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

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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

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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.
• 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 platforms 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 blogs 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.

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,

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

<table>
<thead>
<tr>
<th>Total Number of Bloggers</th>
<th>40</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of Tweets</td>
<td>64934</td>
</tr>
<tr>
<td>Top Words in Tweet</td>
<td>autism, autistic</td>
</tr>
<tr>
<td>Top Hashtag in Tweet</td>
<td>Autism, specialneeds, autistic, sensory</td>
</tr>
<tr>
<td>Top Domain in Tweet</td>
<td>wordpress.com, blogspot.com</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mention and Reply Network</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of users</td>
<td>2598</td>
</tr>
<tr>
<td>Total Edges</td>
<td>2912</td>
</tr>
<tr>
<td>In-Degree</td>
<td>9 (Max), 1.28 (Average)</td>
</tr>
<tr>
<td>Out-Degree</td>
<td>388 (Max), 2.24 (Average)</td>
</tr>
<tr>
<td>Degree</td>
<td>1.12 (Average), 2.134 (Weighted Average)</td>
</tr>
<tr>
<td>Graph Density</td>
<td>0.00132</td>
</tr>
<tr>
<td>Connected Components</td>
<td>1 with 2592 Maximum Vertices</td>
</tr>
<tr>
<td>Geodesic Distance (Diameter)</td>
<td>9 (Max), 3.224 (Average)</td>
</tr>
</tbody>
</table>

Overall metrics of the Autism Bloggers Mention and Reply Network
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

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

1990 Driving protest in Riyadh

Saudi Arabian Women Campaign
September 2007

International Women’s Day
March 2008

We the Women
April-May 2009

Women to Drive
June 2011

My Right to Dignity
June 2012

Oct26Driving
October 2013

1990 | ... | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013

It’s been a long road
but we’ll keep HONKING

We support Oct26Driving
Beep beep!

I SUPPORT WOMEN DRIVERS
ON 26 OCTOBER, 2013
WWW.OCT26DRIVING.ORG

Saudi Women Challenge Driving Ban

Would you like anything else?

NO, TO DO THIS AGAIN.
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_

“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

Blogsite Data Distribution

http://fman-a.com/ (5) (7) LP Nov ’09
http://www.rebelliousarabgirl.net/ (22) (7) LP Jul ’10
http://sou.blossom.wordpress.com/ (9) (7) LP Jun ’10
http://homeaway-sim.blogspot.com/ (7) LP Dec ’09
http://www.arbwomanprogressivevoice.blogspot.com/ (42) (7) LP Jan
http://oeliwat.jeera.com/ (27) (see Jordan)
http://aquaseol.subzeroblue.com/ (6) (7) LP Jul ’10
http://lootl.wordpress.com/ (7)
http://s-mother-from-gaza.blogspot.com/ (7) moved Aug ’09
http://www.gazanom.com/ (7) LP Jun ’10
http://nubesworldviews.blogspot.com/ (7)
http://www.ofeefemaleanwak.com/ (7)
http://ohseriously.wordpress.com/ (7) in Jordan

Qatar
http://jewaria.wordpress.com/ (31) (1) LP Jul ’10

Saudi Arabia
http://halal.wordpress.com/ (2) (7) LP Jul ’10
http://majlismanal.blogspot.com/ (7) (PW)
http://saudiwriter.blogspot.com/ (13) (107) LP Jul ’10
http://saudisstepfordwife.blogspot.com/ (9) (1) LP May ’08
http://saudiwoman.wordpress.com/ (32) (413) LP Jun ’10
http://sweetaneeku.blogspot.com/ (3) (7) LP May ’10
http://zitgahas.blogspot.com/ (5) (1) LP May ’10
http://sea-of-waves.blogspot.com/ (7) (CF)
http://princess-mood.com (7) (CF)
http://www.samahertario.com/ (1) (7) LP Jul ’10
http://me-splendid.blogspot.com/ (7) (CF)
http://ohsheiscrazy.blogspot.com/ (7) LP Apr ’10
http://sporstan-kur.com/ (7) LP May ’10
http://chocolateriegirl85.vos.com/ (7) (1) LP Dec ’09
http://indiasblathers.blogspot.com/ (7) LP Jun ’10
http://uber87.blogspot.com/ (7) Sep ’09

Singapore
http://www.nursamad.blogspot.com/ (7) (see Malaysia)
http://lemna.blogspot.com/ (3) (7) LP May ’10
http://lifes-indulgence.blogspot.com/ (4) (7) LP Jun ’10

Syria
http://mangelhazawi.com/ (42) (1) LP May ’10
http://www.orientalista.blogspot.com/ (5) (1) LP Aug ’09
http://myfog-dania.blogspot.com/ (12) (92) LP Jun ’10
http://www.shinjuyaof君閉い.com/ (7) LP Jul ’10
Data Preprocessing of Blogs
Web Content Extractor
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
Scores of Assent Verbs

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
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; AAAI Spring 2015 Symposium; JDFS 2014; ICDF2C 2014; IEEE JISIC 2014
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

- 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” and now his description is “Помощь должна совершаться не против воли того, кому помогает,” 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](https://twitter.com/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,

2. “Andreas Speck – Be The Revolution” www.andreasspeck.info
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
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
in top-down, right-left order.

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

<table>
<thead>
<tr>
<th>Entity Type</th>
<th>How many were identified</th>
</tr>
</thead>
<tbody>
<tr>
<td>DNS Names</td>
<td>87</td>
</tr>
<tr>
<td>Documents (deep web)</td>
<td>130</td>
</tr>
<tr>
<td>Domains</td>
<td>52</td>
</tr>
<tr>
<td>Email Addresses</td>
<td>65</td>
</tr>
<tr>
<td>IPV4 Addresses</td>
<td>5</td>
</tr>
<tr>
<td>Locations</td>
<td>12</td>
</tr>
<tr>
<td>MX Records</td>
<td>9</td>
</tr>
<tr>
<td>NS Records</td>
<td>44</td>
</tr>
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<td>Netblocks</td>
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<td>Persons</td>
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<td>URL Titles</td>
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</tr>
<tr>
<td>Websites</td>
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</tr>
</tbody>
</table>
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."

Twitter chatter on TRJE 15

A user-user network extracted from their Twitter Communications
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)
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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