Welcome and Project Intro

Discovering the Traces of Disinformation on Instagram

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Web Science and Digital Libraries (WS-DL) Group
Old Dominion University
Who Am I?

Dr. Michele Weigle
Professor of Computer Science
Web Science and Digital Libraries Research Group
Research interests: web science, social media, web archiving, information visualization
Wife, and mom of 2 boys
Who Was I?

Small-town Louisiana girl

Computer Science undergrad in Louisiana

Computer Science MS and PhD at UNC-Chapel Hill
Undergrad Experience

- Attended a relatively small CS dept in my home state, no graduate program
- Advisor (and later department chair) was female
- Thought about changing my major my first year
- Summer REU-like internship at GTE Labs in Boston after junior year
- Considered Louisiana-Lafayette, Alabama, NC State, and UNC for graduate school
Grad School Experience

- Chose UNC after campus visits
- Met amazing people from all over the world
- Worked with really smart people on interesting projects
- Got to travel (for free) - Italy, Sweden, Lake Tahoe, Norfolk
- Fellow female CS students helped me through and boosted my confidence
Why Did I Become a Professor?

- Inspired by mentors and undergraduate/graduate faculty
- Love learning new things
- Enjoy teaching
- Flexibility in time and research topics
- I loved being a graduate student, didn't want to leave academia
2006 - Joined as Assistant Professor
2012 - Tenure, promoted to Associate Professor
2018 – Promoted to Full Professor

Research interests (in chronological-ish order): TCP/IP networking, vehicular networks, sensor networks, web archiving, information visualization, social media, web science

Recent Teaching: Web Science, Data Visualization, Information Visualization and Visual Analytics, Research Methods (Intro to PhD)
REU Project: Discovering the Traces of Disinformation on Instagram

Metadata of users and posts on Twitter has been used to identify potential sources of disinformation

- follower counts
- number of likes, shares, retweets
- retweet networks

Can we do the same with Instagram?

Image credit: Center for Countering Digital Hate (CCDH), "Malgorithm: How Instagram's algorithm publishes misinformation and hate to millions during a pandemic", March 2021, https://www.counterhate.com/malgorithm

Instagram: 1.21 billion monthly active users
Twitter: 330 million monthly active users
Investigating Spread of Misleading Tweets

@realDonaldTrump tweet about NC voting from 2020

Blue circles - retweets
Red diamonds - quote tweets
Red circles - retweets of quotes

Interactive chart can show the tweet content

Most later red activity are corrections

Instagram was a significant front in the IRA’s influence operation

- Russian Internet Research Agency (IRA)
- Manipulated social media narratives to influence American culture and politics in run-up to 2016 Presidential election
- Employed 1000+ to engage in influence operations, budget of over $25M
- Analysis commissioned by the US Senate Select Committee on Intelligence

<table>
<thead>
<tr>
<th></th>
<th>Facebook</th>
<th>Instagram</th>
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<tbody>
<tr>
<td>Likes</td>
<td>37,627,085</td>
<td>183,246,348</td>
</tr>
<tr>
<td>Likes/Post</td>
<td>612</td>
<td>1,568</td>
</tr>
<tr>
<td>Comments</td>
<td>3,339,752</td>
<td>4,017,731</td>
</tr>
<tr>
<td>Comments/Post</td>
<td>54</td>
<td>34</td>
</tr>
<tr>
<td>Reactions</td>
<td>5,188,182</td>
<td>N/A</td>
</tr>
<tr>
<td>Shares</td>
<td>30,350,130</td>
<td>N/A</td>
</tr>
<tr>
<td>Total Engagements</td>
<td>76,505,149</td>
<td>187,264,079</td>
</tr>
</tbody>
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However, Instagram is not as studied as Twitter or Facebook

<table>
<thead>
<tr>
<th><strong>Twitter</strong></th>
<th><strong>Instagram</strong></th>
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<tbody>
<tr>
<td>450 million monthly active users</td>
<td>2 billion monthly active users</td>
</tr>
<tr>
<td>8 million hits in Google Scholar</td>
<td>3 million hits in Google Scholar</td>
</tr>
<tr>
<td>Open (for now) API allows for searching and</td>
<td>API is focused more on allowing creation of</td>
</tr>
<tr>
<td>downloading public tweet content</td>
<td>content and monitoring engagement</td>
</tr>
<tr>
<td>Sharing based on retweets</td>
<td>No native sharing feature (though there are</td>
</tr>
<tr>
<td></td>
<td>methods for &quot;regrams&quot;)</td>
</tr>
<tr>
<td>Public posts and accounts viewable to not logged</td>
<td>Public posts and accounts limited for not logged</td>
</tr>
<tr>
<td>in users and bots</td>
<td>in users and bots</td>
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### Results from 2022 REU Project

<table>
<thead>
<tr>
<th>Haley Bragg</th>
<th>Himarsha R. Jayanetti</th>
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</thead>
<tbody>
<tr>
<td><a href="mailto:haley.bragg.19@cnu.edu">haley.bragg.19@cnu.edu</a></td>
<td><a href="mailto:hjaya002@odu.edu">hjaya002@odu.edu</a></td>
</tr>
<tr>
<td>Christopher Newport University</td>
<td>Old Dominion University</td>
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<tr>
<td>Newport News, Virginia, USA</td>
<td>Norfolk, Virginia, USA</td>
</tr>
<tr>
<td>Michael L. Nelson</td>
<td>Michele C. Weigle</td>
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<td><a href="mailto:mln@cs.odu.edu">mln@cs.odu.edu</a></td>
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<td>Old Dominion University</td>
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**ABSTRACT**

We examined the archived Instagram account pages of the "Disinformation Dozen", a group of anti-vaccine conspiracy theorists, along with account pages of a set of health authorities. In the Internet Archive, we found that a majority of the archived web pages, or mementos, are actually redirections to the Instagram login page, and of the remaining replayable mementos, many are missing post images. In our combined dataset, over 83% of the archived account pages redirected to the Instagram login page, due to Instagram’s treatment of access by non-logged-in users. For the Disinformation Dozen, 96.13% of their account page mementos redirect to the login page, and only 27.16% of the remaining replayable mementos contain every post image that was requested. Combined, these results reveal that merely 1.05% of mementos for the Disinformation Dozen account pages are replayable with complete post images. Furthermore, we found that the percentage of replayable mementos is decreasing over time, with a particular lack of replayable mementos for the years 2021 and 2022.

and creators insight into their own accounts, rather than allowing researchers to study others’ posts. This is in contrast to Twitter’s previously [24] open Developer API [25]. The nature of sharing on Instagram is also different than on other platforms. Instagram has no "retweet" or "share" analog, which changes the nature of how things “go viral.” Analyzing these retweet (Twitter) and share (Facebook) networks is a standard way that researchers study disinformation propagation networks [20, 21, 23], but this does not exist in Instagram. Instead, spread of information is largely controlled by the Instagram feed, which is tailored to an individual based on who they follow [7].

Due to the nature of the malicious content, many posts spreading disinformation are caught by fact-checking software and deleted. Similarly, accounts dedicated to disinformation are banned once they violate guidelines repeatedly. For example, the Center for Countering Digital Hate (CCDH) released a report in 2021 [6] on a group of content creators known as the "Disinformation Dozen," who were responsible for 65% of anti-vaxx content online, receiving substantial coverage in the news media [3, 11, 17, 19]. Since the

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Bragg, Jayanetti, Nelson, and Weigle, 'Less than 4% of Archived Instagram Account Pages for the Disinformation Dozen are Replayable', JCDL 2023, 

Source code: [https://github.com/oduwsdl/DisinformationDozen](https://github.com/oduwsdl/DisinformationDozen)
You can't view banned accounts on the live web

instagram.com/robertfkennedyjr/

instagram.com/drbutter/

instagram.com/drchristianenorthrup/
Web archives can provide access to past versions of webpages

- If the Instagram account pages were archived before they were banned, we can study the content to learn about their tactics.
- Largest public web archive is the Internet Archive's (IA) Wayback Machine, [https://web.archive.org/](https://web.archive.org/)
But most of these just redirect to the Instagram Login Page

Only 6 successful replays for instagram.com/RobertFKennedyJr

<table>
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<th>Mementos</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Redirects to Login Page</td>
<td>592</td>
</tr>
<tr>
<td>Replayed Account Pages</td>
<td>6</td>
</tr>
<tr>
<td>Total Mementos</td>
<td>598</td>
</tr>
</tbody>
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Even if archived, not all post images may be replayable

Instagram has made it even harder to archive pages

2021, 2022: Low percentages of replayable mementos and number post images available in those replayable mementos

Possible Directions for Summer 2023

- Pinpoint when redirects to the Instagram login page became prominent
- Investigate the quality of archived posts
- Investigate the use of backup accounts to get around account bans
- Investigate tagging networks (what accounts are using similar hashtags) for spreading disinformation
- Investigate the role of specific hashtags over time in spreading disinformation
Graduate Student Helpers

Himarsha Jayanetti
Kritika Garg
David Calano
Backups

https://ws-dl.blogspot.com/2020/05/2020-05-21-visualizing-webpage-changes.html

Virginia at 18.59% positivity (rolling avg: 17.48%) on 6/4/2022
Norfolk at 27.61% positivity (rolling avg: 23.16%) on 6/4/2022
148.72 weekly cases/100k on 5/31/2022

Green: State Avg, Blue: Norfolk
Select range in top chart to zoom in larger charts or use radio buttons under charts (Source: VDH, data.virginia.gov)

https://www.cs.odu.edu/~mweigle/research/atlantic-vis/

https://observablehq.com/@weiglemc/virginia-covid-status-pcr-pos-cases