In recent years, the phenomenon of online misinformation and junk news circulating on social media has come to constitute an important and widespread problem affecting public life online across the globe, particularly around important political events such as elections. At the same time, there have been calls for more transparency around misinformation on social media platforms, as many of the most popular social media platforms function as “walled gardens,” where it is impossible for researchers and the public to readily examine the scale and nature of misinformation activity as it is unfolding on the platforms. In order to help address this, this paper, we present the Junk News Aggregator, an interactive web tool made publicly available, which allows the public to examine, in near real-time, all of the public content posted to Facebook by important junk news sources in the US. It allows the public to gain access to and examine the latest articles posted on Facebook (the most popular social media platform in the US and one where content is not readily accessible at scale from the open Web), as well as organise them by time, news publisher, and keywords of interest, and sort them based on all eight engagement metrics available on Facebook. Therefore, the Aggregator allows the public to gain insights on the volume, content, key themes, and types and volumes of engagement received by content posted by junk news publishers, in near real-time, hence opening up and offering transparency in these activities, at scale across the top most popular junk news publishers and in near real-time. In this way, the Aggregator can help increase transparency around the nature, volume, and engagement with junk news on social media, and serve as a media literacy tool for the public.

Keywords data mining · social media · misinformation

1 Introduction

In recent years, the phenomenon of online misinformation and junk news circulating on social media has come to constitute an important problem affecting public life online across the globe, particularly around important political events such as elections. This phenomenon has become so widespread, and has continued to grow in scale and sophistication over the years, that it has been recognised as posing an important threat to the health of online political discourse and to democratic processes. At the same time, the volume, nature, and engagement with such content has often been difficult for researchers or the public to examine, due to the closed nature of many of the most popular social media platforms.

In order to address this issue, in this paper we present the Junk News Aggregator, an interactive web tool made publicly available, which allows the public to examine, in near real-time, all of the public content posted to Facebook...
by important junk news sources in the US. This tool was deployed in the context of the 2018 US midterm elections, as the previous US elections in 2016 were recognised as a time where a lot of online misinformation was circulated in relation to the elections, and misinformation in relation to US politics has far from ceased since. This tool allows the public to gain access to and examine the latest articles posted on Facebook, the most popular social media platform in the US and one where content is not readily accessible at scale from the open Web, as well as filter them by time (from the last hour to one month in the past), news publisher, and keywords of interest, and sort them based on all eight engagement metrics available on Facebook. The aggregator offers three tools, each of which offers a different type of window into this activity: a full interactive explorer with all the filtering and sorting functionality, and an Daily Visual Grid of all images in this activity which links to the full aggregator, as well as a static Daily Top-10 List showing the posts that received the most engagement in the last day. Therefore, the Aggregator allows the public to gain insights on the volume, content, key themes, and types and volumes of engagement received by content posted by junk news publishers, in near real-time, hence opening up and offering transparency in these activities, at scale across the top most popular junk news publishers and in near real-time. In this way, the Aggregator can help increase transparency around the nature, volume, and engagement with junk news on social media, and serve as a media literacy tool for the public.

In more detail, on November 1st 2018, we launched the Junk News Aggregator (JNA), a new tool for investigating junk news posted publicly on Facebook, in the context of the 2018 US midterm elections.

In brief, junk news sources are news sources that deliberately publish misleading, deceptive or incorrect information purporting to be real news about politics, economics or culture. This content includes ideologically extreme, hyper-partisan, or conspiratorial news and information, as well as various forms of propaganda.

The JNA is an interactive web tool for exploring junk news stories posted on Facebook in the lead-up to the US midterms, and it enables website visitors to examine and parse content posted by junk news sources on Facebook in real-time. It make visible the depth of the junk news problem, displaying the quantity and the content of junk news, as well as the levels of engagement with it. Junk news content can be sorted by time and by engagement numbers, as well as via keyword search (such as for a candidate, district, or specific issue). It also offers a visual overview (the Daily Visual Grid), and a top-10 snapshot of the day’s most engaged-with junk news (the Daily Top-10 List).

The goal in building the JNA was to help shed light on the problem of junk news on social media, to make this issue more transparent, and to help improve the public’s media literacy. We also aimed to help journalists, researchers, policy-makers, and social media platforms understand the impact of junk news on public life.

The JNA can be used to track any set of public Facebook Pages, as it takes as an input a list of websites and their associated public Facebook Pages. In the future, we plan to keep it alive and have an instance of it for tracking junk news related to any election or other event that we may want to study.

This paper describes the JNA – how it was built, what data it displays, and the methodology based on which that data was collected. The first section presents relevant background, discussing what junk news is, and the context of online misinformation. The second section proceeds to describe the methodology used to collect data for the JNA. Next, the paper discusses how the collected data is presented on the JNA website, discussing each of the three tools made available for the user to examine, organise, and explore junk news posts on Facebook. The paper ends with a brief concluding remarks on the goals and contributions of the JNA.

2 Background

This section presents background on online misinformation, as well as related work in the area of online tools for presenting and analysing misinformation on social media platforms.

2.1 What is Junk News?

Per the definitions in Bolsover and Howard (2018); Gallacher et al. (2018); Howard et al. (2017, 2018); Woolley and Howard (2017), the term “junk news” refers to various forms of propaganda and ideologically extreme, hyper-partisan, or conspiratorial political news and information. The term includes news publications that present verifiably false content as factual news. This content includes propagandistic, ideologically extreme, hyper-partisan, or conspiracy-oriented news and information. Frequently, attention-grabbing techniques are used, such as lots of pictures,
moving images, excessive capitalization, personal attacks, emotionally charged words and pictures, populist generalizations, and logical fallacies. It presents commentary as news. The term refers to a publisher overall, i.e. based on content that is typically published by a publisher, rather than referring to an individual article. Further context on junk news and online misinformation can be found in the next section.

The following five criteria are used to determine whether a website is a source of junk news. If a website satisfies the majority, i.e. three or more, of these five criteria, it is considered a source of junk news.

**Professionalism** (P) These sources do not employ standards and best practices of professional journalism. They refrain from providing clear information about real authors, editors, publishers and owners. They lack transparency and accountability, and do not publish corrections on debunked information.

**Style** (S) These sources use emotionally driven language with emotive expressions, hyperbole, ad hominem attacks, misleading headlines, excessive capitalization, unsafe generalizations and logical fallacies, moving images, and lots of pictures and mobilizing memes.

**Credibility** (Cr) These sources rely on false information and conspiracy theories, which they often employ strategically. They report without consulting multiple sources and do not fact-check. Sources are often untrustworthy and standards of production lack reliability.

**Bias** (B), **Left-wing bias** (LB), **Right-wing bias** (RB) Reporting in these sources is highly biased, ideologically skewed or hyper-partisan, and news reporting frequently includes strongly opinionated commentary and inflammatory viewpoints.

**Counterfeit** (Ct) These sources mimic established news reporting. They counterfeit fonts, branding and stylistic content strategies. Commentary and junk content is stylistically disguised as news, with references to news agencies and credible sources, and headlines written in a news tone with date, time and location stamps.

Further, a website is also considered junk news if it is an aggregator of junk news (JN AGGR), i.e. if it aggregates other sources that are themselves deemed to be junk news sources based on the above criteria.

### 2.2 Online misinformation

Social media is an important source of news and information about politics in the United States. But during the 2016 US Presidential Election social media platforms emerged as a fertile breeding ground for foreign influence campaigns, conspiracy theories, and radical alternative media outlets. Anecdotally, the nature of this political news and information seems to have evolved over time, but political communication researchers have yet to develop a comprehensive, grounded, internally consistent, typology of the types of sources shared by social media users. Rather than chasing a definition of what is popularly known as “fake news”, we produce a grounded typology of what users actually shared and apply rigorous coding and content analysis techniques to define the new phenomenon. To understand what social media users are sharing in their political communication, we had analyzed large volumes of political conversation over Twitter during the 2016 Presidential campaign period and the 2018 State of the Union Address in the United States. Based on this analysis, researchers have developed the concept of “junk news”, which refers to sources that deliberately publish or aggregate misleading, deceptive or incorrect information packaged as real news about politics, economics or culture.

Following the highly contentious 2016 US Presidential Election, there has been a growing body of empirical work demonstrating how large volumes of misinformation can circulate over social media during critical moments of public life [Allcott and Gentzkow (2017); Del Vicario et al. (2016); Nosoughi et al. (2018)]. Scholars have argued that the spread of “computational propaganda” sustained by social media algorithms can negatively impact democratic discourse and disrupt digital public spheres [Bradshaw and Howard (2018); Howard and Wooley (2016); Persily (2017); Tucker et al. (2017); Wardle and Derakhshani (2017)]. Indeed, both social network infrastructure and user behaviors provide capacities and constraints for the spread of computational propaganda [Bradshaw and Howard (2018); Flaxman et al. (2016); Marwick and Lewis (2011); Pariser (2011); Wu (2017)]. Yet, the body of work that is devoted to conceptualizing misinformation phenomena faces a number of epistemological and methodological challenges, has remained fragmentary, is ambiguous at best and lacks a common vocabulary [Boyd (2017); Fletcher et al. (2018); Wardle and Derakhshani (2017)]. Terminology on misinformation has become highly contentious, constantly being weaponised by politically motivated actors to discredit media reporting [Neudert (2017); Woolley and Howard (2018)].

Drawing on perspectives from political communication, this typology helps reveal the nature of content being shared over social media. The typology has evolved over several years and multiple scholarly publications, including scientific working papers, peer review journal articles, and book manuscripts.
There have been a few attempts to systematically operationalize fake news as a concept. The primary challenge is that it is impossible to evaluate the amount of fact checking that goes into a particular piece of writing at a scale sufficient for saying something general about the trends on a social media platform. Most researchers—and indeed most citizens—have manual heuristics for evaluating sources that deliberately publish or aggregate misleading, deceptive or incorrect information purporting to be real news about politics, economics or culture. For different social media users there are different ways of evaluating the qualities of news and political information on social media.

Some outlets appear highly unprofessional. These sources do not employ standards and best practices of professional journalism. They refrain from providing clear information about real authors, editors, publishers and owners. They lack transparency and accountability, and do not publish corrections on debunked information. Other outlets have stylistic trademarks that make them suspicious to most readers. These sources use emotionally driven language with emotive expressions, hyperbole, ad hominem attacks, misleading headlines, excessive capitalization, unsafe generalizations and logical fallacies, moving images, and lots of pictures and mobilizing memes. For other sources of political news and information, false information and conspiracy theories seem to drive the strategy of word choice, story placement, and argument structure. They report without consulting multiple sources and do not fact-check. Sources are often untrustworthy and standards of production lack reliability. While some sources may have a fatal “credibility issue”, others have strong bias, and reporting in these sources is highly biased, ideologically skewed or hyper-partisan, and news reporting frequently includes strongly opinionated commentary and inflammatory viewpoints. Finally, some sources simply mimic established news reporting styles and formats, as counterfeit sources. Such sources are most commonly cited as examples of fake news, but they are essentially sources of commentary that is masked as news. They are stylistically disguised or falsely branded, making references to news agencies and credible sources, and headlines written in a news tone with date, time and location stamps.

Focusing specifically on political news and information being shared during the 2016 US Presidential election and the State of the Union Address in January 2018, we have already analyzed in previously published studies 21.8 million tweets that voters shared over Twitter, one of the most popular platforms for conversations about politics in the United States.

Content typologies are of central importance to the study of political communication, and for many years the broad categories and subcategories of political news and information have remained widely accepted by researchers, though of course there is debate over how transportable such traditional categories are to new media political communication. However, the recent attention and debate over the effects of junk news in the media ecosystem have forced researchers—especially those working in political communication and social media—to re-evaluate the production models, normative values, and ideational impact of political news and information of social media with new categories and definitions that are actually grounded in the content being shared over social media. Currently, the debate lacks a grounded and comparative framework of the types of information that circulate on social media, and remains detached from evidence of social media sharing behavior. We advance this debate with a rigorously composed typology based on a focused, cross-case comparison of key political events in the US.

We proceed from a recognition that what users consume and share over social media in their political conversations is not simply news, but could include a wide variety of sources for political news and information, including user-generated content, conspiratorial alternative media outlets, and entertainment outlets. Indeed, there is significant research that humorous content is a staple of information sharing in contemporary political communication. Given the lack of guidance in the existing literature on what information users are sharing, a grounded and iterative method of cataloguing content and evaluation is especially relevant. Based on our analysis of the US Presidential Election in 2016 we develop and analyze such a grounded typology of sources of news and information shared over Twitter. While Twitter provides access to a wealth of data on public news sharing in the United States, the user base is not fully representative. Nevertheless, Twitter remains a central source of news and is especially popular among journalists, politicians and opinion leaders, who further disseminate information in non-public social media spaces such as Facebook and WhatsApp.

Typology building is one of the most foundational tasks in political research, and is especially important when it comes to investigating and explicating new phenomena, unexpected problems, or sudden changes in social systems. Understanding the diversity of variables and cases, among real world outcomes, involves carefully constructing categories that both accurately describe the features of such new political phenomena and serve as transportable concepts across several cases. Certainly political propaganda, misinformation, dirty tricks, and negative campaigning are not new features of public life. But social media applications are new platforms for spreading political news and information, the speed at which misinformation spreads is significantly greater, and use of an individual’s data in the targeting formula for misinformation are three distinct components of this contemporary mode of political communication.
Typologies in political communication research have been useful for frame analysis for the study of news, or the organization of event-based datasets in which media accounts provide the primary features for important incidents (Althaus, Edy, and Phalen 2001; Erickson and Howard 2007). Even before social media, scholars used such methods to expose the ways in which sensational news organizations used human interest frames, while serious news organizations used responsibility and conflict frames (Semetko and Valkenburg 2000). In order to understand what users were actually sharing over social media, we develop a typology of political news and information.

3 Methodology

The Junk News Aggregator website (JNA) offers the public a suite of three tools, enabling them to track in near real-time the junk news content being posted and engaged with on Facebook, and to filter this information by time, reaction type, and by keywords.

The JNA queries Facebook every hour on the hour, using the public Facebook Graph API, and collects only public data. No sensitive, personal or user-identifying data is collected. Specifically, it queries a list of Public Facebook Pages of specific junk news publishers. These junk news publishers were chosen because their web content was found to be particularly frequently discussed in social media conversations relating to the 2018 US midterm elections. The list of junk news publishers was assembled and utilised in the JNA according to the following sequence of steps:

1. Selecting Twitter hashtags relevant to the 2018 US midterm elections. Ensure that these hashtags relate to this specific election and not to other 2018 elections around the world, and ensure the list of hashtags is balanced, in the sense of covering both right and left-leaning hashtags.

2. Using this expanded hashtag list, use the Twitter Streaming API to retrieve all English-language tweets (including retweets and quote tweets) mentioning any of these hashtags. This data collection resulted in 2,541,544 tweets posted in the period September 21 to September 30, 2018.

3. Out of this set of tweets, get all the URLs they mention. Keep only the base URL (i.e. not a specific article’s URL but the homepage URL), and count how many times each base URL was mentioned.

4. Giving this list of URLs to trained US experts (trained human annotators or “coders”), to classify all URLs into categories of news and political content, using a grounded typology Woolley and Howard (2018). For the junk news category, there exist five criteria, so if a news source fails to satisfy at least three of these five criteria, it gets classified under this category. To train our team of US experts to categorize sources of political news and information according to our grounded typology, we established a rigorous training system. For the analysis of the 2018 US midterms, we worked with a team of three coders. Each source was triple-coded. Any conflicting decision was thoroughly discussed between coders to achieve consensus. For sources where consensus was not achieved, coders discussed with each other thoroughly to achieve consensus. In the event that consensus was not achieved, an executive team of three other highly experienced coders reviewed the source and made a final coding decision.

5. For every website in the Junk News list that has been shared on Twitter, identifying their Facebook page, if they have any. In order to establish that a given Facebook page corresponds to a given website, it is required that either the website explicitly lists this Facebook page as theirs, and/or that the given Facebook page lists under its ‘Website’ field this particular website.

6. Out of all junk news sites, keep only the ones that have a Facebook page. Out of those, keep only the top 50 most shared ones on Twitter (due to the Facebook Graph API’s rate limits, not all of them can be tracked). These 50 junk news sites, along with the typology criteria which they violate (due to which they get classified as junk news), can be found in Table 2 where the explanation of the code (abbreviation) used for each criterion is described above.

7. Out of these 50 junk news sites, for the public Facebook page of each, retrieve the public posts authored by them and some of the post metadata (including aggregate-level engagement numbers): every hour on the hour, get all posts authored by these pages, not including any names of people who engage with these posts, but rather only numbers of engagements (reactions), for all eight types of engagement that Facebook makes available: Share, Comment, Like, Love, Haha, Wow, Sad, Angry. Write these posts to a database.
Table 1: Twitter Hashtags used

| Hashtags                          | 2018midterms               | bluetsunami                  | bluetsunami2018              | bluwave                      | bluwave2018                  | bluwavecoming2018             | bluwaveiscoming              | dem                         | democrat                     | democrats                    | dems                        | earlyvoting                 | flipitblue                   |
|-----------------------------------|-----------------------------|------------------------------|-----------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|
|                                   | getoutthevote               | gop                          | midtermelctions             | midterms                     | midterms2018                 | rednationrising              | redwave                      | redwave2018                 | redwavering                  | redwavering2018              | republican                   | republicans                 | uniteblue                    |
|                                   | voteblue                    | voteblue2018                 | votebluetosaveamerica       | votedemout                   | votedsouth                    | votego                        | voatered                    | votered2018                 | voteredtosaveamerica         | walkaway                     | walkawayfromdemocrats2018    | whenweallvote               |
|                                   | voteblue2018               |                              |                              |                              |                              |                              |                              |                              |                              |                              |                              |                              |                              |
|                                   |                              |                              |                              |                              |                              |                              |                              |                              |                              |                              |                              |                              |                              |

8. For the Junk News Aggregator site, retrieve data from this database of public Facebook posts by junk news publishers, and allow site visitors to explore, sort, and filter this data by time, engagement numbers, and keywords.

We note that, for each Facebook post collected, the displayed engagement numbers were last updated at most an hour after the post was posted, as, due to the Facebook API's data limits, we cannot update those again later. But the link to the Facebook post is provided, so you can click on that to see current engagement levels for this post.

4 The Junk News Aggregator website

This section briefly describes the three tools available on the JNA website: the Interactive Explorer, as well as two simpler and less interactive tools that show the top posts of the last 24 hours: the Daily Top-10 List, and the Daily Visual Grid.

4.1 The Interactive Explorer

The full Interactive Explorer shows Facebook posts posted by junk news outlets on their public Facebook page. It shows up-to-the-hour posts, going as far back as a month into the past.

The user can filter posts based on how long ago they were posted (e.g. 1 hour ago, 2 hours ago, etc.), and also based on keywords and based on the publisher name. The user can also sort posts, not only by when they were posted (newest/oldest), but also by how many engagements (or reactions) they received, for each of the eight post engagement types available on Facebook (Likes, Comments, Shares, and the five emoji reactions: Love, Haha, Wow, Angry, Sad), and by the sum of all engagements across all eight metrics ("All").

In addition, the user can sort posts by the age-adjusted version of each of the engagement types (number of engagements divided by the post’s age in seconds), which shows the number of engagements this post received per second of its life on Facebook (up to the point it was retrieved by the JNA system). Since the JNA system only queries Facebook once an hour (due to Facebook API’s rate limits, this cannot be done more frequently), this accounts for the age of the post at the time Facebook was queried, and offers a more appropriate measure for comparing and sorting posts based on engagement numbers.

4.2 The Daily Top-10 List

The Daily Top-10 List is a smaller and simpler tool of the Interactive Explorer. It uses the same data as the full Interactive Explorer, but it queries this data less frequently, once every 24 hours, at 5pm ET, and shows only the top 10 most engaged-with Facebook posts that were posted in this 24-hour period by junk news sources.

In more detail, it shows the top 10 most engaged-with posts in terms of the overall age-adjusted total engagements these posts have received. A post’s overall age-adjusted total engagements is the sum of all engagements received by this post (the number of Likes + Comments + Shares + Love reactions + Haha reactions + Wow reactions + Angry reactions + Sad reactions).
Table 2: Junk News Sources and Relevant Criteria Violated

| Source                          | Junk News Criteria Violated |
|---------------------------------|-----------------------------|
| breitbart.com                   | RB S Cr P                   |
| thegatewaypundit.com            | RB S Cr P                   |
| libertyheadlines.com            | RB S Cr                     |
| theblacksphere.net              | RB Cr S P                   |
| dailywire.com                   | RB S Cr                     |
| thefederalist.com               | RB S Cr                     |
| rawstory.com                    | LB Cr P                     |
| thedailydigest.org              | CR Ct RB P                  |
| lifenews.com                    | RB S Cr P                   |
| infowars.com                    | RB S Cr P                   |
| dailycaller.com                 | RB S P                      |
| zerohedge.com                   | Cr P S                      |
| barenakedislam.com              | RB S Cr P                   |
| pjmedia.com                     | P Ct Cr RB                  |
| americanthinker.com             | RB S Cr Ct                  |
| newrightnetwork.com             | Ct S RB                     |
| gellerreport.com                | RB S Cr Ct                  |
| davidharrissjr.com              | RB S P                      |
| theoldschoolpatriot.com         | S RB Cr                     |
| 100percentfedup.com             | RB S Cr P                   |
| committedconservative.com       | RB S Cr P                   |
| truthfeednews.com               | P Ct Cr RB                  |
| michaelsavage.com               | RB S Cr                     |
| bigleaguepolitics.com           | RB S Cr                     |
| cnsnews.com                     | RB S Cr P                   |
| truepundit.com                  | RB S P                      |
| thepoliticalinsider.com         | P Cr Ct RB                  |
| hotair.com                      | RB S Cr                     |
| lifezette.com                   | RB S Cr P                   |
| canadafreepress.com             | RB S Cr P                   |
| shareblue.com                   | LB P CT                     |
| wnd.com                         | Ct RB P                     |
| bizpacreview.com                | RB S P                      |
| rushlimbaugh.com                | RB P S                      |
| theblaze.com                    | P RB Cr                     |
| frontpagemag.com                | RB S Cr P                   |
| redstate.com                    | RB S Ct P                   |
| palmerreport.com                | LB P S                      |
| chicksonright.com               | RB S Cr                     |
| nworeport.me                    | S RB B P                    |
| en-volve.com                    | RB S Cr                     |
| magaoneradio.net                | RB S P JN AGG               |
| twitchy.com                     | S RB P                      |
| naturalnews.com                 | RB S Cr P                   |
| westernfreepress.com            | P S RB                      |
| legalinsurrection.com           | RB S P Ct                   |
| conservativedailypost.com       | RB S Cr P                   |
| therightscoop.com               | RB S P                      |
| conspiracydailyupdate.com       | Cr S JN AGG                 |

reactions + Sad reactions) divided by the post’s age in seconds, where a post’s age equals the time when the post was retrieved from Facebook minus the time when the post was posted to Facebook, with this age measured here in seconds.
4.3 The Daily Visual Grid

The interactive image grid on the homepage is an image-based top-256 Daily Visual Grid. It shows images from the top 256 most engaged with junk news posts of the last 24 hours.

This Daily Visual Grid uses exactly the same logic as the Daily Top-10 List (described above): it updates every 24 hours at 5pm ET, and shows only the top 256 most engaged with Facebook posts that were posted in this 24-hour period by junk news sources. These are the top posts based on age-adjusted total engagements (the “age-adjusted total: All” metric). Each image in the grid corresponds to a junk news Facebook post. Hovering over an image reveals a pop-up showing more information about the relevant post: the Facebook Page that posted it, the time and date posted, the text in the post, and engagement numbers. Clicking on an image takes the user to the Interactive Explorer, where one can explore junk news in greater detail.

5 Conclusion

Given the proliferation of misinformation and junk news on social media platforms around important election events, we have built the Junk News Aggregator (JNA), to enable the public to transparently and systematically examine and parse junk news on Facebook in near real-time, hence contributing towards transparency around junk news on social media. This is achieved through this interactive web app, by making visible the quantity and all the content that US junk news published publicly on Facebook, as well as the levels of engagement with it. This effort started shortly before the 2018 US midterm elections, and continues to this day. The JNA website is comprised of three tools, each offering a different window into the online activity of these junk news sources: an Daily Visual Grid, focusing on the visual media content that these sources employ, which leads to the Interactive Explorer, which displays the full content of each Facebook post and offers more extensive filtering and sorting functionality and goes up to a month back (temporal, keyword-based, and engagement-based, for all 8 engagement actions available for Facebook posts), and the Daily Top-10 List, offering a snapshot of the day’s top engaged-with Facebook posts from these junk news publishers. In this manner, the JNA is the first publicly-available tool that offers insights into the content publicly uploaded to Facebook by junk news sources, contributing towards increasing transparency around the nature, volume, and engagement with junk news on social media, and aiming to serve as a media literacy tool for the public.

6 Acknowledgements

This work is funded by the European Research Council through the grant “Computational Propaganda: Investigating the Impact of Algorithms and Bots on Political Discourse in Europe,” Proposal 648311, 2015-2020, Philip N. Howard, Principal Investigator, and the grant “Restoring Trust in Social Media Civic Engagement,” Proposal Number: 767454, 2017-2018, Philip N. Howard, Principal Investigator. We are grateful for additional support from the Open Society Foundation and Ford Foundation. Project activities were approved by the University of Oxford’s Research Ethics Committee, CUREC OII C1A 15 044, C1A 17 054. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the researchers and do not necessarily reflect the views of the funders, or the University of Oxford.

We thank Shaun A. Noordin, Adham Tamer and John Gilbert of the OII, and Mike Antcliffe of Achromatic Security, for their valuable web development and security testing work on this project. Thanks also to Lisa-Maria Neudert and Vidya Narayanan, and to the rest of the COMPROP team, for their very helpful suggestions, feedback and support during the development of this project.

References

Hunt Allcott and Matthew Gentzkow. Social media and fake news in the 2016 election. *Journal of Economic Perspectives*, 31(2):211–36, 2017.

Hilliard Aronovitch. Interpreting weber’s ideal-types. *Philosophy of the Social Sciences*, 42(3):356–369, 2012.

Amy B Becker. Comedy types and political campaigns: The differential influence of other-directed hostile humor and self-ridicule on candidate evaluations. *Mass Communication and Society*, 15(6):791–812, 2012.

Amy B Becker, Michael A Xenos, and Don J Waisanen. Sizing up the daily show: Audience perceptions of political comedy programming. *Atlantic Journal of Communication*, 18(3):144–157, 2010.

https://newsaggregator.oii.ox.ac.uk/index.php#visual_jna
Grant Blank. The digital divide among twitter users and its implications for social research. *Social Science Computer Review*, 35(6):679–697, 2017.

Gillian Bolsover and Philip N Howard. Chinese computational propaganda: automation, algorithms and the manipulation of information about chinese politics on twitter and weibo. *Information, Communication & Society*, pages 1–18, 2018.

D Boyd. Google and facebook can’t just make fake news disappear. Abgerufen von https://backchannel.com/google-and-facebook-cant-just-make-fake-news-disappear-48f4b4e5f8e8, 2017.

Samantha Bradshaw and Philip N Howard. Why does junk news spread so quickly across social media? algorithms, advertising and exposure in public life. *Knight Foundation, Working Paper*, January 2018. URL https://kf-site-production.s3.amazonaws.com/media_elements/files/000/000/142/original/Topos_KF_White-Paper_Howard_V1_ado.pdf.

Michela Del Vicario, Alessandro Bessi, Fabiana Zollo, Fabio Petroni, Antonio Scala, Guido Caldarelli, H Eugene Stanley, and Walter Quattrociocchi. The spreading of misinformation online. *Proceedings of the National Academy of Sciences*, 113(3):554–559, 2016.

Jennifer Earl, Andrew Martin, John D McCarthy, and Sarah A Soule. The use of newspaper data in the study of collective action. *Amn. Rev. Sociol.*, 30:65–80, 2004.

Seth Flaxman, Sharad Goel, and Justin M Rao. Filter bubbles, echo chambers, and online news consumption. *Public opinion quarterly*, 80(S1):298–320, 2016.

Richard Fletcher, Alessio Cornia, Lucas Graves, and Rasmus Kleis Nielsen. Measuring the reach of “fake news” and online disinformation in europe. *Reuters Institute Factsheet*, 2018.

John D Gallacher, Vlad Barash, Philip N Howard, and John Kelly. Junk news on military affairs and national security: Social media disinformation campaigns against us military personnel and veterans. *arXiv preprint arXiv:1802.03572*, 2018.

Philip N Howard and Muzammil M Hussain. *Democracy’s fourth wave?: digital media and the Arab Spring*. Oxford University Press, 2013.

Philip N Howard and Samuel Wooley. Political communication, computational propaganda, and autonomous agents: Introduction. *International Journal of Communication*, 10:4882–4890, 2016.

Philip N Howard, Gillian Bolsover, Bence Kollanyi, Samantha Bradshaw, and Lisa-Maria Neudert. Junk news and bots during the us election: What were michigan voters sharing over twitter. *Computational Propaganda Research Project, Oxford Internet Institute, Data Memo, 2017.1*, 2017.

Philip N Howard, Samuel Woolley, and Ryan Calo. Algorithms, bots, and political communication in the us 2016 election: The challenge of automated political communication for election law and administration. *Journal of Information Technology & Politics*, 15(2):81–93, 2018.

Andreas Jungherr. Twitter use in election campaigns: A systematic literature review. *Journal of information technology & politics*, 13(1):72–91, 2016.

Michael Karlsson and Helle Sjøvaag. Content analysis and online news: epistemologies of analysing the ephemeral web. *Digital Journalism*, 4(1):177–192, 2016.

Alice Marwick and Rebecca Lewis. Media manipulation and disinformation online. *New York: Data & Society Research Institute*, 2017.

Patricia Moy, Michael A Xenos, and Verena K Hess. Priming effects of late-night comedy. *International Journal of Public Opinion Research*, 18(2):198–210, 2005.

Lisa-Maria N Neudert. Computational propaganda in germany: A cautionary tale. Technical report, Working Paper, 2017.

Eli Pariser. *The filter bubble: How the new personalized web is changing what we read and how we think*. Penguin, 2011.

Nathaniel Persily. The 2016 us election: Can democracy survive the internet? *Journal of democracy*, 28(2):63–76, 2017.
Richard Swedberg. How to use max weber’s ideal type in sociological analysis. *Journal of Classical Sociology*, page 1468795X17743643, 2017.

Edson C Tandoc Jr, Zheng Wei Lim, and Richard Ling. Defining “fake news” a typology of scholarly definitions. *Digital Journalism*, 6(2):137–153, 2018.

Joshua A Tucker, Yannis Theocharis, Margaret E Roberts, and Pablo Barberá. From liberation to turmoil: social media and democracy. *Journal of democracy*, 28(4):46–59, 2017.

Soroush Vosoughi, Deb Roy, and Sinan Aral. The spread of true and false news online. *Science*, 359(6380):1146–1151, 2018.

Claire Wardle and Hossein Derakhshan. Information disorder: Toward an interdisciplinary framework for research and policymaking. *Council of Europe report, DGI (2017)*, 9, 2017.

Samuel Woolley and Philip N Howard. Computational propaganda: Executive summary. *Computational Propaganda Research Project, Oxford Internet Institute, Working Paper 2017.11*, 2017.

Samuel C Woolley and Philip N Howard. *Computational Propaganda: Political Parties, Politicians, and Political Manipulation on Social Media*. Oxford University Press, 2018.

Tim Wu. *The attention merchants: The epic scramble to get inside our heads*. Vintage, 2017.