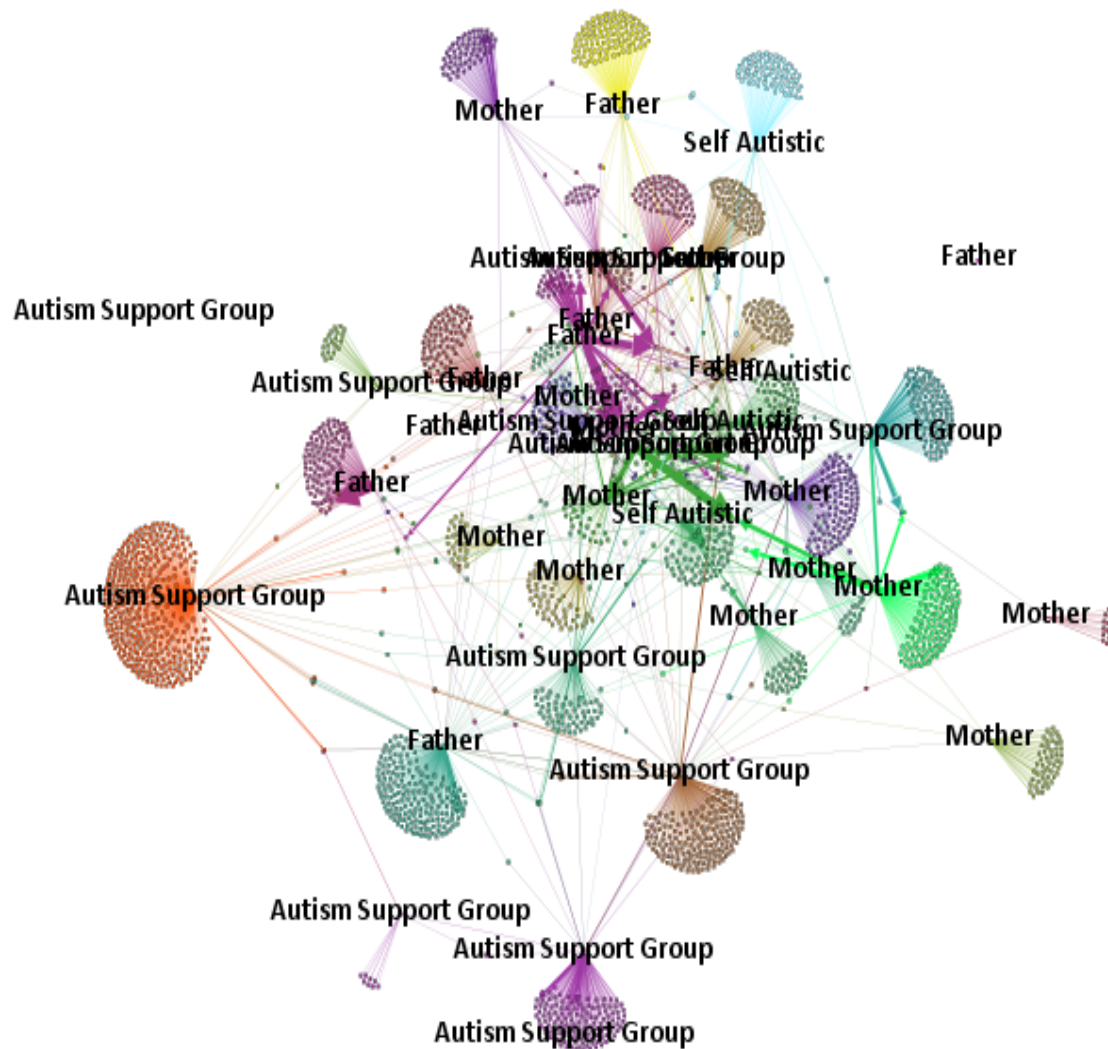
In honor of Autism Awareness Month, Babble rounds up the top 30 autism spectrum blogs for parents of autistic children, moms and dads with autism themselves, and young people living with the disorder. Through laughter and tears, these bloggers will remind your family that you're not alone.

Autism Blogger Community

The 40 autism bloggers are categorized as follows,

Categories	Termed	Numbers	Numbers of Blog Posts Analysed
Female bloggers with autistic kids	Mother	13	1586
Male bloggers with autistic kids	Father	10	1823
Bloggers who blogged as a group (example autismspeaks, militaryautism)	Autism support group	13	2589
Individuals diagnosed with autism and blogs for themselves	Self-Autistic bloggers	4	537

Autism Blogger Community's Mention and Reply Network



- **Community network** looks fragmented but it is **highly focused** in its efforts of information dissemination and sharing
- Spoke and hub nature of the network shows **popular bloggers reply and mention several other members of the community** – a behavior that is quiet different from a typical microblogging community

Autism Bloggers' Mention and Reply Network

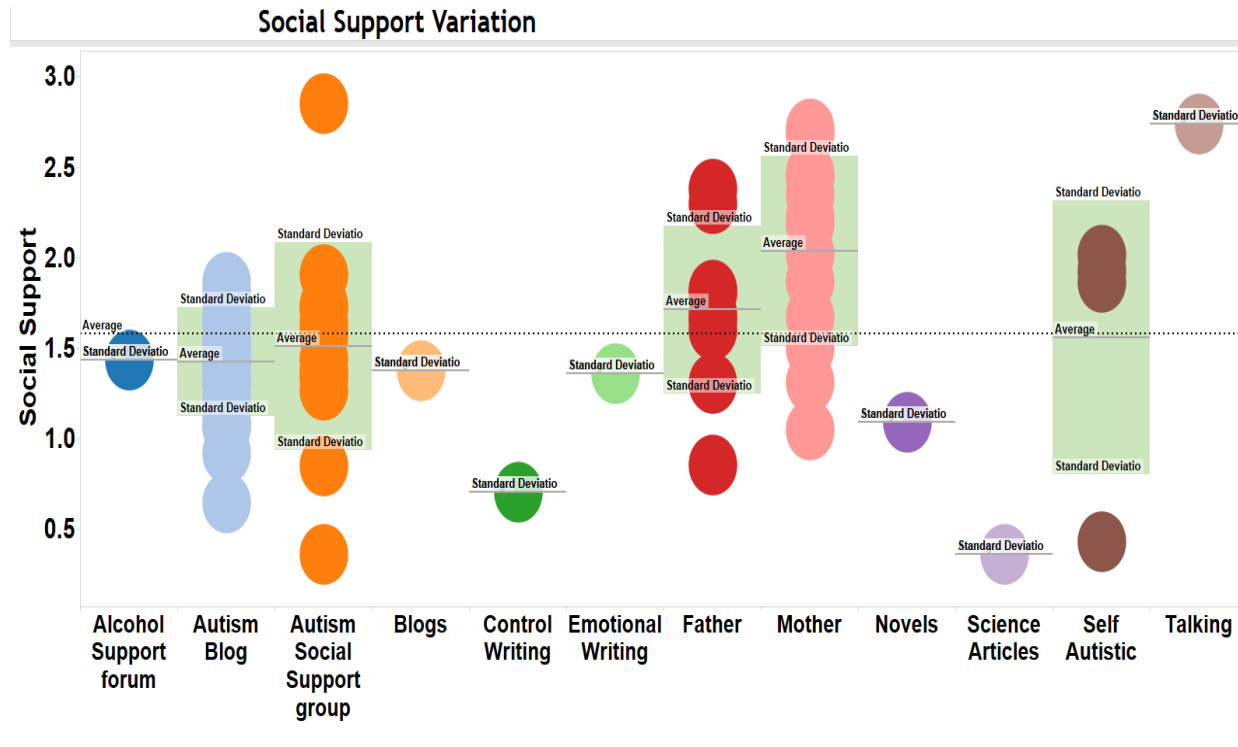
- Autism blogger community network shows some unique characteristics where any member of the community can reach a fellow member on average 3 hops indicating **high reaching out tendency of the community members**.
- 'autism' & 'autistic' being the top words used in the tweets manifest that the **discussion is highly focused** on "autism" related topics.
- One strong component in the network indicates the community is **strongly connected** as one unit where any member of the community can reach other members if needed.
- Relationships are **largely mutually reciprocal**.

Total Number of Bloggers	40
Total number of Tweets	64934
Top Words in Tweet	autism, autistic
Top Hashtag in Tweet	Autism , specialneeds, autistic, sensory
Top Domain in Tweet	wordpress.com blogspot.com

	Mention and Reply Network
Number of users	2598
Total Edges	2912
In-Degree	9(Max),1.28 (Average)
Out-Degree	388(Max), 2.24(Average)
Degree	1.12 (Average) , 2.154 (Weighted Average)
Graph Density	0.00132
Connected Components	1 with 2592 Maximum Vertices
Geodesic Distance (Diameter)	9 (Max), 3.224 (Average)

Overall metrics of the Autism Bloggers
Mention and Reply Network

Social Support in Autism Community



- ✦ Social support estimated using the scores of assent, positive sentiment, and social process for family, friends, and humans.
- ✦ ***Social support provided by talking or verbal communication is higher than other modes of communication, or in other words, interactions on social media cannot replace speech as a mode of interaction in providing social support.***
- ✦ ***The amount of social support provided by the mother blogger of an autistic kid is maximum among all other categories of bloggers.***

SOCIAL MEDIA AND CYBER CAMPAIGNS

Published in: SNAM 2015; AMCIS 2015; SBP 2015; SBP 2014; Sunbelt 2014; JGIM 2014; **PACIS 2013***; AAMAS 2013; SBP 2013; **BISE 2012***; ECIS 2011; NDT 2011

Forms of Collective Action

Collective action: defined as all activity of common or shared interest among two or more individuals (Olson, 1977)



1- Palestinians Practicing Parkour in Gaza



2- A Flash Mob Dance in a Shopping Mall



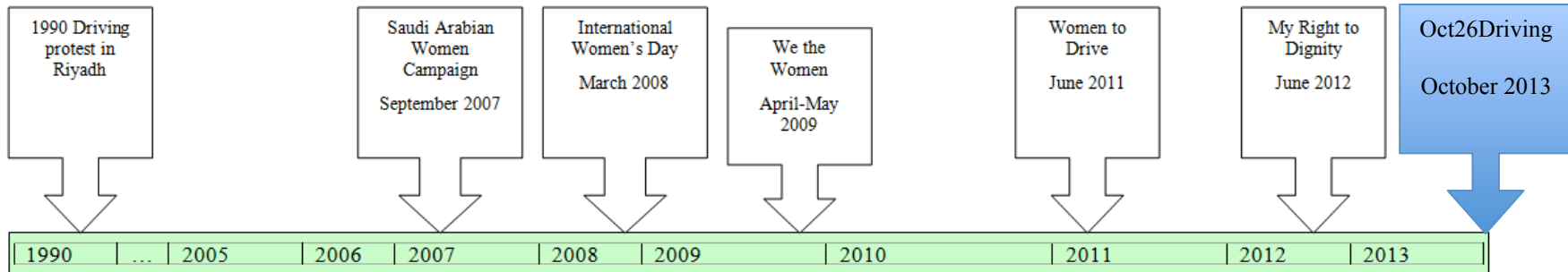
3- Young British Muslims have Launched the #NotInMyName Campaign to Counter ISIS' Extremism



4- The 2011 Arab Spring Social Movement

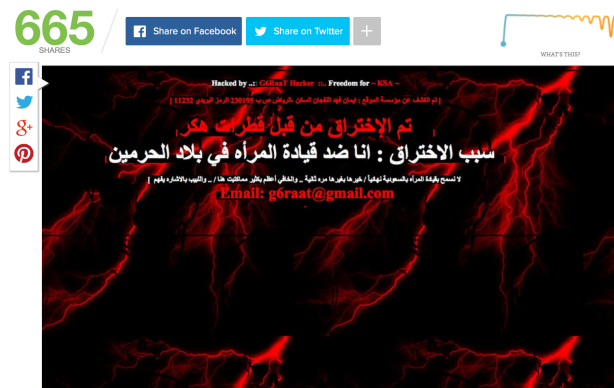
An influential individual may not be effective at organizing a campaign or social movement. Often a key set of actors coordinate such an act.

Movement against the Driving Ban 'Oct26Driving' Campaign



Oct26Driving Campaign

Saudi Women Driving Campaign's
October 26 Site Hacked



“Organizers tell the AP that at least 60 women took part in Saturday's protest. More than 20 women posted videos of themselves driving in Saudi Arabia today.”

NPR, October 26, 2013

“Several Saudi supporters of the October 26th Women's Driving Campaign told CNN that at least 25 women drove Saturday.”

CNN, October 26, 2013

theguardian

News | US | World | Sports | Comment | Culture | Business | Money

News > World news > Saudi Arabia

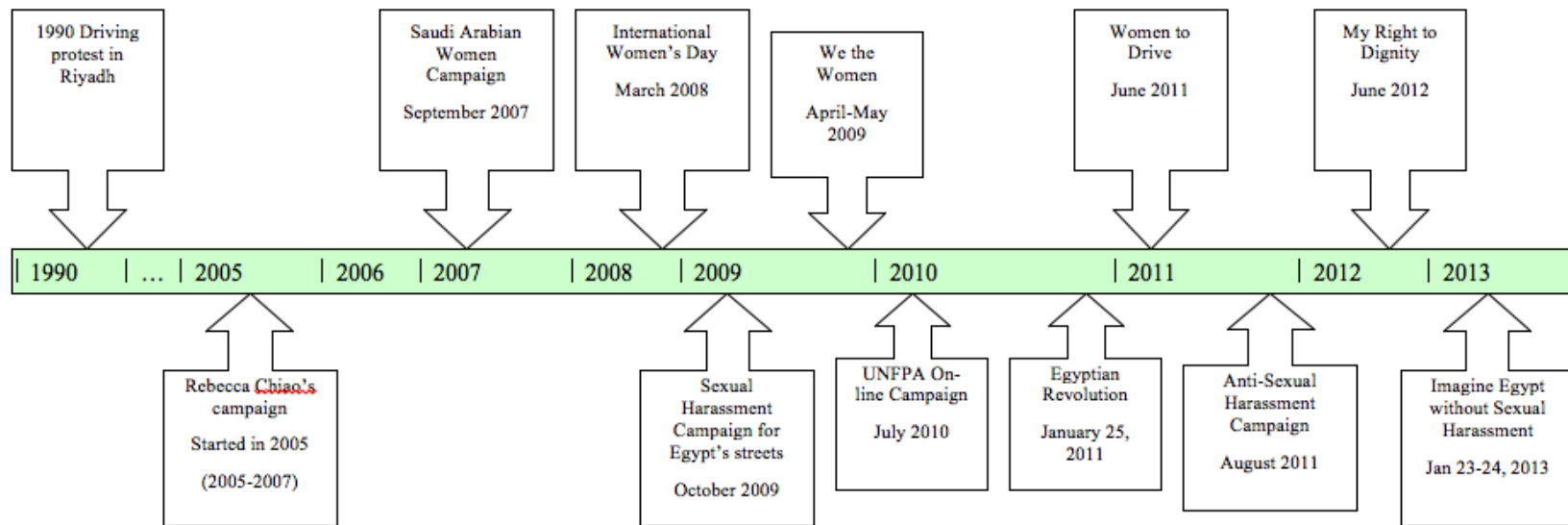
Saudi Arabia's women hold day of action to change driving laws

Government warily observes public reaction as media joins calls for ban on female drivers to be rescinded

Ian Black, Middle East editor

“Efforts to publicise the issue by the "October 26 driving for women" group have been described as the best-organised social campaign ever seen in Saudi Arabia, where Twitter has millions of users and is used to circulate information about the monarchy and official corruption.”

Sexual Harassment Movement



- Sexual Harassment is global in nature demonstrating the universality of this crime against women.
- These forms of collective action are not isolated events.
- There are shared goals of collective awareness and aspirations of addressing gender inequality promoting women's rights.



Social Media and Collective Action

- Socio-Political Movements in the news:
 - Arab Spring, Occupy protests
 - Saudi Arabian Women movements to protest gender-biased practices (ban on driving, guardianship, etc.)
 - Worldwide movements for Sexual Harassment
- ICTs – such as social media:
 - Interaction, Communication & Sharing Information
 - Mobilization
- Internet-driven collective actions:
 - Examine and explore fundamentals of CA
 - Reconceptualize CA theories
- Proposed research:
 - Aim to depict the dynamics of two women's rights movements, viz., Women's Right to Drive and Sexual Harassment movements
 - Using social media based interactions, we aim to understand the complexity of cyber-collective movements and methodologically track their formations

Cyber Collective Action

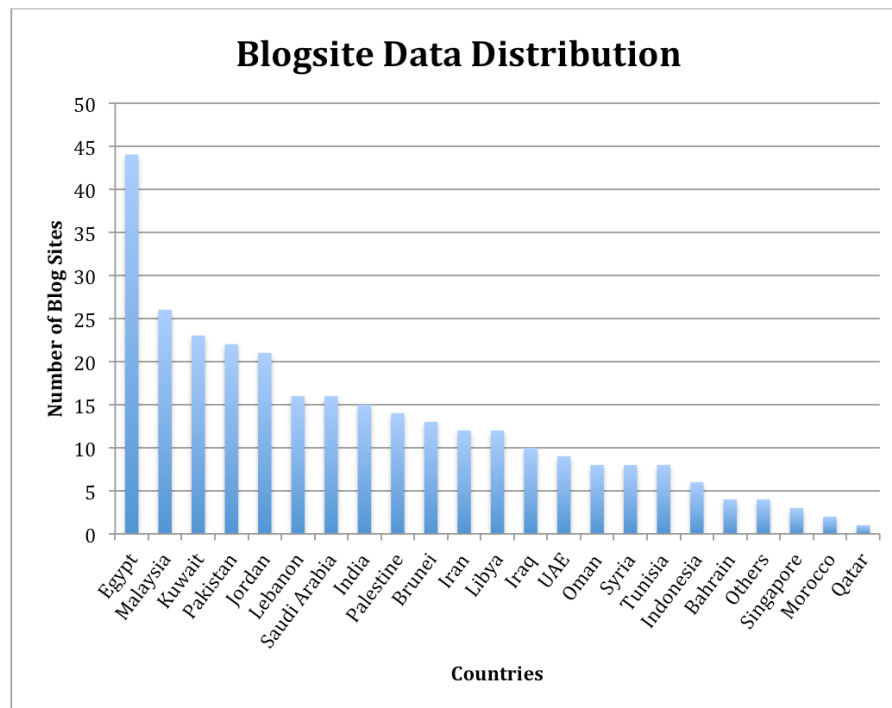
- ❖ Cyber collective action (CCA) is:
 - a form of public participation that is **primarily organized using cyber platforms**.
 - the action benefits multiple members of the group (e.g., by accomplishment of the shared goal) but has an associated cost (or risk) which is impossible for a single member to undertake.
 - **coordinated and could be conducted entirely online**.

- ❖ There is a **heightened sense of motivation among members to connect and act online due to the anonymity and reduced personal risk perception afforded by the cyber environment**.

- Theory of collective action:
 - Social movements
 - Membership in interest groups
 - Operation of international alliances
 - Establishment of electronic communities
 - Formation of interorganizational relationships
 - Formation of standards-setting organizations
 - Bidding behaviors

Data Collection – Blog Data

- 23 countries, 297 blog sites, over 100K posts and growing
- Time period: 2005 onwards
- Indexed in database



<http://iman-a.com/> (5) (?) LP Nov '09
<http://www.rebelliousarabgirl.net/> (23) (?) LP Jul '10
<http://soulblossom.wordpress.com/> (9) (?) LP Jun '10
<http://homeaway-sam.blogspot.com/> (?) LP Dec '09
<http://www.arabwomanprogressivevoice.blogspot.com/> (42) (?) LP Jan
<http://oeliwat.jeeran.com/> (27) (see Jordan)
<http://aquacool.subzeroblue.com/> (9) (?) LP Jul '10
<http://loolt.wordpress.com/> (7)
<http://a-mother-from-gaza.blogspot.com/> (?) moved Aug '09
<http://www.gazamom.com/> (?) LP Jun '10
<http://rubysworldviews.blogspot.com/> (?)
<http://www.onefemalecanuck.com/> (?)
<http://ohseriously.wordpress.com/> (?) in Jordan

Qatar

<http://jewaira.wordpress.com/> (31) (1) LP Jul '10

Saudi Arabia

<http://hala1.wordpress.com/> (2) (?) LP Jul '10
<http://majlismanal.blogspot.com/> (?) (PW)
<http://saudiwriter.blogspot.com/> (13) (107) LP Jul '10
<http://saudistepfordwife.blogspot.com/> (9) (1) LP May '08
<http://saudiwoman.wordpress.com/> (32) (413) LP Jun '10
<http://sweetangerksa.blogspot.com/> (3) (?) LP May '10
<http://nzinghas.blogspot.com/> (32) (1) LP May '10
<http://sea-of-waves.blogspot.com/> (?) (CF)
<http://princess-mood.com> (3) (?) (CF)
<http://www.samahertariq.com/> (1) (?) LP Jul '10
<http://me-splendid.blogspot.com/> (?) (CF)
<http://ohshescrazy.blogspot.com/> (?) LP Apr '10
<http://spontan-kur.com/> (?) LP May '10
<http://chocolate-girl-85.vox.com/> (1) (?) LP Dec '09
<http://hindxblabbers.blogspot.com/> (?) LP Jun '10
<http://ubergirl87.blogspot.com/> (?) Sep '09

Singapore

<http://www.nursamad.blogspot.com/> (?) (see Malaysia)
<http://lemna.blogspot.com/> (3) (?) LP May '10
<http://lifes-indulgences.blogspot.com/> (1) (?) LP Jun '10

Syria

<http://razanghazzawi.com/> (42) (1) LP May '10
<http://www.orientalista.blogspot.com/> (5) (1) LP Aug '08
<http://myfog-dania.blogspot.com/> (12) (92) LP Jun '10
<http://www.rimeallaf.com/mosaics/> (?) LP Jul '10

Data Preprocessing of Blogs

Web Content Extractor

My Web Tasks

- http://gazelledusahara.wordpress.com/ (1 records, 11 links)
- http://gazelledusahara.wordpress.com/2013/01/30/shes-baaaack-on-black-hair-care-...
- http://gazelledusahara.wordpress.com/2012/12/31/%d8%af%d8%a7-%d8%a7%d9%84%d9%8a-%d9%86%d8%a7%d9%82%d8%b5-thats-just-what-was-missing/
- http://gazelledusahara.wordpress.com/2012/12/22/from-being-abroad-to-being-just-a-t...
- http://gazelledusahara.wordpress.com/2012/11/17/chicken-chicken-chicken-thats-rig...
- http://gazelledusahara.wordpress.com/2012/09/21/my-next-28-years/ (1 records)
- http://gazelledusahara.wordpress.com/2012/08/31/im-fluent-in-arabic-now-what/ (1 re...
- http://gazelledusahara.wordpress.com/2012/08/21/if-my-first-host-family-stole-my-inoc...
- http://gazelledusahara.wordpress.com/2012/08/17/on-putting-my-nose-where-it-doesr...
- http://gazelledusahara.wordpress.com/2012/08/15/on-desire-as-the-root-of-suffering/...
- http://gazelledusahara.wordpress.com/2012/08/13/im-finally-a-winner-on-understandr...
- http://gazelledusahara.wordpress.com/page/2/ (1 records, 11 links)
- http://gazelledusahara.wordpress.com/2012/08/13/whats-the-difference-between...
- http://gazelledusahara.wordpress.com/2012/08/11/on-what-a-difference-16-inche...
- http://gazelledusahara.wordpress.com/2012/08/11/third-times-the-charm/ (1 recor...
- http://gazelledusahara.wordpress.com/2012/08/08/its-just-one-of-those-days/ (1 r...
- http://gazelledusahara.wordpress.com/2012/08/05/hes-sexy-and-i-know-it/ (1 rec...
- http://gazelledusahara.wordpress.com/2012/08/05/when-im-feeling-blue-on-how-r...

Archives

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On Judging Books by their Covers II

wp.me/pfxiP-Kb

1 week ago

On Riding with an Egyptian Cabbie in America

wp.me/pfxiP-K9

3 weeks ago

Tags

arabic, education, faith matters,

31 Monday DEC 2012

POSTED BY GAZELLEDUSAHARA IN GOD, GROWING, HEALTH, LIFE, MILESTONES, RELIGIOUS MATTERS, SOCIETY, THE FUTURE

LEAVE A COMMENT

دا الي ناقص (da ili na-is) is a phrase that you say in Arabic when a situation goes from bad to worse. my translation in the title should be read with sarcasm. Now, onto my post:

When my uncle passed on I was angry. It didn't make sense, his

ID	title	date	description	user_info	comment_num...	comments	posted_in	tags
274	Black in America	Jun 2007	I am finally blac...	gazelledusahara	1	Bruce said: July ...	Posted by gazell...	
275	On Being a whit...	Jun 2007	So, I have heard ...	gazelledusahara	Leave		Posted by gazell...	
276	Walking around ...	Jun 2007	hmmm I guess I ...	gazelledusahara	2		Posted by gazell...	
277	Walking around ...	Jun 2007	hmmm I guess I ...	gazelledusahara	2	Daphne said: Ju...	Posted by gazell...	
278	Walking around ...	Jun 2007	So, today I went ...	gazelledusahara	2	Kristen said: Jun...	Posted by gazell...	
279	Facebook Gener...	Jun 2007	I took a one-mo...	gazelledusahara	Leave		Posted by gazell...	
280	Reflections of th...	Jun 2007	So I am down to...	gazelledusahara	Leave		Posted by gazell...	
281	In Yemen the Be...	May 2007	Well, just like th...	gazelledusahara	3	Margari Aziza sai...	Posted by gazell...	Arabs, personal r...
282	Yemeni Stares- ...	May 2007	I have been tryin...	gazelledusahara	1	Margari Aziza sai...	Posted by gazell...	Arabs, dialogue, ...
283	On Sketchy Men	May 2007	So I went to the ...	gazelledusahara	Leave		Posted by gazell...	Arabs, male-fem...
284	on elitism	May 2007	So lately I have b...	gazelledusahara	3	Kristen said: Ma...	Posted by gazell...	academia, educ...
285	New heights	May 2007	So we had a ladi...	gazelledusahara	Leave		Posted by gazell...	cross-cultural in...
286	Standards... of li...	May 2007	Here's a synopsi...	gazelledusahara	2	Kristen said: Ma...	Posted by gazell...	cross-cultural in...
287	?? ??? ????— Th...	Dec 2012	?? ??? ???? (da ili ...	gazelledusahara	Leave		Posted by gazell...	arabic, educatio...

Ready

Records: 287

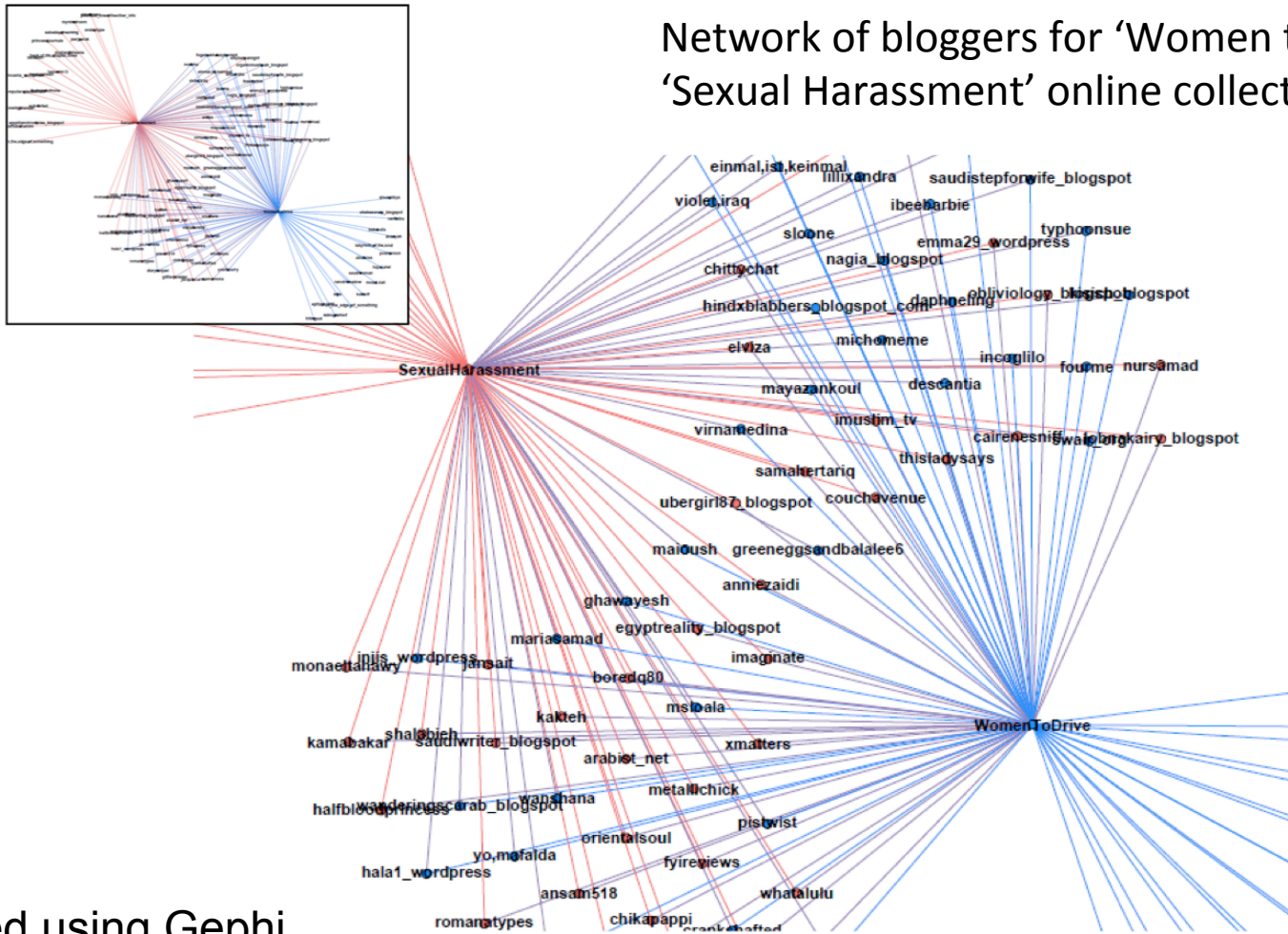
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Downloaded: 18062 kb

Elapsed time: 00:00:05

Network Construction

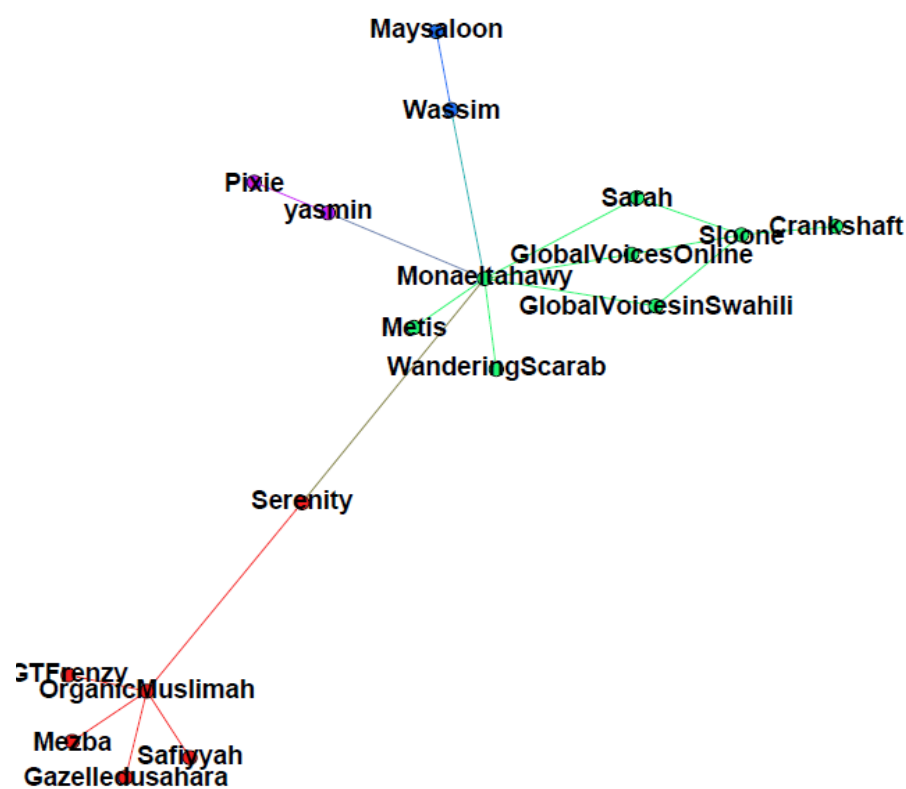
Network of bloggers for 'Women to Drive' and 'Sexual Harassment' online collective actions



Visualized using Gephi

Cooperative Network

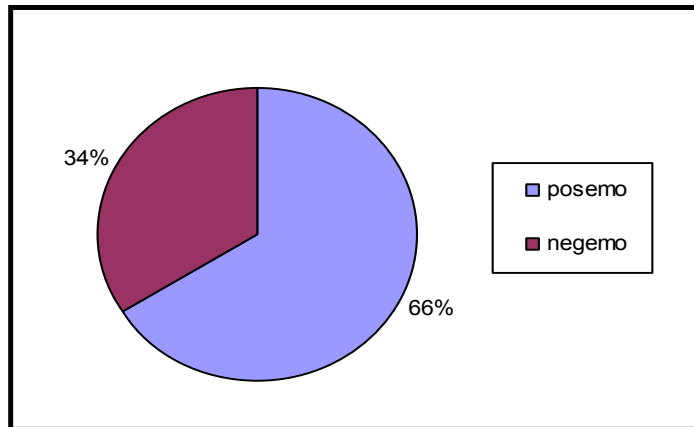
Focused on bloggers belonging to both 'Women To Drive' and 'Sexual Harassment' network classifications



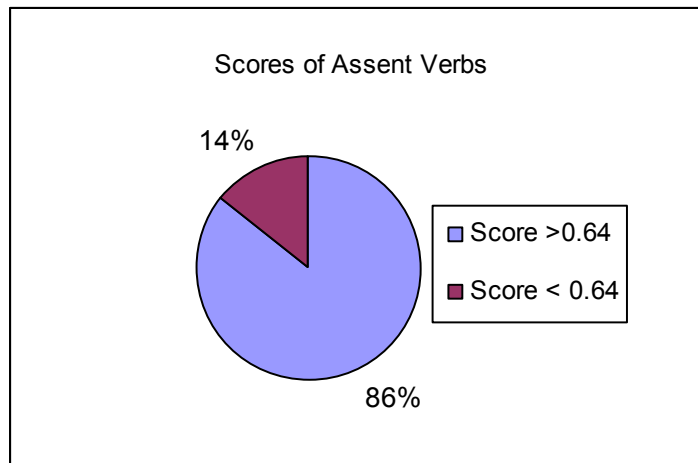
Interactions in the cooperative network between the members common to both collective actions with-in the larger blogger network

Sentiment Analysis (contd.)

Distribution of positive and negative emotions for the interactions observed in the cooperative network



Distribution of the Assent Verbs Scores observed in the cooperative network



Serenity's comment on Monaeltahawy's entry:

*"**Thank you** so much for writing this, Mona! **Thank you** for speaking up for those of us who are too cowardly to do so (at least yet!), Mona! God bless you and give you more courage and strength!"*

GTfrenzy's comment on OrganicMuslimah's entry:

*"Just read it and I love it! I couldn't **agree** with you more...."*

Mezba's comment on OrganicMuslimah's entry:

*"I **fully agree**. I say leave the judgement to God..."*

Marahm's comment on Hala:

*"**Good** question, Hala, and **good** answer"*

Gazelledusahara's comment on OrganicMuslimah:

"I am in Egypt in now and my classmates and I can totally relate to Everything that you wrote about"

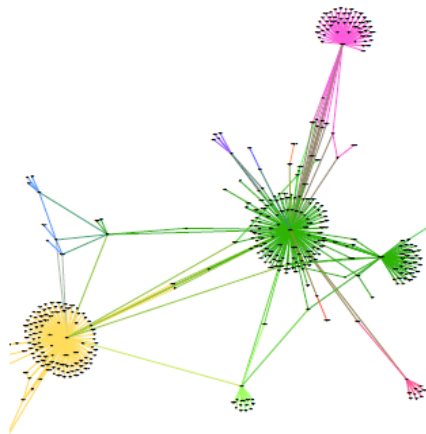
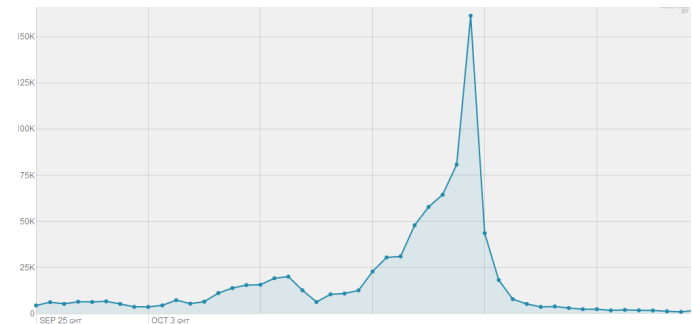
Laylah's comment on Saudiwoman:

"I linked your post to my blog, thanks for the translation

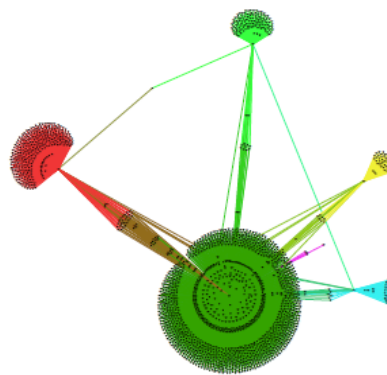
☺"

Evolution of Collective Action

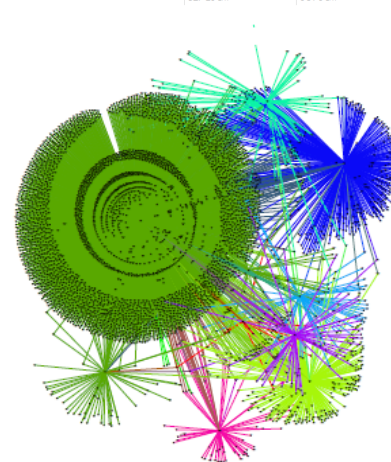
- Track formation of collective action
- Given the definitive nature of hashtags, we investigate the co-evolution of hashtag usage and campaign network growth
- Methodological approach for Twitter data:
 - Data classification
 - Overlap detection, and
 - Network construction and visualization
- Create tweet-retweet networks for each day



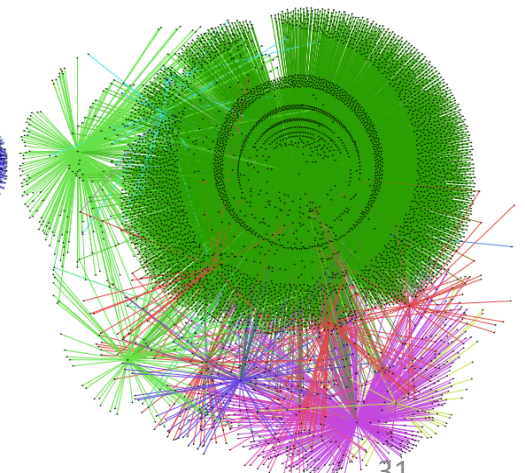
October 9, 2013



October 15, 2013

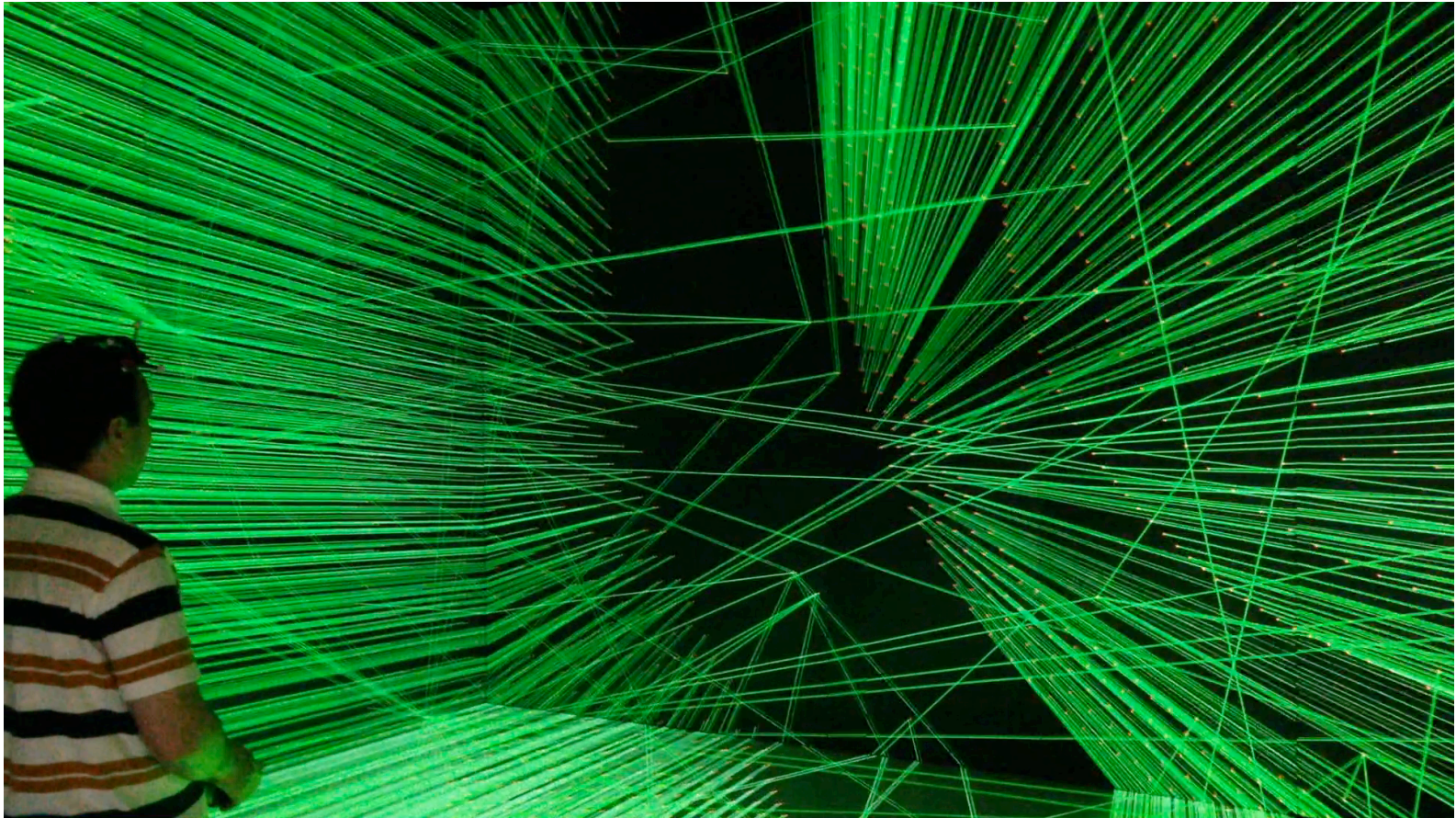


October 19, 2013



October 27, 2007

Saudi Women 'Right to Drive' Twitter Campaign Network 3-D Visualization

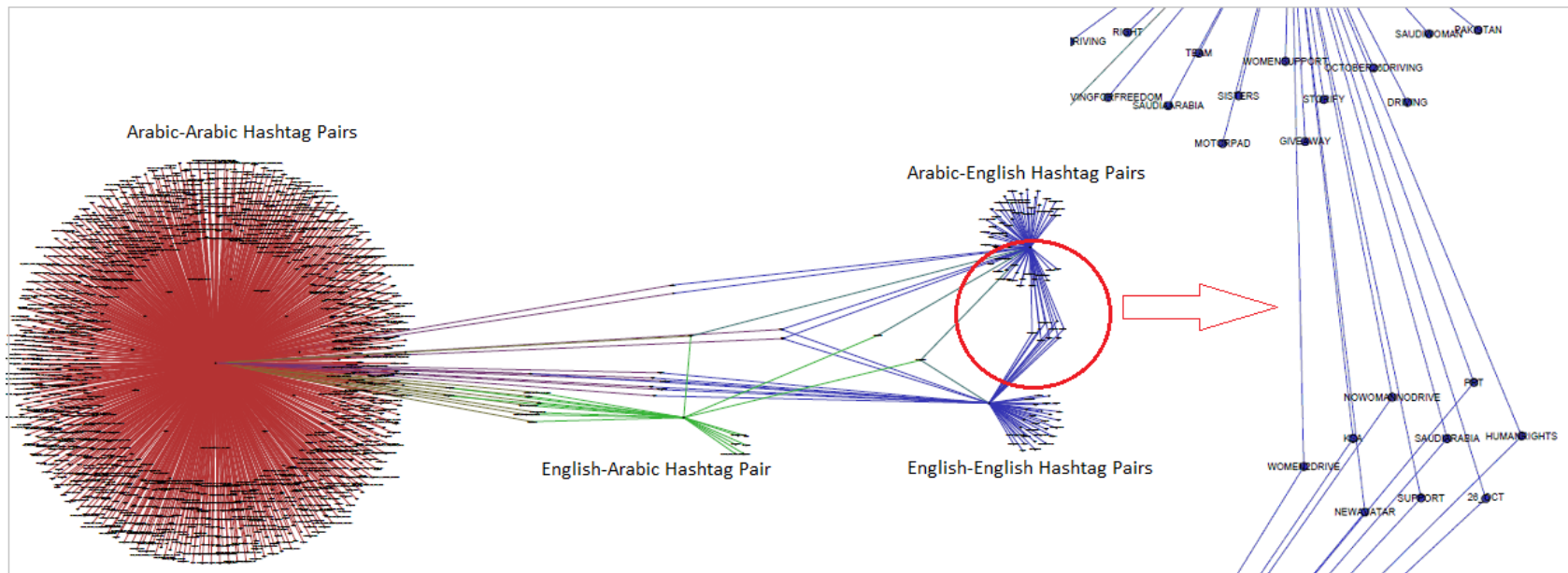
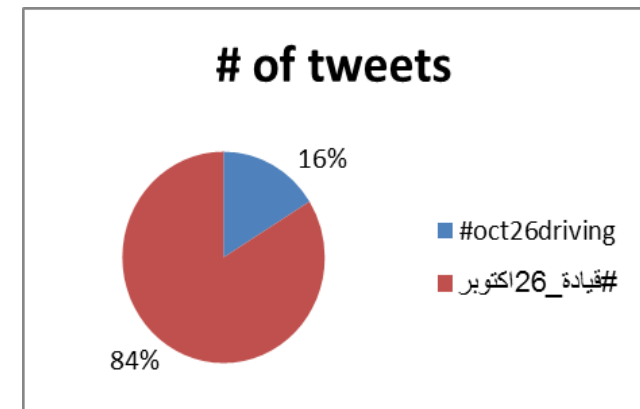


<https://www.youtube.com/watch?v=FVKCgYYPHWA>

Best Information System Publication of the Year award by the Senior Scholars Consortium of the Association for Information Systems.

Cross-Cultural Reflections

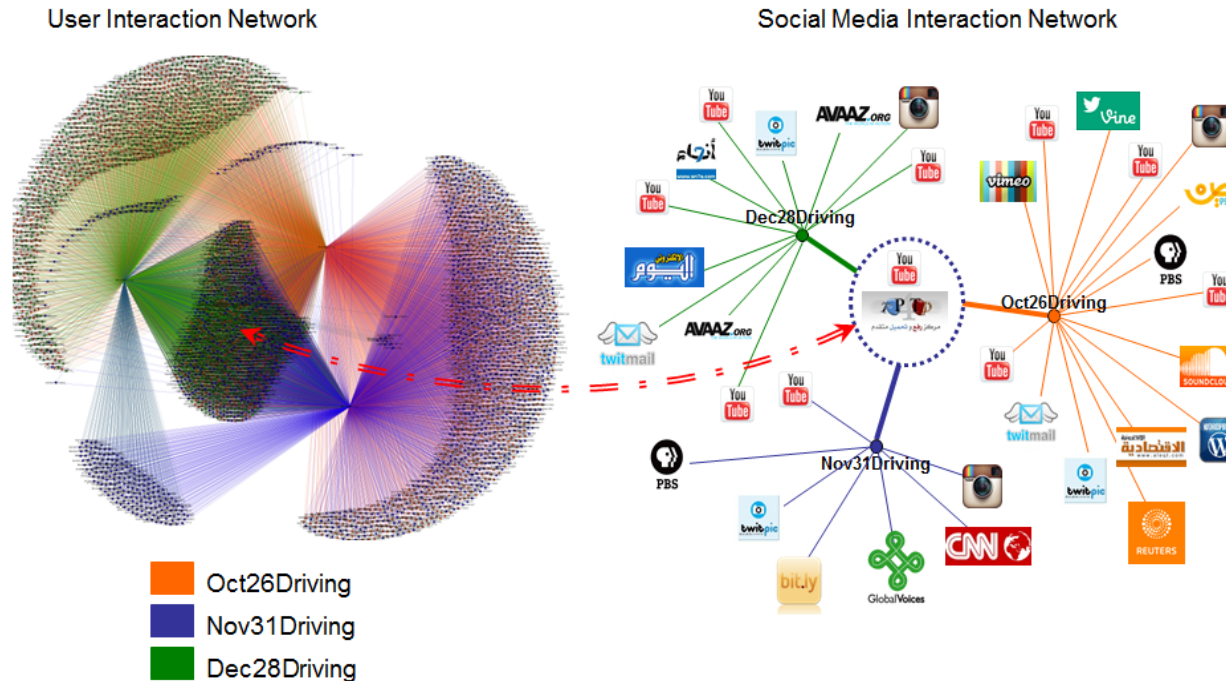
- A hashtag network was created
 - Grouped tweets by their usage of English hashtag and Arabic hashtag
- Arabic hashtag is used more frequently than the English hashtag
- Hashtag co-occurrence network was analyzed



Arabic hashtags are depicted in red color and English hashtags are depicted in blue and green colors

Spillover of Movements

- Spillover of supporters, activists, and resources
 - Social Movement Spillover Theory (Meyer and Whittier 1994)
 - Resource Mobilization Theory (McCarthy and Zald 1977)



SOCIAL MEDIA AND CYBER- WARFARE

Published in: ICDM 2015; SBP 2015; AAI Spring 2015 Symposium; JDFSL 2014; ICDF2C 2014; IEEE JISIC 2014

Cyberwarfare

ISIL attacked the U.S. Central Command Twitter page on January 12, 2015

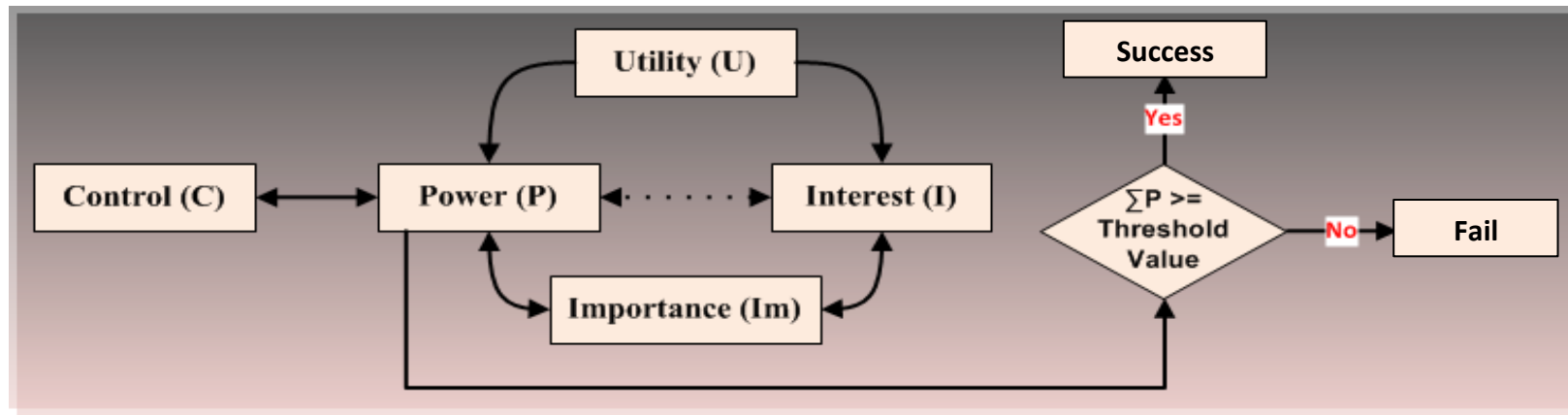


Hackers who say they are loyal to the Islamic State group took control over the U.S. Central Command Twitter account -

<http://www.voanews.com/content/us-centcom-twitter-hacked-apparently-by-is-group/2595139.html>

Theoretical Model for the Formation of Cyber Collective Actions

(Coleman 1973, *Mathematics of Collective Action*)



- Collective action will occur when the participants gain **Utility (U)** as Coleman (1973) argued that “there is a single action principal which governs the actions of the actors in the system: Each actor chooses those actions which maximize his utility given environmental context created by the events...”
- The more utility an actor has the more **interested (I)** he/she is in participating and vice-versa.
- **Control (C)** is to what extent an actor could affect the outcome of the event.
- The more Control (C) and Interest (I) an actor has the more **Powerful (P)** that individual is.

Focal Structures

- A **powerful set of individuals** instead of a set of powerful individuals that coordinate a collective action
- Individuals who may not be influential on their own but by acting together form a compelling power

Huge body of literature on identifying influential individuals



We want to identify powerful substructures *

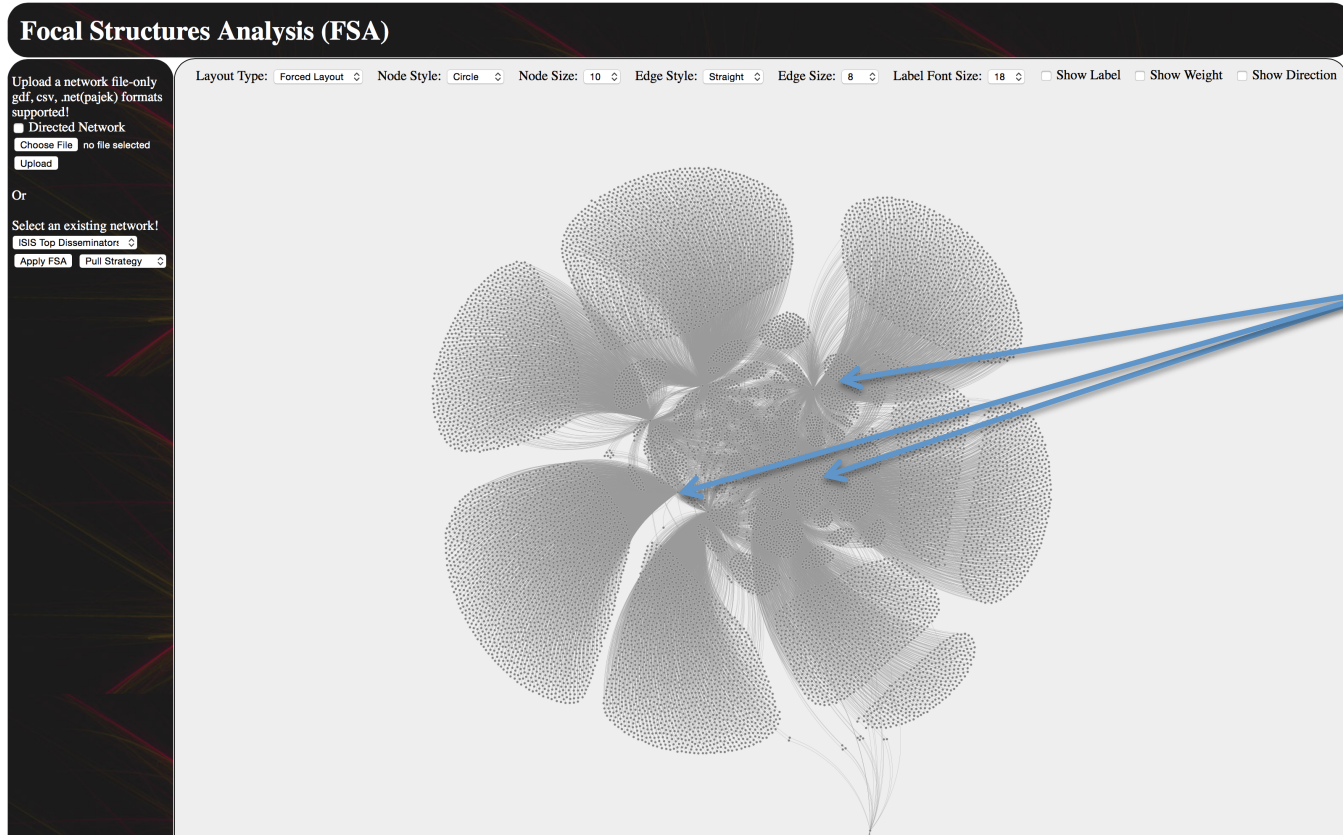


Huge body of literature on identifying communities

* Responsible for coordinating and mobilizing collective actions

To explain the motivation needed to conduct such highly coordinated acts we revisit theories of collective action, formation of collective identity, and social capital among others

Social Media and ISIS Disseminator Network



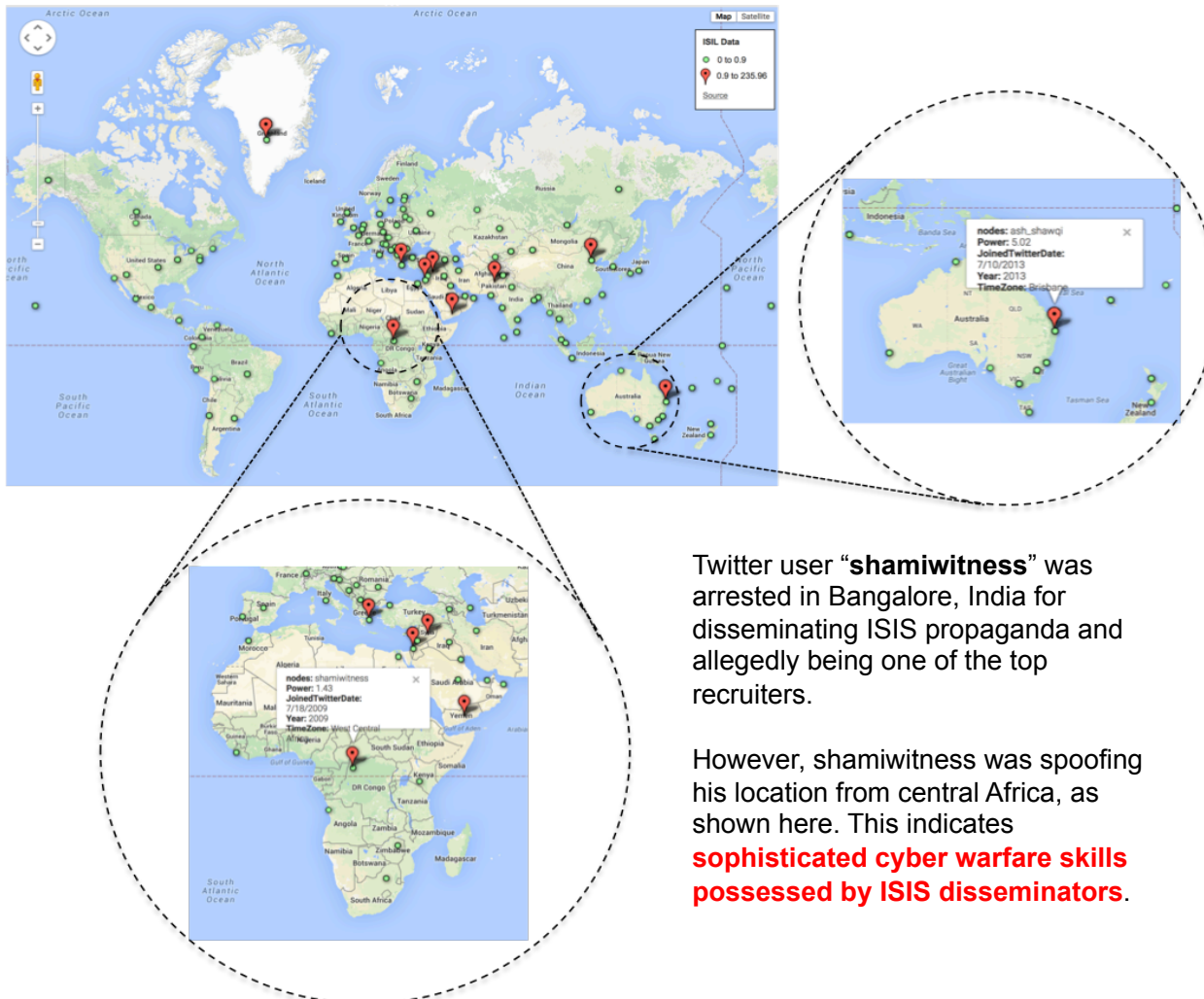
3 of the 10 ISIS Top Disseminators (identified by a report published by the International Center for Study of Radicalization and Political Violence in September 2014).

We crawled their friends and followers network.

Top disseminator nodes are not only the leaders (most connected) but they are also coordinating with each other. **They are coordinating in disseminating ISIS propaganda, forming a powerful campaign organization network.**

Geo-mapping ISIS Disseminator Network

We geographically map the powerful actors by extracting the locations through time zones associated with the timestamps in their posted tweets. (Less than 1% of the Twitter users report their locations)
Red markers are the high power ISIS nodes and green dots are low power ISIS nodes.



During the December 2014 Sydney hostage situation, one of the top disseminator nodes **ash_shawqi** with Brisbane time zone made stark changes to his profile.

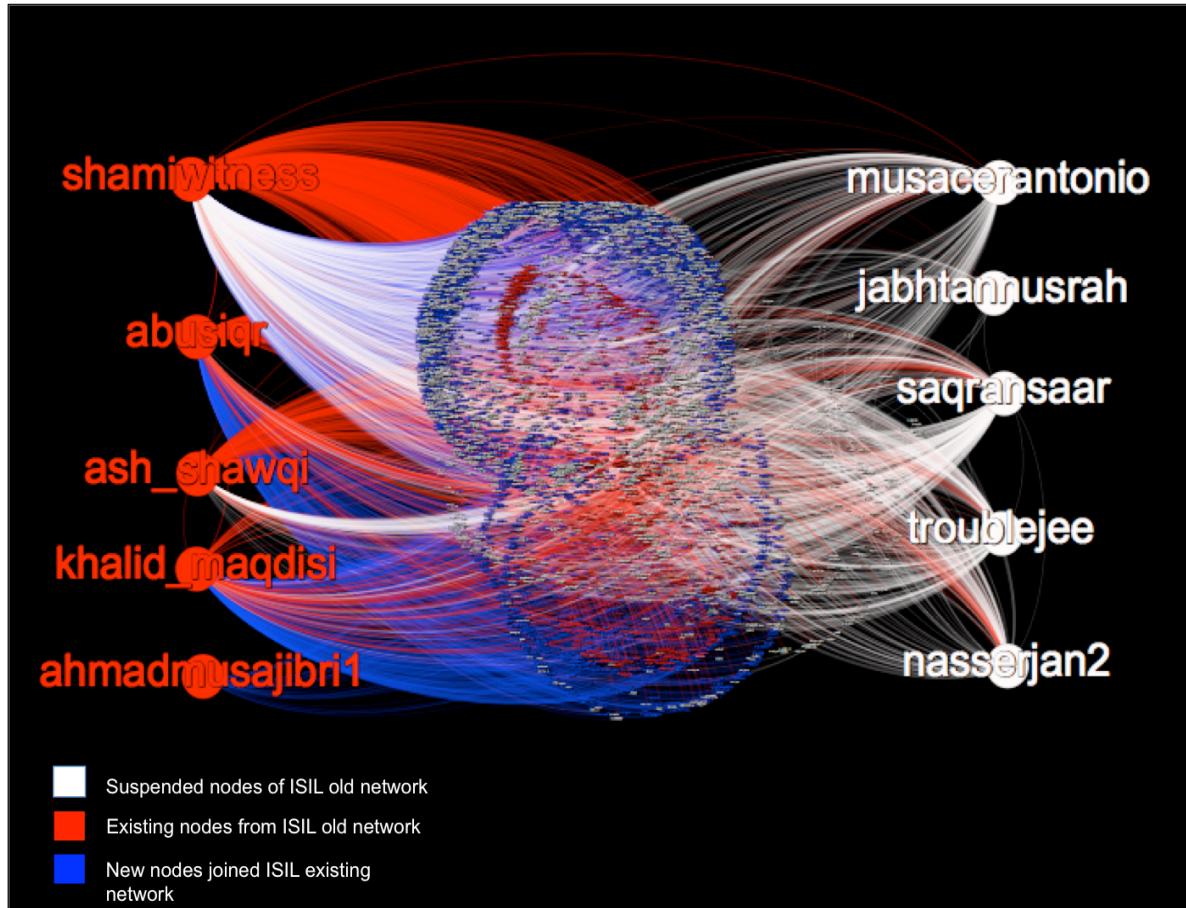
In September 2014, he had 5990 tweets, 3867 followers, and followed by 279 user. His time zone was Brisbane, Australia. **Now his account looks totally different** with the following changes,

1. Now he has just 3 tweets and 1 follower.
2. His profile language is changed to Russian!
3. He shared his location as “Москва”, and
4. Previously this guy described himself as “Abu Zubayr ash_Shawqi | Ahlu-Sunnah Wal Jama’ah منبر التوحيد والجهاد” and now his description is “Помощь должна совершаться не против воли того, кому поморает.” which is translated to English as “Aid should not be committed against the will of the one who helps.” His earlier profile description, which was in Arabic, translates as “Platform Tawhid and Jihad” in English.

Twitter user “**shamiwitness**” was arrested in Bangalore, India for disseminating ISIS propaganda and allegedly being one of the top recruiters.

However, shamiwitness was spoofing his location from central Africa, as shown here. This indicates **sophisticated cyber warfare skills possessed by ISIS disseminators.**

Monitoring ISIS Disseminator Network



Visualization of how ISIL's Twitter Disseminator dark network has changed from September 2014 to March 2015. Many nodes are suspended. Few are still active. And new ones have joined.

This figure has a total of 16,539 node and 21,878 edges (just the friends and followers of ISIS disseminators)

Suspended nodes: 10739 nodes in white color

Active nodes: 2921 nodes in red color

New nodes: 2879 nodes in blue color

Nodes with many connections are depicted with big labels and these are the top disseminators. Of the top 10 Disseminators, 5 have been suspended in the last 6 months. Five are still active.

The account **@shamiwitness** (considered to be the most active Twitter recruiter) continues recruiting which is puzzling because the man behind this account was arrested by the Indian police last year in Bangalore. Perhaps, the Twitter account is taken over by someone else (or possibly a group).

Although half of the top disseminator nodes have been suspended the other half keeps the network growing. This means that the other powerful nodes are attracting and/or recruiting more people to their network.

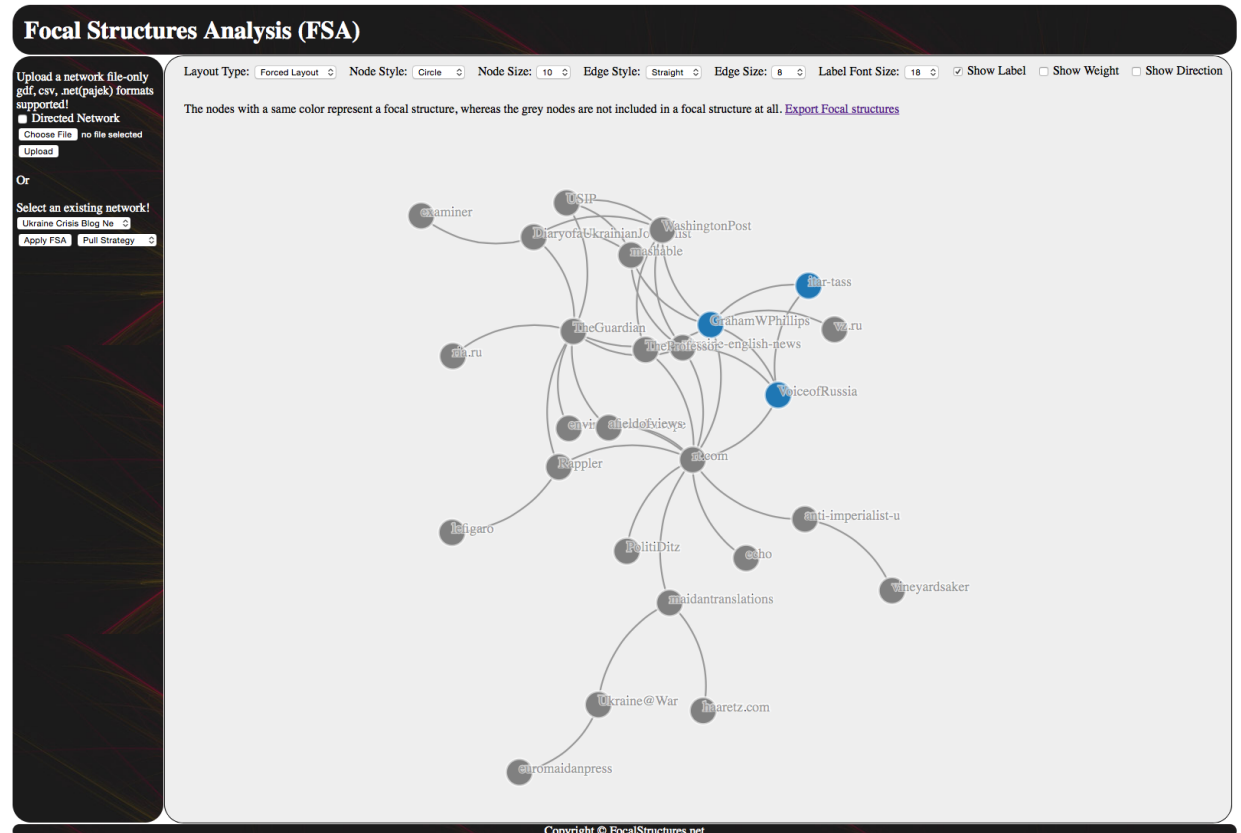
Social Media and Propaganda Campaigns

Work done in collaboration with
ONR, NATO JFC and NATO
STRATCOM COE

A tiny sample of blog network for
Ukraine-Russia conflict.

Nodes represent blogs and edges
represent link between blogs.

The structure with blue nodes is
identified as a focal structure.
Although RT.COM is the most
central node, the triad “**Graham
Phillips – itar-tass – voiceofrussia**”
is a more influential coordinating
structure for information
dissemination



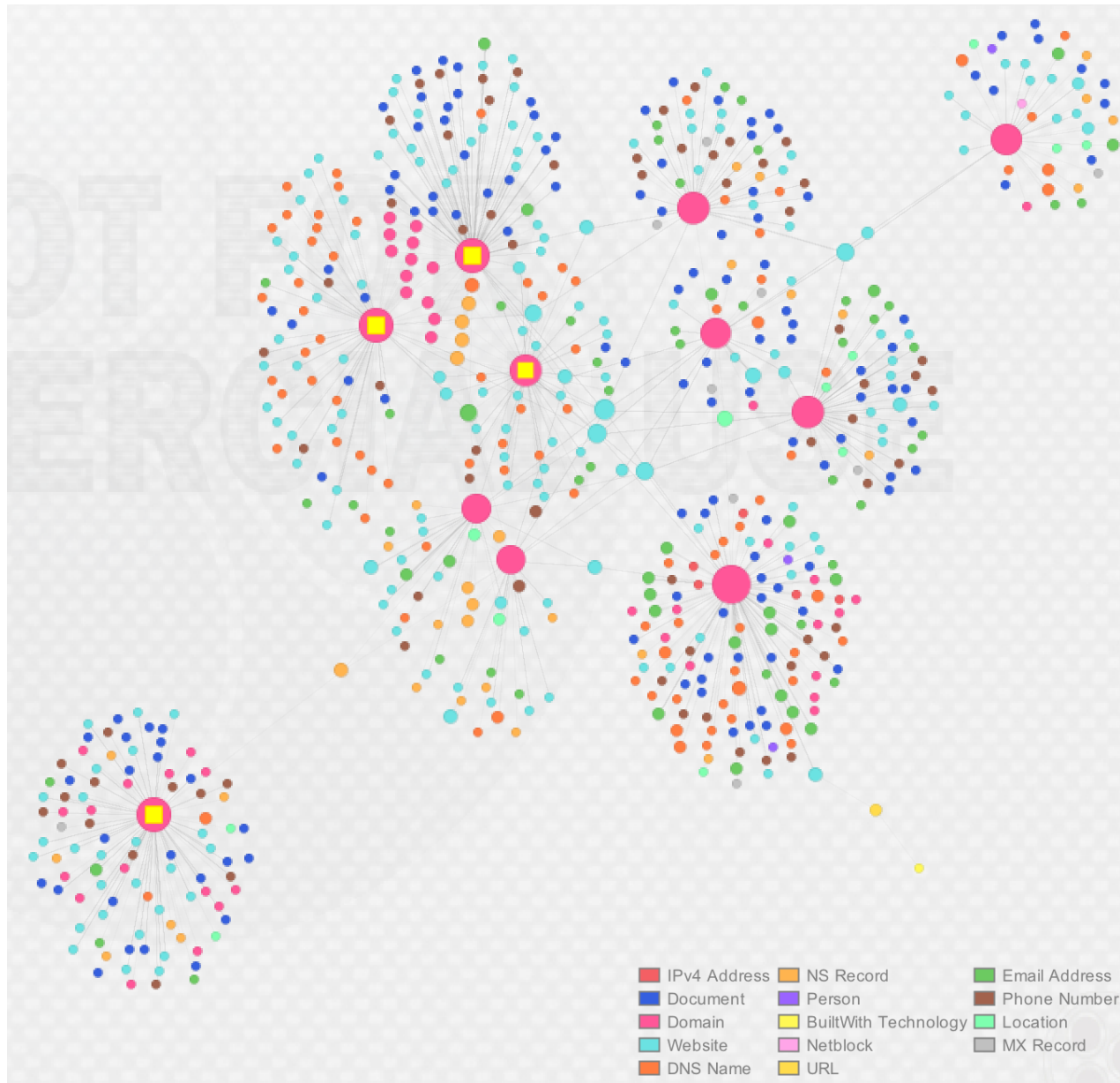
Graham Phillips (originally a British citizen) is now banned from Ukraine, who became an instant Internet celebrity due to his ‘live blogging’ style reporting of events riddled with Russian propaganda.

Propaganda on Blogs

Using information network analysis and cyber forensic techniques, more blogs were identified that contain **anti-NATO** and **anti-US propaganda** during the TRJE 2015 (oct. 19 – nov. 6). These are presented below,

1. “Platforma Anti-OTAN Zaragoza” www.plataformaotan.blogspot.com.es
2. “Andreas Speck – Be The Revolution” www.andreasspeck.info
3. “War Resisters’ International” www.wri-irg.org
4. “No to Compulsory Military Service” www.nomilservice.com
5. “Maikel Nabil Sanad – Son of Raa” www.maikelnabil.com
6. “TARCOTECA Contrainfo” www.tarcoteca.blogspot.nl
7. “TARCOTECA Contrainfo” www.tarcoteca.blogspot.com
8. “TARCOTECA Contrainfo” www.tarcotecacounterinfo.blogspot.com
9. “SinKUARtEL – BILBOKO TALDE ANTIMILITARISTA” www.sinkuartel.org
10. “Coordinadora Tarragona Patrimoni de la Pau” www.tgnapau.blogspot.com.es
11. “COORDINADORA tarragona patrimoni de la pau” www.usuaris.tinet.org/tgnapau/
12. “INSUMISSIA” www.antimilitaristas.org
13. “NOBORDERSARD” www.nobordersard.wordpress.com

Connections Among Blogs and Associated Metadata



Nodes depict blogs, domains, metadata, etc.

Node size depicts how much linked (incoming and outgoing) they are. The more a node is linked the bigger it is.

The big pink nodes are

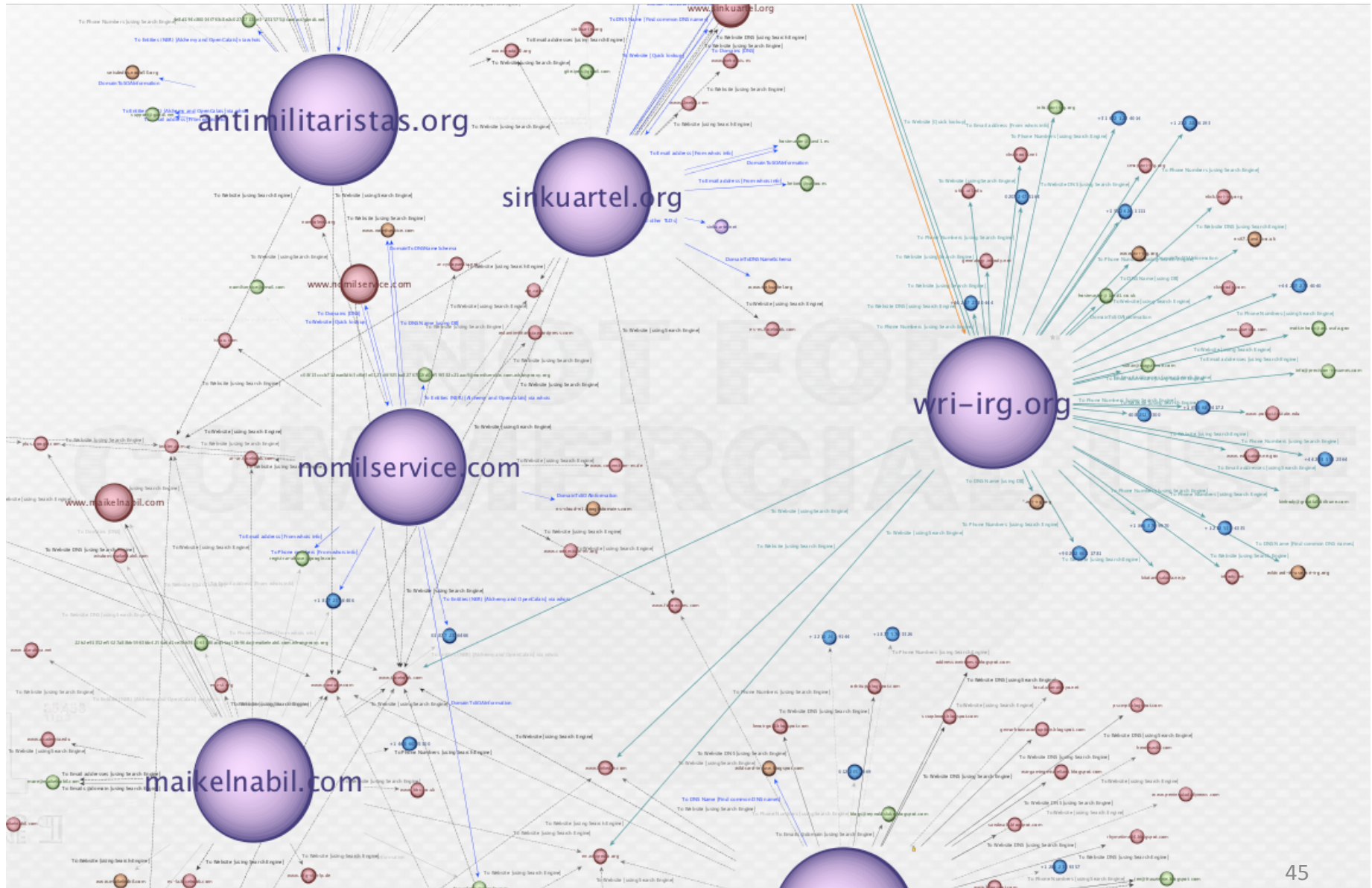
1. andreasspeck.info
2. wri-irg.org
3. sinkuartel.org
4. antimilitaristas.org
5. maikelnabil.com
6. nomilservice.com
7. twww.usuaris.tinet.org

These 7 blogs need to be further monitored.

Other four big nodes with yellow squares in center are the big blog hosting technologies,

1. Blogspot.com
2. Blogspot.com.es
3. Blogspot.nl
4. Wordpress.com

Top Blogs



Entities Extracted

- 635 total entities extracted

Entity Type	How many were identified
DNS Names	87
Documents (deep web)	130
Domains	52
Email Addresses	65
IPV4 Addresses	5
Locations	12
MX Records	9
NS Records	44
Netblocks	1
Persons	3
Phone Numbers	67
URL Titles	1
Websites	167

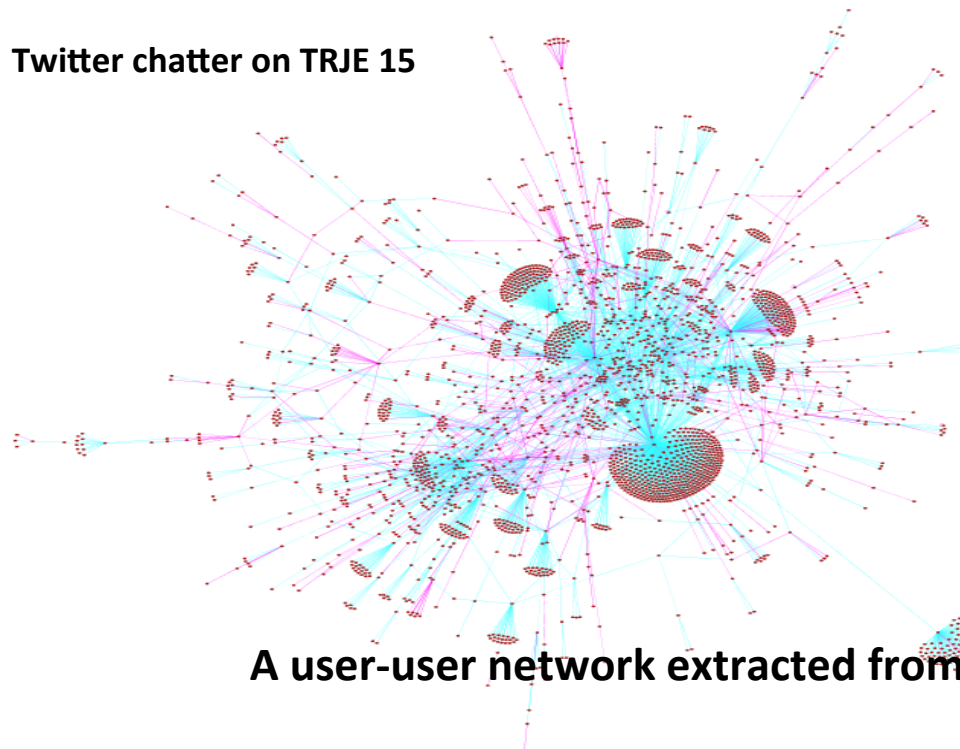
Trident Juncture Exercise (TRJE 2015)



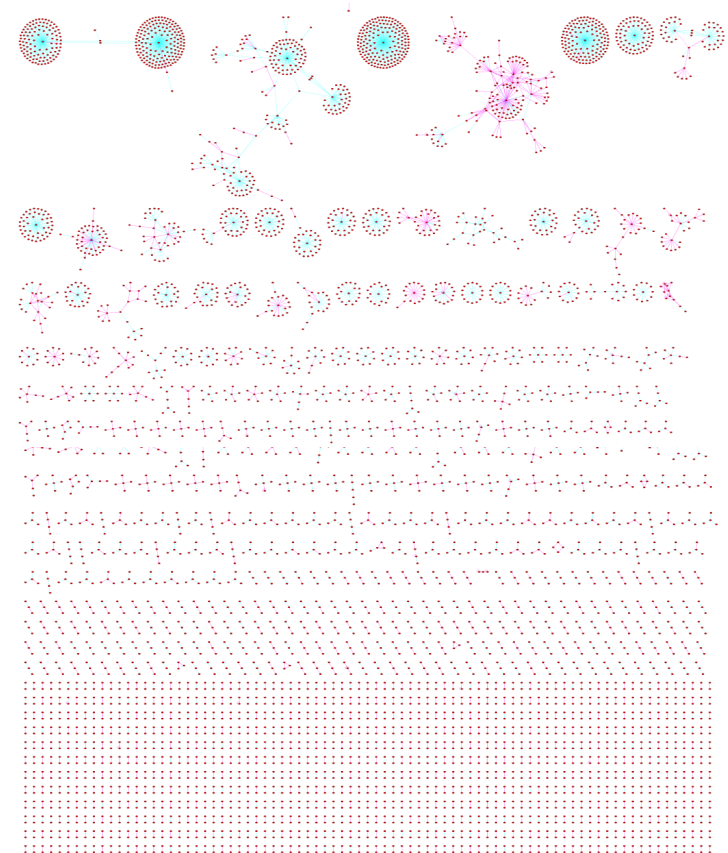
"SFJZ 13 was only the first step of a process that will continue throughout this and next year with **TRJE 15** on the path to full implementation of NATO's latest Command Structure."

Pink – mention
Blue – retweets

Twitter chatter on TRJE 15

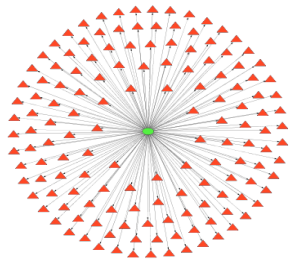
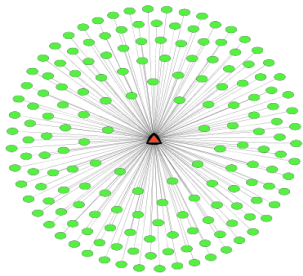


A user-user network extracted from their Twitter Communications

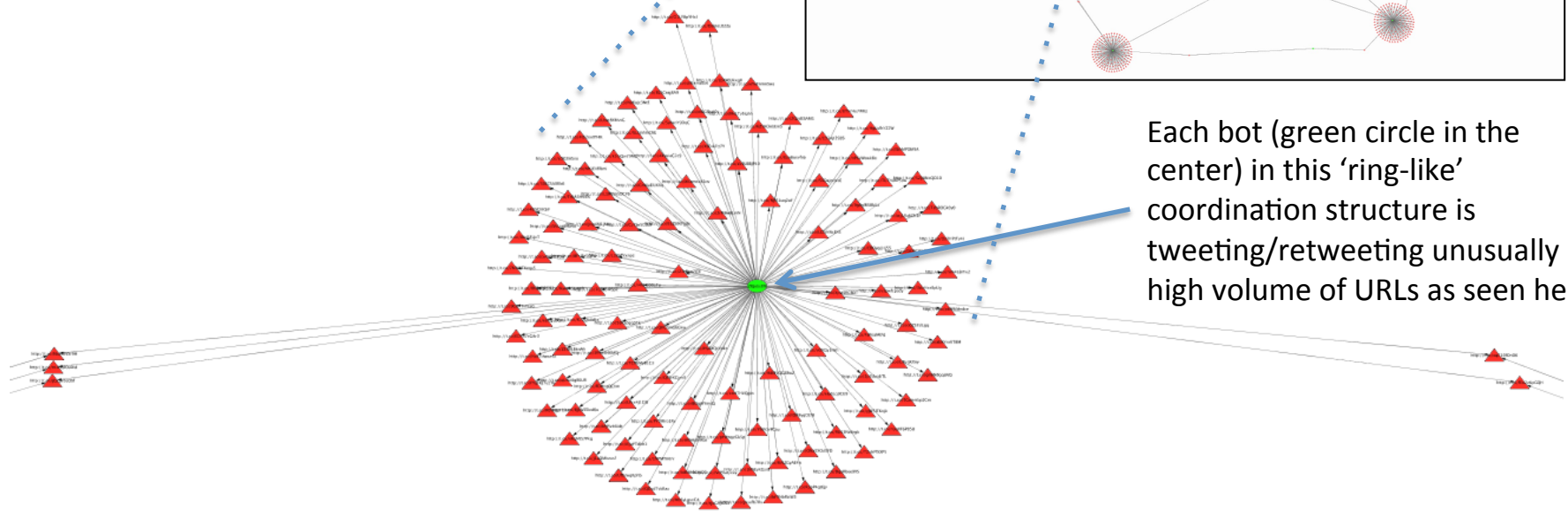
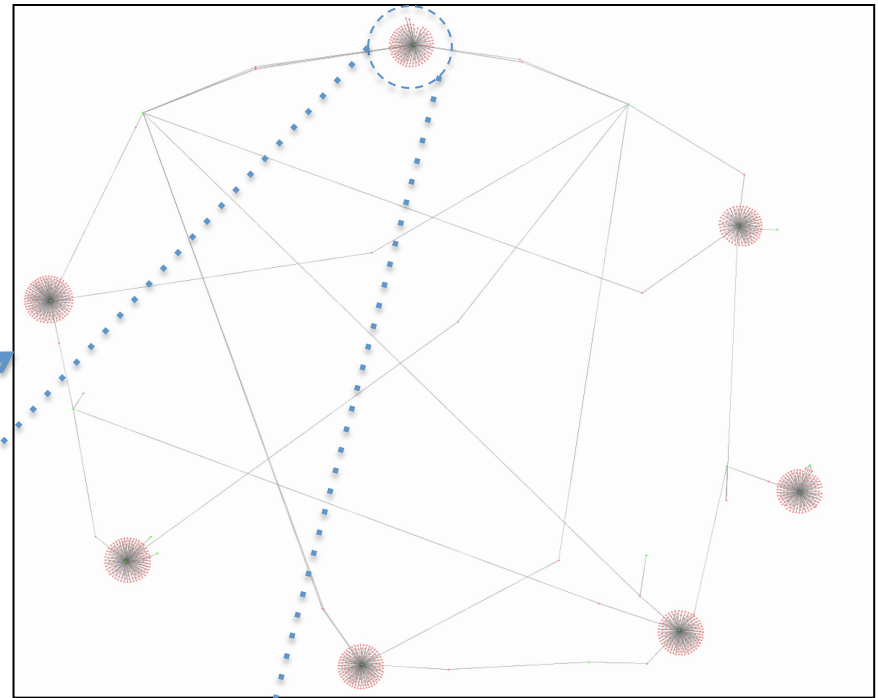


Transforming to User-URL Graph

▲ URL
● User



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

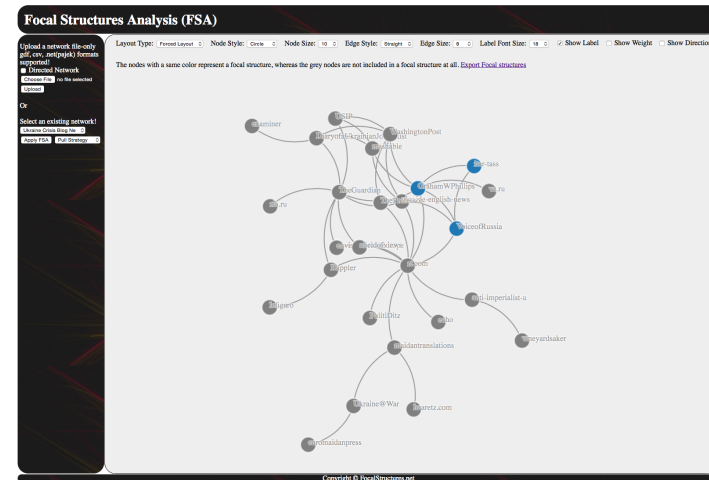


Each bot (green circle in the center) in this 'ring-like' coordination structure is tweeting/retweeting unusually high volume of URLs as seen here.

Tools Developed



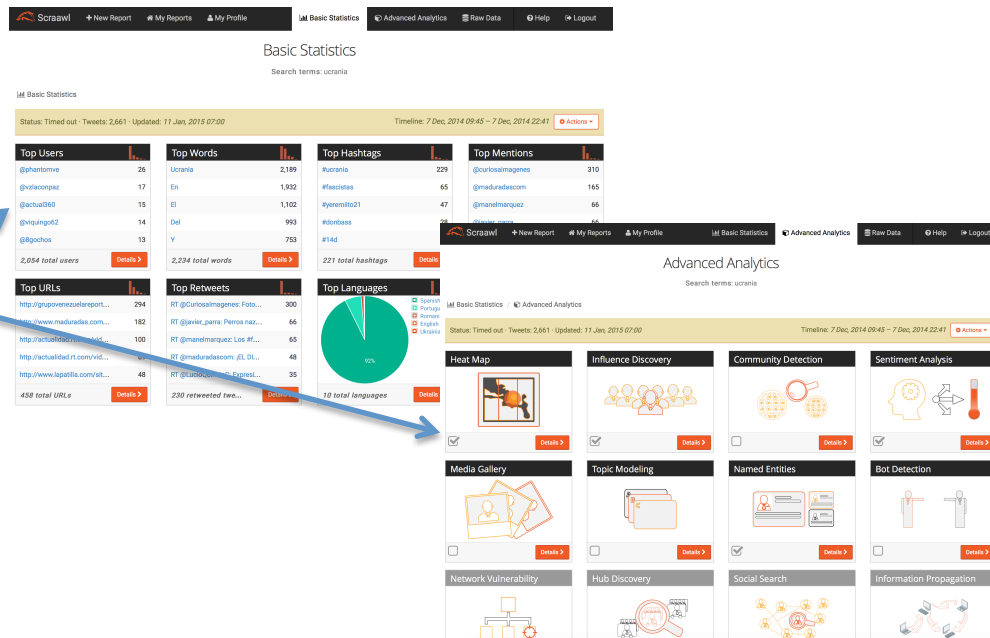
Blogtrackers (ONR-funded)



Focal Structures Analysis (ONR-funded)



Scraawl (DoN/STTR-funded)



Looking Ahead...

- ✦ Examined the role of social media in healthcare community, social movements, and cyberwarfare
- ✦ Information is scattered across various social media platforms. An integrated analysis is required.
- ✦ Operationalized theoretical framework of collective action for social media to assess coordination power of subgroups and evaluated in cyberwarfare domain
- ✦ At a broader level, the research helps to examine the role of ICTs in the emerging sociotechnical behaviors with implications to health, society, security, business, marketing campaigns, viral behaviors and many other settings.

Thank You!



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