

Bridging AI and Social Computing to Mitigate Socio-Cognitive Threats

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Fellow of IARIA, ARA, AAOC, IEEE, ACM

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- Vanguard in the field of Social Computing & Socio-Cognitive Threat Mitigation
- Develop tools to understand digital behaviors and forecast trends to achieve social good
- Develop and establish partnerships (university-industry-government), alliances, standards, and policies
- Promote and disseminate research, training, and education
- Work with US government agencies and allies to protect our nation from adversaries
- Accelerate industry adoption and incubate commercialization opportunities

\$25+ million in grants

350+ journal and conference publications

10+ books

40+ best paper awards

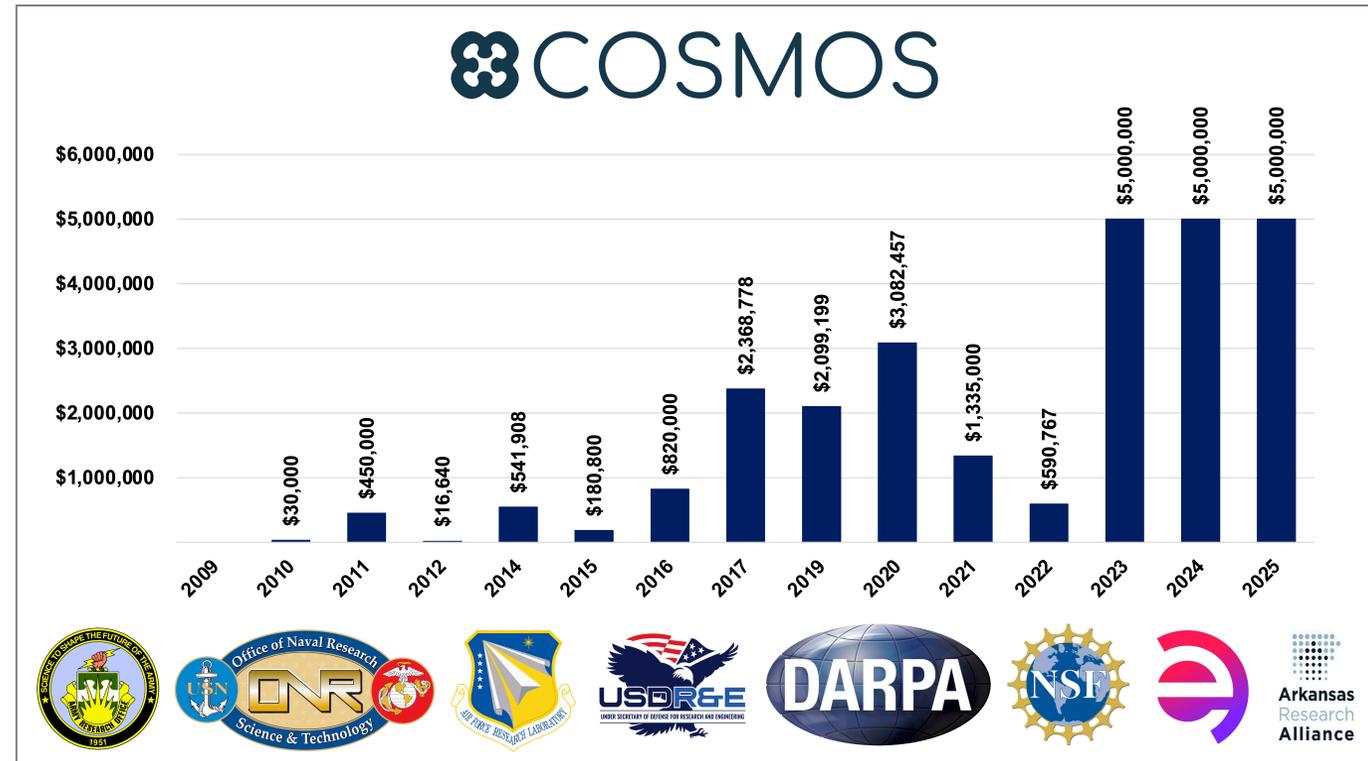
5500+ research citations

NATO & WHO recognized COSMOS tools

	State	National	Global
Academia			
Government			
Industry			

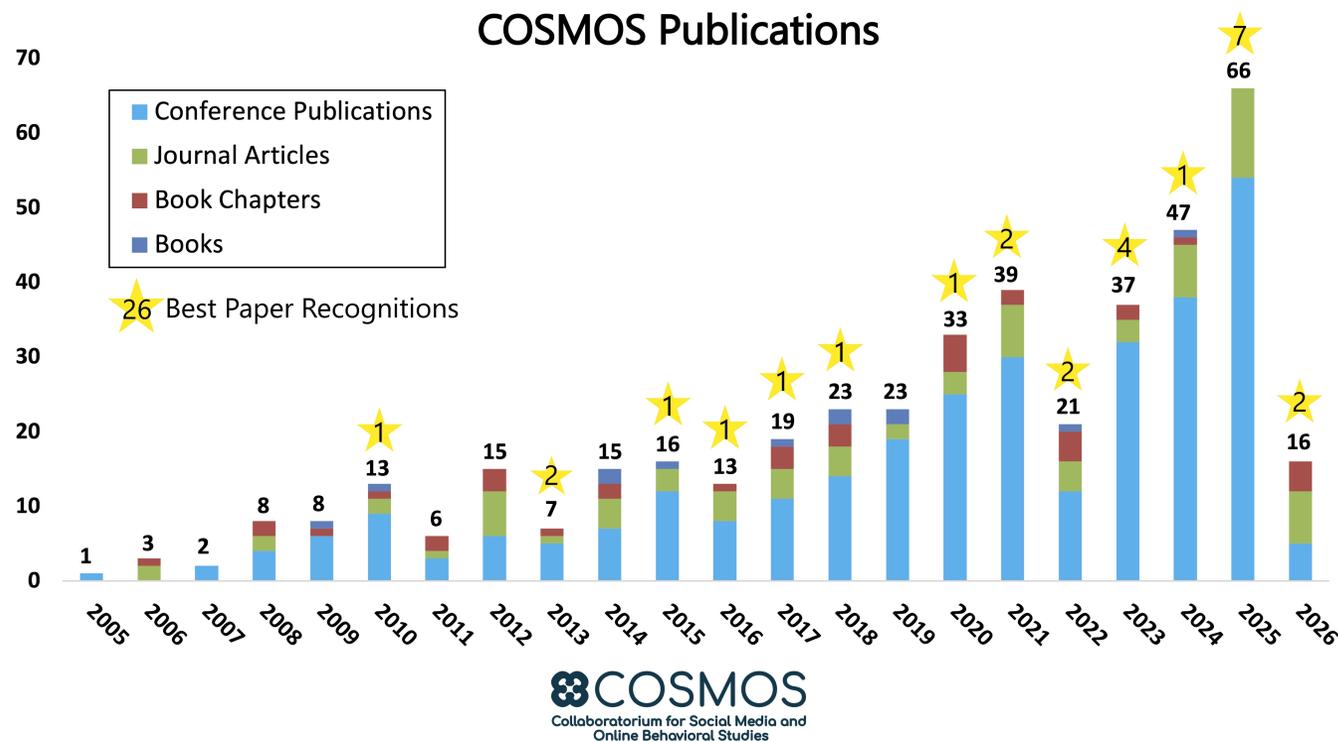
- Mitigating cognitive threats & enhancing community resiliency
- Combating AI-generated and amplified influence campaigns
- Toxicity, polarization, terrorism
- Social movements and collective action
- Smart and connected health

37 grants as PI (total \$69 million and \$30 million to UALR/COSMOS)



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Collaboratorium for Social Media and Online Behavioral Studies

Statewide research center headquartered in the University of Arkansas - Little Rock, USA

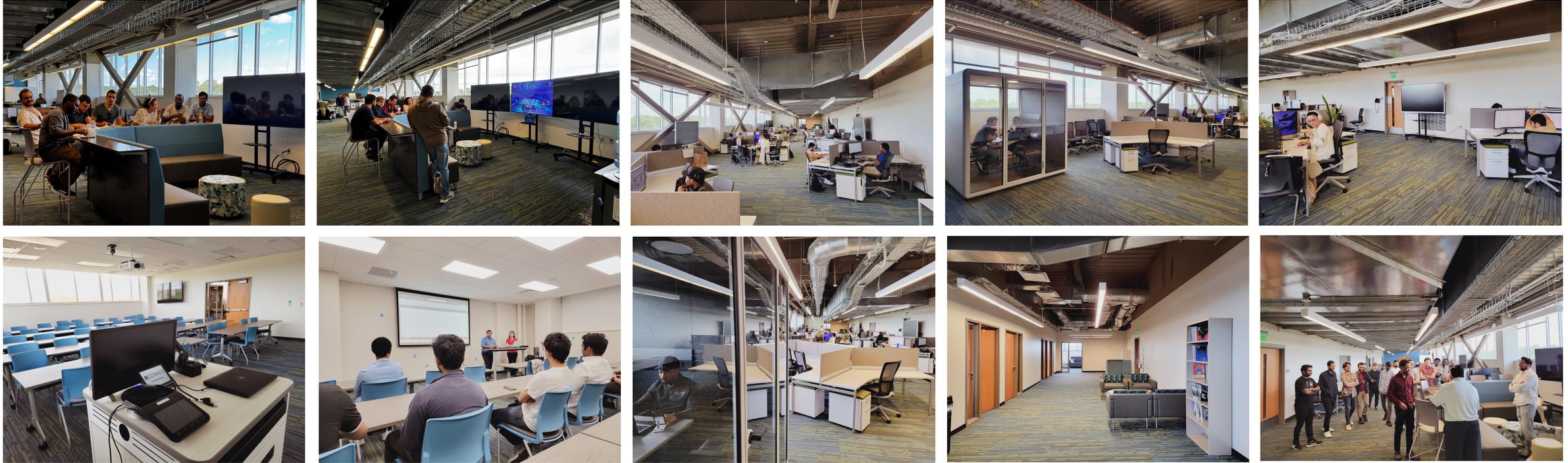
100+ members (Canada, USA, St. Vincent & The Grenadines, Germany, France, Turkey, Nigeria, Iraq, Pakistan, India, Nepal, Bangladesh)

Funding \$30 million from US Army, Navy, Air Force, DARPA, NSF.



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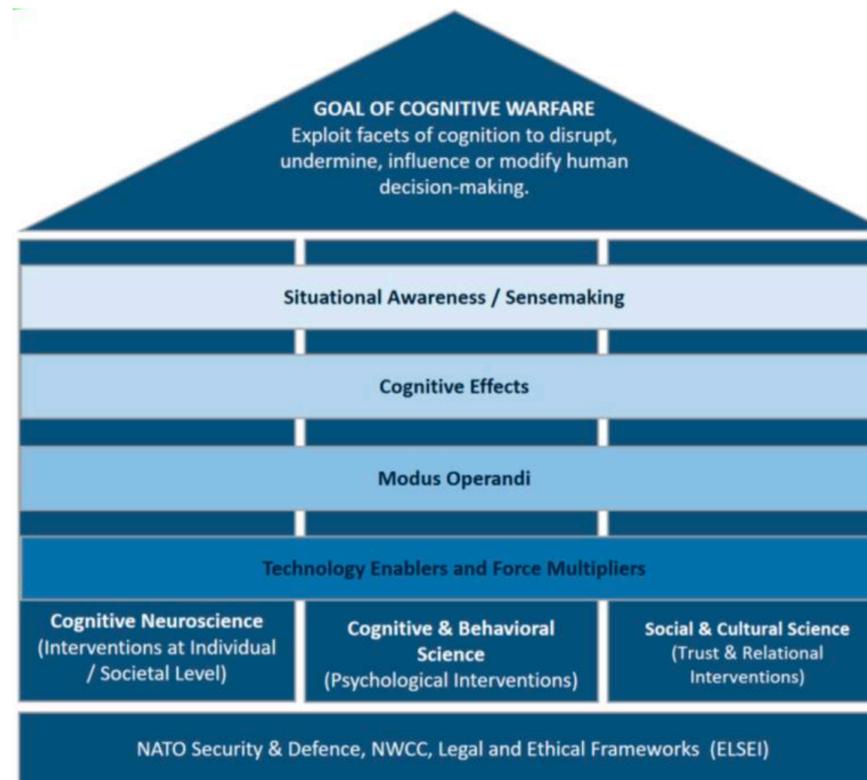
- Characterizing multimedia information environment tactics (TTPs) and impact assessment [**\$5 million from US DOD - 2023**]
- Characterizing coordinated cognitive attacks through collective action-based framework [**\$5 million from US DOD - 2024**]
- Characterizing information actors (producers and consumers) engaged in cognitive attacks [**\$5 million from US DOD - 2025**]



ARO



NATO



NATO HFM ET-356 House Model for CogWar framework.

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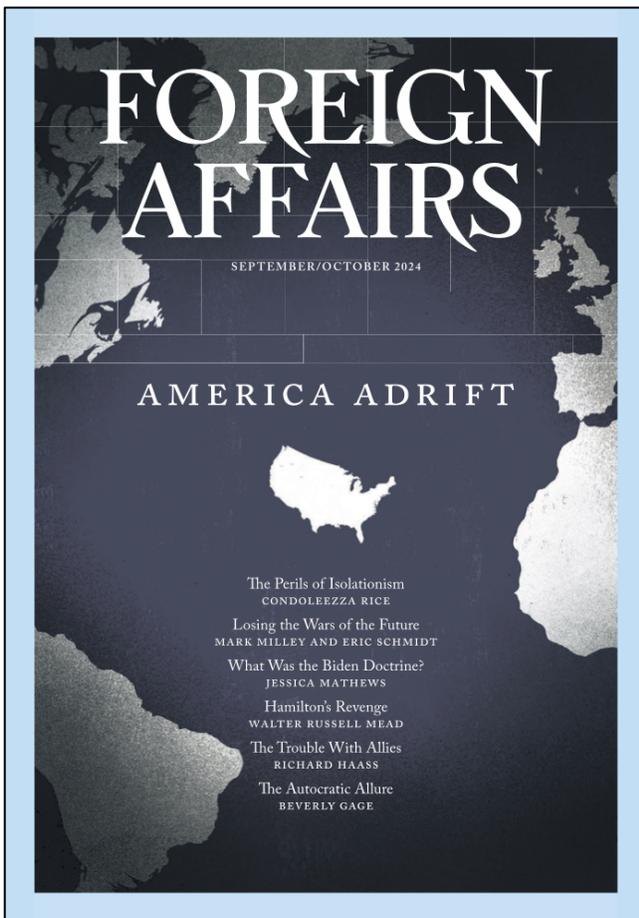

Developing Socio-computational Approaches to Mitigate Socio-cognitive Security Threats in a Multi-platform Multimedia-rich Information Environment

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ABSTRACT

Growing weaponization of social media is influencing peacekeeping, tactical, operational, and strategic operations. At the strategic and operational levels, social media platforms that are manipulated by adversarial campaigns can shift international and regional opinions about the use of military force or validity of military operations in a region. At the tactical level, social media propaganda could potentially be used to persuade susceptible targets to disrupt or delay military operations through protests or other “non-lethal” resistance. Narratives can be easily manipulated and influenced by bots, trolls, and other influence operation TTPs. Moreover, most users of social media cannot or will not differentiate between legitimate and non-legitimate accounts. Since such influence operation TTPs can be employed clandestinely in a low-cost, low-risk context, military leaders can expect to encounter an increased amount of adversary-generated AI-amplified social media-driven propaganda. Furthermore, socio-cognitive threats are increasingly becoming – (1) a collective phenomenon and (2) multimedia online information environment centric. This study aims to advance social, behavioural, and cultural science and enhance situation awareness and sensemaking (HFM ET-356 House Model) by detecting, examining, evaluating, measuring, and predicting the cognitive threat level/impact of the adversarial information campaigns to strengthen community resiliency further. The models and approaches presented in this study are validated and demonstrated in real-world use cases (e.g., COVID-19, the Indo-Pacific region). A multi-model multi-theoretic approach is developed that blends computational modelling, big ‘social’ data, and social science theoretical principles to characterize adversarial information campaigns conducted in an integrated online information environment (OIE). Specifically, the research identifies key actors, groups/mobs, narratives, TTPs (and their impact), in mainstream platforms as well as emerging and multimedia-rich platforms to characterize information actors (producers and consumers) and campaign dynamics for proactive decision-making to mitigate cognitive threats.

NATO STO-MP-HFM-361 Symposium on Mitigating and Responding to Cognitive Warfare



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America Isn't Ready for the Wars of the Future

—
And They're Already Here

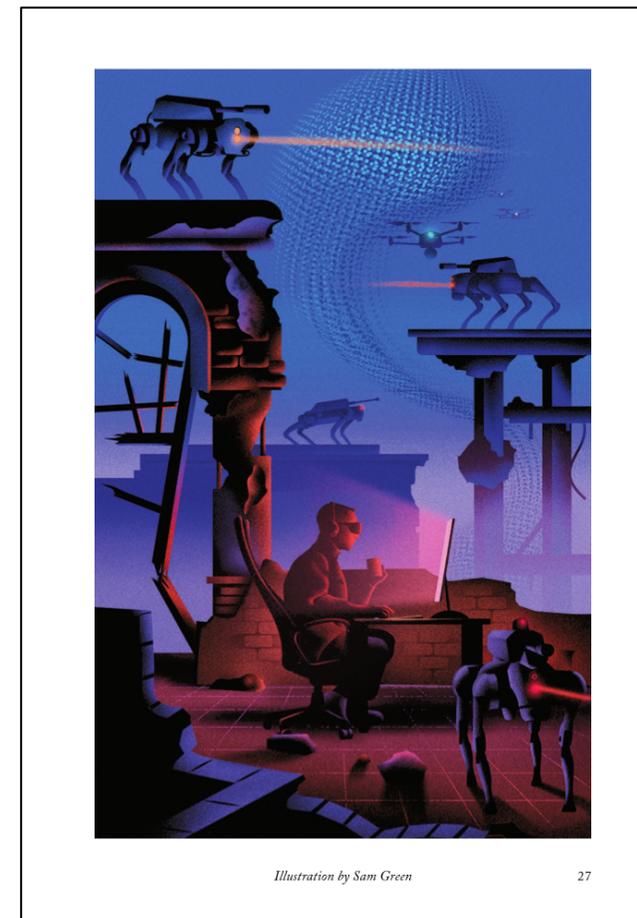
MARK A. MILLEY AND ERIC SCHMIDT

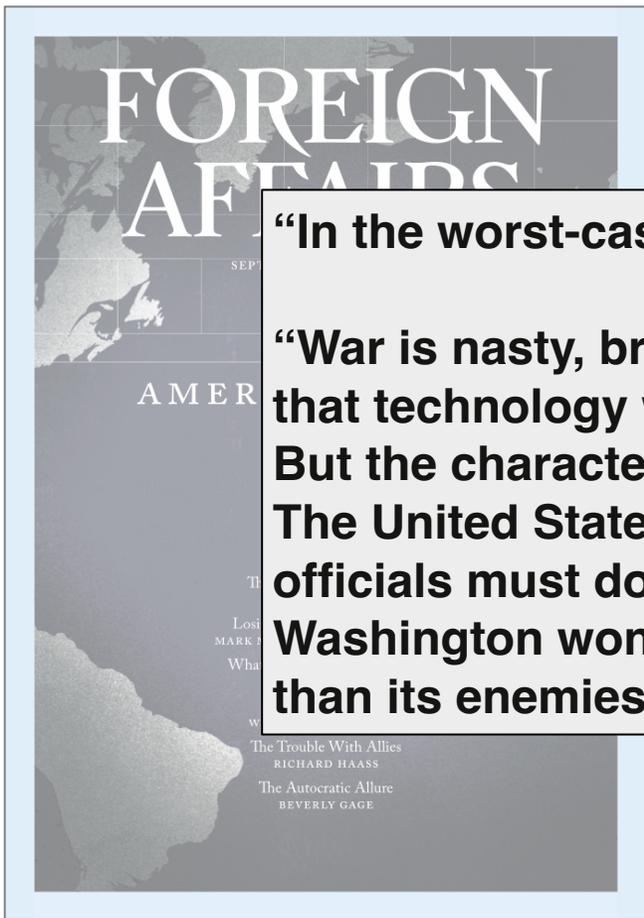
On the battlefields of Ukraine, the future of war is quickly becoming its present. Thousands of drones fill the skies. These drones and their operators are using artificial intelligence systems to avoid obstacles and identify potential targets. AI models are also helping Ukraine predict where to strike. Thanks to these systems, Ukrainian soldiers are taking out tanks and downing planes with devastating effectiveness. Russian units find themselves under constant observation, and their communications lines are prone to enemy disruption—as are Ukraine's. Both states are racing to develop even more advanced technologies that can counter relentless attacks and overcome their adversary's defenses.

MARK A. MILLEY served as the Chairman of the Joint Chiefs of Staff from 2019 to 2023. He is a Visiting Professor at Princeton University and Distinguished Fellow in Residence at the Georgetown University School of Foreign Service.

ERIC SCHMIDT is Chair of the Special Competitive Studies Project and former CEO and Chair of Google. He is a co-author, with Henry Kissinger and Daniel Huttenlocher, of *The Age of AI: And Our Human Future*.

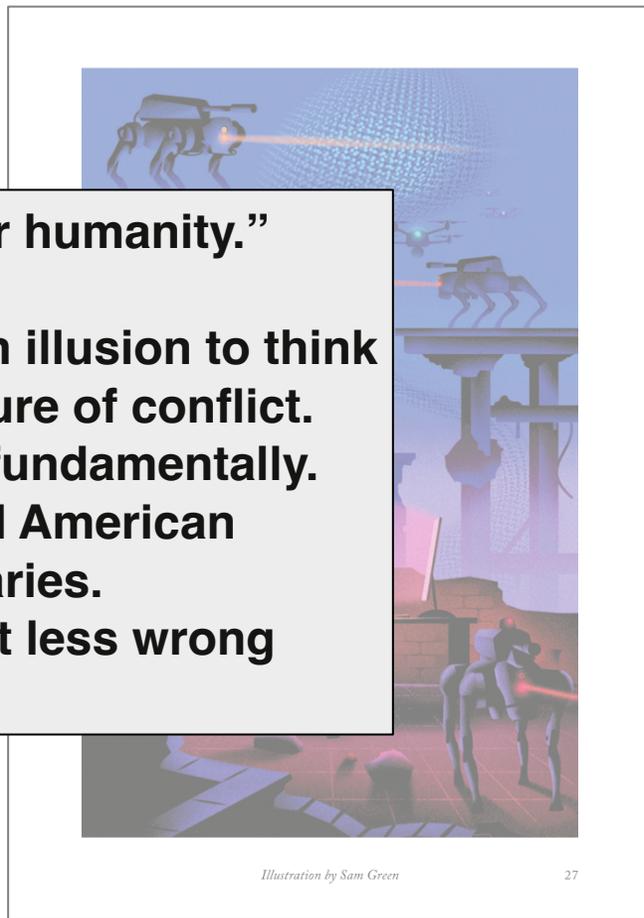
26 FOREIGN AFFAIRS





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America Isn't



“In the worst-case scenario, AI warfare could endanger humanity.”

“War is nasty, brutish, and often much too long. It is an illusion to think that technology will change the underlying human nature of conflict. But the character of war is changing both rapidly and fundamentally. The United States must change and adapt, as well, and American officials must do so faster than their country’s adversaries. Washington won’t get it exactly right—but it must get it less wrong than its enemies.”

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Mitigating Cognitive Threats

- Cognitive is categorized as the 6th and newest warfighting domain after land, sea, air, space, and cyber
- Influence operations: Anti-US and allies (e.g., NATO, EU)



Dragoon Ride
2015



Trident Juncture
2015



Brilliant Jump
2016



Anakonda
2016



Trident Juncture
2018



Baltic Operations
2019



ISIS flag misusing the *kalma*



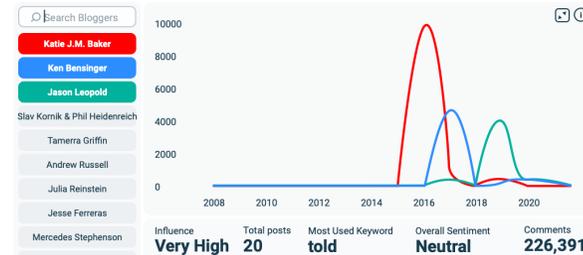
- Social media channels for US Air Force Public Affairs Office
- Terrorist groups campaigns for recruitment, radicalization, and raising funds.
- Indo-Pacific region (Australia, Indonesia, Malaysia, Philippines, Singapore, Taiwan)
- Pandemic: COVID-19 scam busting & awareness (Arkansas AG, FVEYS, NATO)

Real-time influence assessment



Vaccine Tracker Influence Analysis

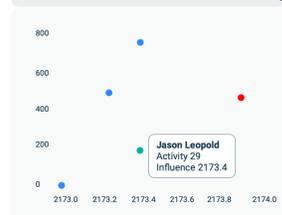
Trackers / Vaccine Tracker / Dashboard / Influence Analysis



Keywords of Katie J.M. Baker and 2 others



Activity Vs Influence of Katie J.M. Baker

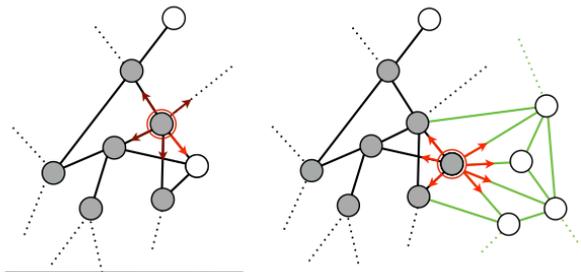


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How Oil Industry Videos Have Skirted Canadian Campaign Disclosure Rules

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GBlog

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

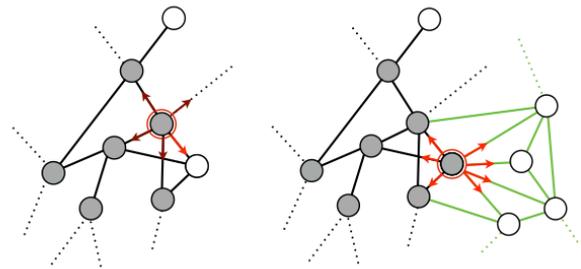
NATO Porn: My anaconda do not My anaconda do not My anaconda do not want none Unless you got buns, hum. - Or: Capybara Staring into the abyss

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 / HME 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 maneuverer?! 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 travel 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! 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??**



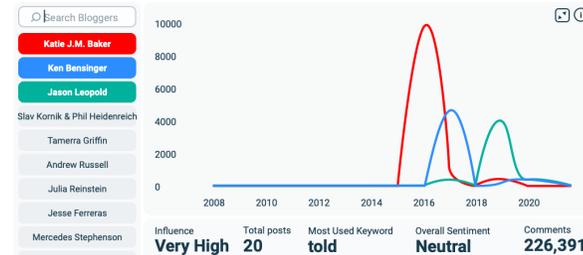
A picture of Anaconda eating an animal and video of Nicki Minaj's Anaconda song on the blog mocking the Anakonda 2016 exercise.

Real-time influence assessment

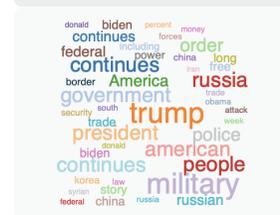


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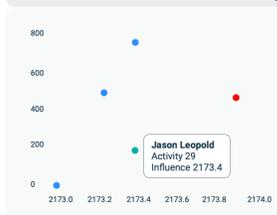
Trackers / Vaccine Tracker / Dashboard / Influence Analysis



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Steve Kornik & Phil Heidenreich | May 18, 2018 | 4 Comments

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Marucha.wordpress.com – another highly influential blog during Anakonda 2016 exercise is ridiculing Polish government's policy on accepting refugees and further called US Army participation in Anakonda exercise as INVASION. The blog had several provocative images and espoused conspiracy theories.

This blog was also one of the most influential during Brilliant Jump exercise.

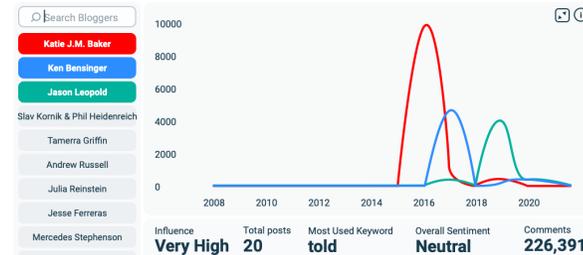


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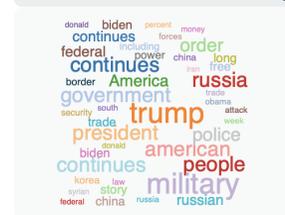


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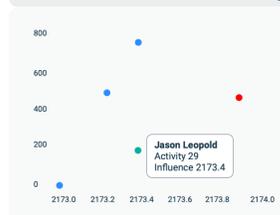
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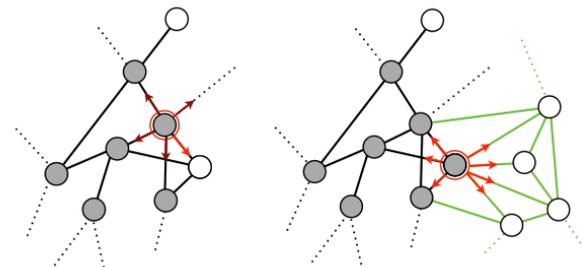


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English Español Français Deutsch

No to war – no to NATO

International Network to delegitimize NATO

Home Actions around NATO Summits Network No to war – No to NATO Materials and documents Women against NATO

International Demonstration Warszawa 09-07-2016

Money for the hungry not for tanks
No to War and NATO Bases
Moscow Has Already Been – We Do Not Want Washington
Yes to Refugees and international solidarity
Saturday July 9th at 12:00 City center of Warszawa
With Polish and International Speakers of the Alternative Summit
Informal peace gathering in the evening

A Call For Actions Warszawa 8-10 July 2016

during the NATO Summit in Warsaw July 8-9 2016

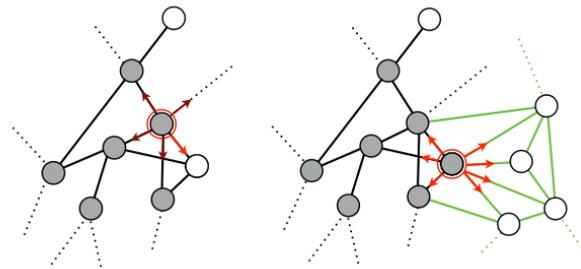
No to War – No to Militarism – Yes to Refugees
No to NATO Bases | No to the Defence Missile Shield | No to Arms Race | Disarmament – Welfare Not Warfare | Refugees Welcome Here | Solidarity with peace and anti-war movements
New! Updated program of activities is online!

Polish and International Organizers:
Elifita Association Poland, Social Justice Movement Poland, Stop the War Initiative Poland, Warsaw Anarchist Federation, Workers Democracy Poland, International Network No to War – No to NATO

The next NATO summit is planned to take place in Warsaw on 8-9 July. This summit will be held during a period of wars, heightened global instability and conflict. The wars waged by the West in the Middle East and Afghanistan have left hundreds of thousands dead, destroyed these countries' infrastructure and ruined the conditions for political stability and social peace. The terrorism that has spread around the world is a terrible legacy of these conflicts.

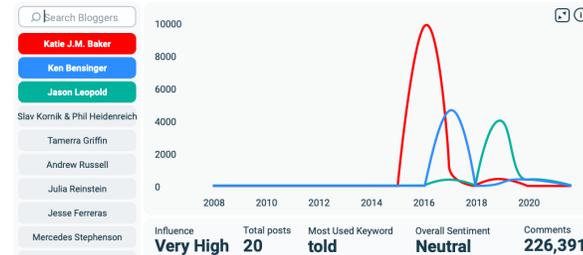


Real-time influence assessment

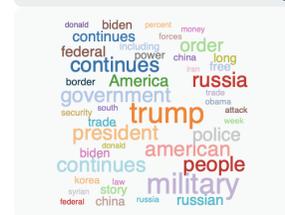


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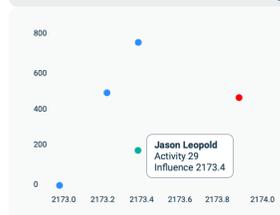
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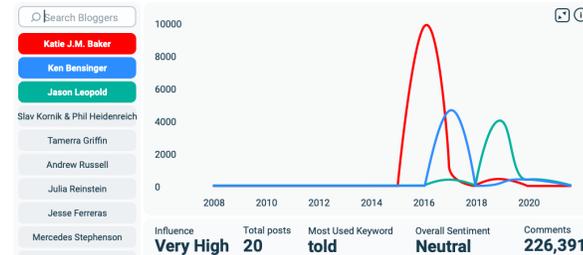
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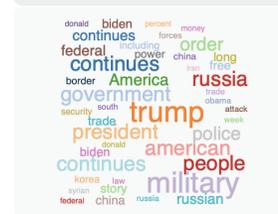


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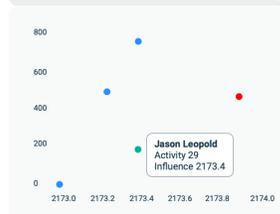
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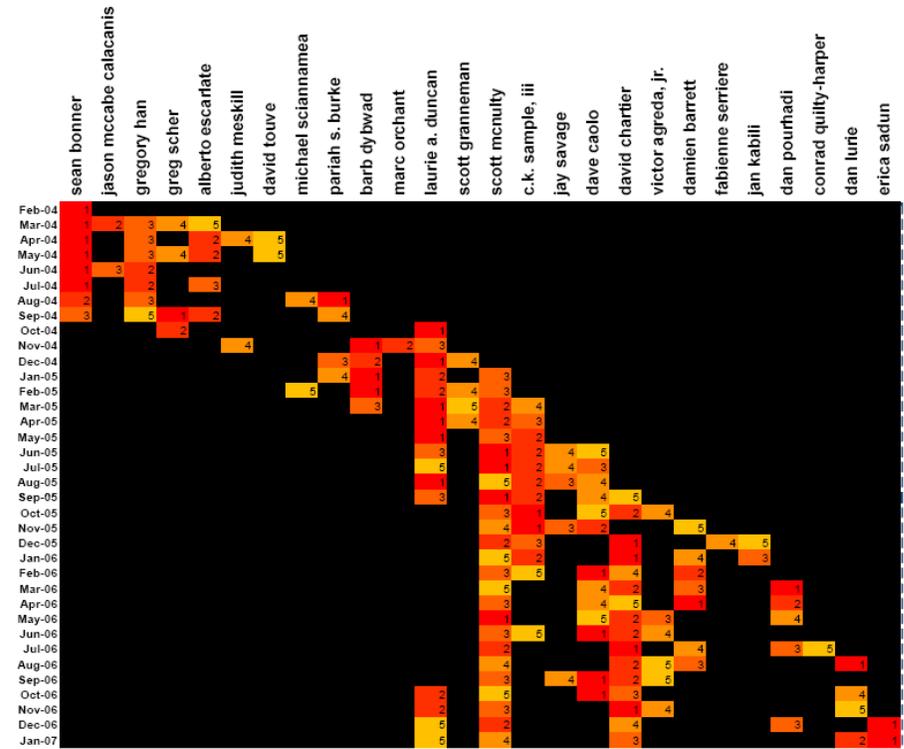
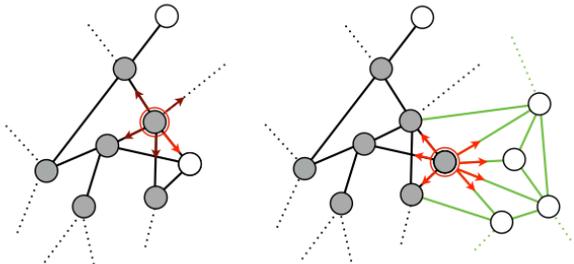
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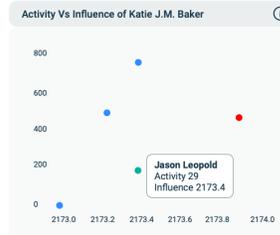
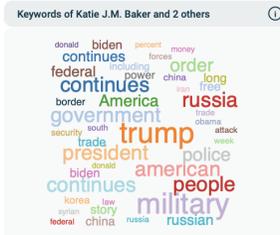
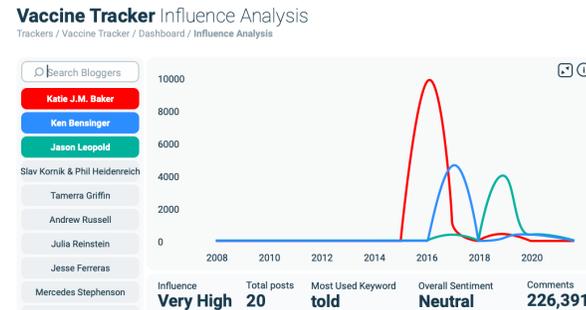
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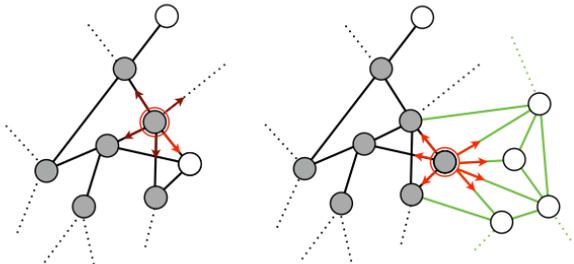
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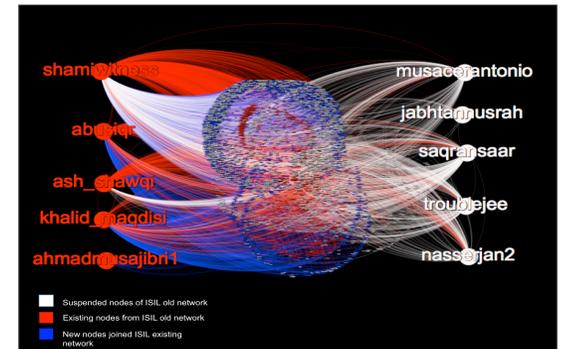
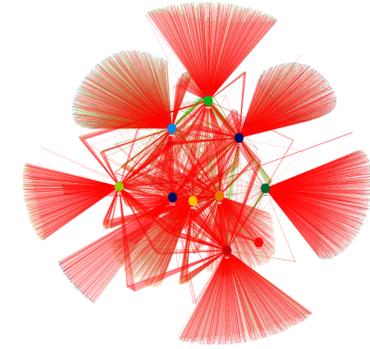
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ISIS Recruitment Network



4chan **reddit** **YouTube** **Blogger** **WordPress** **LIVEJOURNAL** → **Facebook** **Twitter** **Tik Tok** **Telegram** **WhatsApp** **Discord**

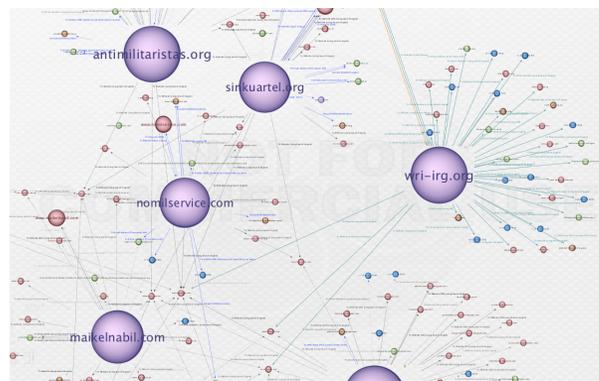
A YouTube channel with several Anti-NATO propaganda videos. The channel is called, "ANTI NATO".

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.

“US will provide weapons to NATO Commandos to attack Ukrainian separatists.”

Name	Influence	Top Keyword	Posts	Top Domain
CNN	Low	Virus	42,000	www.cnn.com
NewYorkPost				
Russia Today				
Nato				
Daily Beast				
Al Arabiya				
Engadget				
New York Times				



@warresistant → **Founder of** → **@nomilservice**

@nomilservice → **affiliated to** → **No Military Service Facebook page**

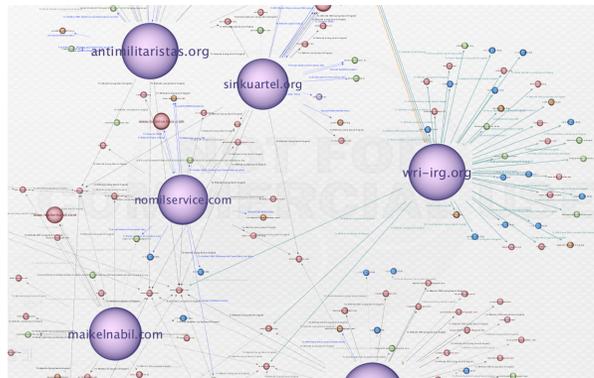
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"US will provide weapons to NATO Commandos to attack Ukrainian separatists."

Name	Outlinks	Posts	Top Domain	Location
CHN	158,000	3,000	cnn.com	US
NewYorkPost	17,000	400	bbc.co.uk	US
China Post	3,000,000	32,000	alarabiyas.net	China
Russia Today	12,000	503	aljazeera.net	Russia
Nato	93,000	9,001	1,000,000	Europ
Daily Beat	34,000	430	342,000	US



Norwegian Frigate Helge Ingstad collides with an oil tanker in Norwegian Sea. Nov. 8, 2018 #HelgeIngstad #Sola

Badly Damaged Norwegian Frigate Intentionally Ran Aground After Tanker Collision (Updated)

Spooft Attack - Vlad Putin jamming the GPS of NATO ship Ingstad (F313) H -

Лучшее selfie дня.

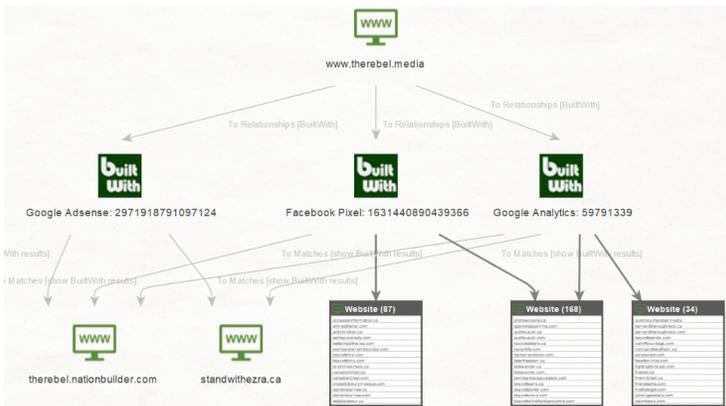
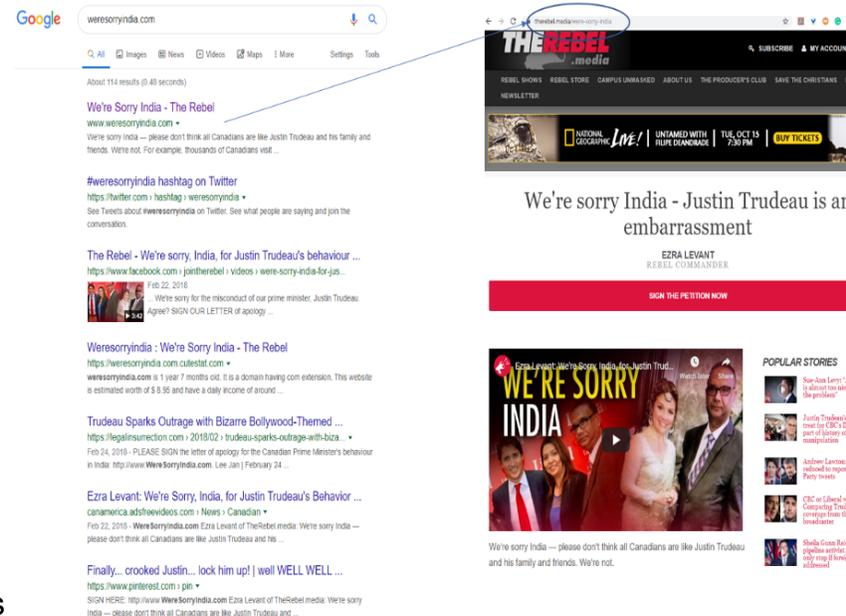
China Tracker Related Videos

Views: 43 K, Likes/Dislikes: 80%, Comments: 13 K, Location: US

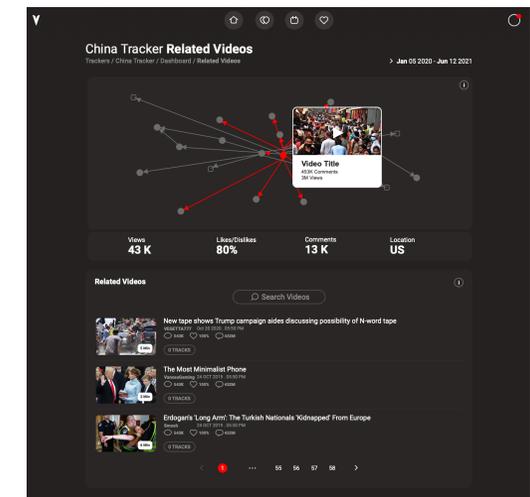
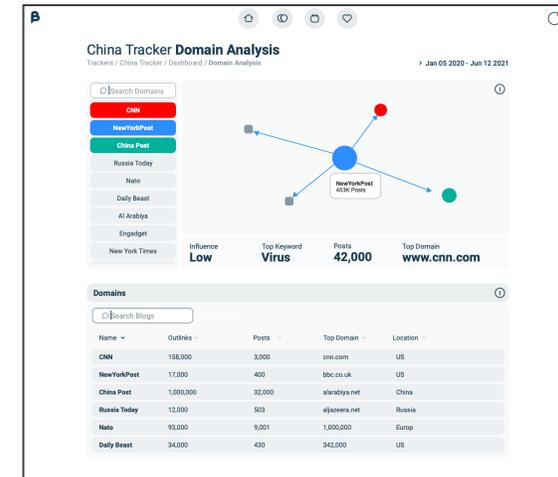
Multiplatform Influence Campaigns



Influence Campaigns: Designated domains for controversial subjects to draw traffic to main site. Orchestrated use of Twitter hashtags and cross media campaigns to drive traffic to designated domains.

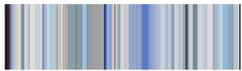

DRDC
RDDC
Canada



291 fake websites created using “Built with API” service with anti-Trudeau narrative. One such fake website “weresorryindia.com” amplifies anti-Trudeau narrative suggesting he is not a friend of the Canadian-Indian community. The website tops the results in search engines

Computational propaganda tactics on YouTube detected using a groundbreaking multimedia processing approach based on color theory.
Research received Best Paper award at the International Conference on Human and Social Analytics (HUSO), Oct.18-22,2020

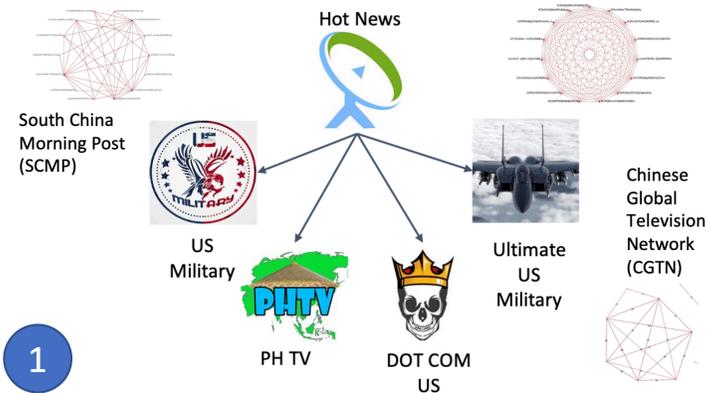
Video ID: OM5vaF2kzPA
Title: China vs US The War in the South China Sea already Start
Channel: Breaking News TV



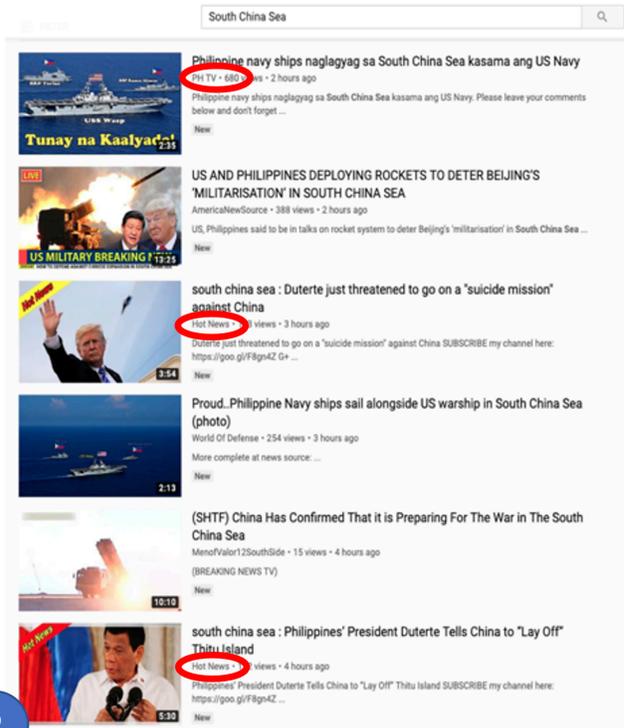
Video ID: GsCmudyXY2o
Title: China vs US The War in the South China Sea already Start
Channel: DOT COM US



Similar videos detected on different YouTube channels using barcode approach. Below, network of channels identified deploying crowd amplification tactic.



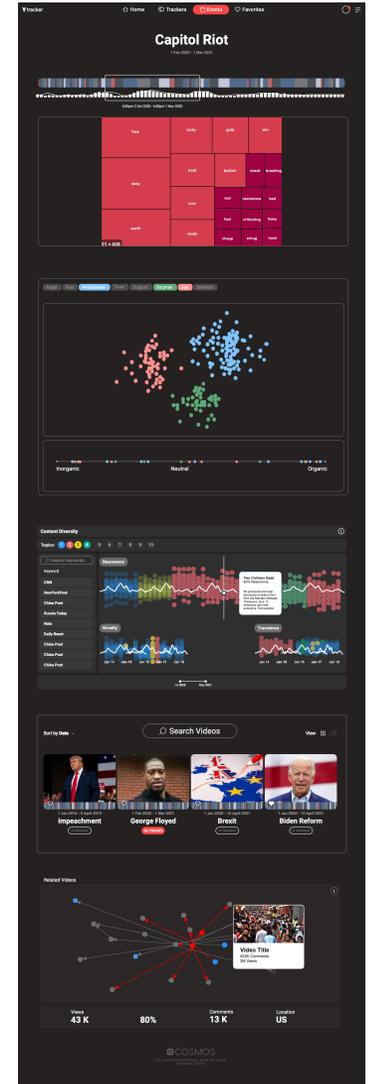
Crowd amplification tactic successfully manipulated YouTube's search results. "Hot News" - a prominent channel disseminating anti-US videos related "South China Sea" conflict – shows up at top of the search results.



Video barcode technique has been transitioned to YouTubeTracker



Video barcode technique allows us to navigate interesting narrative elements for a collection of videos pertaining to an event (above) or a single video (below)





Strengthening Australia's Information Warfare Capabilities in Fighting Foreign Interference and Propaganda

Strategic Policy Grants Program 2020
Department of Defence

Aim Sinpeng
The University of Sydney

Nitin Agarwal
University of Arkansas, Little Rock

Justin Hastings
The University of Sydney

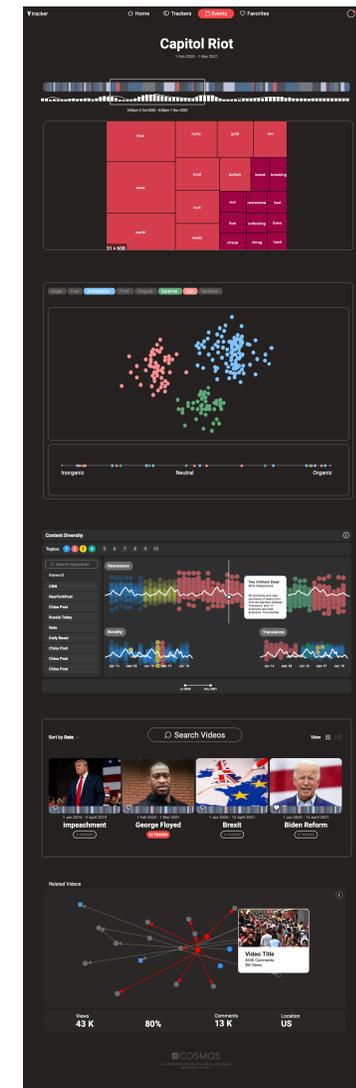
30 July 2021



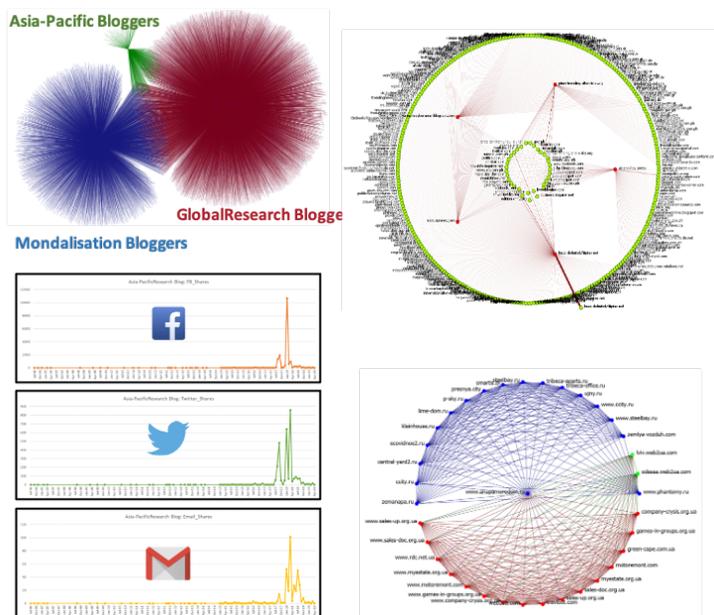
Strengthening Australia's Information Warfare Capabilities Page | 25

South Korea (Arirang News). Two channels of note – Defence Flash News and CIS News Network – are YouTube-based organisations based in the US and India respectively.

Defence's military exercises with US and its allies and deteriorating relations with China dominated YouTube comments

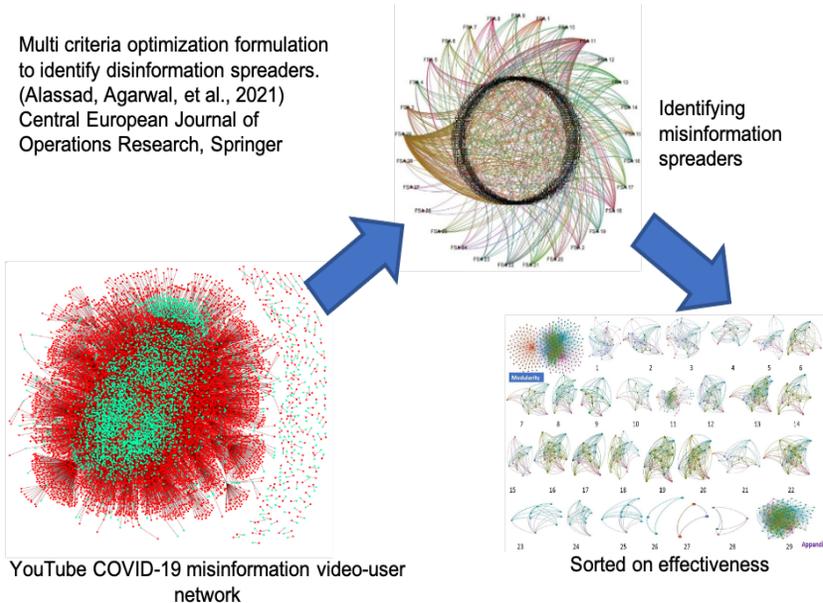



Coordinated bloggers



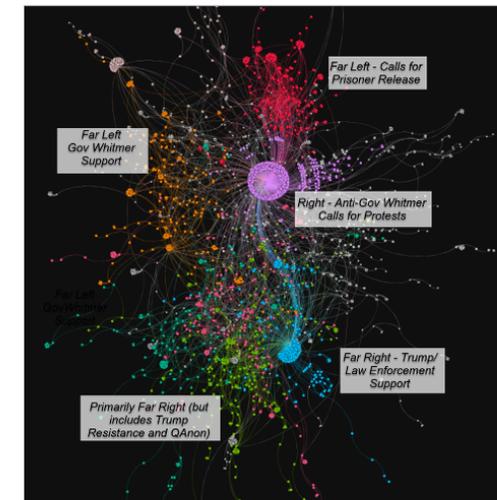
Anti-West/anti-US Indo-pacific bloggers

Coordinated YouTubers

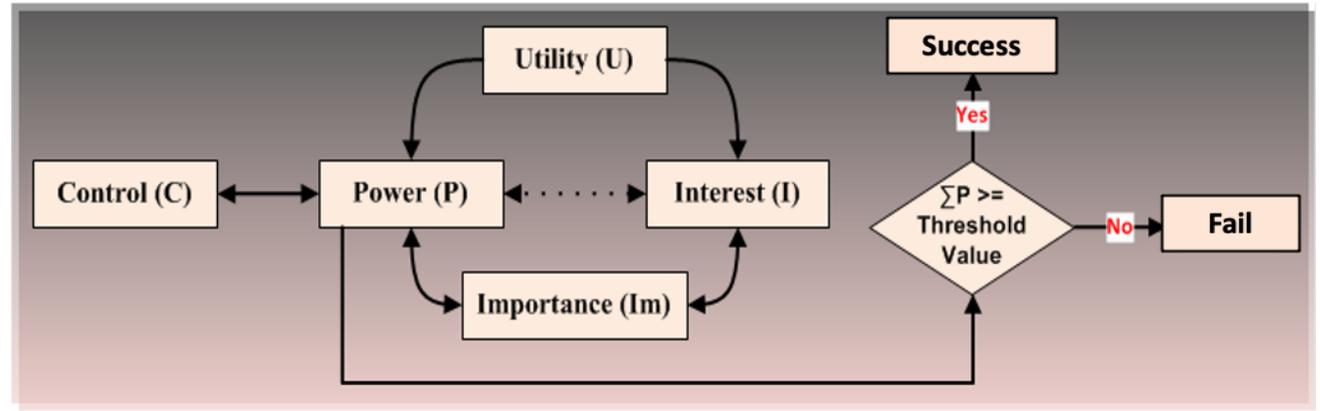
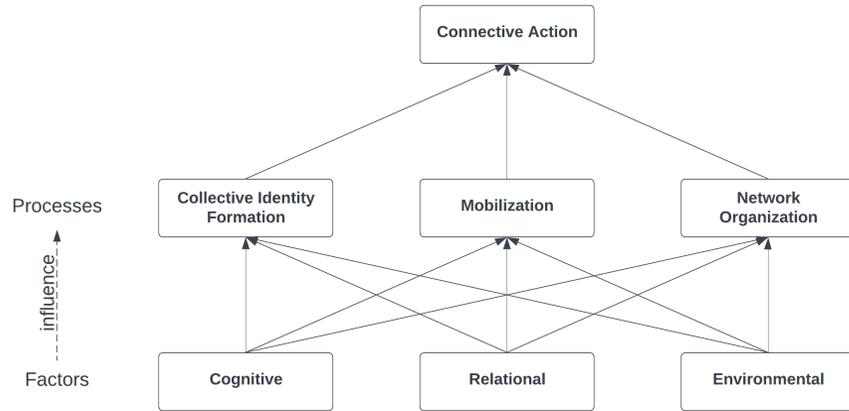


COVID-19 misinformation and conspiracy theory YouTubers

Coordinated Twitter users



Michigan lockdown protest network
 #LetMiPeopleGo, #MiLeg, #Endthelockdown, #MichiganProtest; April 1 to May 20; 16,383 tweets; 3,632 nodes; 382 groups (focused on 5 most powerful groups)
Research showed powerful coordination among conspiracy groups calling for protest and actions against Gov. Whitmer. FBI later unraveled a plot to kidnap Gov. Whitmer.



$$\max \sum_{i=1}^n \delta_i \quad (1)$$

Subject to

$$\delta_i = \{d\tilde{c}_1 \ll d\tilde{c}_2 \ll d\tilde{c}_3 \ll \dots \ll d\tilde{c}_i\} - \overline{dc}^0 \quad \forall i, j \quad (2)$$

$$d_i^c = \sum_j m_{ij} \quad \forall i \quad (3)$$

$$d_i^c \geq 2 \quad \forall i \quad (4)$$

$$D_i^c = \frac{1}{n} \sum_{i=1}^n d_i^c \quad (5)$$

$$D_i^c < d_i^c \leq D_i^u \quad \forall i \quad (6)$$

$$a_i^c = \frac{(\# \text{ of Triangles}) \times 3}{\# \text{ of Connected Triples of Nodes}} \quad \forall i \quad (7)$$

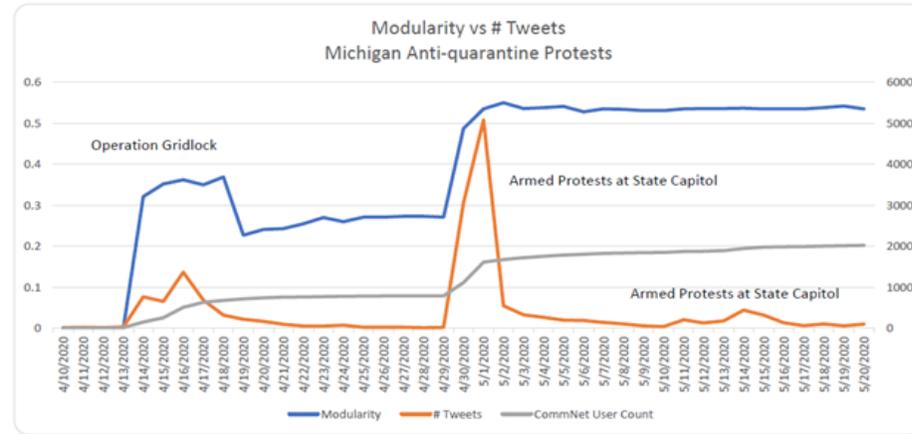
$$AC_i^L = \frac{1}{n} \sum_{i=1}^n a_i^c \quad (8)$$

$$AC_i^L < a_i^c \leq AC_i^U \quad \forall i \quad (9)$$

$$C_i^c = \{c_1^c, c_2^c, c_3^c, \dots, c_i^c\} - c_j^0 \quad \forall i, j \quad (10)$$

$$\overline{dc}_{i,n \times k} = \overline{dc}_k \quad \forall i \quad (11)$$

$$F = \{c_0, c_j^0, c_{j+1}^0, \dots, c_k^0\} \quad \forall j, k \quad (12)$$



Communities	Political Category	No. of Users in Each Community	No. of Nodes	No. of Edges	Modularity	Average Weighted Degree	Average Betweenness Centrality	DCFM Power
Largest Community	Right	459	510	526	0.294	1.457	0	90.88
Second Community	Right	152	284	419	0.578	2.771	0	77.12
Third Community	Right	212	269	322	0.468	1.792	0	280.98
Fourth Community	Left	78	204	491	0.422	9.779	24.26	10.36
Fifth Community	Left	115	243	339	0.608	7.683	0.16	28.94

Table Y1 - Top 5 Largest Modularity-Based Communities

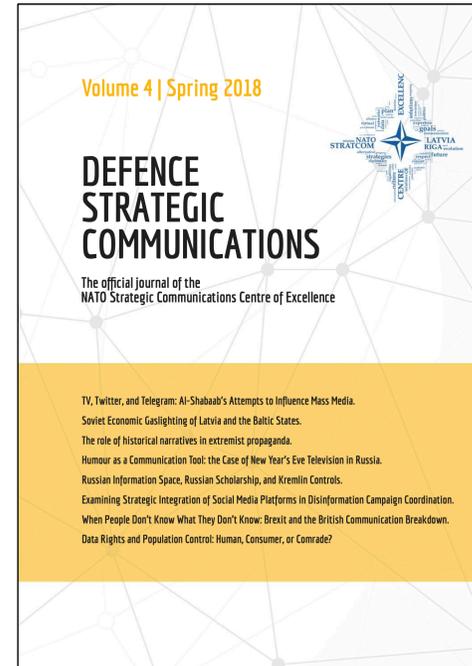
Elsevier Journal of Information Processing and Management. Springer's Central European Journal of Operations Research. Journal of Computational and Mathematical Organization Theory, Journal of Social Network Analysis and Mining. (2020, 2021, 2022, 2023, 2024)

Research and Books

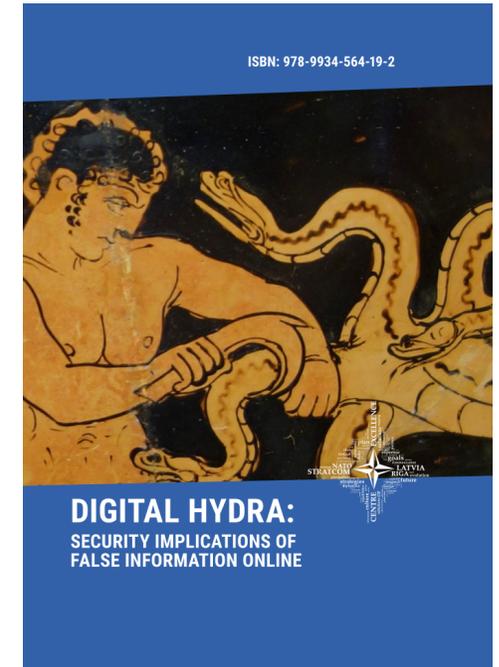


Large-Scale Combat Operations Book Set

Published by Army University Press, in 7 volume book set on **Large-Scale Combat Operations**, in the book titled "Perceptions are Reality: Information Operations" (AUSA)



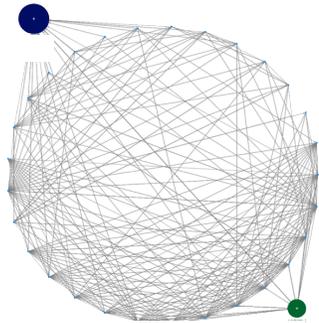
Examining Strategic Integration of Social Media Platforms in Disinformation Campaign Coordination. **Journal of NATO Defence Strategic Communications**



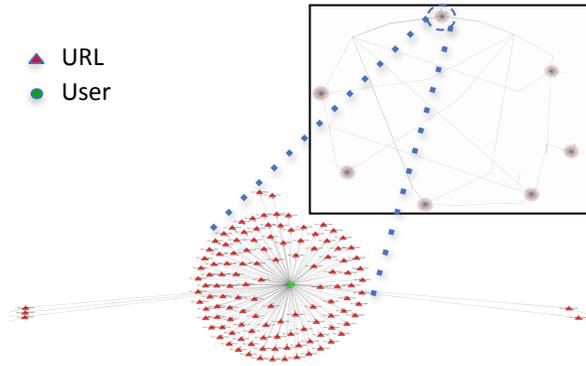
Blogs, Fake News, and Influence Operations. Digital Hydra: False Information Online as a Weapon, **NATO StratCom COE.**

From bots → botnets → social bots

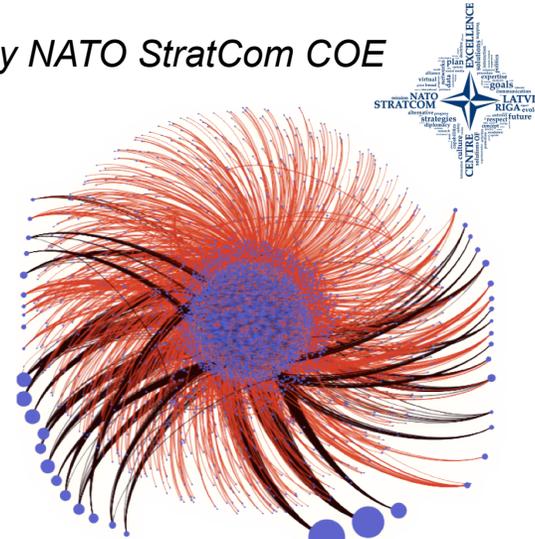
Published by NATO StratCom COE



Mutual reciprocity.
IFYM & FMIF



No mutual reciprocity.
Coordination in information network



Organizational hierarchy.
Core and peripheral bots

COORDINATION/BEHAVIOR COMPLEXITY



Crimean Invasion 2014



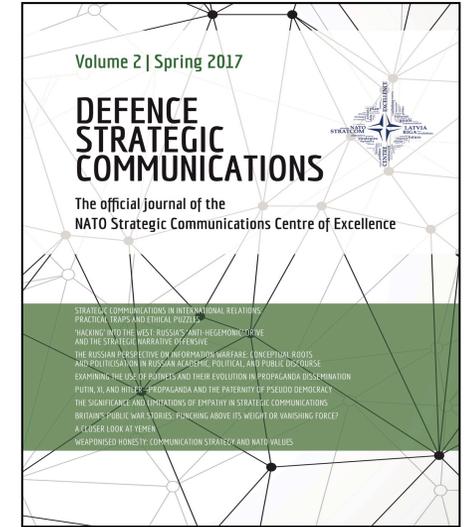
Dragoon Ride 2015



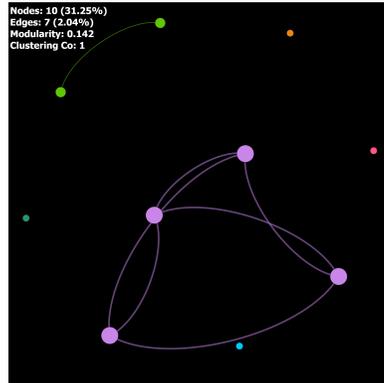
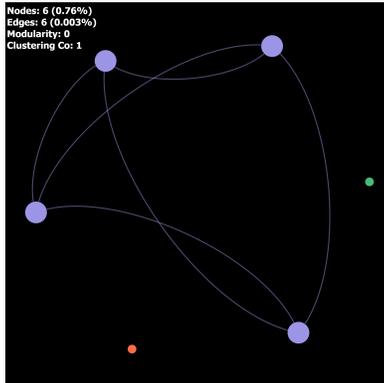
Trident Juncture 2015



ISIS Propaganda 2016

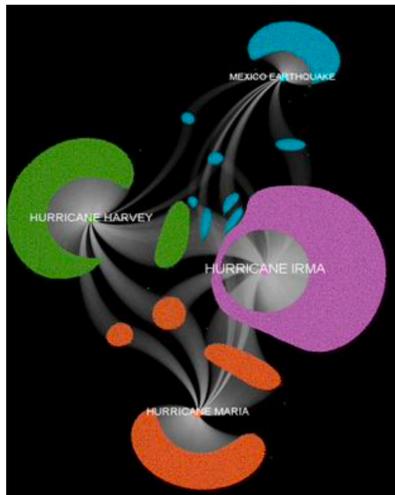
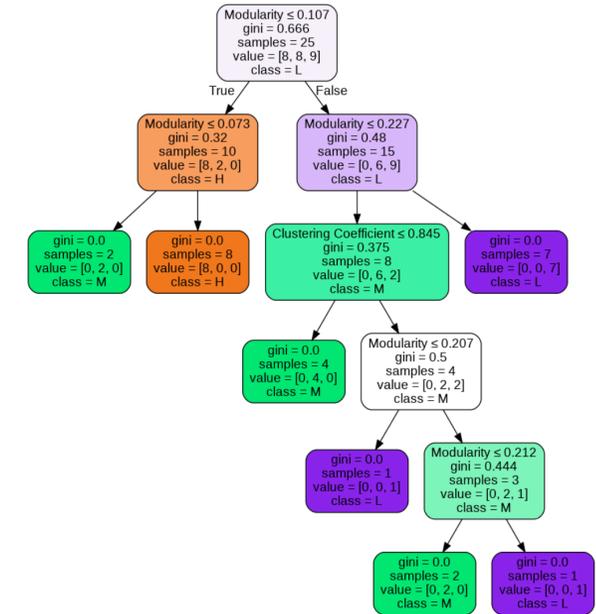
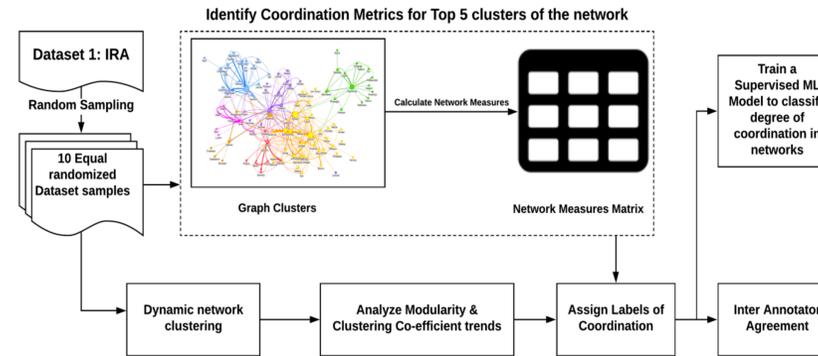


Examining the Use of Botnets and their Evolution in Propaganda Dissemination. **Journal of NATO Defence Strategic Communications**



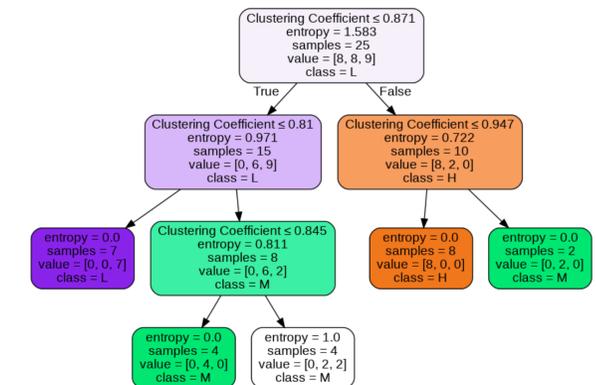
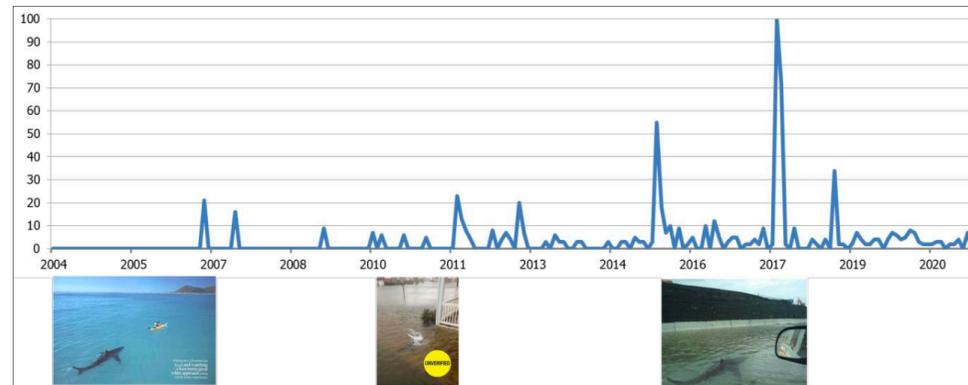
IRA Twitter bot data released by US Intelligence Agencies

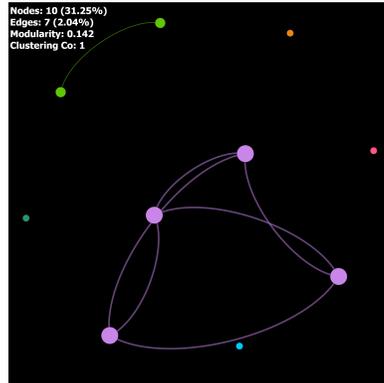
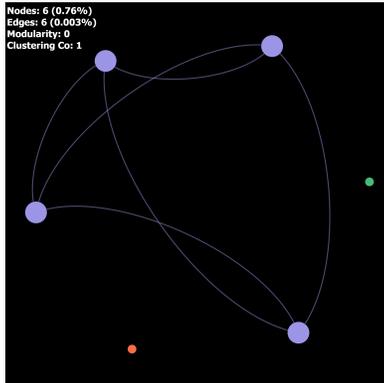
Detecting coordination among Twitter social bots IEEE Transactions on Computational Social Systems (TCSS), 2021.



Language	Hashtag (Translation)
English	#DACA, #BlackLivesMatter
Spanish	#VenezuelaDemocraciaYDialogo (Venezuela Democracy and Dialogue), #Cáncer (Cancer)
Arabic	(The demise Of Israel) #, (The Jews) #
French	#Nucléaire (Nuclear), #GendarmerieEnOpération (Gendarmier Special Operations)
Mandarin	金正恩 (Kim Jong-un), 核试验 (Nuclear Test)

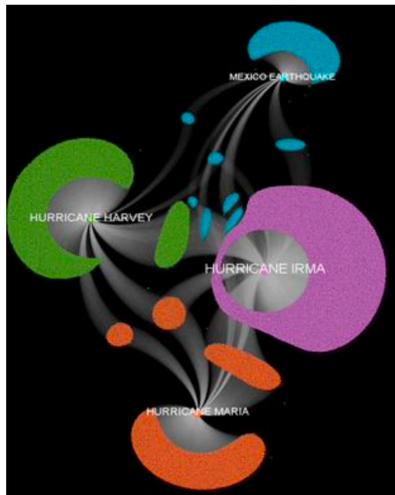
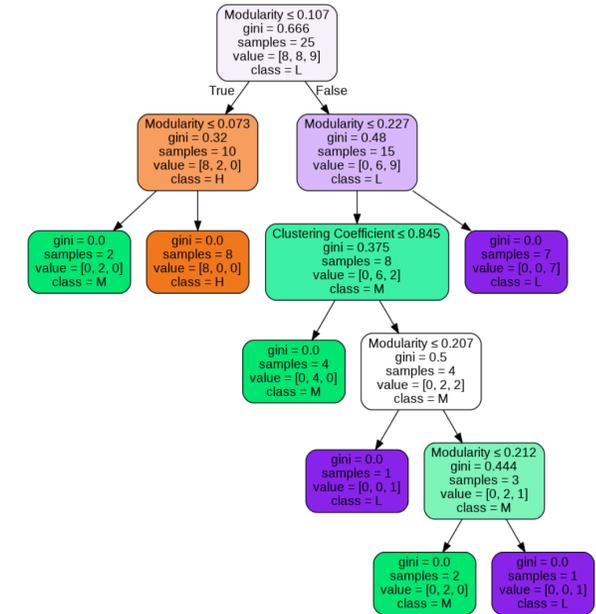
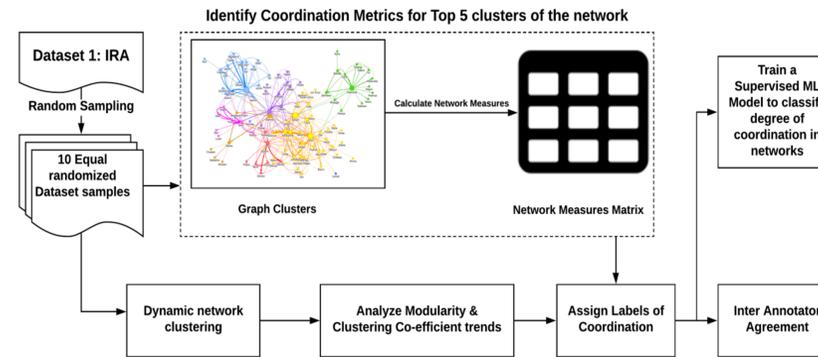
Bot coordinated misinformation during Hurricanes





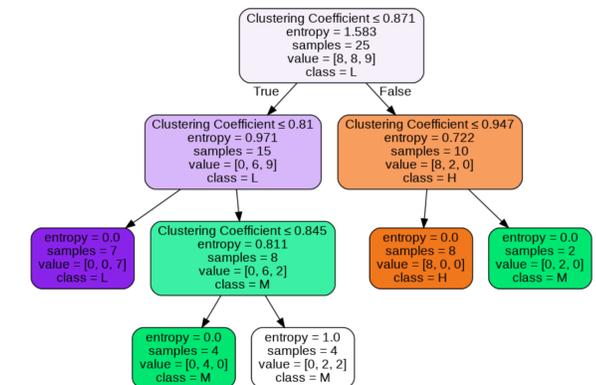
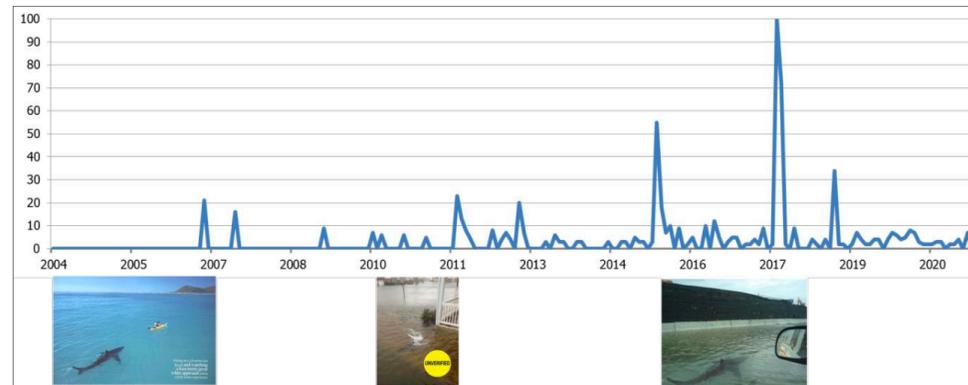
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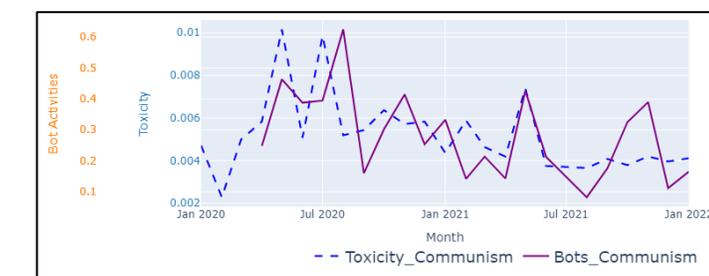
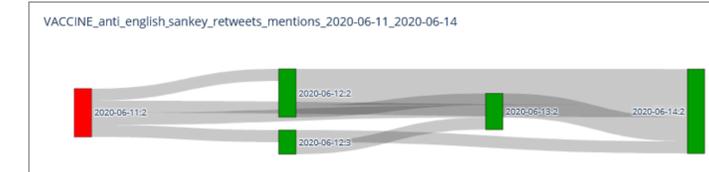
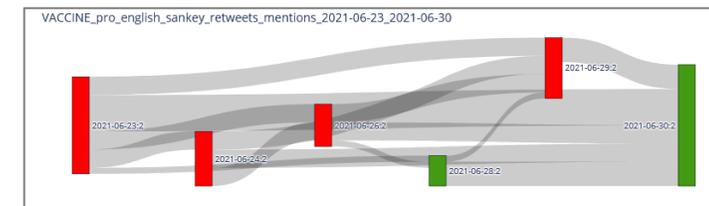
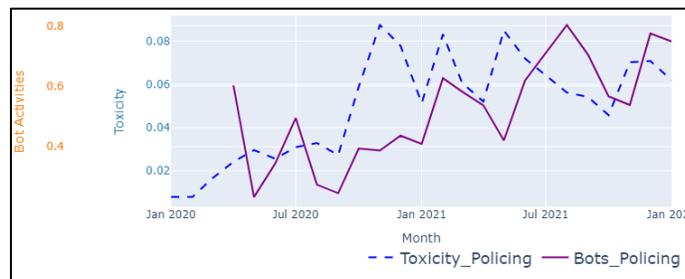
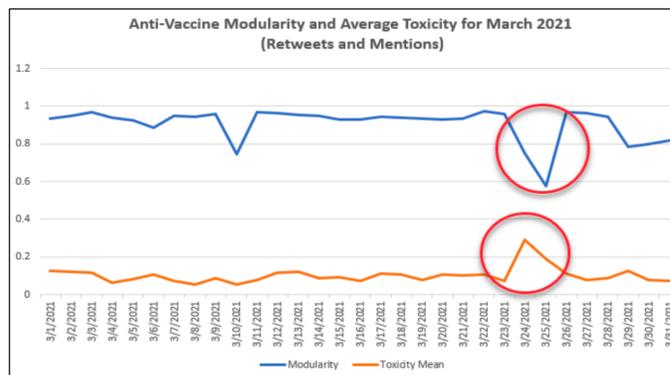
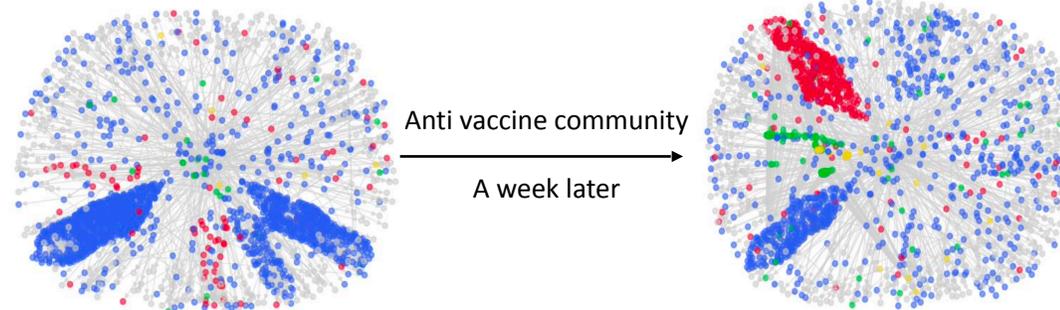


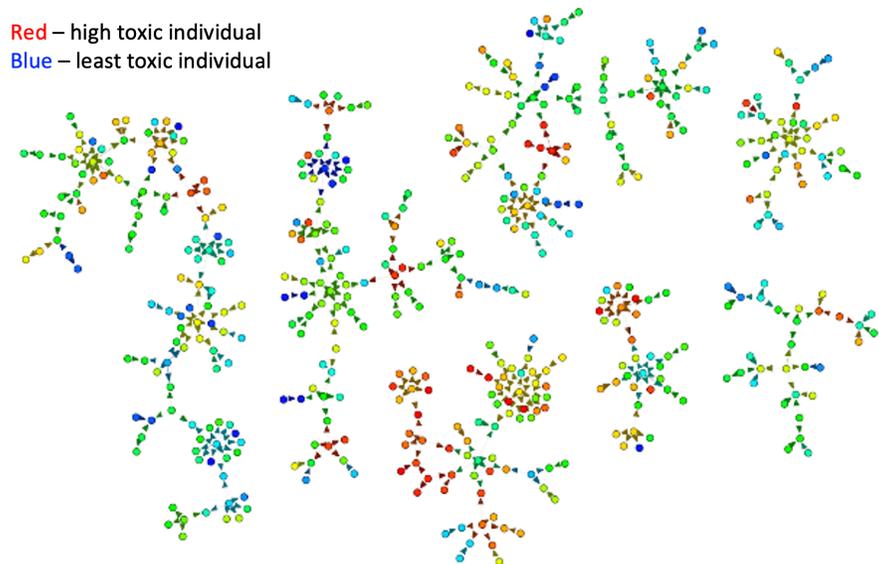
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Mandarin	金正恩 (Kim Jong-un), 核试验 (Nuclear Test)

Bot coordinated misinformation during Hurricanes



- Toxic discourse causes disruption and polarization/ segregation among communities.
- Community splinters when toxicity rises.
- Granger causality test suggests the effect is strongest after two days.
- Bot activity found to be positively correlated with toxicity.
- Higher toxicity leads to community fracturing.
- This work shows a way to measure impact of bots.





Toxicity analysis on YouTube commenters. Toxic discourse causes disruption and polarization/segregation among communities, as seen above. We demonstrate that by removing highly toxic users from a network, hate speech reduces, online discourse improves, and fractured communities heal. Our findings offer guidance to policymakers within each online social network to make informed decisions about the information environment and derive appropriate and timely countermeasures to continue providing a healthy platform for their users.

STRS epidemiological model for toxicity propagation – Susceptible (S); Toxic (T); Recovered (R); Susceptible (S)

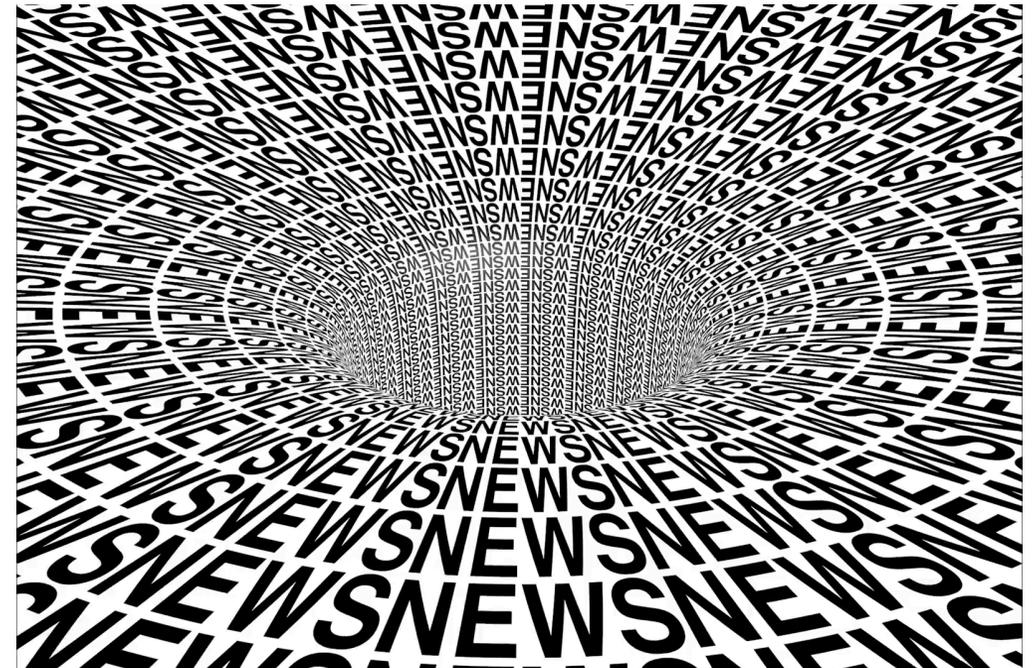
We demonstrate that by removing highly toxic users from a network, hate speech reduces, online discourse improves, and fractured communities heal. Our findings offer guidance to policymakers within each online social network to make informed decisions about the information environment and derive appropriate and timely countermeasures to continue providing a healthy platform for their users.

Experimental simulation	Toxicity score	Percentage reduction
Removal of top 10 users with high Betweenness centrality	0.720981759	0.21
Removal of top 10 users with high PageRank centrality	0.722317191	0.02
Removal of users with toxicity scores greater than 0.8	0.641927323	11.15

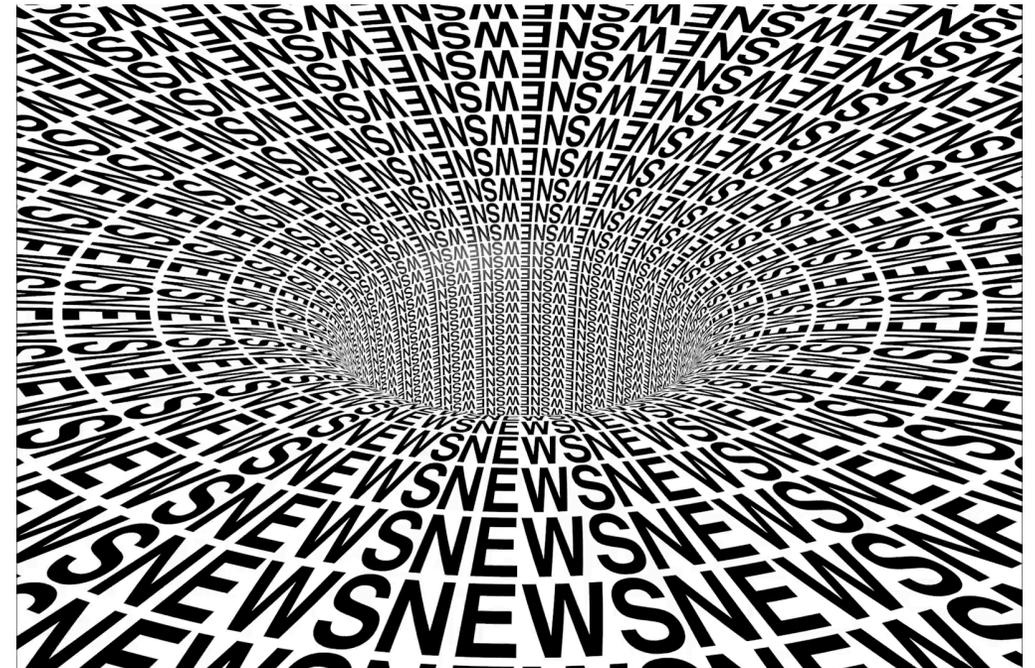
Elsevier Journal on Information Processing and Management Special issue on Dis/Misinformation Mining from Social Media 2022, HICSS 2022, AMCIS 2024, ICWSM 2024.

Working with Social Media platforms and Arkansas Office of the Attorney General

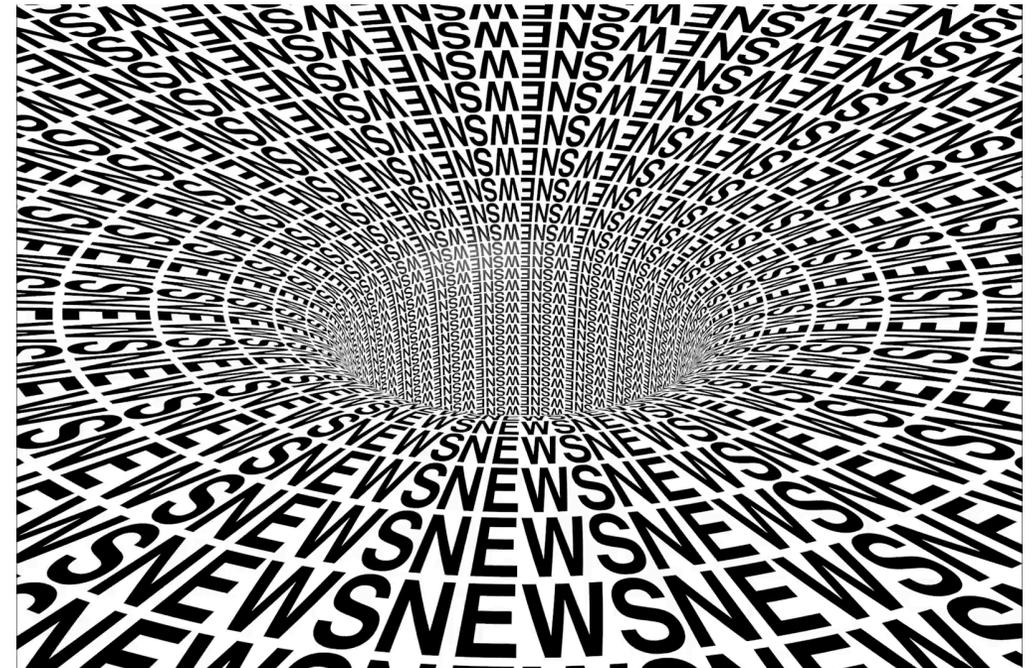
- AI-based recommendation algorithms that predict our shopping behaviors, books and articles to read, videos to watch lack transparency.
- Recommendation algorithm learns from behavioral data and perpetuates the underlying bias in its recommendations.
 - YouTube's recommendation algorithm is known to push its viewers down the conspiratorial rabbit hole by suggesting related videos.
 - On Facebook, ads to recruit delivery drivers for Domino's Pizza Inc. were disproportionately shown to men, while women were more likely to receive notices in recruiting shoppers for grocery-delivery service Instacart Inc.
- Explainable model could help in identifying causes of biased recommendations thereby enhancing the model's transparency.



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- Channel characterization based on implicit algorithmic bias requires identification and measurement of bias.
 - Power law distribution fitting (exponent)
 - Gini coefficient - a single number that demonstrates a degree of inequality in a distribution of income/wealth.
- Characterization based on context -> COVID-19 context showed largest implicit algorithmic bias, marked in red.
- Characterization based on impact -> Implicit bias resulted in extremist content communities (far left and far right information bubbles).

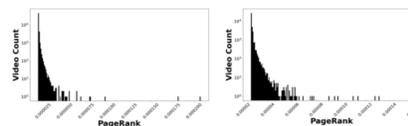


Fig. 1. Distribution of PageRank values in the recommendation graphs 1 (left) and 2 (right). We observe similar results in all recommendation graphs. The count of videos is represented in log scale on the y-axis.

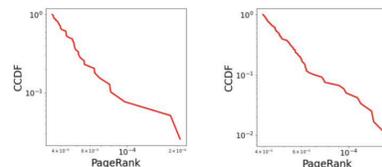
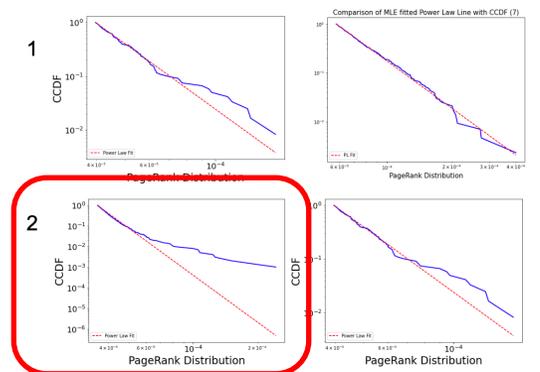
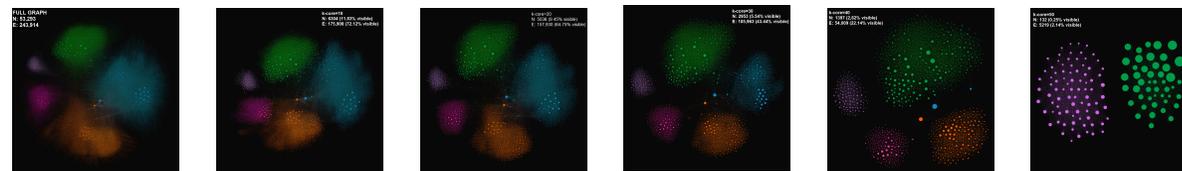


Fig. 2. Complementary Cumulative Distribution Function (CCDF) Plots of PageRank Scores in each Recommendation Graphs 1 (left) and 2 (right).

Topic drift and decrease in relevance was observed.

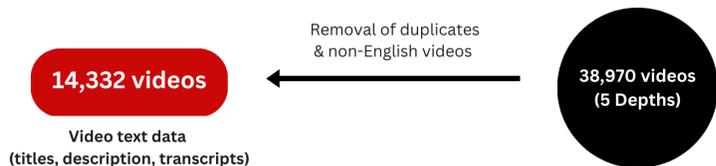
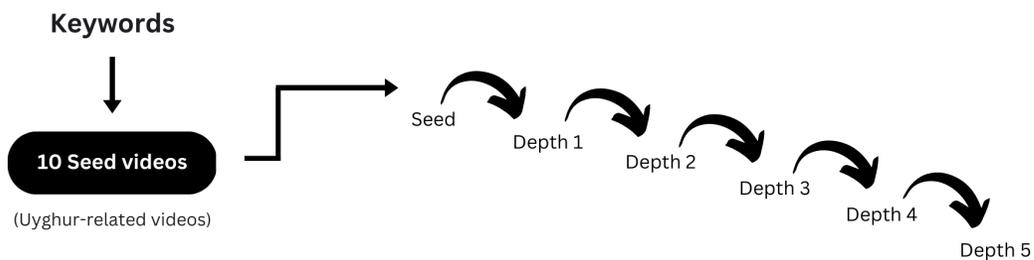


Top PageRank videos were removed weeks or months after their appearance in the recommendation network. Reason for content removal is violation of platform terms and services.



Far-left and far-right content communities/information bubbles resulting due to biased recommendations

Complex Networks 2021; ECIR 2023; Complex Networks 2023, 2024; ASONAM 2023, 2024, HICSS 2025



Emotion Assessment

joy, anger, sadness, fear, surprise, love

Popularity Assessment

video likes & video views

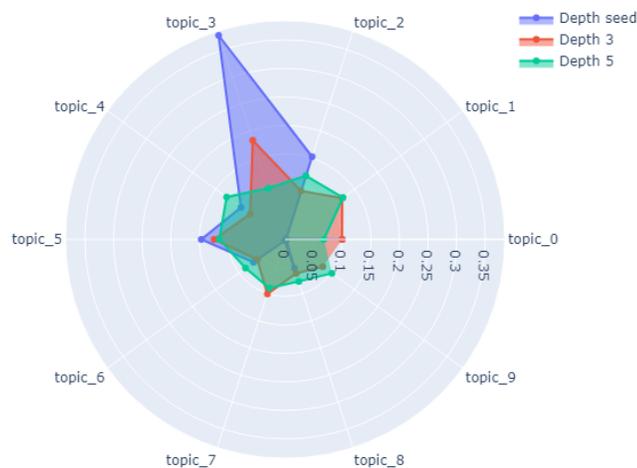
Topical Similarity Assessment

Hellinger divergence & Jensen-Shannon divergence.

Network and Content Analysis

'Highly-influential' videos & topic communities

Topic Drift

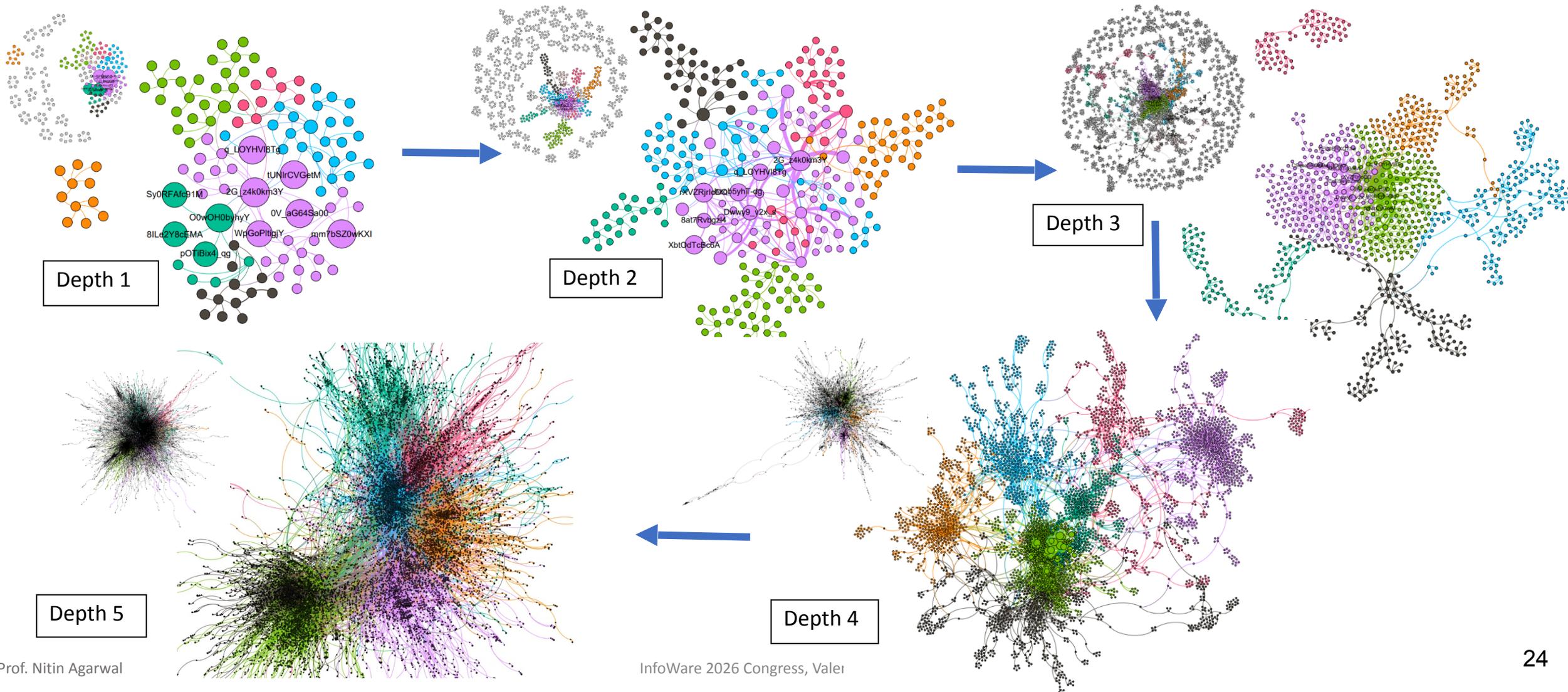


Emotion Drift



ECIR 2023, HUSO 2023, The Web Conference 2024, Jnl of SNAM 2024

AI Bias 'Hot Spots'



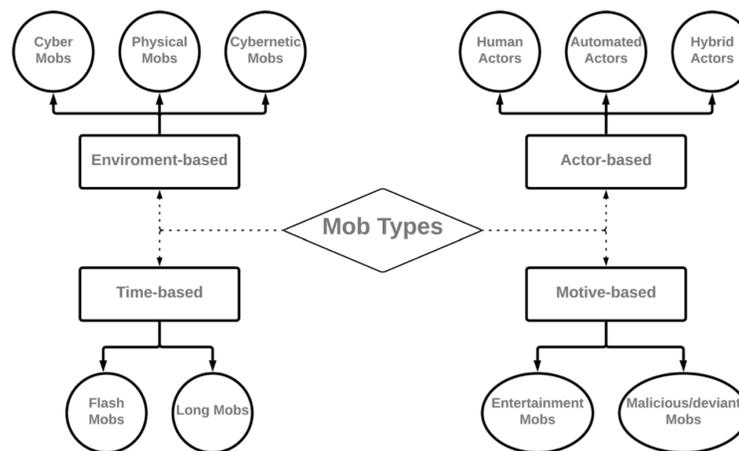
SCF and SNA informed methodologies to examine strategic combination of mainstream and fringe social media platforms; influence and reach of digital activity of extremist groups; multi-theoretic mob simulation – AI and Agent based modeling.



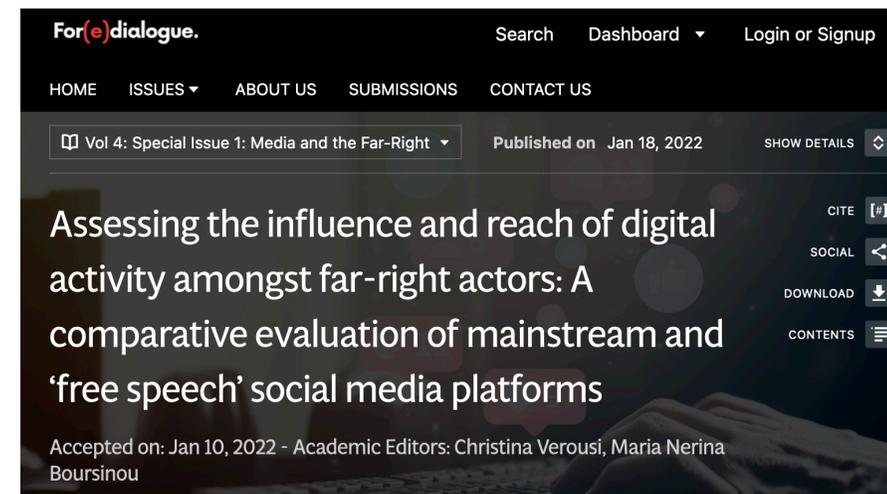
US



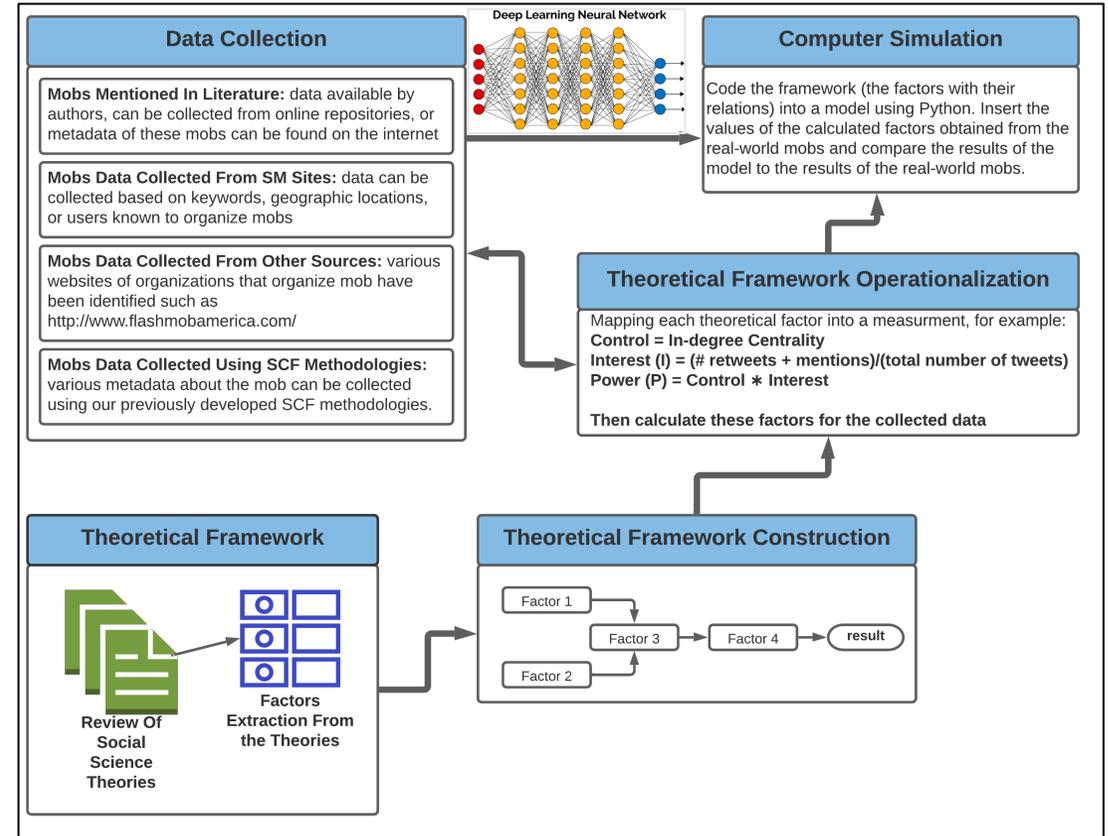
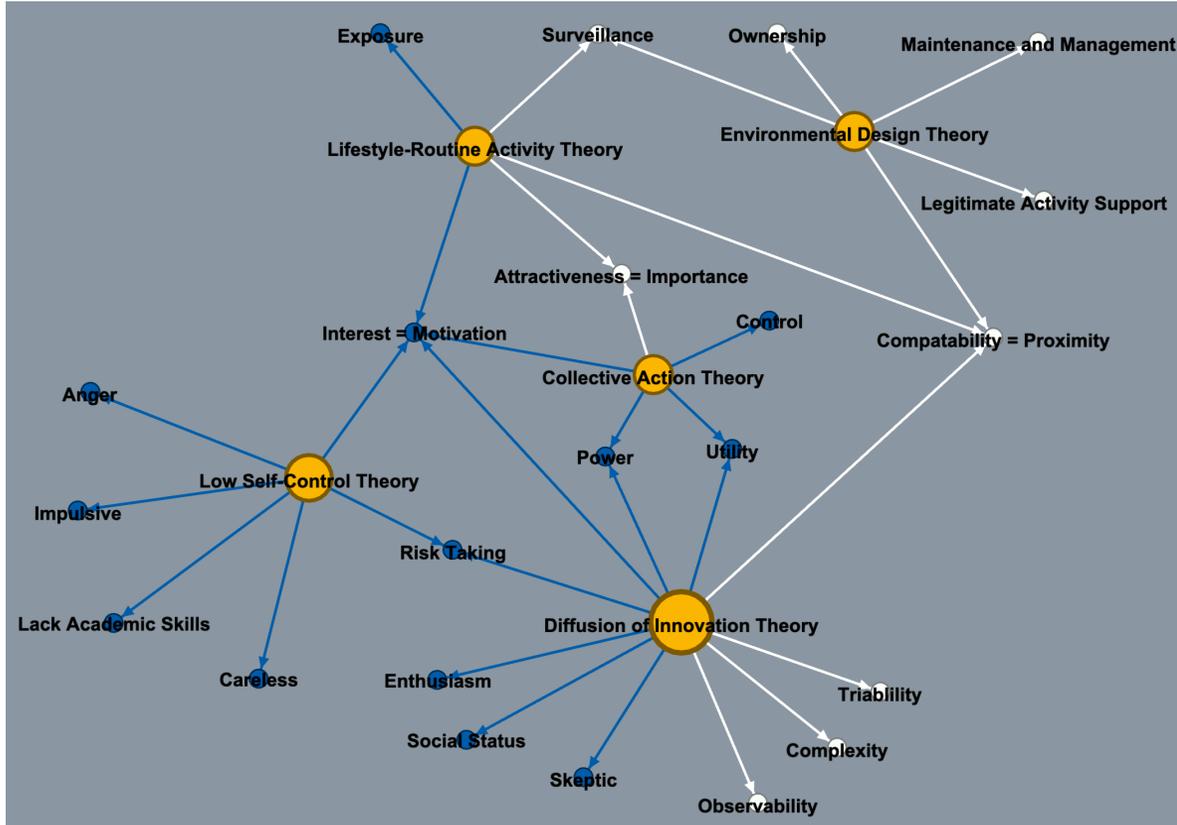
Brazil



Mob Characterization
(Social Networks Analysis & Mining, AMCIS, HICSS, 2021, 2022, 2023, 2024)

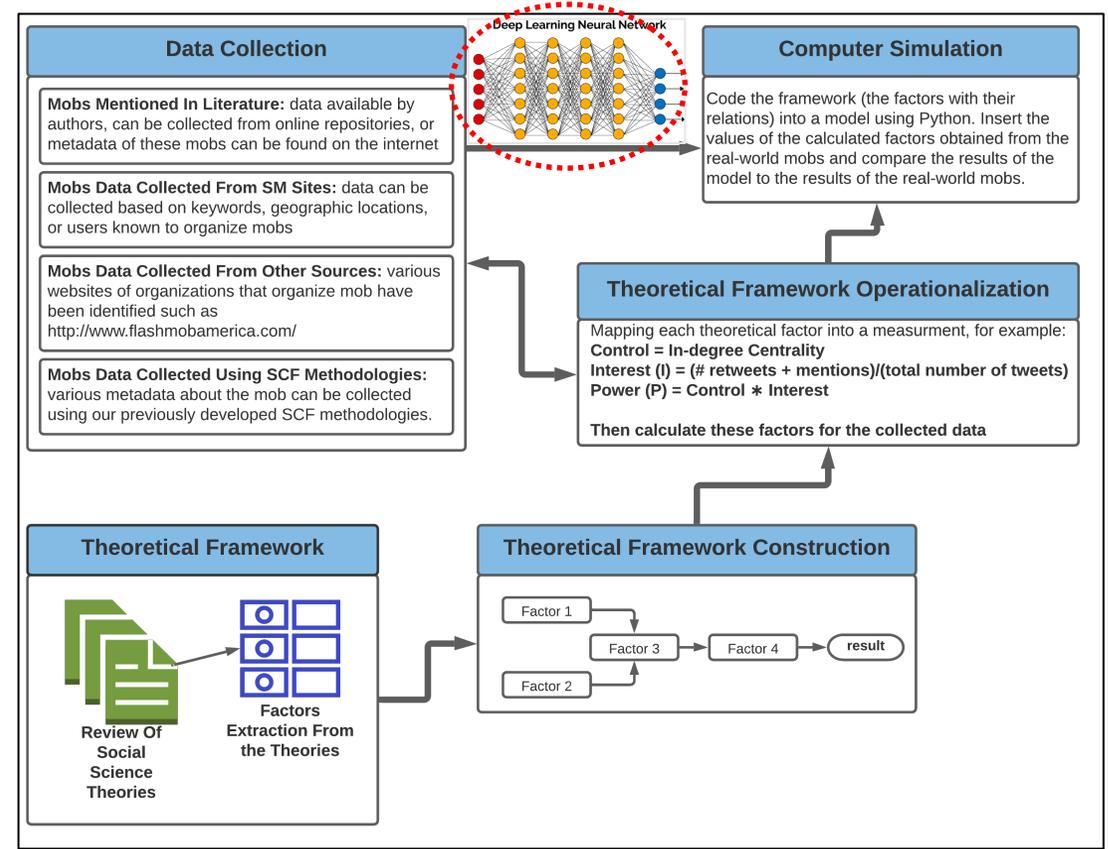
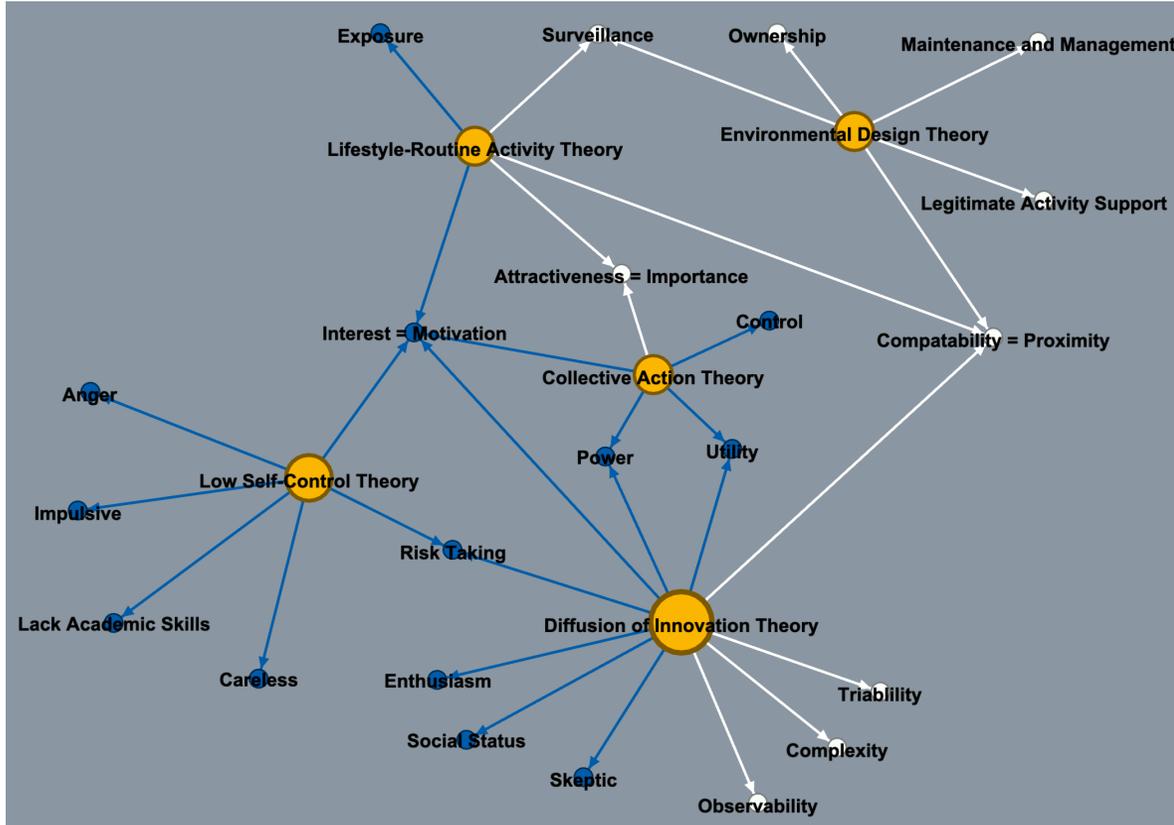


Influence and reach of digital activity of extremist groups (Agarwal et al., 2022, For(e)dialog)



Moral Foundations Theory					
Care	Fairness	Liberty	Loyalty	Authority	Sanctity
Harm	Cheating	Oppression	Betrayal	Subversion	Degradation



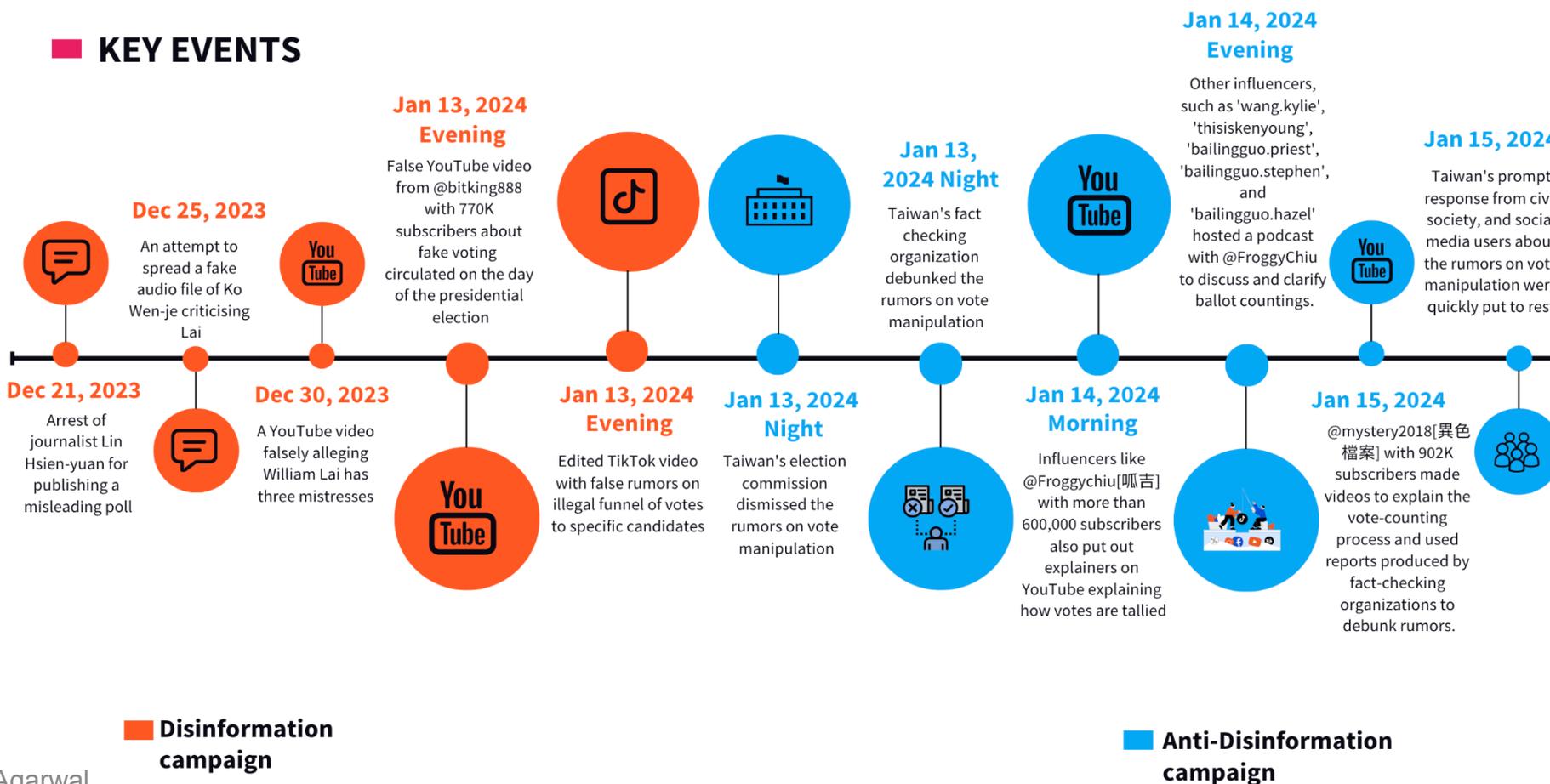


Moral Foundations Theory					
Care	Fairness	Liberty	Loyalty	Authority	Sanctity
Harm	Cheating	Oppression	Betrayal	Subversion	Degradation



Taiwan 2024 Elections

KEY EVENTS



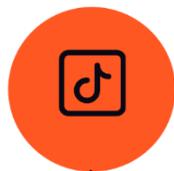
Taiwan 2024 Elections

KEY EVENTS



Jan 13, 2024
Evening

Use YouTube video from @bitking888 with 770K subscribers about fake voting circulated on the day of the presidential election



Jan 13, 2024
Evening

Edited TikTok video with false rumors on illegal funnel of votes to specific candidates

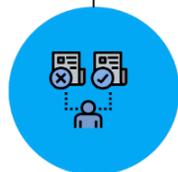


Jan 13, 2024
Night

Taiwan's election commission dismissed the rumors on vote manipulation

Jan 13, 2024
Night

Taiwan's fact checking organization debunked the rumors on vote manipulation



Jan 14, 2024
Morning

Influencers like @Froggychiu[呱吉] with more than 600,000 subscribers also put out explainers on YouTube explaining how votes are tallied



Jan 14, 2024
Evening

Other influencers, such as 'wang.kylie', 'thisiskeyoung', 'bailingguo.priest', 'bailingguo.stephen', and 'bailingguo.hazel' hosted a podcast with @FroggyChiu to discuss and clarify ballot countings.



Jan 15, 2024

@mystery2018[異色檔案] with 902K subscribers made videos to explain the vote-counting process and used reports produced by fact-checking organizations to debunk rumors.



Jan 15, 2024

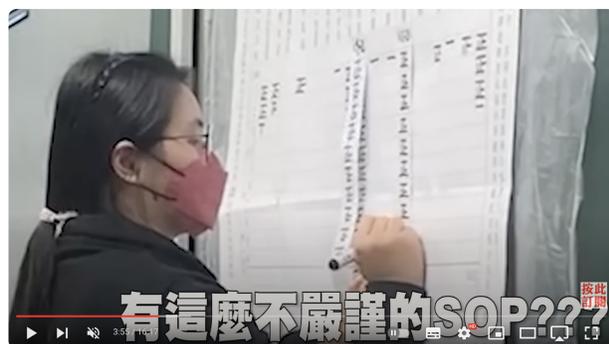
Taiwan's prompt response from civil society, and social media users about the rumors on vote manipulation were quickly put to rest

Disinformation campaign

Anti-Disinformation campaign

Taiwan 2024 Elections

KEY EVENTS



【中英字幕】這不是作票！什麼才是作票？原本不相信！直到半夜收到雪片般飛來的監票影片，才發現事情大條了！#柯文哲#2024總統大選#做票

Bit King REAL Taiwan's true 770K subscribers

2M views 1 month ago 比特王新聞
影片由監票群組網友提供
滿夜整理到早上請按讚分享出去
收看廣告是對我們最大的鼓勵！...more

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Use YouTube video from @bitking888 with 770K subscribers about fake voting circulated on the day of the presidential election



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Other influencers,



【呱吉】台灣選舉作票指南2024年版

呱吉 608K subscribers

645,095 views Premiered on 14 Jan 2024

explainers on YouTube explaining how votes are tallied

reports produced by fact-checking organizations to debunk rumors.

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KEY EVENTS



Jan 14, 2024
Evening

Other influencers,



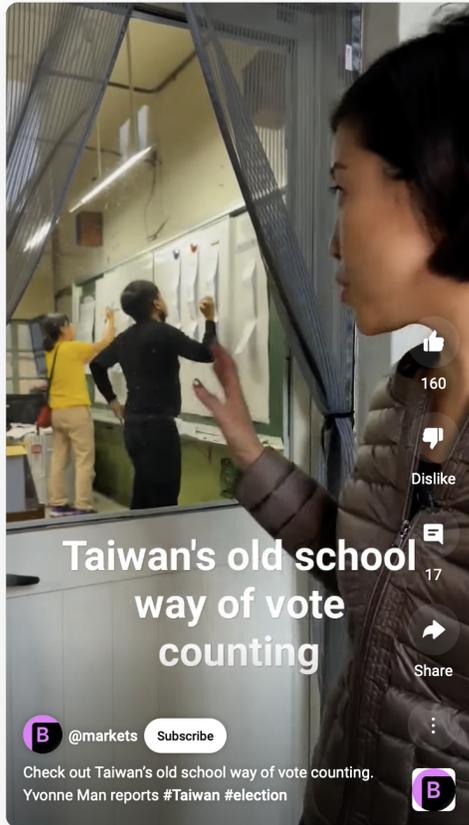
explainers on YouTube explaining how votes are tallied

reports produced by fact-checking organizations to debunk rumors.

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Voting doesn't need to be efficient, it needs to accurately reflect the uncoerced will of the people. This is the way to do it.
14 likes

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7 likes

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That is most transparency way for all level people
3 likes

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Very interesting. As long as the count is accurate. Whatever works for them. All the best to the new government
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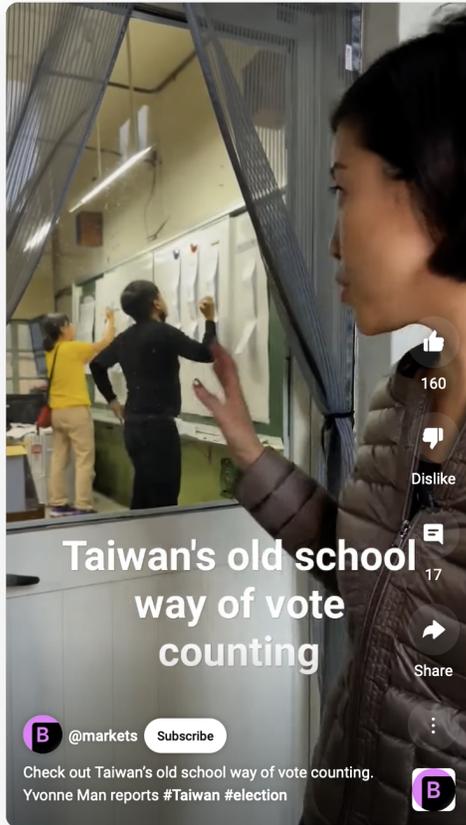
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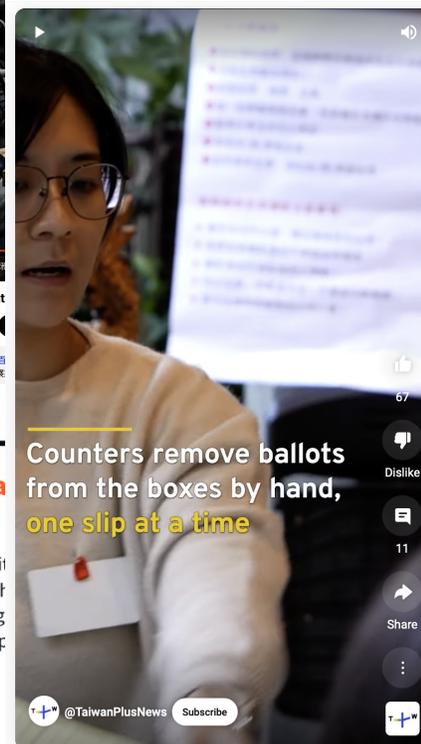
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3 likes · Reply
- @andyang5234** 1 month ago
Given the fervor surrounding Taiwanese elections, full transparency of the process and leaving no room for doubt is paramount.

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- @rubylaser6601** 1 month ago (edited)
People can see every vote and record the process.
5 likes · Reply
- @jennyfan9586** 2 months ago
But it is open and transparent,
5 likes · Reply
- @sonurajacrypto** 2 months ago
Very slow and manual
1 like · Reply
3 replies
- @t5e2** 1 month ago
Yes the efficiency of the people counting is impressive.
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- @fila6243** 1 month ago
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- @ShaGuangZhiNaZhu** 1 month ago
Transparency comes first.
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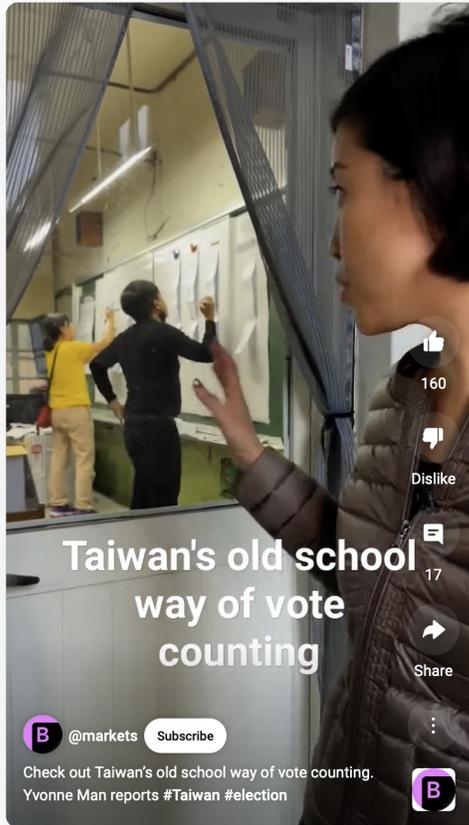


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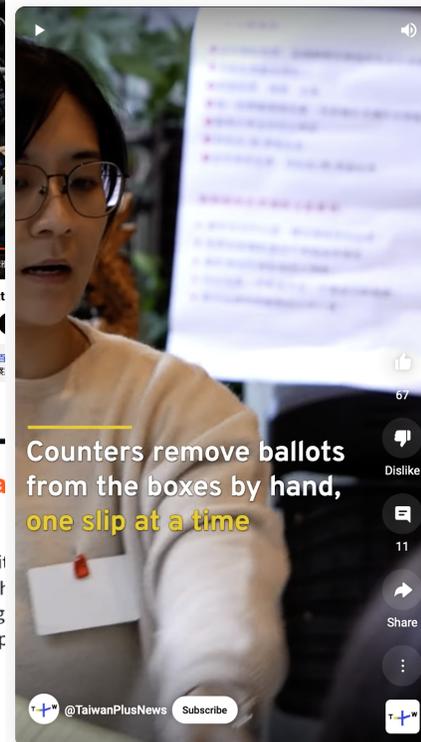
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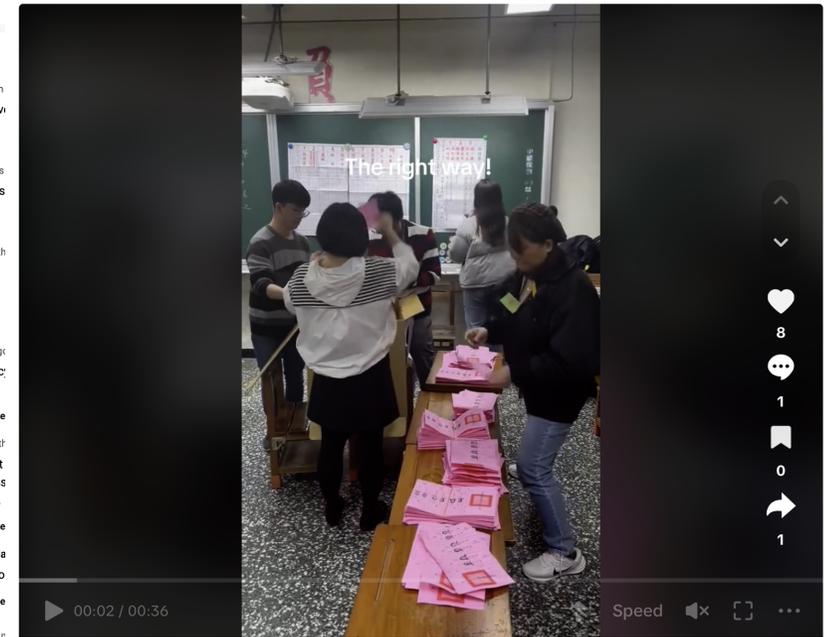
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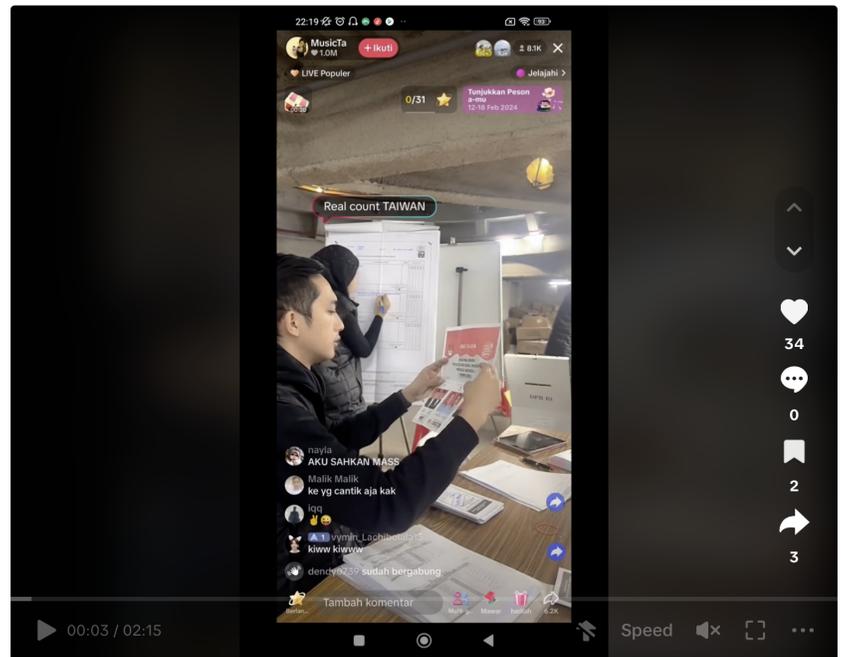
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Taiwan's old school way of vote counting



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Check out Taiwan's old school way of vote counting. Yvonne Man reports #Taiwan #election

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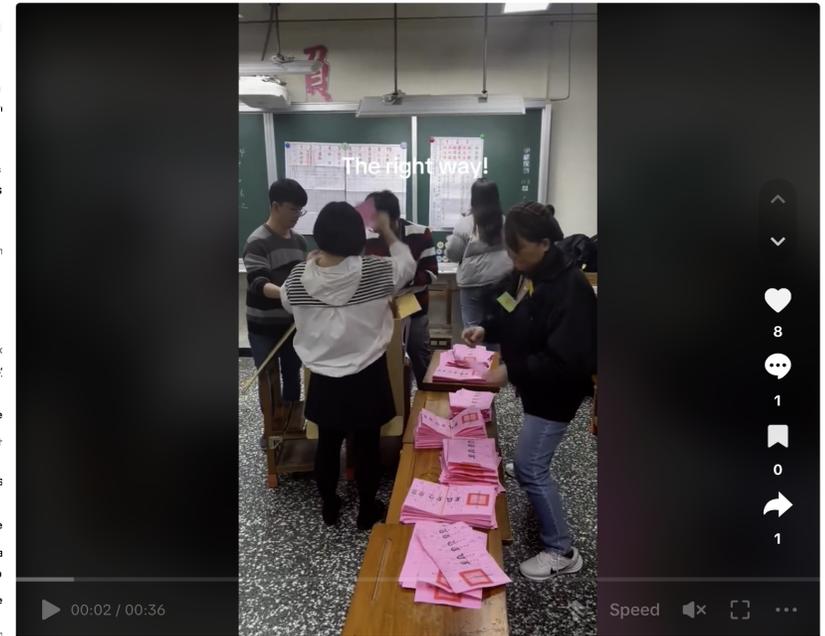
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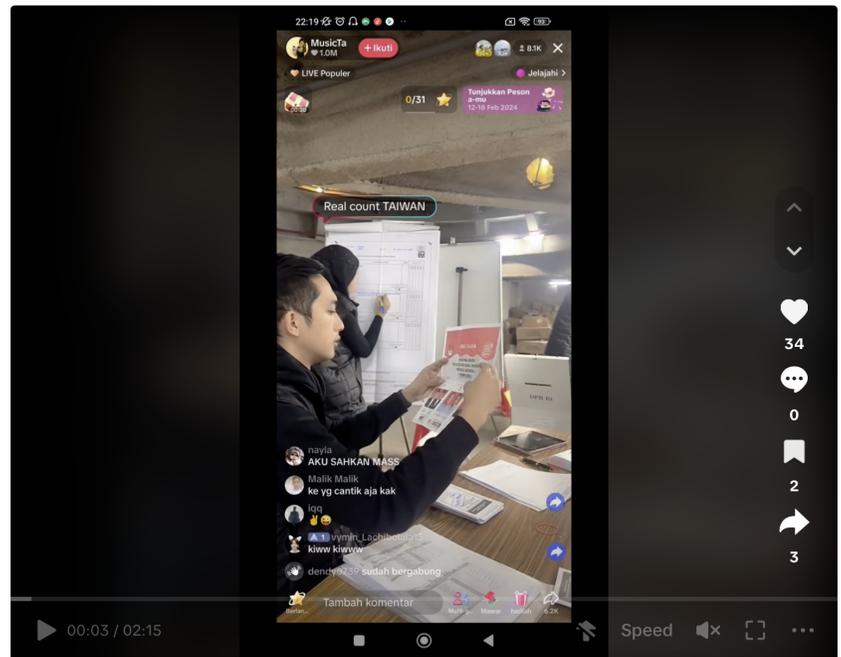
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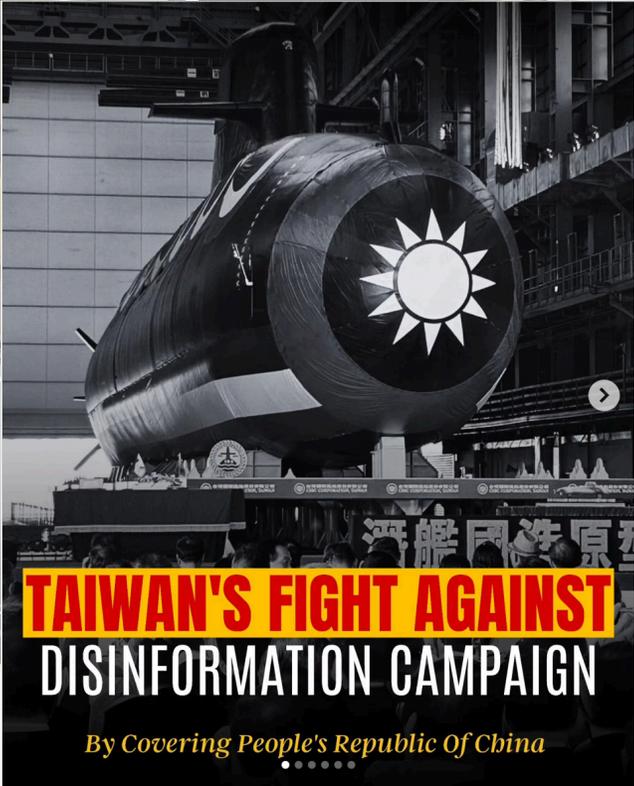
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TAIWAN'S FIGHT AGAINST DISINFORMATION CAMPAIGN

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The recent elections in Taiwan reveal that there were cases of Chinese intervention that were offset by Taiwanese civil societies using artificial intelligence.

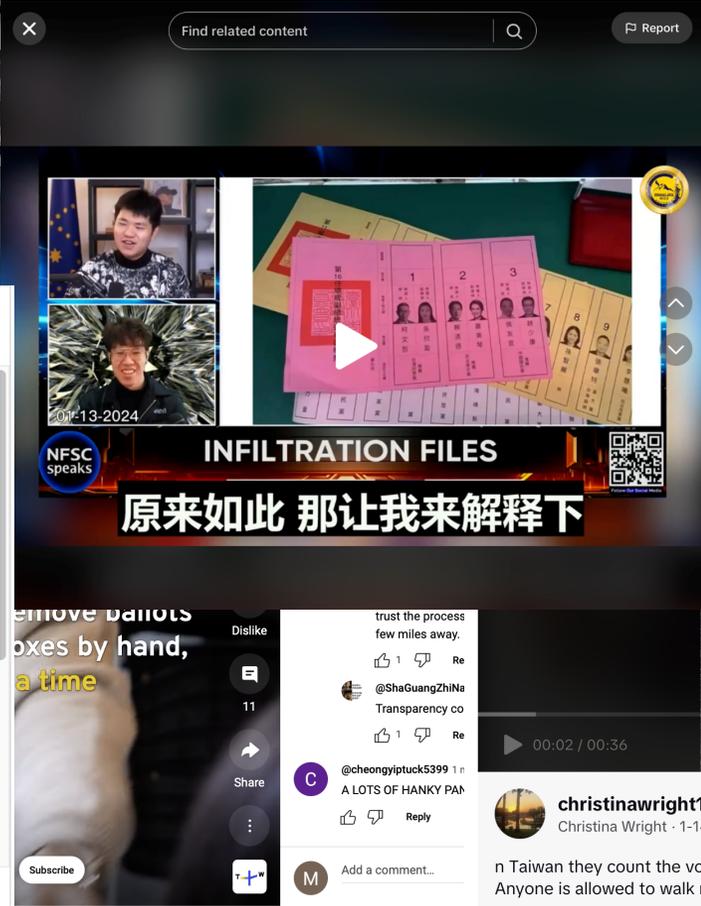
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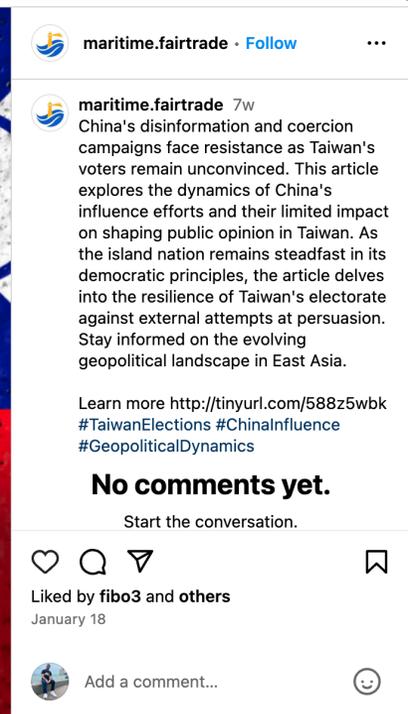
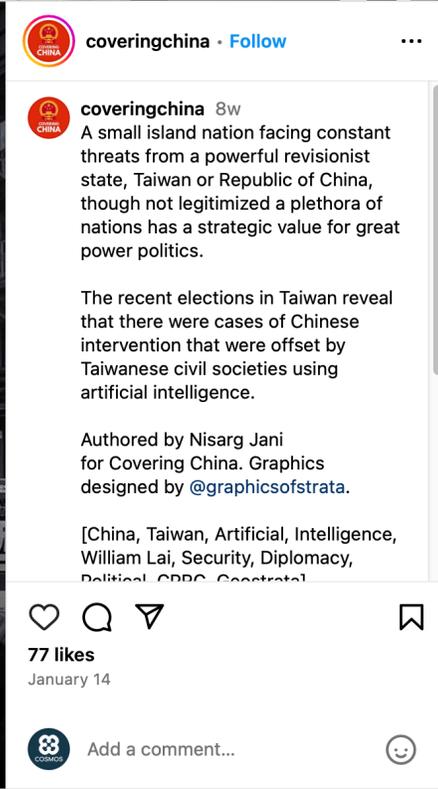
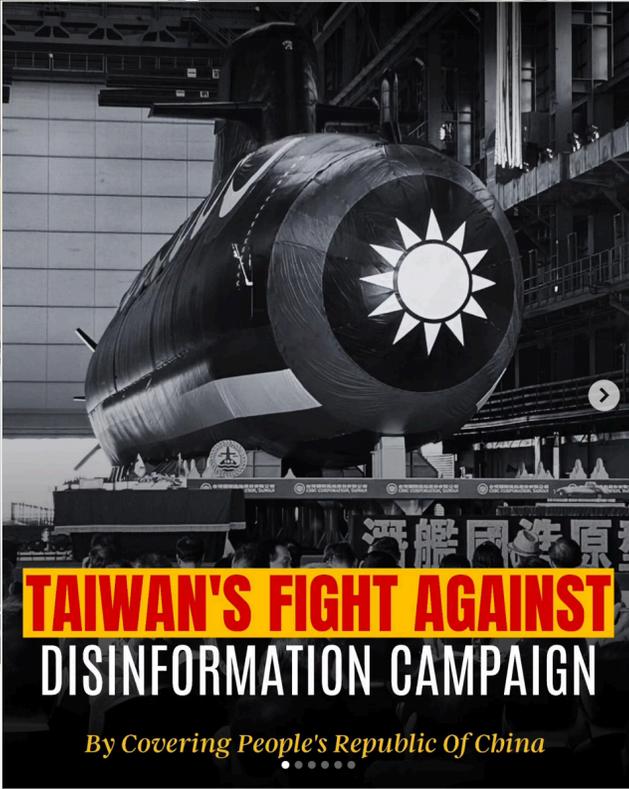
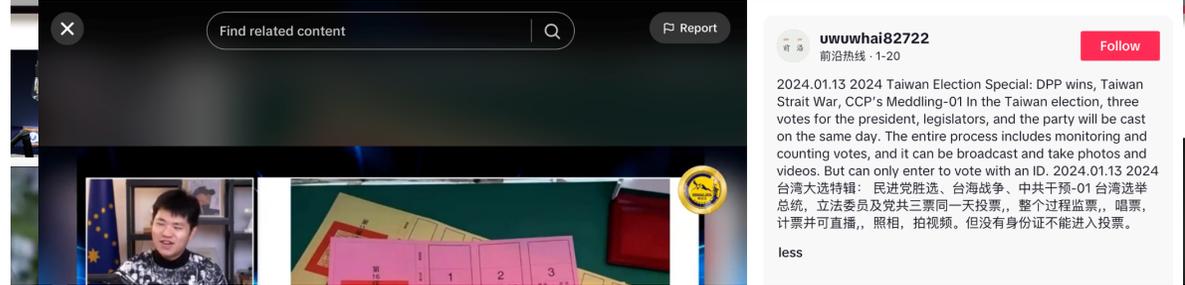
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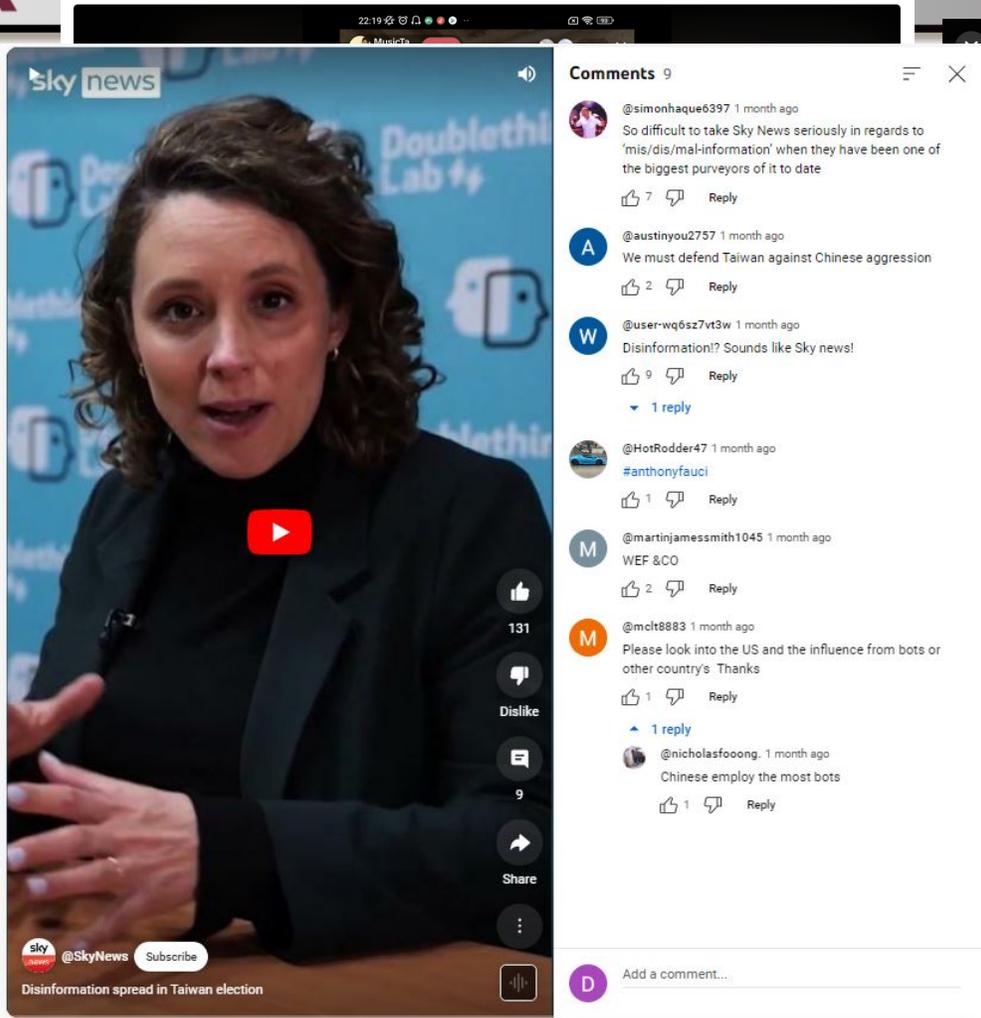
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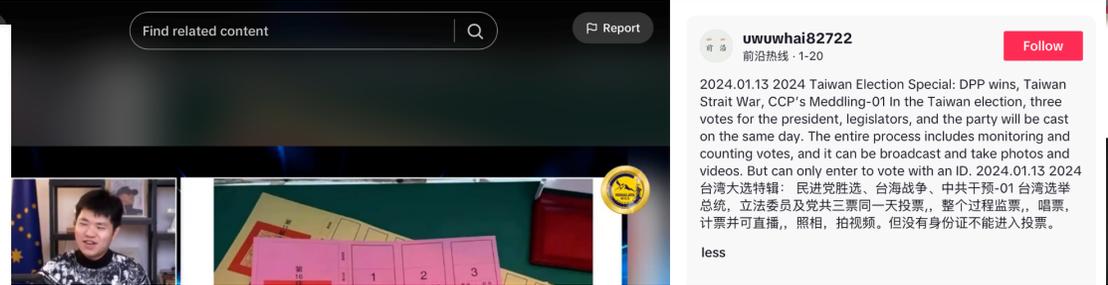
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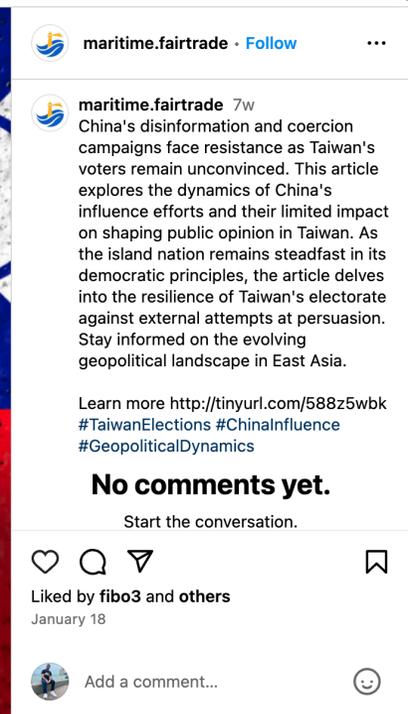
- @simonhaque6397 1 month ago
So difficult to take Sky News seriously in regards to 'mis/dis/mal-information' when they have been one of the biggest purveyors of it to date
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We must defend Taiwan against Chinese aggression
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- @mclt8883 1 month ago
Please look into the US and the influence from bots or other country's Thanks
- @nicholasfooong, 1 month ago
Chinese employ the most bots



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CHINA'S INTRUSIVE ATTEMPT FAILS To Convince Taiwan's Voters



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China's disinformation and coercion campaigns face resistance as Taiwan's voters remain unconvinced. This article explores the dynamics of China's influence efforts and their limited impact on shaping public opinion in Taiwan. As the island nation remains steadfast in its democratic principles, the article delves into the resilience of Taiwan's electorate against external attempts at persuasion. Stay informed on the evolving geopolitical landscape in East Asia.

Learn more <http://tinyurl.com/588z5wbk> #TaiwanElections #ChinaInfluence #GeopoliticalDynamics

No comments yet.
Start the conversation.

By Covering People's Republic Of China

Social Media a Positive Force



Fighting Disinformation in Taiwan's Local Elections

The Fight Against Disinformation in Taiwan's Local Elections | TaiwanPlus News

TaiwanPlus News 36.3K subscribers

229 views 1 year ago #Mayor #Taiwan #election
Reporters: Klein Wang/James Chater

Taiwan is a global hotspot for disinformation and fact-checking groups say fake news is on the rise in the run-up to the country's local elections. James Chater meets some of those on the front line...

8 Comments

Add a comment...

@huoyeh4319 1 year ago
BRAVO CHINESE Taipei, DIEwan province of China !!!!! PEACE, not war

@NickiH-sc8uo 1 year ago
Taiwan tw democracy 🙌🙌🙌

@user-vg1xv3ii5u 1 year ago
So TaiwanPlus is a mouthpiece for the DPP? Some DPP funding members also criticize the DPP's corruptions, including this guy and the guy you show as misinfo. Do not only interview the DPP supporters. Pubic TVs are supported by tax dollars, the DPP should not control or influence them.



By Covering People's Republic Of China
Prof. Nitin Agarwal

Anti-Disinformation
campaign

Social Media a Positive Force



Mei Wang @MeiWangv · Feb 1
#Chinese are quite expert in floating disinformation! It's known that Chinese intended to use misleading information to compromise #Taiwan's recent elections. @BoycottHegemony 1/3



taipeitimes.com
IN FOCUS: Taiwanese came together to combat disinformation
Bringing Taiwan to the World and the World to Taiwan

1 1 1 79

Mei Wang @MeiWangv
Videos purportedly showing voter fraud were refuted by #Taiwan's #FactCheck Center, one of which showed #election workers making an unintentional mistake that was captured on camera. #ShameChina 2/3

6:31 AM · Feb 1, 2024 · 16 Views

1 1 1

Post your reply Reply

Mei Wang @MeiWangv · Feb 1
#China is dumbly expert in every tactic of deceiving other nations! Having ZERO Media literacy and a tall man in creating fake news. #Taiwan is tackling China with a "whole of society response." 3/3

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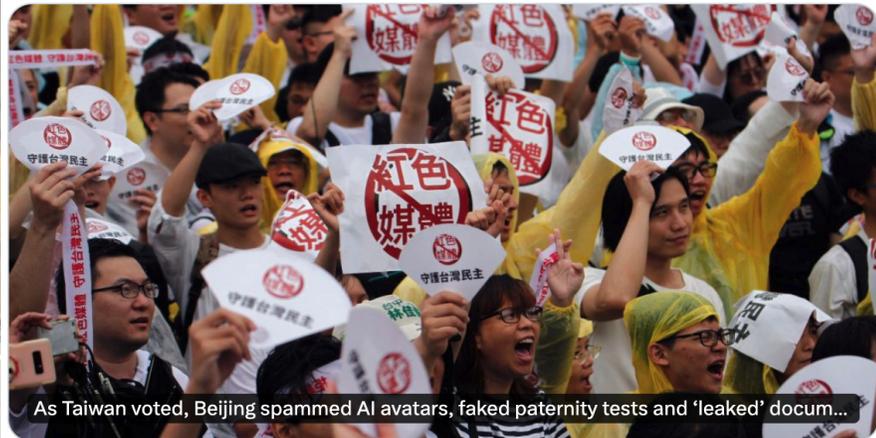
guy you show as misinfo. Do not only interview the

Social Media a Positive Force



Doublethink Lab
@doublethinklab

The success of Taiwan's whole-of-society counter-disinformation and propaganda efforts is primarily due to civil organisations, including Doublethink Lab, the Information Environment Research Center, Taiwan FactCheck Center, Cofacts, Kuma Academy et al.



As Taiwan voted, Beijing spammed AI avatars, faked paternity tests and 'leaked' docum...

From aspistrategist.org.au

2:26 AM · Jan 18, 2024 · 3,662 Views

10 17 33 9



Prof. Nitin Agarwal



Mei Wang @MeiWangv · Feb 1

#China are quite expert in floating disinformation! It's known that ...
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stake that was captured on camera. #ShameChina 2/3

24 · 16 Views

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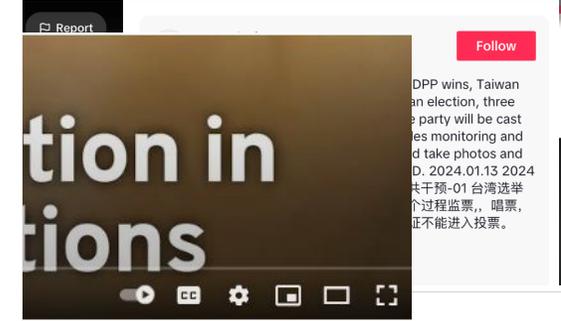
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@MeiWangv · Feb 1

#China is dumbly expert in every tactic of deceiving other nations! Having
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tackling China with a "whole of society response." 3/3



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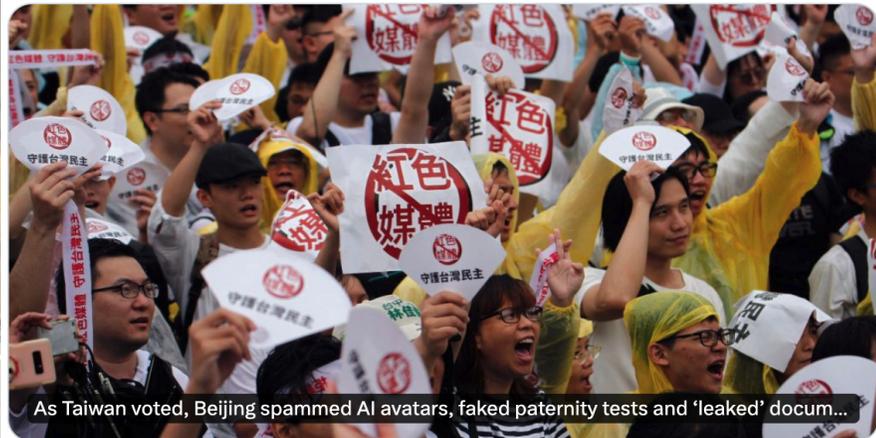
Anti-Disinformation
campaign

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Doublethink Lab
@doublethinklab

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As Taiwan voted, Beijing spammed AI avatars, faked paternity tests and 'leaked' docum...

From aspistrategist.org.au

2:26 AM · Jan 18, 2024 · 3,662 Views

10 replies · 17 retweets · 33 likes · 9 bookmarks



Mei Wang @MeiWangv · Feb 1
#China are quite expert in floati...



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24 · 16 Views

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MeiWangv · Feb 1
#China is dumbly expert in every t...
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tackling China with a "whole of so...

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James @JamesMashadar · Jan 18
Private industry does the same on scale in the west with no repercussions or media coverage xx

Jaek People @Snowsands · Jan 18



campaign

Social Media a Positive Force



Alex Vuving
@Alex_Vuving

Time to demystify disinformation. It's not as effective as usually assumed. Despite China's extremely aggressive disinformation campaign, "Team Taiwan" DPP won an unprecedented 3rd term in Taiwan's presidential election.



Taiwan ruling party's Lai wins presidential election

From aljazeera.com

3:02 PM · Jan 13, 2024 · 5,886 Views

11 replies 10 retweets 66 likes 3 shares

Prof. Nitin Agarwal



Mei Wang @MeiWangv · Feb 1

#Chinese are quite expert in floati
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4 · 16 Views

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MeiWangv · Feb 1
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James @JamesMashadar · Jan 18

Private industry does the same on scale in the west with no repercussions or media coverage xx

8 likes



Jaek People @Snowsands · Jan 18



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Alex Vuving
@Alex_Vuving

Time to demystify
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Taiwan's pres



From aljazeera.co
3:02 PM · Jan 13

11

中共会攻打台湾吗?
习近平只是在放空炮?
《反分裂国家法》第8条爆出真相

01月16日

事實上也就是在告訴

TikTok
@yiqiqingsong

Mei Wang @MeiWangv · Feb 1
#Chinese are quite expert in floati
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大選結果刺痛了中共
氣急敗壞之後小動作不斷
金元撒幣，挖角台灣，消解心頭怒氣

01月15日

更主要的是習近平一直

TikTok
@yiqiqingsong

James @JamesMashadar · Jan 18
Private industry does the same on scale in the west with no repercussions

Now, let's talk the China-Taiwan situation.

TikTok
@datos.vitalia

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Alex Vuving @Alex_Vuving · Jan 13
Time to demystify the... assumed. Des... campaign, "Taiwan's pres...

Mei Wang @MeiWangv · Feb 1
#Chinese are quite expert in floati... d to use misleadir... @BoycottHegem

In Taiwan, they publicly count the votes!
TikTok @freedomnationtwo

如果刺痛了中共... 之后小动作不断... 台湾, 消解心头怒气
TikTok @yiqiqingsong

中選會對於艾莉莎莎的回應
TikTok @super_tw_people

院院會後記者會
TikTok @super_tw_people

Freedom Nation

By covering Peoples Republic of China... campaign

Everyone can't allow this

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Alex Vuving @Alex_Vuving
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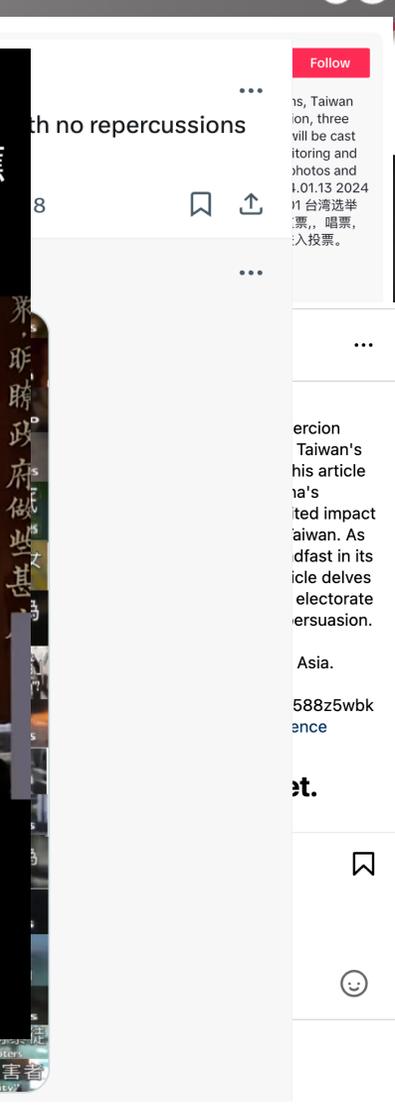
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Alex Vuving
@Alex_Vuving

Time to demystify the narrative assumed. Desecrating the campaign, "Taiwan's president" is a



Taiwan ruling party
From aljazeera.com
3:02 PM · Jan 13

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中共会攻打
习近平只是在
《反分裂国家法》



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中選會對於艾莉莎莎的回應



應該要
選舉補

院院會後記者會
TikTok Conference
@super_tw_people



竟然還有人說

TikTok
@dengawtfc1o

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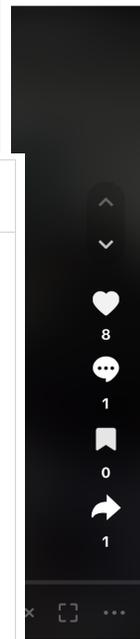
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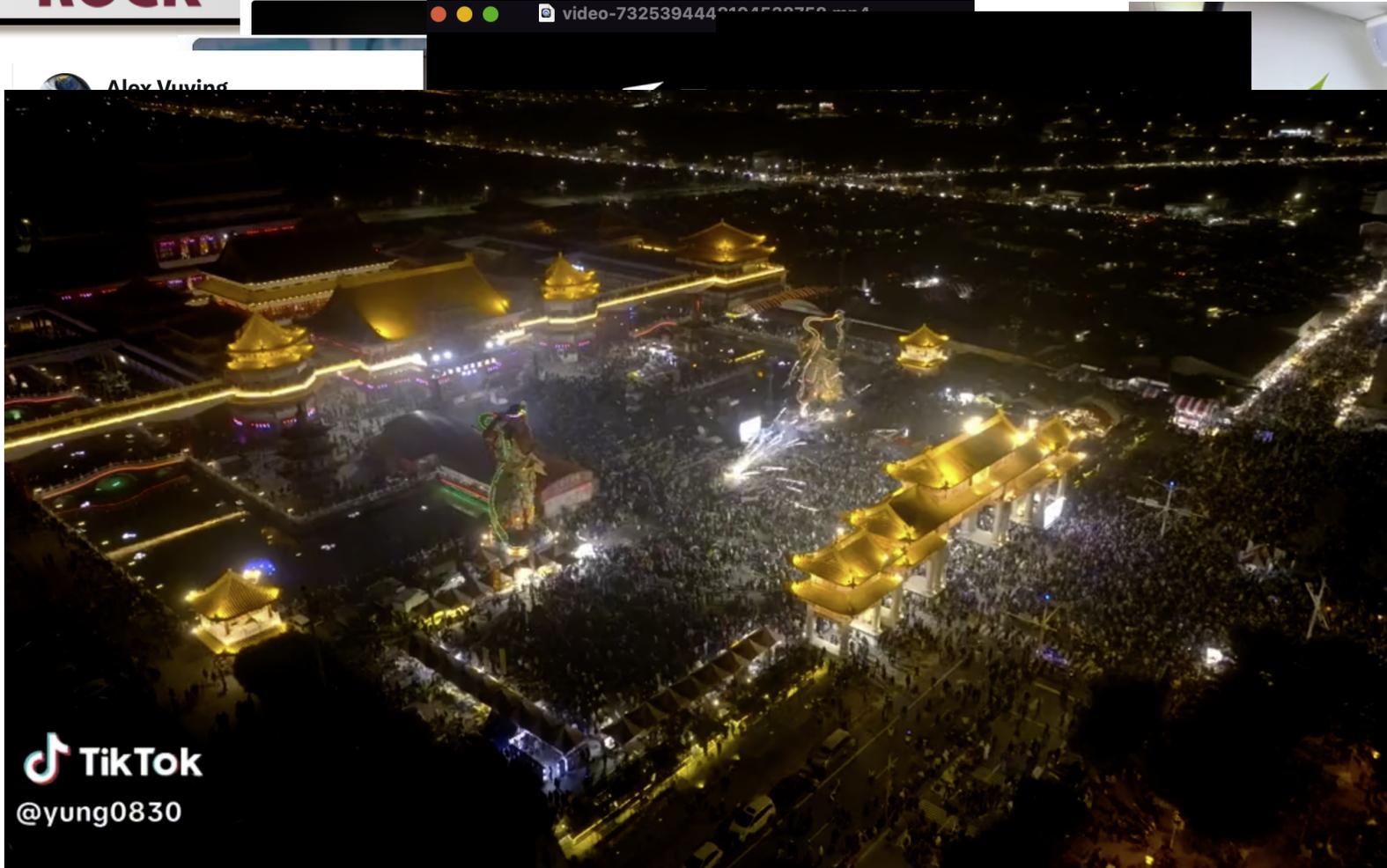
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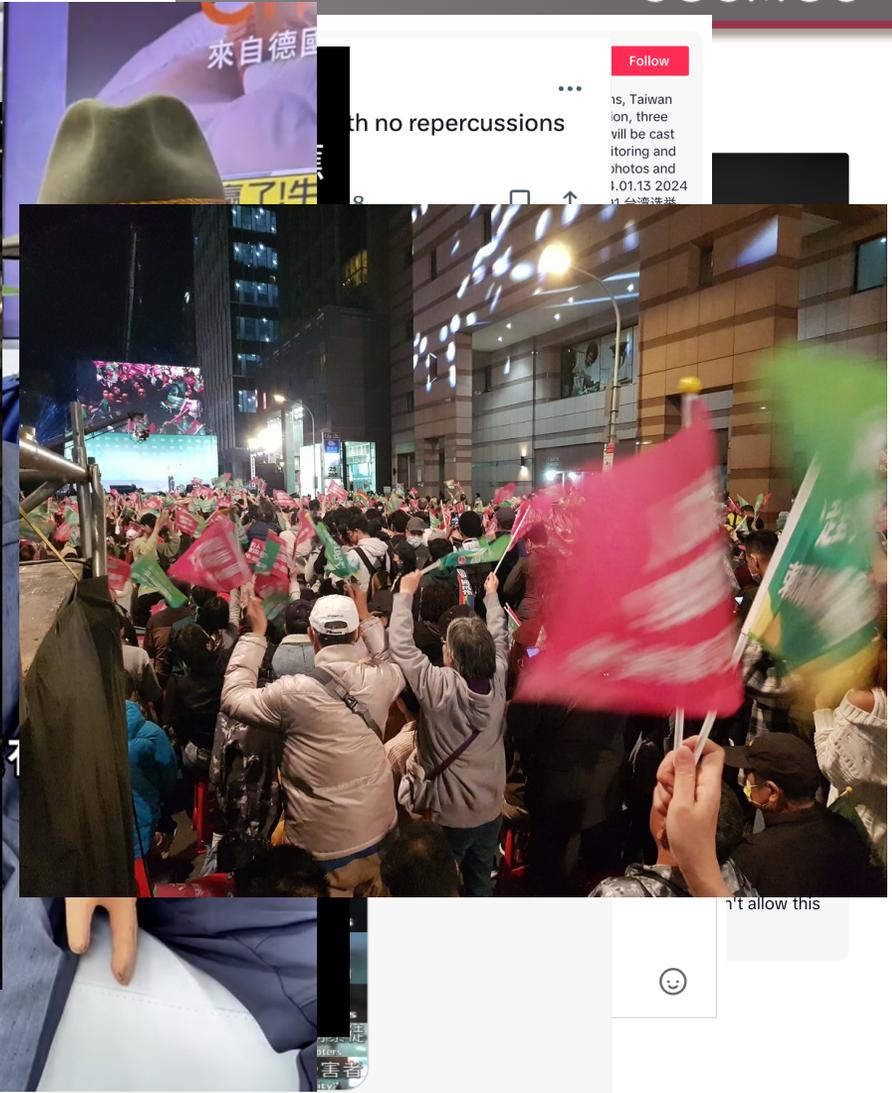
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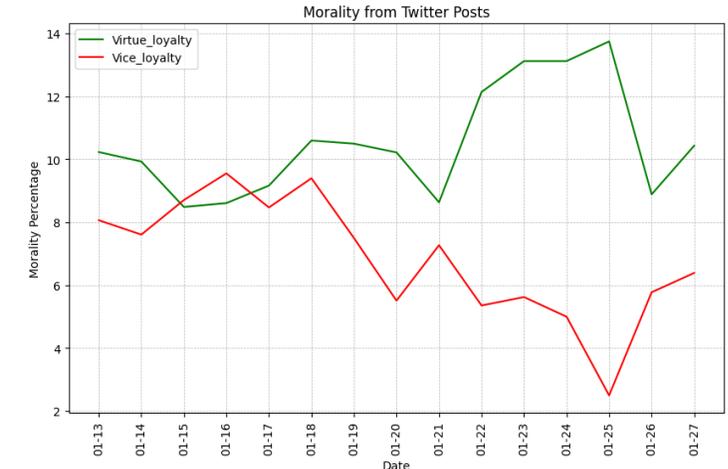
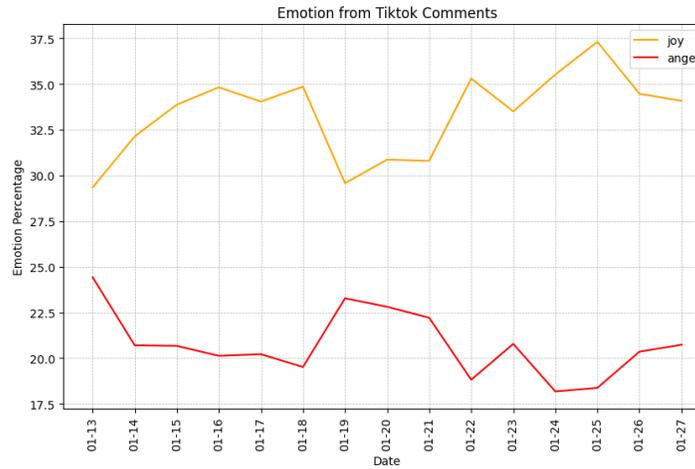
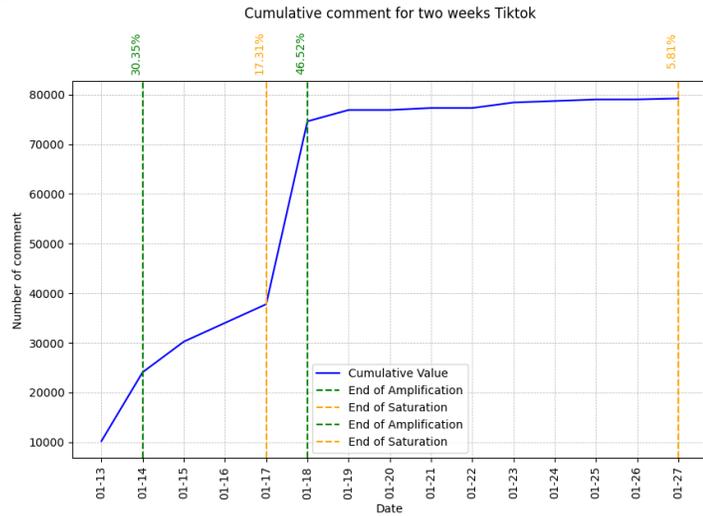


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TikTok
@yung0830





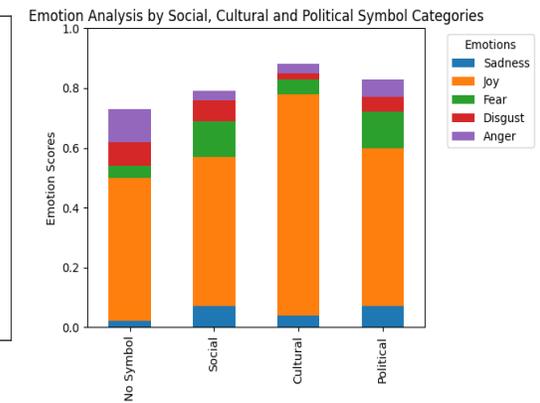
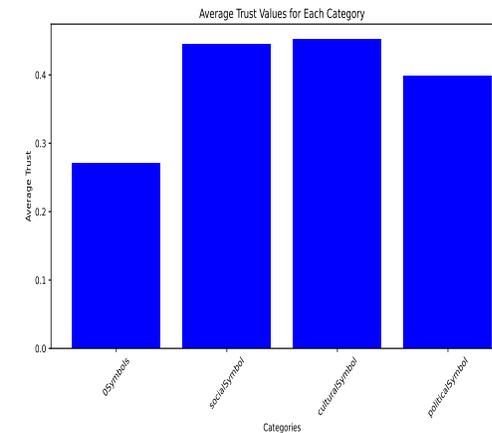
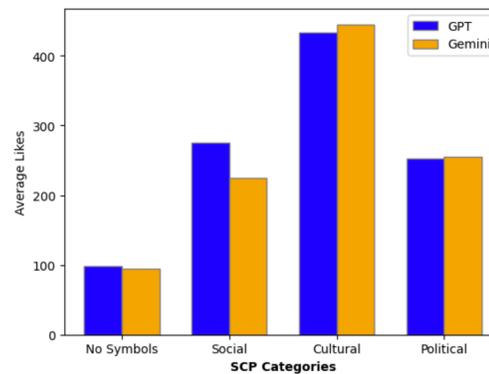
Modeling anti-disinformation campaign adoption.
When is a campaign successfully adopted?

Stronger positive emotions about electoral process.

Trust restored in electoral process.

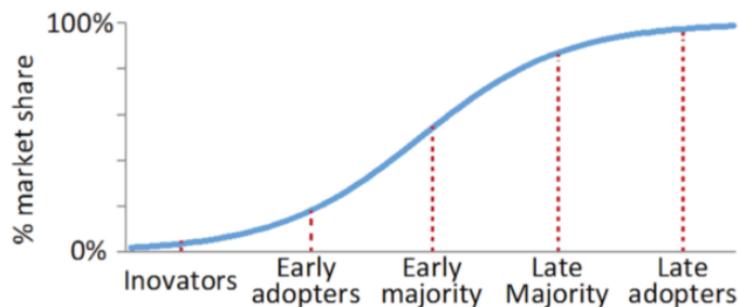
How to design a successful campaign message?
Social, Cultural, and Political Symbols!!!

- Message consistency
- More engagement
- More positive reactions
- Faster trust restoration

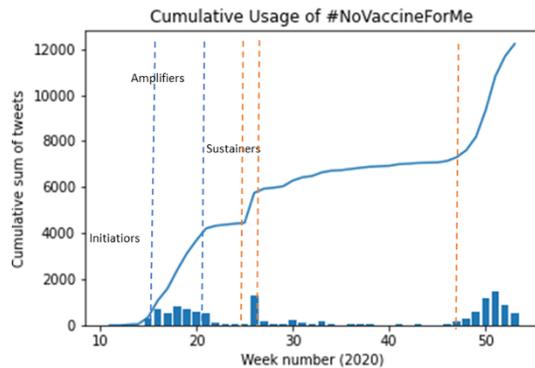
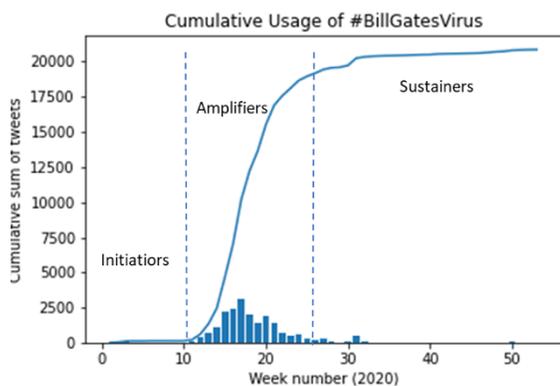


Characterization of information producers

Diffusion of Innovations



Diffusion of innovations, (1962)

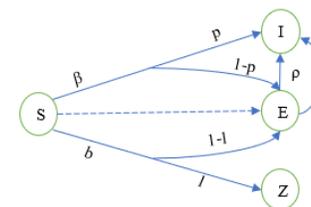


OSNEM, ASONAM, SNAM, HICSS, 2022, 2023, 2024, 2025

Characterization of information consumers

How misinformation spreads? Who should be inoculated? Leveraging epidemiological modeling. Treat misinformation like an epidemic → misinfodemic

- S: Susceptible
- I: Infected
- Z: Skeptic
- E: Exposed

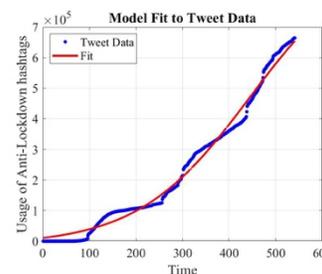


$$\frac{dS}{dt} = -\beta S \frac{I}{N} - bS \frac{Z}{N}$$

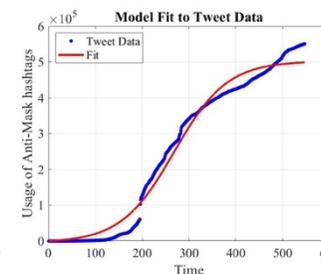
$$\frac{dE}{dt} = (1-p)\beta S \frac{I}{N} + (1-l)bS \frac{Z}{N} - \rho E \frac{I}{N} - \epsilon E$$

$$\frac{dI}{dt} = p\beta S \frac{I}{N} + \rho E \frac{I}{N} + \epsilon E$$

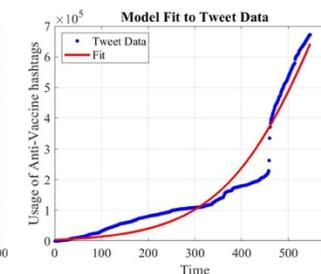
$$\frac{dZ}{dt} = lbS \frac{Z}{N}$$



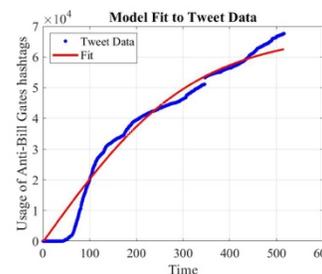
Anti lockdown 6.9% error



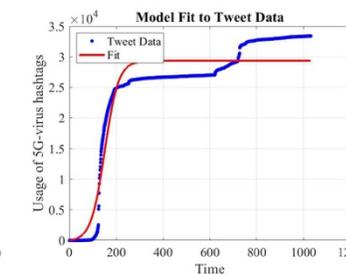
Anti mask 8.2% error



Anti vaccine 12.3% error



Anti Bill Gates 7.9% error



Anti 5G 9.5% error

HICSS 2022, ICWSM 2024

Blogtrackers

Track Blogs

Monitor and suggest valuable insights in a drill down fashion using content analysis and social network analysis

Search

Start Tracking

Why Blogtrackers?

Blogtrackers helps sociologists to track and analyze blogs of particular interests by designing and integrating unique features.

- Research Based: Built to review user behavior in the blogosphere.
- User Friendly: Easy-to-use interface for the user.
- Actionable Insights: Track Blogs at your tips.

Start Tracking

What Can You Do With It?

- Posting Frequency: Analyze Traffic Pattern
- Keyword Trends: Search Top Keywords
- Influence Analysis: Check influence of Blogs, Blog Posts and Bloggers

Start Tracking

Blogtrackers
btracker.host.ualr.edu/

Searching for trident juncture

1800 posts found for "trident juncture"

Recent

- Forventer motiltak mot Trident Juncture
- Sverige skal bist med forsvær av Norge
- Trump Agrees To Meet With Kim Jong Un Great Progress Being Made
- US Admits Unipolar Moment Is Over

Daily Defense News

My Trackers - NATO - First trial - Sentiment Analysis

Aggregate of Positive and Negative Sentiment of post

Personal Content - Post #1

Showing 1 to 10 of 200 entries

YouTubeTracker

Track YouTube Data

Monitor and suggest valuable insights in a drill down fashion using content analysis and social network analysis

Start Tracking

Why YouTubeTracker?

YouTubeTracker helps sociologists to track and analyze YouTube content of particular interests by designing and integrating unique features

- Research Based: Built to review user behavior in the YouTube.
- User Friendly: Easy-to-use interface for the user.
- Mobile Optimized: Render efficiently on Desktop and mobile devices.

Start Tracking

What Can You Do With It?

- Detect Influential Content: Track, monitor, and identify influential YouTube content and users.
- Gain Insights on Content Engagement: Allows users to draw insights into content engagement behaviors of individuals via likes, dislikes, comments, replies, shares, etc.
- Pattern Analysis: Use Visual analytics to identify trends, opinions, communities, anomalous behaviors such as bots, spam, trolls etc.

Start Tracking

vtracker
vtracker.host.ualr.edu/

norwegian frigate

Race to stop Norway frigate sinking after oil tanker collision

Like Clockwork! Russians Accused of Sinking Norwegian Frigate Full of Capable Woman Navigators

Norwegian Frigate Helge Ingstad Completely Disappears Under Water

Head of Royal Norwegian Navy: Eight crew injured when vessel became unstable

Norwegian Navy Frigate-Collides with Big Oil Tanker Sola TS

NATO Nightmare: How Norway Sank Its Own Frigate

Oil tanker collides with frigate off Norway, oil and gas plants shut

Fast-Thinking Captain Saves 6,000-Ton Frigate with Unorthodox Grounding Order

NATO

Created at March 3, 2009

66,778 subscribers

17,076,503 views

2,725 videos

Subscribers

Daily Subscribers

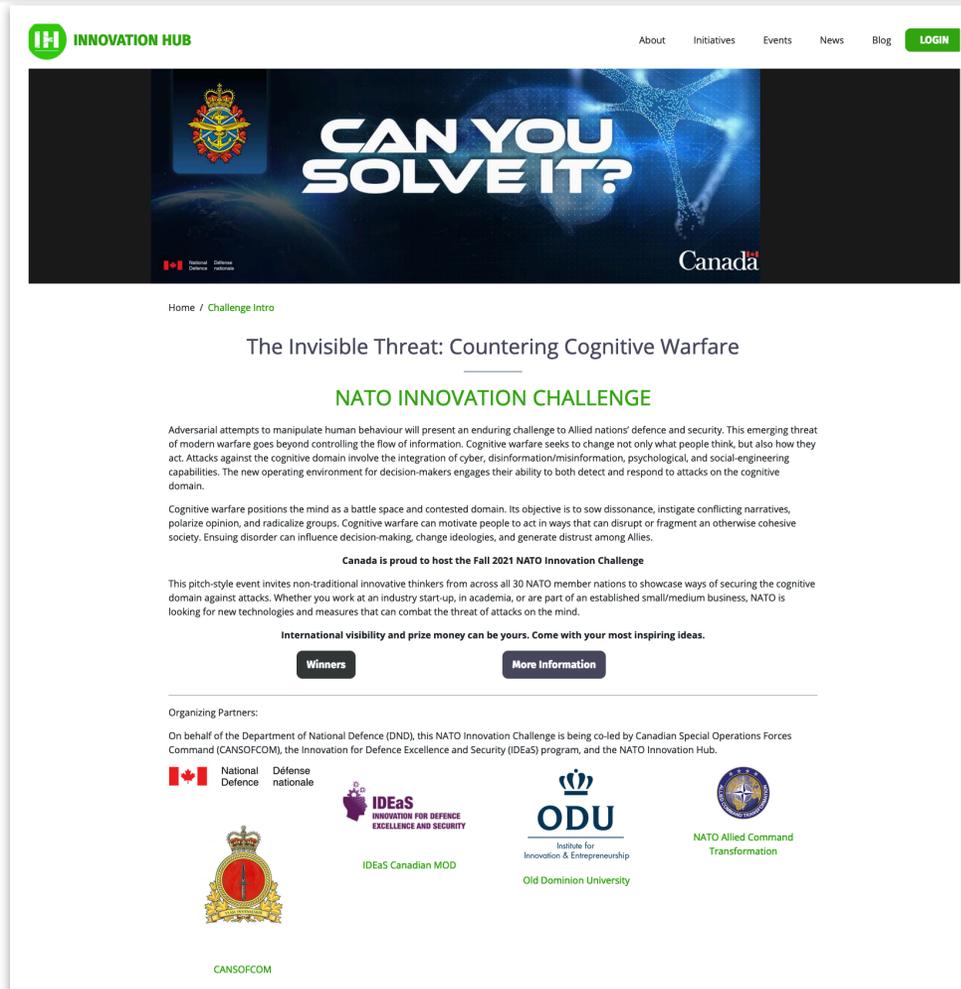
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Video Uploads



**Selected by US State Department in Global Engagement Center's
GO2Tech program to fight foreign based propaganda**

InfoWare 2026 Congress, Valencia, Spain



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Home / Challenge Intro

The Invisible Threat: Countering Cognitive Warfare

NATO INNOVATION CHALLENGE

Adversarial attempts to manipulate human behaviour will present an enduring challenge to Allied nations' defence and security. This emerging threat of modern warfare goes beyond controlling the flow of information. Cognitive warfare seeks to change not only what people think, but also how they act. Attacks against the cognitive domain involve the integration of cyber, disinformation/misinformation, psychological, and social-engineering capabilities. The new operating environment for decision-makers engages their ability to both detect and respond to attacks on the cognitive domain.

Cognitive warfare positions the mind as a battle space and contested domain. Its objective is to sow dissonance, instigate conflicting narratives, polarize opinion, and radicalize groups. Cognitive warfare can motivate people to act in ways that can disrupt or fragment an otherwise cohesive society. Ensuing disorder can influence decision-making, change ideologies, and generate distrust among Allies.

Canada is proud to host the Fall 2021 NATO Innovation Challenge

This pitch-style event invites non-traditional innovative thinkers from across all 30 NATO member nations to showcase ways of securing the cognitive domain against attacks. Whether you work at an industry start-up, in academia, or are part of an established small/medium business, NATO is looking for new technologies and measures that can combat the threat of attacks on the mind.

International visibility and prize money can be yours. Come with your most inspiring ideas.

[Winners](#) [More Information](#)

Organizing Partners:

On behalf of the Department of National Defence (DND), this NATO Innovation Challenge is being co-led by Canadian Special Operations Forces Command (CANSOFCOM), the Innovation for Defence Excellence and Security (IDEaS) program, and the NATO Innovation Hub.



CANSOFCOM



NATO Innovation Hub
@NATOinnovation

NATO Innovation Challenge Finalists are: ADTAC, Beam Me Up, COSMOS, Deloitte, Influence Influencers, IIDR, Novacene AI, Preveny, Shumac, Veriphix . Watch the final live on 30 Nov at [ow.ly /Ec2W50GSM0w](https://ow.ly/Ec2W50GSM0w) #WeAreNATO #Innovation @DeloitteUK @veriphix @cosmographers



Recognized as top 10 solutions in the 2021 NATO Innovation Hub Challenge on “The Invisible Threat: Countering Cognitive Warfare” from 132 teams across the 30 NATO member nations.

InfoWare 2026 Congress, Valencia, Spain

COVID-19 MISINFO

This website educates about COVID-19 misinformation and provides tips on how to identify it.

Misinfo Tips Reports Press

Search...

612 Known Misinfo

False Claim: New evidence ties COVID-19 creation to research funded by Fauci

False Claim: The COVID-19 vaccine "went out for distribution" in Nebraska "days before the FDA even said they were going to approve it."

False Claim: Doctors and nurses who administer the coronavirus vaccine can be "tried as war criminals."

Cross-platform false narratives detected using developed socio-computational methodologies

52 Tips to Spot Misinfo

Tip: Contact tracing will not cost money. Avoid giving personal bank account information over the phone or buying gift cards to pay scam artists for fake contact tracing attempts.

Tip: Avoid clicking on links in emails and text messages unless you signed up to receive the messages.

Tip: If you receive an unsolicited email or text message from a potential contact tracer, verify its authenticity by contacting the Arkansas Department of Health at ADH.CovidVirus@arkansas.gov or call (800) 803-7847.

COSMOS
Laboratorium for Social Media and Online Behavioral Studies

Education component of the effort

How did you come across this content?

- Social Media
- Web or Video
- Phone or Text
- Email
- Physical Mail
- TV / Radio

People notify us of scams and other misinformation cases not in our database which are then investigated

10 Reports

Misinformation Text Analysis Report
June 16, 2020

DAILY COVID-19 Misinformation and Scam Report
April 17, 2020

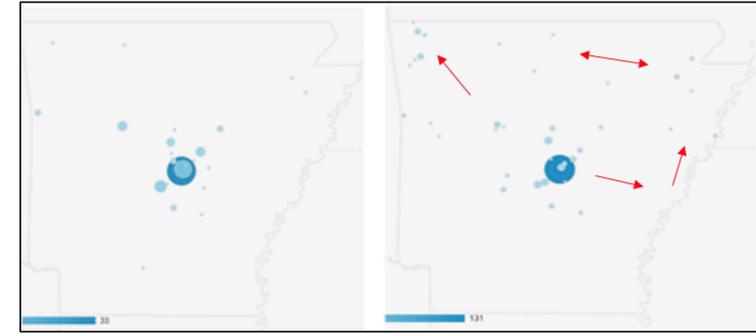
DAILY COVID-19 Misinformation and Scam Report
April 16, 2020

DAILY COVID-19 Misinformation and Scam Report
April 15, 2020

DAILY COVID-19 Misinformation and Scam Report
April 14, 2020

DAILY COVID-19 Misinformation and Scam Report
April 10, 2020

Daily reports to the AG's Office with our investigation results and recommendations for enhancing outreach/awareness



May 5, 2020
Increased penetration into rural areas of Arkansas as annotated by the arrows in the figure on right demonstrates the effectiveness of the tool and communications strategies.

ATTORNEY GENERAL LESLIE RUTLEDGE

NEWS RELEASES

RUTLEDGE TO PARTNER WITH UA LITTLE ROCK TRACKING FALSE COVID-19 WEBSITES AND SCAMS ONLINE

APRIL 6, 2020

Says, "Identifying and putting a stop to fake websites that are spreading misinformation"

LITTLE ROCK - Arkansas Attorney General Leslie Rutledge today announced a partnership with the University of Arkansas Little Rock (UALR) and the Arkansas Research Alliance to identify and track COVID-related scam websites and social media disinformation that have rapidly spread with the pandemic.

Arkansas Office of the Attorney General Press Release on our COVID-19 Misinfo Tracker

cosmos.ualr.edu/covid-19



Coronavirus Misinformation Database

COSMOS - UALR

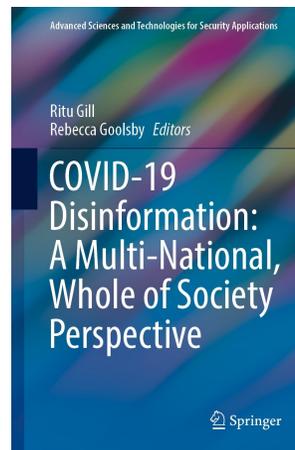
Category

Risk communication & Community Engagement

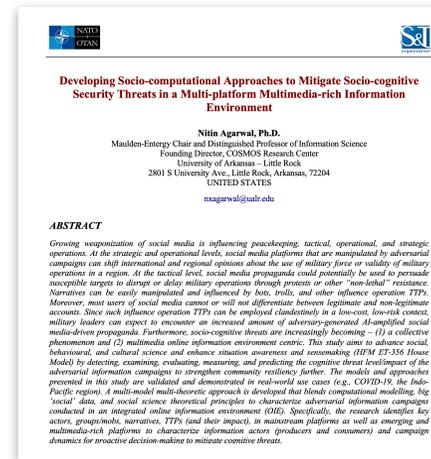


Briefing US Senator John Boozman

- COVID-19 Scam Tracker
- The capability was developed in partnership with the Arkansas Office of the Attorney General.
- Recognized by the World Health Organization (WHO) as one of the key technological innovations developed across the world to address COVID-19 pandemic.
- The application leverages our work on socio-cognitive threat modeling, education, and awareness efforts to assist policymakers.



NATO Research and Technology Group RTG HFM-293

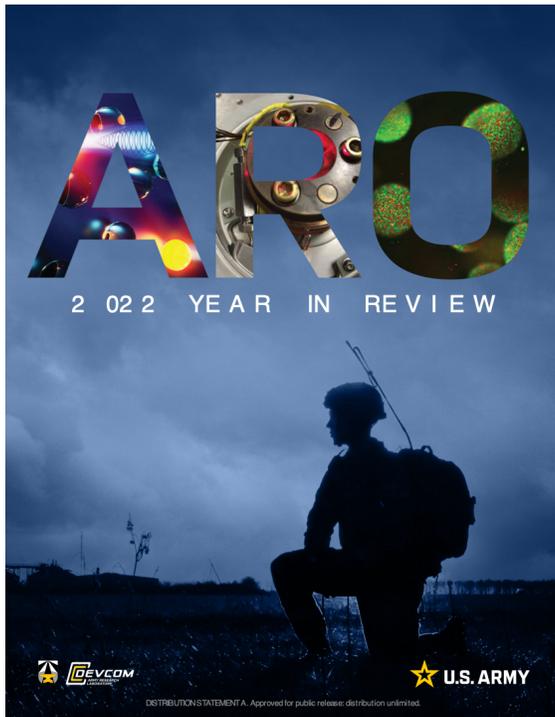


NATO STO-HFM-361 Mitigating Cognitive Warfare

ARA Fellow Dr. Nitin Agarwal's Partnership with the AR Attorney General to Combat COVID Disinformation, Scams

"Scammers are working overtime to exploit coronavirus fears. We are grateful for the ongoing efforts in Arkansas by Dr. Agarwal and his team at UA Little Rock helping identify the schemes thieves employ so we can stop these fraudulent activities, hold offenders accountable and prevent Arkansans from being fooled by bogus claims."

- U.S. Sen. John Boozman (R-Ark.)



HUMANS IN COMPLEX SYSTEMS

SOCIAL AND COGNITIVE NETWORKS PROGRAM

Dr. Edward T. Palazzolo
Program Manager

Dr. Palazzolo completed his undergraduate studies in 1997 at the State University of New York at Buffalo as a double major in Psychology and Communication. He received his M.A. from the State University of New York at Buffalo in Interpersonal and Organizational Communication in 1999. He earned his Ph.D. at the University of Illinois Urbana-Champaign in 2002 in Organizational Communication and Knowledge Management.

He came to ARO in 2014 as the Program Manager for the Social and Cognitive Networks Program.

Current Scientific Objectives

1. Develop fundamental science (nonclinical) in support of Community Cognitive Resilience that, if successful, will help the military, veterans, and civilians transition from illness to wellness with respect to post-traumatic stress disorder (PTSD), depression, anxiety, chronic pain, suicidal ideation and prevention, substance abuse, and disinformation.
2. Discover the fundamental principles governing human-agent teaming activities that support designing and maintaining high performance teams that, if successful, will allow the Army and Joint Staff to engineer high performance teams with specified characteristics to satisfy mission requirements, and enable teaming with unprecedented coordination across multiple defense organizations while improving Soldiers' cognitive resilience.
3. Create verifiable models of networked human behavior by bridging social science theories with computer science techniques and engineering precision that, if successful, will create the ability to forecast societal opinions and shifts with pinpoint accuracy, especially with potential for real-world effects, to support Army and joint Operations by providing support for decision-making.

Anticipated Impact

If this research is successfully replicated with active duty Soldiers, the Army would have a powerful tool to reduce binge drinking and improve Army readiness. If the collective Community Cognitive Resilience program is successful, the Army will not only be able to help people more quickly transition from illness to wellness but could also discover ways to prevent PTSD and reduce suicides among Soldiers and veterans.

WAY AHEAD

Current findings by the foundation for four possible research directions. First, Dr. Palazzolo is working with the MURI team to develop a follow-on grant that will replicate the research, but instead of studying undergraduate students, the team will collect data from active duty service members. This new proposal is being coordinated with the Humans in Complex Systems Intramural team. Second, expand this research methodology from alcohol consumption to focus on anxiety, depression, PTSD, and suicidal ideation and identify if similar, positive effects can be affected. Third, combine all of this with other efforts into a systemic model for community cognitive resilience that has the potential to improve overall Army readiness. And fourth, work with colleagues at Walter Reed Army Institute of Research and NIH's National Center for Complementary and Integrative Health to transition the basic science into clinical trial research efforts.

SUCCESS STORY

Developing Research Infrastructure to Strengthen Socio-Cognitive Security for Combating Misinformation and Deviant Connective Action

Researchers developed a methodology to discover and track COVID-19 misinformation. The COVID-19 Misinformation Tracker was recognized by the World Health Organization (WHO) as one of the key technological innovations developed across the world to address the COVID-19 pandemic. This capability was also adopted by the Arkansas Office of the Attorney General to combat misinformation campaigns.

CHALLENGE

Misinformation is not an individual activity but a coordinated collective activity. This type of collective action is known as connective action, which is a form of collective action where users form more individualized and more technologically organized actions around a protest, demonstration, or social movement using online social networks and in the absence of formally organized groups. The intelligence challenge is to identify both deviant actors and misinformation narratives in a timely fashion that will allow for countermeasures.

ACTION

Having funded Prof. Nitin Agarwal (University of Arkansas at Little Rock) since 2016 for work on detecting and predicting deviant cyber flash mobs (DCFM), coordinated criminal cyber activity), Dr. Palazzolo was well aware of Prof. Agarwal's research capabilities and immediately reached out to solicit a basic research proposal related to COVID-19 misinformation once the global pandemic began. Prof. Agarwal was eager to leverage his skills for society's greater good and quickly turned around a proposal to study COVID-19 related cross-media misinformation campaigns and to evaluate his DCFM model in this new and emerging context. The DCFM will allow him to measure and track the influence power of specific misinformation campaigns.

For one such misinformation campaign, Prof. Agarwal and his research team used social network analysis techniques and the DCFM to examine digitally enabled protests from a computational perspective to measure connective action within COVID-19 anti-quarantine protests in the state of Michigan.

Dr. Palazzolo worked with his Air Force and Navy counterparts (Dr. Laurie Fentemacher and Rebecca Goodley, respectively) to ensure in-service coordination of Dr. Agarwal's research, and together have collectively invested in the development of his labs, further enabling his extremely successful research efforts. Further evidence of this research critical to the National Security Strategy, Dr. Palazzolo in 2022 secured a 2-year funding for Prof. Agarwal to enable the maturation of his research from basic to applied in support of the DoD's mission to combat misinformation.

Anticipated Impact

This success was made possible by:
Dr. Edward T. Palazzolo, Humans in Complex Systems, ARO

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Citations:
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CHALLENGE

The scientific community is at the nascent stage of understanding how the mind-body is coupled at the intersection of biology and psychology. Until this research, there have been no clear coherent models pushing beyond the mind-body connection with the intent to understand how one's social network influences their cognitive network, which in turn influences their neural network, and vice versa. That is, how can we establish a scientific theory describing the impact of people's social connectors, with the messages received and the changes to the way they think? And how does the way people think change the way their brains are wired? In turn, how does the way people's brains are wired influence the way they think and influence the people they choose to spend time with and the messages they choose to consume? Collectively, these questions drive us toward the science of Community Cognitive Resilience.

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CHAPTER 3
LUCAS STORES

ARL Competencies:

Humans in Complex Systems

Military Information Systems

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This research may help design strategies that will help individuals, communities, and military units become cognitively resilient to misinformation campaigns.

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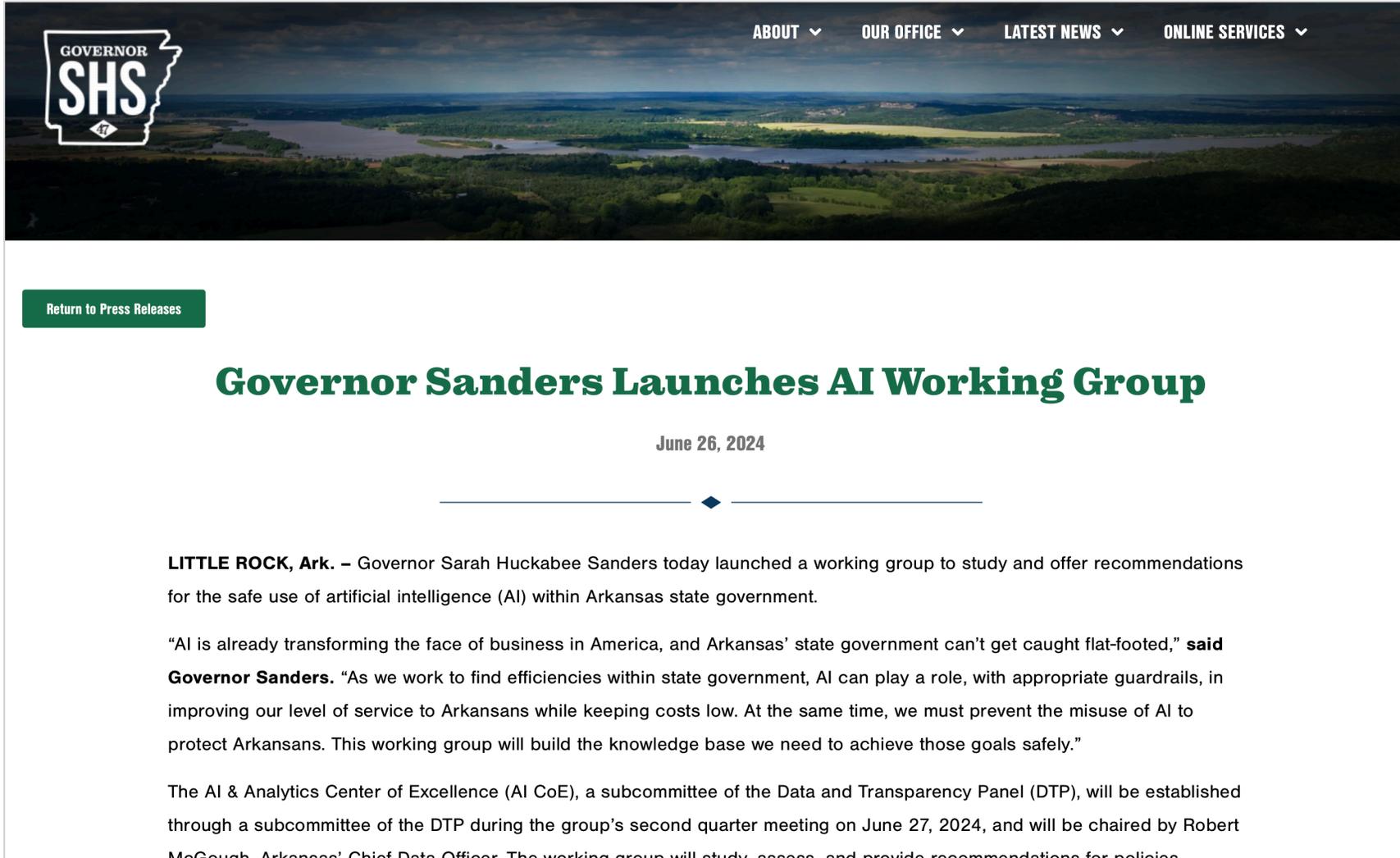
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Research highlighted in the **US Army Research Office "Year in Review"** magazine as a success story for the **Social and Cognitive Networks Program**



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Governor Sanders Launches AI Working Group

June 26, 2024

LITTLE ROCK, Ark. – Governor Sarah Huckabee Sanders today launched a working group to study and offer recommendations for the safe use of artificial intelligence (AI) within Arkansas state government.

“AI is already transforming the face of business in America, and Arkansas’ state government can’t get caught flat-footed,” **said Governor Sanders.** “As we work to find efficiencies within state government, AI can play a role, with appropriate guardrails, in improving our level of service to Arkansans while keeping costs low. At the same time, we must prevent the misuse of AI to protect Arkansans. This working group will build the knowledge base we need to achieve those goals safely.”

The AI & Analytics Center of Excellence (AI CoE), a subcommittee of the Data and Transparency Panel (DTP), will be established through a subcommittee of the DTP during the group’s second quarter meeting on June 27, 2024, and will be chaired by Robert McGough, Arkansas’ Chief Data Officer. The working group will study, assess, and provide recommendations for policies.



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TRAINING

COSMOS Research Center Social Media Analysis Training

[Register Here](#) (select "COSMOS Social Media Analysis Training" from the list)

Dates: September 26 – 28, 2024
Venue: COSMOS Research Center, EIT 603
 2801 S. University Ave., Little Rock, Arkansas 72204

Point of contact:
 Dr. Nitin Agarwal, Ph.D.
 Jerry L. Maulden-Entergy Chair & Donaghey Distinguished Professor
 Director, COSMOS Research Center
 University of Arkansas – Little Rock
 Email: nxagarwal@ualr.edu

Objective: This training course will introduce state-of-the-art developments in mining social media to support business intelligence and decision-making. The course aims to teach emerging challenges and opportunities with social media, impart analytical skills to enhance understanding of the data and prepare the participants to learn innovative applications of multidisciplinary problem-solving approaches.

organizations and advance our understanding of social and cultural dynamics through the lens of contemporary information and communication tools (ICTs). The knowledge thus extracted helps in harnessing business intelligence and guides decision-making.

The course will introduce basic social science concepts, theories, and principles that guide model development, data analysis, and inferencing. Data collection from social media sites using crawlers and APIs will be discussed in depth through hands-on exercises. Interfacing the collected data with visualization and analytical tools/software will be taught to enable a better understanding of data and perform knowledge extraction. Specifically, content analysis and network analysis techniques will be taught to meaningfully process data to identify trends, leaders, sentiments, and opinions. These skills will help analyze social media data about products, services, campaigns, markets, events, customers, and employees; segment audience by geography or demographics, influencers, recommenders or detractors; and measure social media activities. Case studies will be discussed to demonstrate the impact even the most basic analyses could afford in various domains such as security, health, business, policy-making, socio-political and cultural assessments of different regions worldwide, strategic communication, and public affairs, among others.

Agenda: (all times are in US Central)

Day 1 10:00 AM – 5:00 PM		Day 2 10:00 AM – 5:00 PM		Day 3 10:00 AM – 2:00 PM	
Theme: <i>Data Collection</i>		Theme: <i>Data Analysis & Visualization</i>		Theme: <i>Putting it Together: Case Studies</i>	
10:00 AM	Welcome & Introduction	10:00 AM	Content analysis – I	10:00 AM	Invited Talk
10:30 AM	Data collection – scraping	11:00 AM	Content analysis – II	11:00 AM	Lightning Talks
12:00 PM	Lunch	12:00 PM	Lunch	12:00 PM	Lunch
1:00 PM	Data collection – APIs	1:00 PM	Network analysis & visualization – I	1:00 PM	Wrap up
3:00 PM	Break	3:00 PM	Break		
3:30 PM	Data collection – APIs (<i>contd.</i>)	3:30 PM	Network analysis & visualization – II		

Registration: Visit the [registration portal](#) to register and pay for the training course. Select "COSMOS Social Media Analysis Training" from the list of events. Registration is mandatory for participation. Limited participation scholarships up to \$1,000 are available. Please indicate if you need the scholarship on the registration portal.

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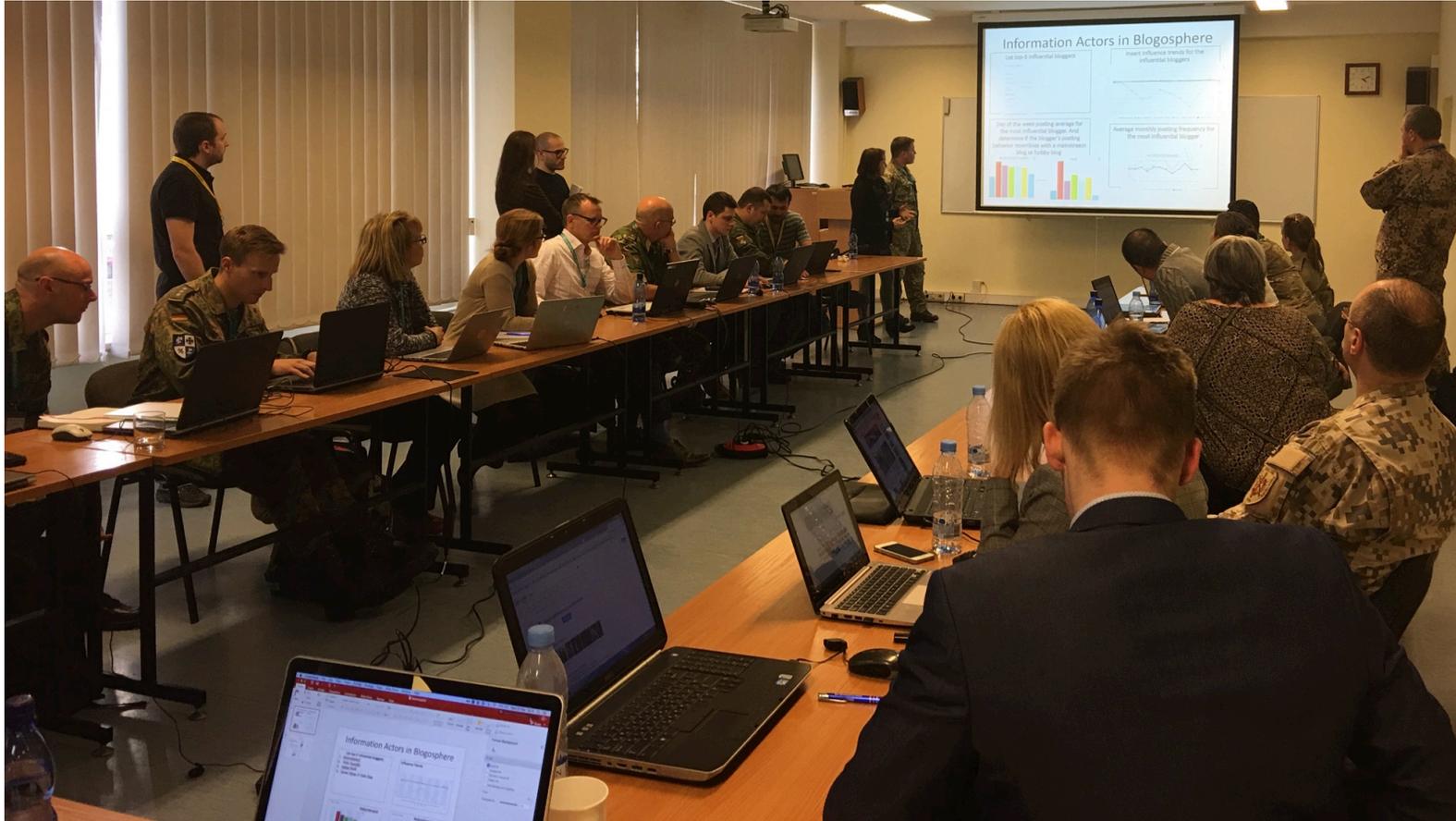
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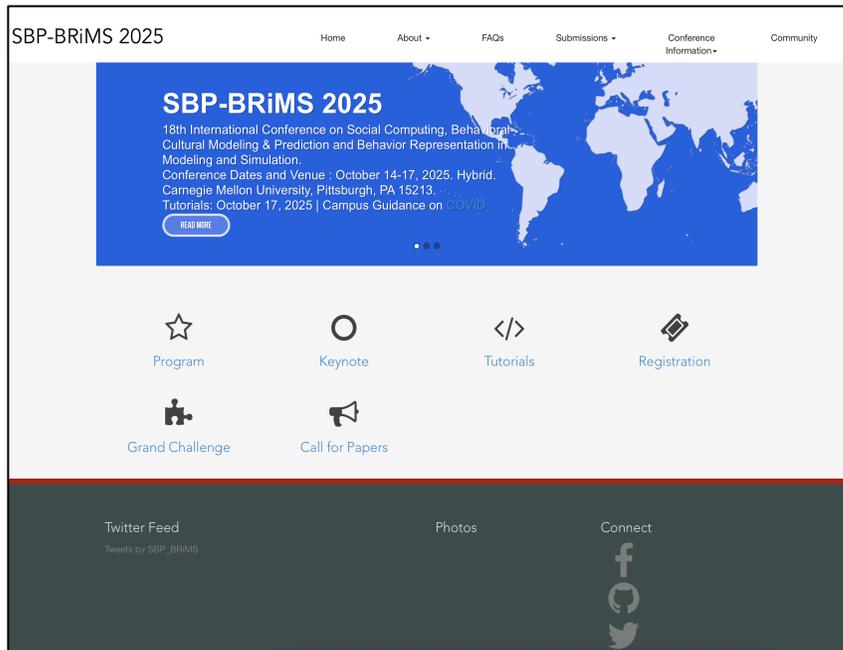
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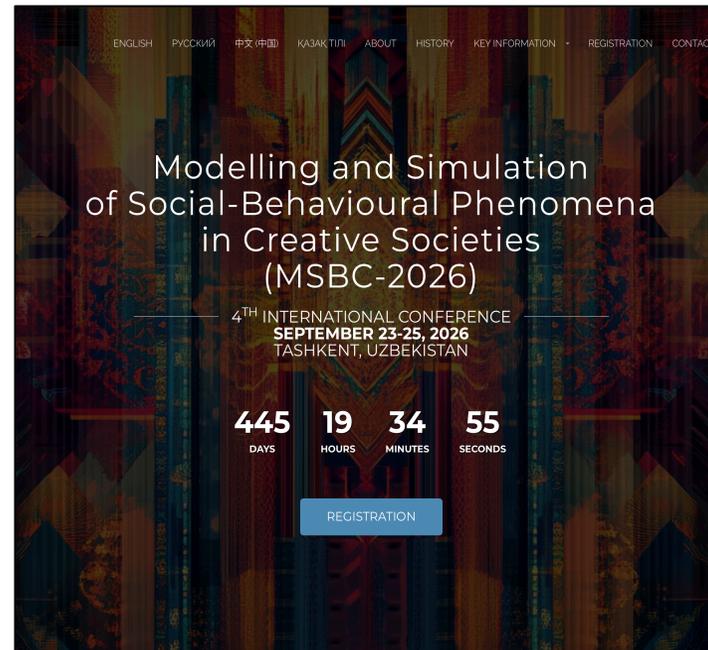
We've conducted training for PAO, info-ops, psy-ops officers from NATO member nations at StratCom COE, US CYBERCOMMAND, US Marine Information Group (3-MIGs)

InfoWare 2026 Congress, Valencia, Spain





International Social Computing Conference
SBP 2026, CMU, Pittsburgh, USA



International Modeling and Simulation
Conference, MSBC 2026, Uzbekistan



International Conference on Advances in Social
Network Analysis and Mining,
ASONAM 2026, Morocco

- **5-year \$15 million grant from the U.S. Department of Defense, PI: Nitin Agarwal, Ph.D.**
- 20+ Graduate Research Assistants (MS/PhD) (\$27k, Full Tuition coverage, Health Insurance covered)
- 10+ Postdoctoral fellowships (\$60k - \$110k, Full benefits, Health insurance)
- 10+ Full stack developer, Dev Ops, Data engineer (\$60k - \$100k, Full benefits, Health insurance)
- 2 System Engineer (\$65k, Full benefits, Health insurance)

Apply at <https://cosmos.ualr.edu/careers/>
Contact Prof. Nitin Agarwal (nxagarwal@ualr.edu)

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