DATA

EDITORS
NORITA AHMAD American University of Sharjah,
nahmad@aus.edu
PREETI CHAUHAN VP Technical Activities, IEEE Reliability Society,
preeti.chauhan@ieee.org

Data and Disinformation

Norita Ahmad, Nash Milic, and Mohammed Ibahrine, American University of Sharjah

COVID-19 has accelerated the use of social data to spread fake news, misinformation, and disinformation. Technology countermeasures alone are not sufficient to address the ongoing problem of the malicious use of data.

The term *fake news* is not new; however, it became popular during the U.S. presidential elections in November 2016.[1] The first publicly known case of fake news was reported back in 1807, when U.S. President Thomas Jefferson wrote a letter to John Novell saying, "Nothing can now be believed which is seen in a newspaper."[2] Then, in 1835, there was a famous hoax by the editor of *The New York Sun*, who wrote that an eminent astronomer had observed life on the moon.[2] The recent digitalization of news production, distribution, and consumption and the massive adoption and uses of social media have significantly contributed to an alarming case of misleading and unreliable information. Adding to that, the COVID-19 pandemic has not only brought fear but also new types of misinformation as people have started to turn to digital platforms for information about the virus.

Governments, scientists, health authorities, and media organizations have the challenge to communicate effectively and provide scientific-based content about the virus to the public. However, misinformation surrounding the pandemic has begun to spread rapidly online. In its fact sheet edition of April 2020, Reuters Institute for the Study of Journalism reported that, between January and March 2020, in a sample of 225 pieces of misinformation rated false or misleading by fact-checkers, 59% of misinformation was created by reconfiguring and recontextualizing information and 38% was entirely fabricated.[3] Interestingly, most of the cases were cheap fakes, created with simple and readily accessible software, rather than highly technologically complex deepfakes. In an effort to assess and measure the capability of media forensic algorithms and systems, the National Institute of Standards and Technology launched a coordinated initiative called the Open Media Forensics Challenge Evaluation (OpenMFC) in 2020. The main objective of OpenMFC is to advance the state of the art of media forensics technologies to automatically detect automated imagery (image and video) manipulation.[4]

In 2017, *BBC Future Now* interviewed 50 leading experts from the psychology, food, climate change, health, social

trends, and technology fields about the grand challenge for our age, and one of the answers was "Lies, propaganda, and fake news."[5] This raises serious concerns about what will happen in the next decade in a society where citizens are misinformed.

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As it stands, the information-dissemination mechanisms seem to rely on subjectivity and trying to inaugurate a subjective authority for verifying information. This stance can be one of the ways to start addressing the fake news problem. Another way arises from using the distributed technological capabilities of existing information systems to build a nuanced approach toward data dissemination. Nuances of this approach stem from not taking an automatic stance on the validity of data but allowing the user to employ independent and distributed technology (for example, blockchain) to make its own stance on the information by tracing it from its initial origin. By adopting this modus operandi, we are not allowing data to become a societal problem; we are merely keeping it as an instrument for digitally representing facts.

FAKE NEWS VERSUS MISINFORMATION VERSUS DISINFORMATION

One of the most used definitions of fake news is "false, often sensational, information disseminated under the guise of news reporting."[6] In this context, information that is described as fake news is inaccurate even though it is being reported as legitimate news by the media. Scholars also clearly distinguish between the terms *misinformation* and *disinformation*. While misinformation is "the inadvertent sharing of false information,"[7] disinformation is "the deliberate creation and sharing of information known to be false."[8] As such, by definition, fake news is closely linked to disinformation.

COVID-19 has aggravated the seriousness of disinformation in a context of a pandemic where citizens' lives and health depend on credible, reliable, and newsworthy information about the virus. Some researchers drew our attention to a new phenomenon known as *misinfodemic*, which is "the spread of a particular health outcome or disease facilitated by viral misinformation."[9] As the world fought against COVID-19, United Nations Secretary General Antonio Guterres was often quoted saying, "We are also seeing another epidemic, a dangerous epidemic of misinformation."[10] As a response, in February 2020, the World Health Organization warned of the rapid global spread of misinformation and disinformation about COVID-19 through social media.

Understanding the difference between these terms is important to help us better sort facts from fiction. While we acknowledge the existing narratives in the literature and in the public sphere, we would like to posit that most of the disinformation and misinfodemic comes from a simple and mendable problem: the lack of independent and distributed information traceability. This cements society in the situation where all information is heavily warped to fit the needs of the dependent dissemination mechanism and its stakeholders. As those stakeholders come from diverse and often conflicting backgrounds, it is no wonder that ordinary audiences are baffled. Should they trust a foreign official more than their own president? What if the said president is blocked by a powerful data aggregator? Perhaps a person screaming at them through Parler or Bitchute understands the situation better than "talking heads'" from major media organizations and channels.

In general, there are three important elements that enable disinformation:[7] types of content being created and shared (for example, a joke, parody, false context, and fabricated content), the creator's motivation (for example, political or financial gain, and reputation), and how content is being disseminated (for example, headline news, social media tweets or statuses, and data leaks). Types of content can be further studied by looking at the types of misinformation, misinfodemic, or disinformation based on the intensity of deceit. For example, satire and parody are classic examples of misinformation with no intention to cause harm but with the potential to fool someone. Misleading content is common nowadays, where false narratives are used with the intention to frame an issue or individual. The most dangerous of all is intentionally and skillfully fabricated content, which is explicitly designed to deceive and harm people.

Figure 1 illustrates these concepts and provides a rough classification of four important clusters. The biggest cluster corresponds to the majority of the information found online. As these information sources display vast differences in terms of information veracity and intention to deceive, we believe that it is simultaneously challenging and futile to corral these ideas into defined categories. This is why we label this fuzzy cluster of the graph "Gray Area." When the information veracity and/or intent to deceive reaches higher intensity, the gray area morphs into three distinct extremes: journalism, propaganda, and fake news clusters.

Journalism tends to have high information veracity as established news outlets mostly operate within information that conforms with truth or facts, with no or little intent to deceive
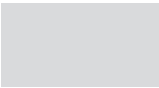
the reader. Propaganda stands in contrast to journalism as it is skillfully and intentionally directed toward deception. However, propaganda also shares one trait with journalism: for it to work, it has to be rooted in high levels of information veracity. Fake news, however, represents the complete antonym to journalism as it tries to deceive with low information veracity. Information belonging in this cluster does not rely on high information veracity—the main mechanism behind the fake news dissemination is virality. In other words, the content of information propels the reader to further disseminate it without much effort from its initial creator. We believe that this mechanism serves as the main driving force behind most misinfodemics cases. We also posit that extremes within journalism, propaganda, and fake news clusters are relatively easy to spot. However, these clusters can overlap with the "Gray Area" cluster. Due to this overlap, traditional information-verifying mechanisms as well as modern fact-checkers appear to be inadequate to solve this problem without the help of technology, such as blockchains.

DIGITALIZATION AND DISINFORMATION

The public debate has been dominated by concerns about fake news and its impact on democracy and that the dystopian notions are likely to happen. Digital platforms, social media, social bots, and data have helped the spread and virality of fake news. Recent surveys of social media consumption during COVID-19 showed an increase of almost 45% in the worldwide use of popular social media websites, such as Twitter, Snapchat, Facebook, and Reddit.[11] Social media platforms are widely accessible, easy to use, and free, making it easier for people to stay connected with their family and friends. However, recent studies have shown that people use social media not only to connect but also to share thoughts and opinions and spread false information.[12] It was also found that more people prefer to read headlines rather than the actual article, making Twitter one of the most popular sources of fake news.[3] With a character limit of 280, the headline or tweet on Twitter is designed to be attention grabbing and something that reinforces extreme views, which is perfect for people who are seeking for information that aligns with their views.

Digitization has not only transformed how the public shares information with one another, but it has also transformed the news media landscape. Rapid digitization and the dissemination mechanisms behind it have brought about profound and unforeseen changes in the news industry.[13] The rise of news websites has shown that it is becoming challenging to disentangle journalism from digitization.[14] The future of the news ecosystem depends on the veracity, not the virality, of the news content.

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Publishers, platforms, and media organizations are caught in a tension between respecting professional journalism standards, the commercial forces, and the logic of digital advertising. Like digital platforms, media organizations have increasingly become obsessed with the attention economy that a news story can generate.[15, 16]

One of the oldest merits of journalism and media organizations is
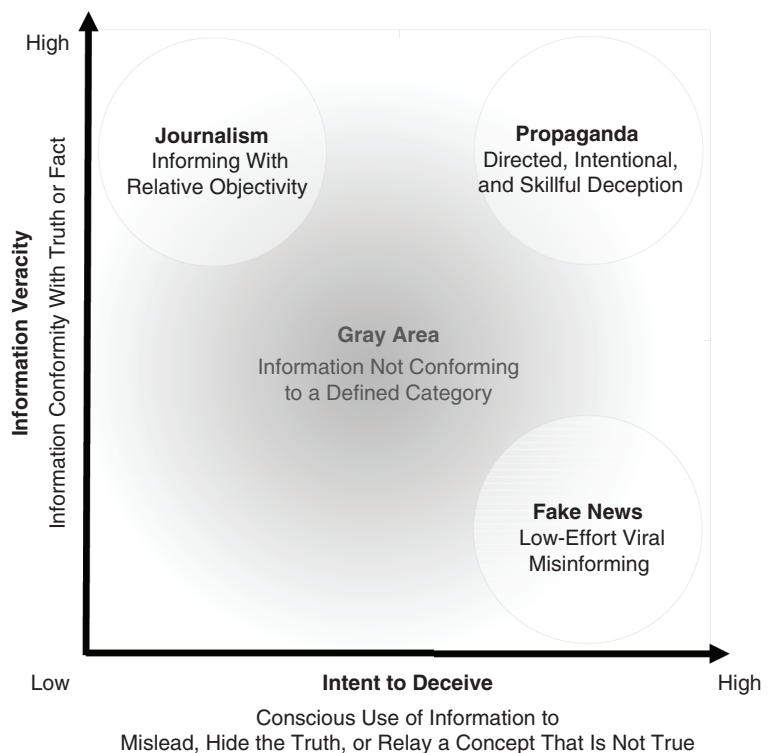

FIGURE 1. Information veracity versus the intent to deceive.

the fact-checking of information before publishing it. This fact-checking function has become more valuable in a brave new world (dis)order of (dis)information, fake news, and Nietzschean posttruth. Fact-check alerts help dampen the virality of disinformation on social media because fact-check alerts nudge users to only share reliable and trustworthy news verified by credible and independent sources.[17] However, fact-check alerts impact legacy media more than user-generated news content.[17]

Additionally, in print media, the editors, as gatekeepers, decide on the positioning and visibility of the articles. The

data, are crucial in understanding fake news and the nuances of misinfodemics. The sheer volume of the data produced and shared renders the existing detection mechanisms inefficient and, thus, impotent to prevent misinfodemics and fake news. The variety of data is making the problem even more challenging: how can artificial intelligence (AI) be taught to make a distinction between a *Call of Duty* streaming session and a heinous act of real mass-terrorism streamed live? Even if future technological breakthroughs would allow us to comprehend the data variety, we still do not know if those mechanisms would ever

is not new. For example, Orwell's *1984* is a symbolic work commonly used to highlight a world where information is heavily censored, truth concealed, and society held captive by the establishment.[18] To start, fact-checkers might appear as Orwellian censors of modernity. Similarly, the fringes of society feel captive under the watchful eye of the cancel culture or call-out culture. However, we still do not live in a fully Orwellian civilization. On the contrary, misinfodemics and fake news have evolved to contain a mixture of mechanisms from Orwell and Aldous Huxley's brave new world. The virality of fake news was compounded by passivity and egotism, just as Huxley posits.[19] There is no urgent reason to ban any information source today—mostly because there are very few people who would want to read one among the newest Twitter headlines, Instagram hashtags, or YouTube tutorials. To continue on Huxley's narrative, digital readers are constantly exposed to vast amounts of information and distracting ads. When Orwell's and Huxley's mechanisms are combined, as they are today, attention spans are reduced, and only a few readers read beyond the somewhat manipulated headings before virally sharing the information.

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front page has usually been reserved for headline news with bold titles and a bigger font size. In the digital news ecosystem, this decision is made by the search engine, not the newspaper editors. Journalists seem to have lost control over the news editorship to technology because data analytics-savvy marketers have gained more influence on the production, distribution, and monetization of digital news content.[17] Rankings by search engines are subject to manipulation; therefore, the knowledge of how search-ranking algorithms work can be used to push items higher in the ranking and can make fake news articles look trending and real.

PREVENTION EFFORTS
Governments, political entities, tech companies, media organizations, brands, and individual crackers have learned to transform data into disinformation in the vastness of big data. Big data has the following characteristics: volume, variety, velocity, veracity, and value. These characteristics, commonly known as the 5Vs of big

catch up with the ever-increasing data velocity of fake news. Information veracity also presents another challenge. Information conformity with facts is difficult to ascertain, even in stable data set environments. Finally, assuming that those 5Vs are addressed in full in the future, what economic value could be derived by utilizing vast resources to keep this gargantuan mechanism running? In short, even if we develop the means to distill the real news from the fake news in the future, who would foot the bill? Would it be the public or some other entity? If the latter, wouldn't that render the said entity into a more sophisticated censor and get us back where we started?

The argument that datafication, a result of digital disruption, undermines the foundations of the proper functioning of a democracy is timely and valid. Datafication has the potential to amalgamate the dystopian futures of both Orwell and Huxley with the reality we are experiencing today. The premise of the intentional manipulation of information through sophisticated systems

Against this background, there is an increase in local, national, and global initiatives to fight disinformation. For example, in 2018, the European Commission took actions to counter disinformation by adopting a multilevel governance approach that includes fact-checking, self-regulation by platforms, and distributed accountability.[20] Fact-checking platforms, such as InVID, were launched to protect European citizens from the threat and consequences of disinformation that can be devastating.[21] More recently, some initiatives have used AI solutions to detect types of disinformation.[22] In response to the growing phenomenon of fake news, misinformation, and misinfodemic, leading giant tech companies and well-established news media organizations, such as Google and BBC, have

realized the potential of adopting chatbots and social bots driven by machine learning and AI in news gathering, production, and distribution. In 2018, Google launched the Google News Initiative to fight fake news and maintain quality journalism in the digital era.[23] Equally important is the growing number of apps that fight disinformation online. One of the most famous ones is Adblock Plus. Initially an adblocker, Adblock Plus has extended its functions to protecting users from other harmful websites, including those that spread disinformation.[24] In the context of newsgathering, these AI technologies help to "search, monitor, retrieve, alert, or nudge" information.[22]

Recent research suggests advanced computational algorithms and architecture data sets, such as Generative Adversarial Networks and Capsule Neural Networks, could be instrumental in detecting fake news.[25] However, it is too early to celebrate the utopianism of technological solutionism before establishing a trusted relationship among humans, algorithmic trust and credibility, and AI. Some scholars call for heuristic algorithmic literacy that can be considered a social practice. "Algorithmic literacy" refers to the heuristic understanding of the technical and social processes by which algorithms are generated, distributed, and consumed.[26]

Since their introduction to public use in 1999 by Netscape, news aggregators have become a valuable tool in the digital news ecosystem. With the explosion of digital news content, tech companies, social networking sites, publishers, and media organizations have launched their news aggregators to provide updates of news stories and headline RSS feeds from different original sources in a systematized, quick, and convenient way for consumers and readers. While they organize the world's news information, news aggregators, including websites and apps such as Google News, Apple News, and Flipboard, present one side of the story and do not reveal different perspectives on the same story.[27] This

form of digital news consumption has increasingly cast doubts on social media feeds and disinformation. Some scholars call for adopting intelligent news aggregators as news validators. Combining machine and deep learning with user rating, the validators can classify the news into three categories: fake, genuine, and neutral.[28]

Technologies such as blockchain can also be designed to trace disinformation. Thus, the same technology that stands behind Bitcoin and lets people who do not know or trust each other build a dependable ledger has the potential to be used to trace the origins of information blocks and

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empower the reader to decide if information is trustworthy or not.[29] As a leading legacy news media, *The New York Times* adopted a blockchain-based News Provenance Project to diminish the spread of misinformation and empower readers. Supported by IBM Garage, *The New York Times* partnered with publishers and platforms to combat misinformation by making the Internet more transparent and by providing more context for readers to distinguish between facts and fiction and among information, fake news, and disinformation.[30]

There are two major takeaways from this article:

1. Technology countermeasures alone are not sufficient to address the ongoing problem of the malicious use of social media. To compound the problem, even credible sources tend to take some time to produce a defendable stance that can be backed by strong arguments.

This became particularly obvious during the ongoing pandemic as many scientific debates are still raging on with no end in sight. Thus, the optimal way to contain the damage from disinformation is to remove the value-making capabilities from the technology and back to the end user.

2. The problem is not technological, it is human. As long as we are trying to use the information dissemination mechanism to encode value judgment to the human reader, we are not solving the problem—we are

making it worse. Users should be presented with mechanisms to trace the genesis of information independently and transparently. Technological artifacts that harbor those capacities already exist and work relatively well in multiple domains. ▄

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NORITA AHMAD is an associate professor with the American University of Sharjah, Sharja, United Arab Emirates. Contact her at nahmad@aus.edu.

NASH MILIC is an assistant professor with the American University of Sharjah, Sharja, United Arab Emirates. Contact him at nmilic@aus.edu.

MOHAMMED IBAHRINE is an associate professor with the American University of Sharjah, Sharja, United Arab Emirates. Contact him at mibahrine@aus.edu.