

Geopolitical Narratives of Social Media Bots

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- PhD in Societal Computing, Carnegie Mellon University
- Research:
 - Large-scale social media data to understand patterns of human & bot behavior
 - Motivated by the use of automation in social media bots, mis/disinformation, information maneuvers
- Selected Papers:
 - Ng, L. H. X., & Carley, K. M. (2023). Deflating the Chinese balloon: types of Twitter bots in US-China balloon incident. *EPJ Data Science*, 12(1), 63.
 - Uyheng, J., Ng, L. H. X., & Carley, K. M. (2021). Active, aggressive, but to little avail: characterizing bot activity during the 2020 Singaporean elections. *Computational and Mathematical Organization Theory*, 27(3), 324-342.
 - Ng, L. H. X., & Carley, K. M. (2024). Assembling a multi-platform ensemble social bot detector with applications to US 2020 elections. *Social Network Analysis and Mining*, 14(1), 1-16.

Geopolitical Events Around the World



Image from EuroNews, 2024

Geopolitical Events & Social Media



Image from EuroNews, 2024, Stanford Cyber Policy Center

Geopolitical Events & Social Media



Image from EuroNews, 2024, Stanford Cyber Policy Center

Geopolitical Events & Social Media



Geopolitical Events & Social Media



(1) US Elections & Singapore Elections in 2020



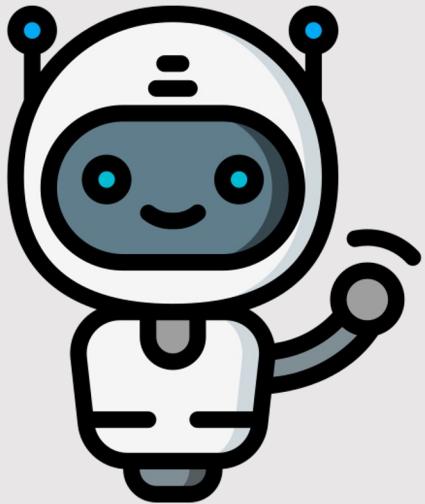
(2) US-China Relations in the 2023 Chinese Balloon incident



Image from EuroNews, 2024, Stanford Cyber Policy Center, BuiltIn

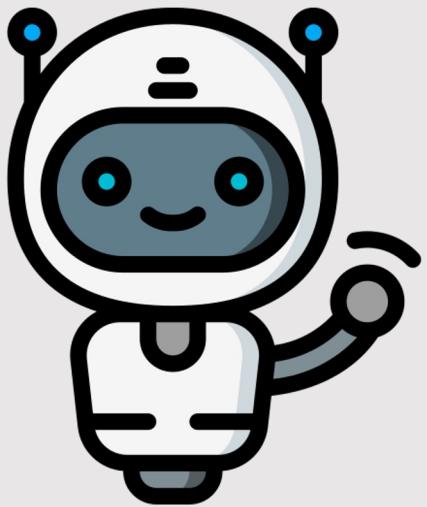
What is Not Human? *A Bot*

What is Not Human? *A Bot*



A Robot?

What is Not Human? *A Bot*

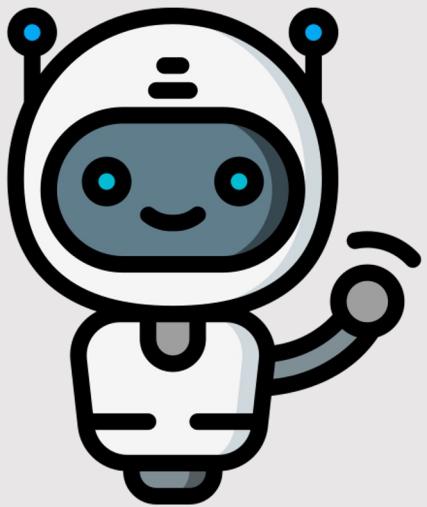


A Robot?



LLM ChatBot

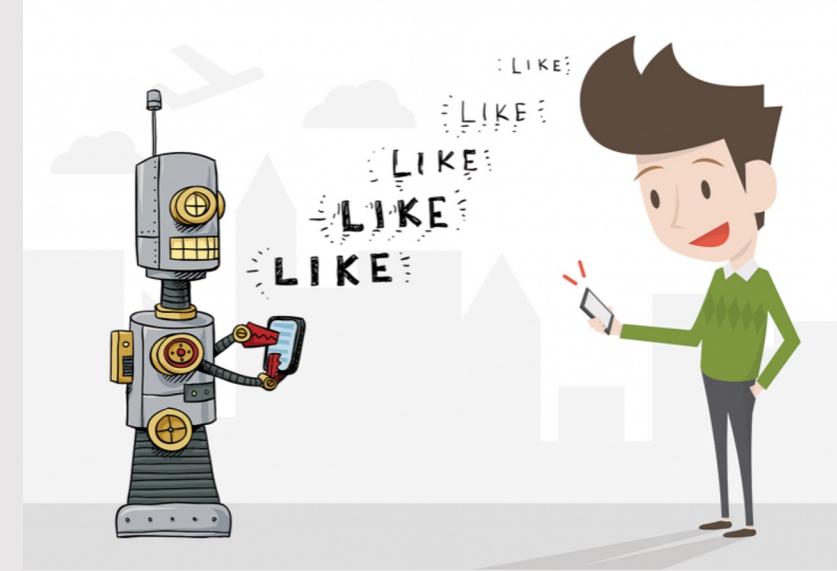
What is Not Human? *A Bot*



A Robot?



LLM ChatBot



Social Media Bot

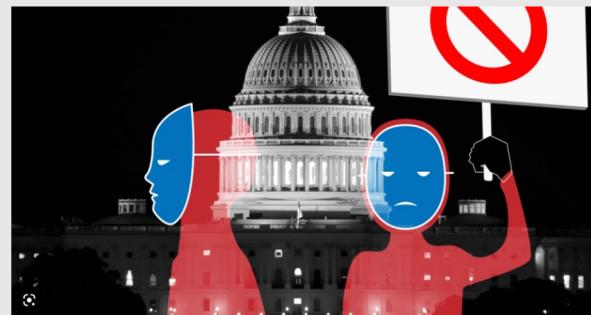
What is a Social Media Bot?

- “Social Media Bot”, or “Bot”:

Programmable account that automatically carries out a series of actions on social media platforms



Business



Politics



Entertainment

What is a Social Media Bot?

- “Social Media Bot”, or “Bot”:

Programmable account that automatically carries out a series of actions on social media platforms

- Many types of bots, with different characteristics and functions (Stieglitz et al, 2017; Orabi et. al., 2020...)
 - Amplifier bot, news bot...



Setting the Scene: Bot Detection

- Botometer¹
 - Machine learning classifier using over 1000 features
 - Works on live data
- BotHunter²
 - Tiered based hierachal model with increasing amounts of data
 - Works on historical data collection

¹ Yang, K. C., Ferrara, E., & Menczer, F. (2022). Botometer 101: Social bot practicum for computational social scientists. *Journal of computational social science*, 5(2), 1511-1528.

² Beskow, D. M., & Carley, K. M. (2018, July). Bot-hunter: a tiered approach to detecting & characterizing automated activity on twitter. In *Conference paper. SBP-BRiMS: International conference on social computing, behavioral-cultural modeling and prediction and behavior representation in modeling and simulation* (Vol. 3, No. 3).

Setting the Scene: Bot Detection

BotBuster Algorithm¹

- Multi-Platform Bot Detector
 - Twitter, Reddit, Facebook, Telegram²

using

- Mixture-of-Experts concept
 - Handle incomplete input data

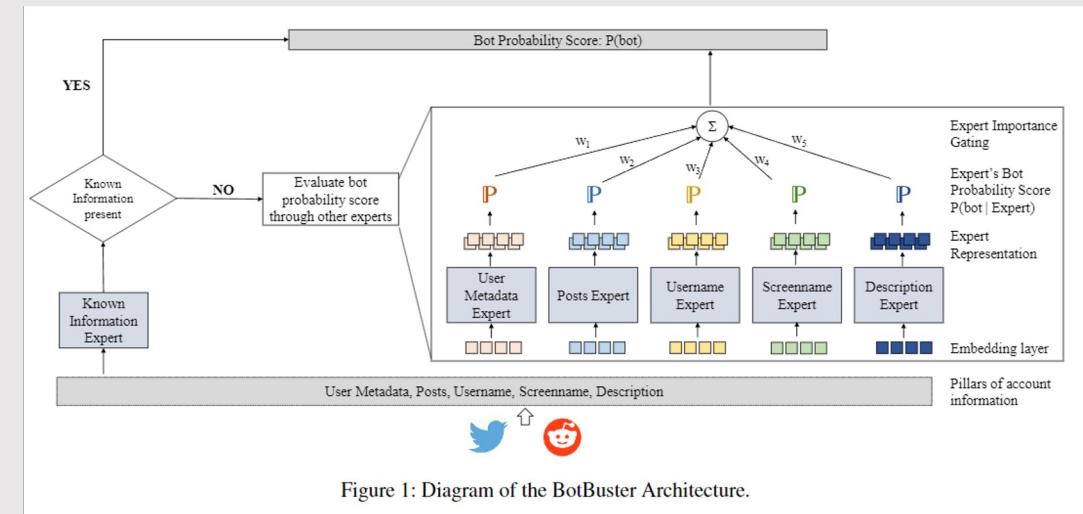


Figure 1: Diagram of the BotBuster Architecture.

¹ Ng, L. H. X., & Carley, K. M. (2023, June). Botbuster: Multi-platform bot detection using a mixture of experts. In Proceedings of the International AAAI Conference on Web and Social Media (Vol. 17, pp. 686-697).

² Ng, L. H. X., Kloo, I., Clark, S., & Carley, K. M. (2024). An exploratory analysis of COVID bot vs human disinformation dissemination stemming from the Disinformation Dozen on Telegram. *Journal of Computational Social Science*, 1-26.

Geopolitical Narratives Analysis



(1) US Elections & Singapore Elections in 2020

Bot activity in the same event in different regions: election discourse



Bot activity in the same event, same region

(2) US-China Relations in the 2023 Chinese Balloon incident



Bot Activity in Similar Events

- United States¹ vs Singapore² elections
- Both elections held in 2020
 - US: 3 Nov, 2020
 - Singapore: 10 July, 2020
- Are the bot activity in both elections the same?
 - Proportion of Bots
 - Narratives of Bots

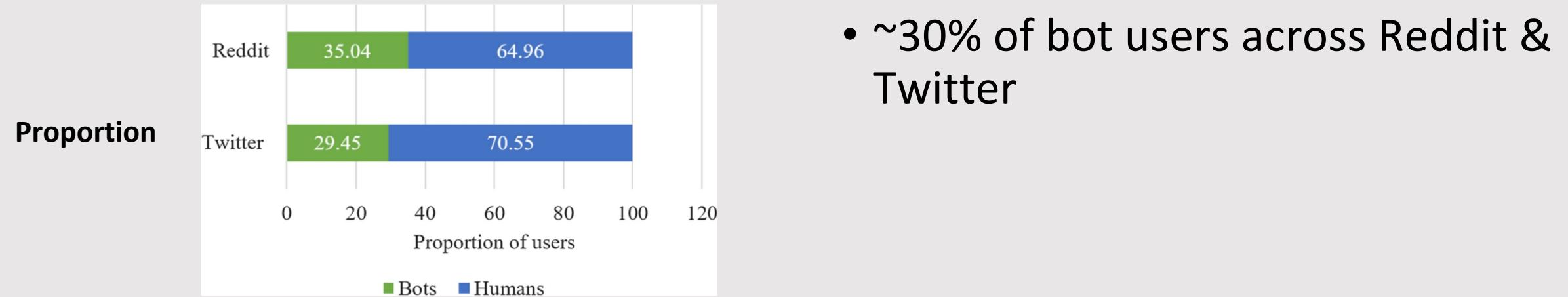


(1) US Elections
& Singapore
Elections

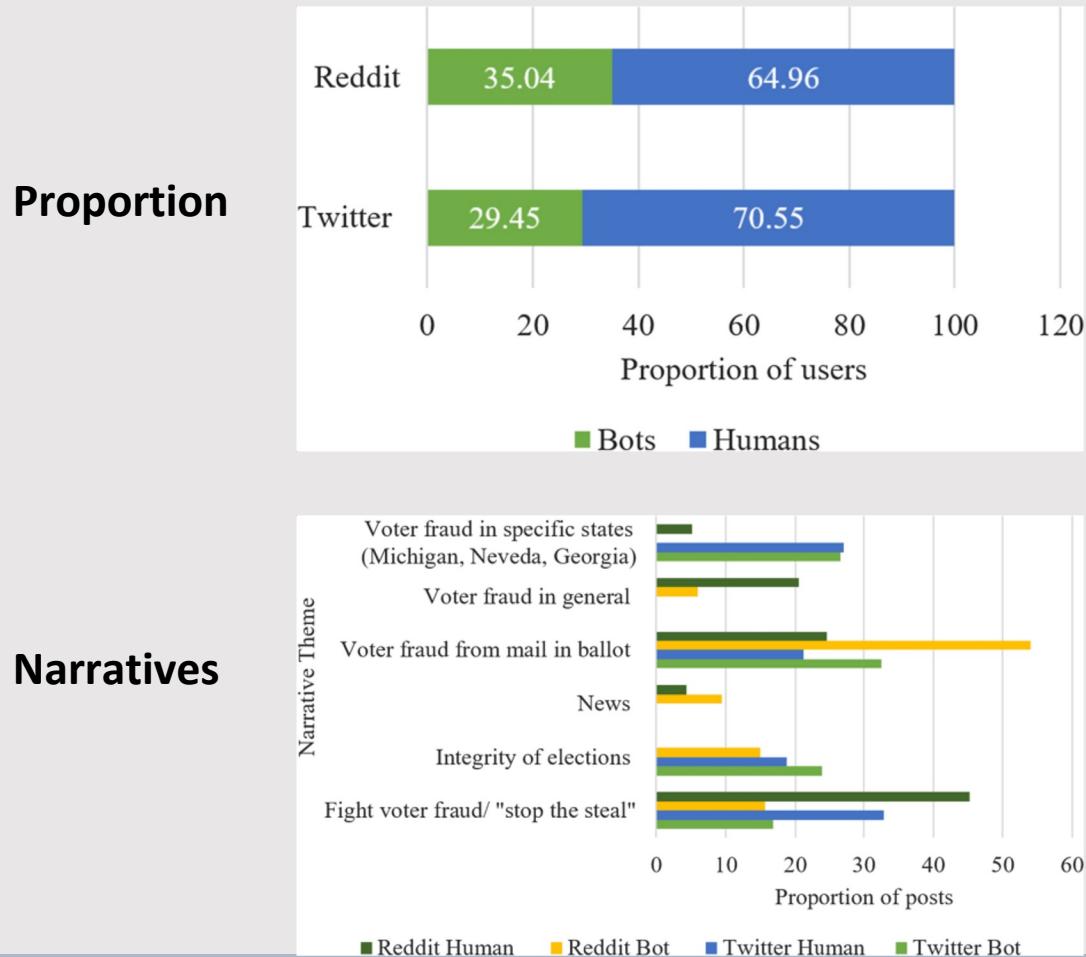
¹ Ng, L. H. X., & Carley, K. M. (2024). Assembling a multi-platform ensemble social bot detector with applications to US 2020 elections. *Social Network Analysis and Mining*, 14(1), 1-16.

² Uyheng, J., Ng, L. H. X., & Carley, K. M. (2021). Active, aggressive, but to little avail: characterizing bot activity during the 2020 Singaporean elections. *Computational and Mathematical Organization Theory*, 27(3), 324-342.

Bot Activity in Elections – United States



Bot Activity in Elections – United States

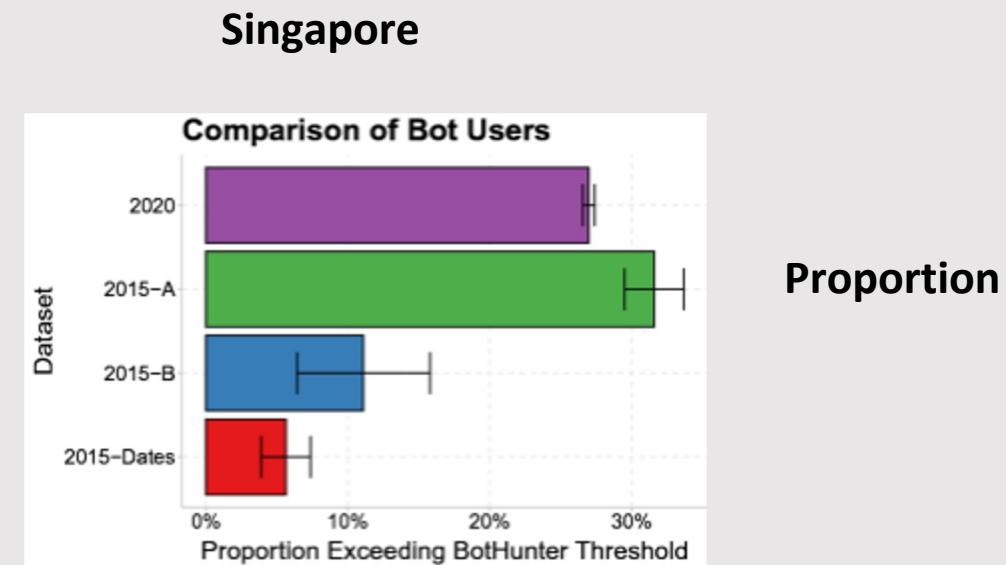


- ~30% of bot users across Reddit & Twitter

- Echoed dis/misinformation narratives of voter fraud
- Bots disseminate disinformation, humans advocate for action

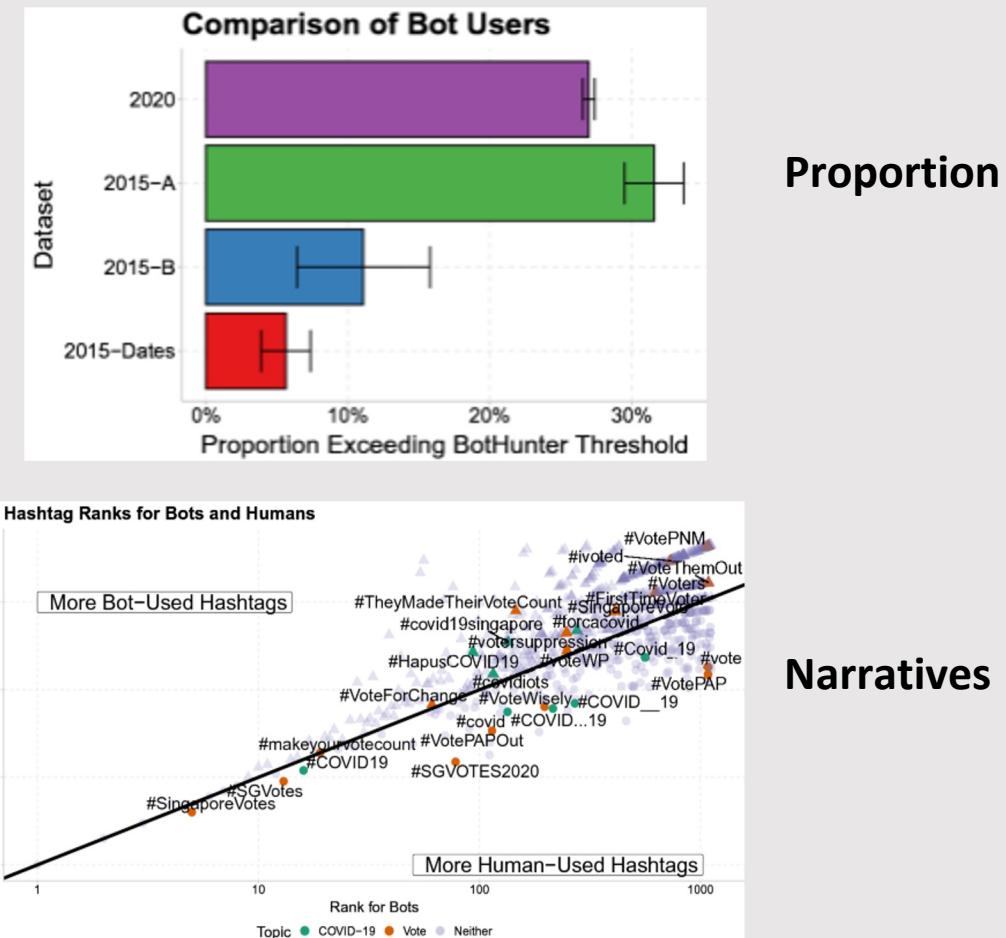
Bot Activity in Elections – Singapore

- ~30% of bot users across Twitter
- Bot activity had been about the same in 2015 and 2020



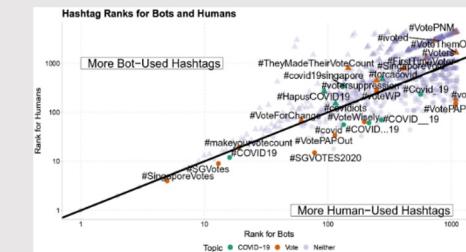
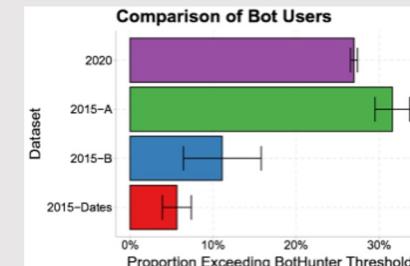
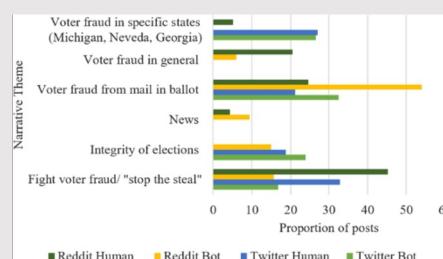
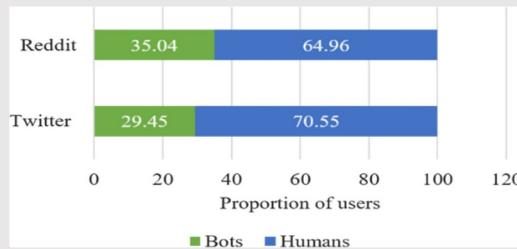
Bot Activity in Elections – Singapore

- ~30% bot users across Twitter
- Bot activity about the same in 2015 and 2020
- Common hashtags used between bots & humans but
- Different specialized hashtags
 - Bots: un-trustworthiness of elections;
 - Humans: mainstream topics



Bot Activity in Elections

United States	Singapore
Active bot activity	Active bot activity
~30% users are bots	~30% users are bots
Bots disseminate disinformation on voter fraud	Bots share messages on the untrustworthiness of elections
Humans advocate for action	Humans talk about mainstream topics



Bot Activity in Same Event

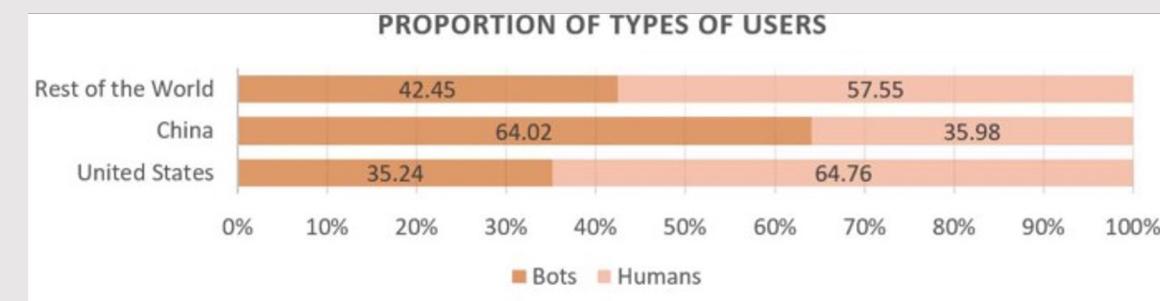
- The story of the 2023 US-China balloon incident
- Is the activity similar with US-affiliated and China-affiliated bots?

(2) US-China Relations in the 2023 Chinese Balloon incident



Bot Activity in Same Event – Balloon Incident

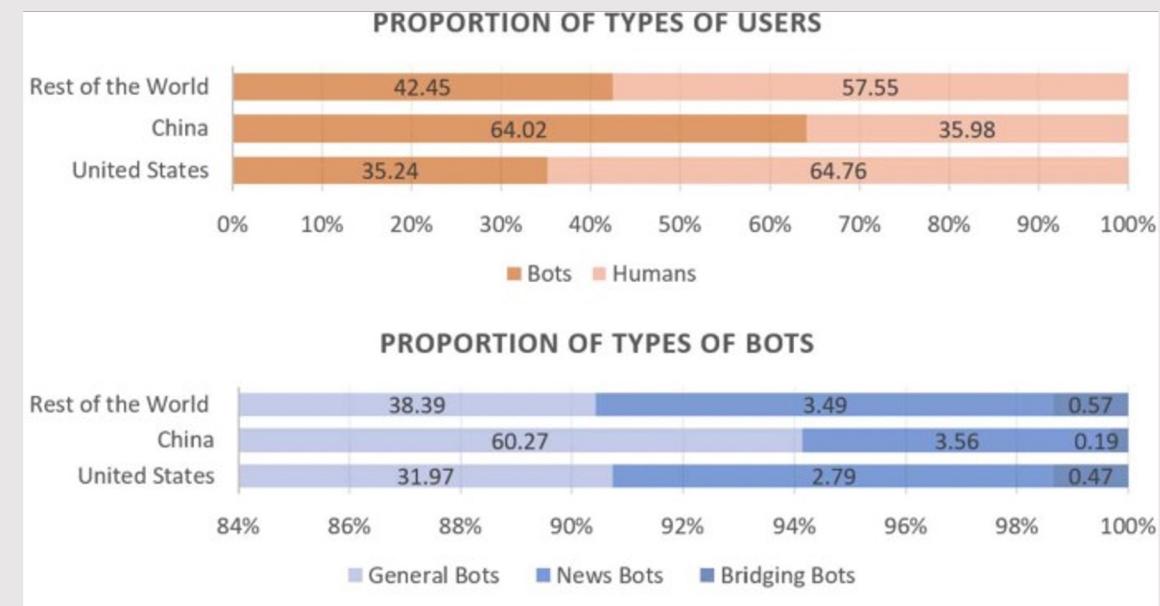
- Proportion of users affiliated with each region in Twitter



- Proportion of bots are higher compared to other events
 - Bots are active, leverage on high-profile events

Balloon Incident

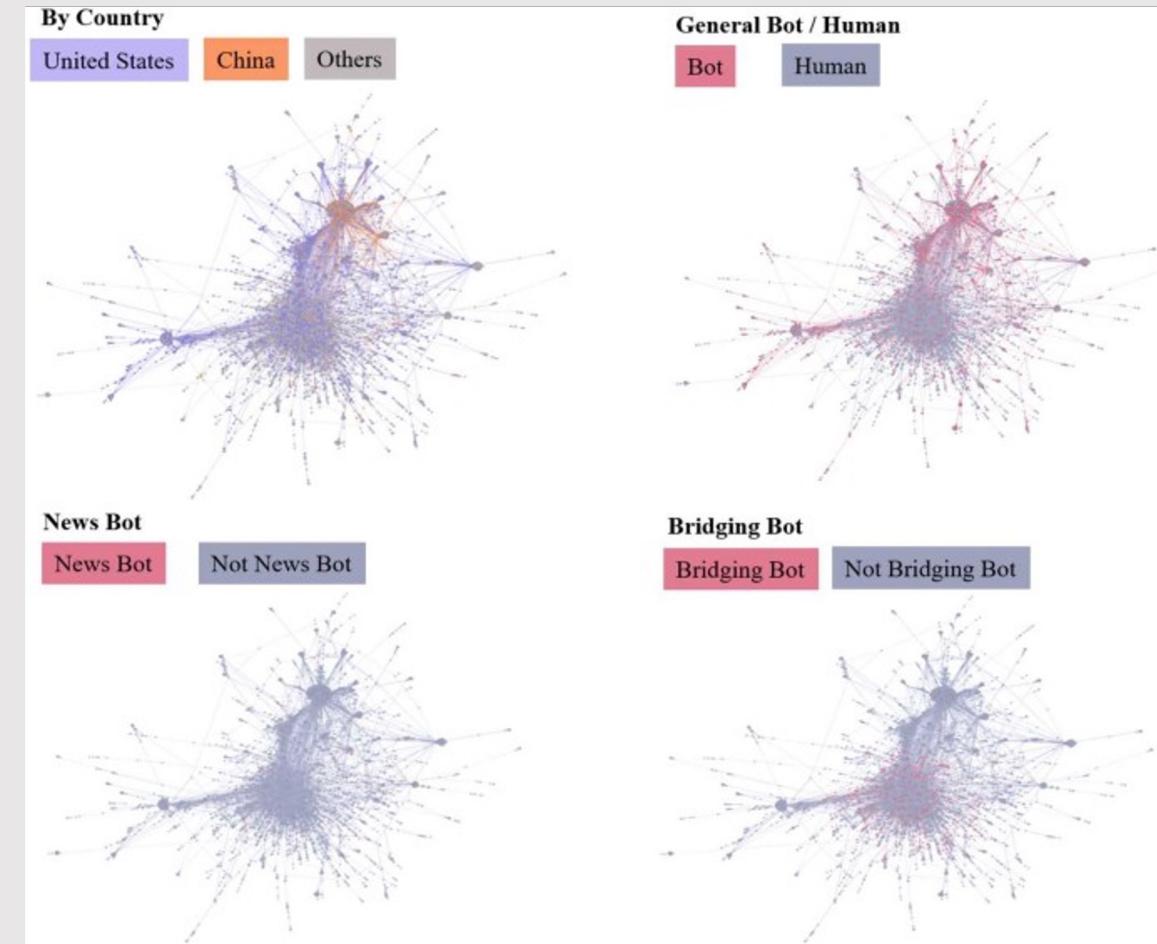
- Types of Bots – General, News, Bridging – are present in all regions
 - General bots
 - News bots
 - Bridging bots



¹ Ng, L. H. X., & Carley, K. M. (2024). Assembling a multi-platform ensemble social bot detector with applications to US 2020 elections. *Social Network Analysis and Mining*, 14(1), 1-16.

Balloon Incident

- Interaction graphs
 - Nodes: Users,
 - Links: Interacted (mention, retweet)
- Users affiliated with US & China in different clusters
- General bots cluster together
- News bots dispersed
- Bridging bots straddle US & China-affiliated clusters



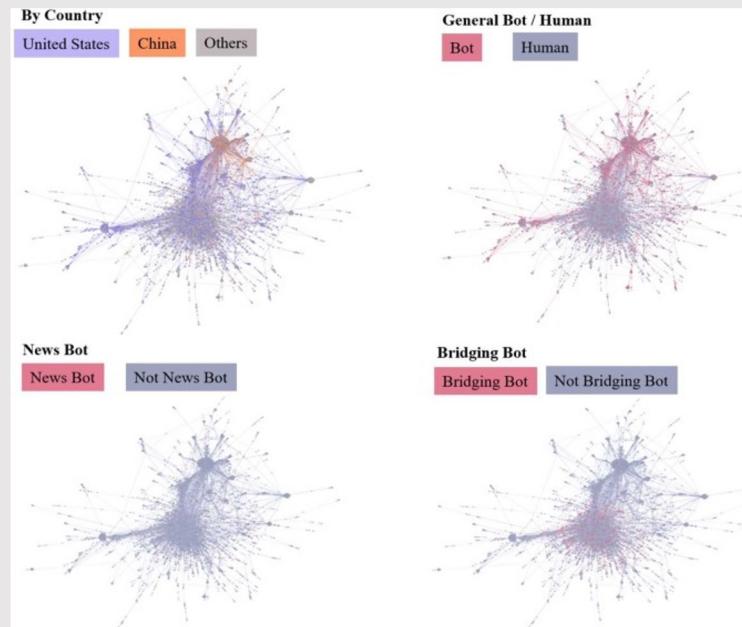
Balloon Incident

- Themes are region-specific, not bot type specific
- US-affiliated: spatial location of balloon, possible surveillance properties
- China-affiliated: worry of the escalation of war and sanctions
- Rest of the world-affiliated: aliens and UFOs



Balloon Incident

United States-Affiliated	China-Affiliated
Active bot activity	Very active bot activity
~35% users are bots	~64% users are bots
Spatial location of balloon Possible surveillance properties	Escalation of war and sanctions

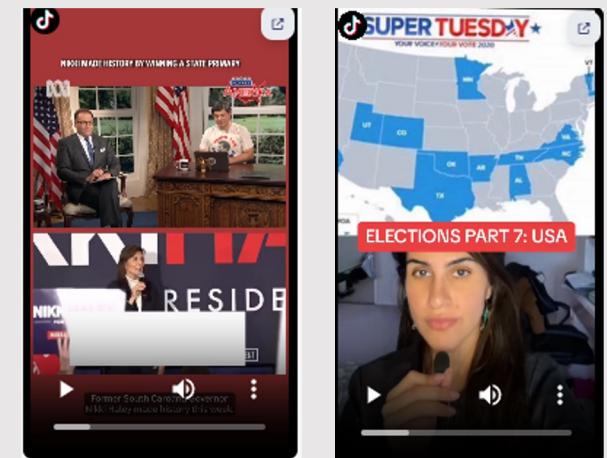


Concluding Thoughts

- Bots are a species in social media that co-exist with humans
- There are different types of bots
- Bots are prevalent in online geopolitical conversations
- Bots in the same event type but targeting different regions can have different activity
- Bots within the same event can project different narratives

Concluding Thoughts

- Bots are likely to be active in the 2024 elections
- Increased platform coverage due to emerging platforms
- Changing techniques due to shifting voter base demographics
- Bots are likely to make use of GenAI tools to increase scalability and increase post variation





r/science • 2 mo. ago
Wagamaga

Armies of bots battled on Twitter over Chinese spy balloon incident. Around 35 per cent of users geotagged as located in the US exhibited bot-like behaviour, while 65 per cent were believed to be human. In China, the proportions were reversed: 64 per cent were bots and 36 per cent were humans.

Computer Science



newscientist.com

Open

- 2mo ago
- So instead of world wars we have this invisible cultural war fought by bots that most people don't know about (tiktok and instagram) resulting in weird polarizations.
- 2mo ago
- It's the new cold war. Though it doesn't necessarily stay on social media, the goal is always to push it mainstream.
- 2mo ago
- 90% of Instagram comments I see are by bots and I can't be proven wrong.
- 2mo ago
- someone should do a study on the comments section on most canadian news outlets. like ctv etc. i swear there must be a ton of bots on there. i looked through a few of the commenters accounts and they're all empty youtube channels or they follow the same channels, or there are reposted videos. tons of them very similar to each other.

 r/science • 2 mo. ago

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Computer Science



newscientist.com

Open

[REDACTED] • 2mo ago

Per cent 😊

↑ 5 ↓ Reply Share ...

[REDACTED] • 2mo ago

per cent

↑ 5 ↓ Reply Share ...

[REDACTED] • 2mo ago

Percent.

↑ 1 ↓ Reply Share ...

[REDACTED] • 2mo ago

I a bot

↑ 1 ↓ Reply Share ...

To everyone who crossed my research path, mentored me, collaborated with me, chatted with me, provided me encouragement, laughed, smiled and cried with me:

Thank you for believing in me.

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