Is This True or Fake News? A Conceptual Fake News Identification Model

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ABSTRACT Over the years, fake news has become unprecedently omnipresent within our society. As social media (SM) become significant channel for disseminating the latest news, its nature also makes the platform an ideal venue for spreading fake stories. The menace of fake news can influence people's beliefs, attitudes, and behaviour by its ubiquity and has a detrimental impact on society. Due to the risks of fake news, research on combatting fake news has gained attention. Despite there were many plausible interventions to combat the spread of fake news, false stories tend to spread faster than accurate stories because of people. Hence, this paper provides a deeper understanding of the fake news presentation on social media from a theoretical lens of information foraging. This study contributes to the growing literature on fake news by developing a conceptual model to identify fake news on social media.

KEYWORDS: Fake news; Social Media; Misinformation; Information Foraging Theory; Conceptual Model.

INTRODUCTION

Over the years, fake news has become unprecedently omnipresent within our society. Fake news is fundamentally news articles intentionally and verifiable false to mislead readers (Allcott & Gentzkow, 2017; Janze & Risius, 2017). Historically, news dissemination was restricted to traditional media, such as radio, television, and printed newspapers. However, the emergence of social media such as Facebook and Twitter have changed the way people consuming and sharing news. As this easy access and low-cost social platforms have become major channels for the diffusion of the latest news and information at a speed of light, they are also increasingly targeted for fake news spreading (Vicario *et al.*, 2016). For instance, the overabundance of fake news stories was shared on social media during the 2016 US presidential election and influenced voter choices, and the result of presidential selection was massively impacted (Allcott & Gentzkow, 2017). During the COVID-19 pandemic in March 2020, the World Health Organization (WHO) has declared this current ongoing misinformation about the disease COVID-19 as "infodemic". Fake news can influence people's beliefs, attitudes, and behaviour by its ubiquity, and thus, it has been listed by the World Economic Forum (WEF) as one of the main threats to nowadays society (Howell, 2013; Vicario *et al.*, 2016).

In response to the constant proliferating cases of fake news, extensive research has been conducted over the years on interventions to counterattack fake news effectively and automatically. Generally, these interventions can be grouped into two classes: *human-checked* and *algorithm-checked*. Human-checked intervention refers to fact-checking websites like Snopes.com, PoliFact.com, FastCheck.org, and Sebenarnya.my (Malaysian fake news checker) is designed for individuals to evaluate the truth of the news. Fact-checking requires trained professionals to evaluate the accuracy of the information manually through research and other studies on the specific claim (Vlachos & Riedel, 2014). Meanwhile, algorithm-checked interventions automatically determine the reliability of article news using algorithms and bots, such as automatic source credibility (Shao *et al.*, 2018) and source rating (Kim *et al.*, 2019). Despite the potential interventions to address the risks of fake news, people tend

more likely to share false news than accurate news (Vosoughi *et al.*, 2018). While more research on improving social media users' evaluation of the information reliability before sharing it is plausibly needed (Moravec *et al.*, 2018), this paper provides a deeper understanding of the fake news presentation on social media from a theoretical perspective lens of information foraging. This understanding of fake news presentation format is vital, leading to a decrease in fake news sharing.

This paper is structured as followed. The underpinning theoretical foundation of this study will be firstly described, followed by the anatomy of fake news. Then, the development of the conceptual model of fake news identification will be explained. A preliminary analysis of two fake news spread on social media will be discussed using the developed model and concluded.

THEORETICAL FOUNDATION

This study seeks to understand the fake news identification and sharing behaviour on social media using Information Foraging Theory (IFT). IFT fundamentally designed to explain the searching behaviour of individuals to satisfy their information need (Pirolli & Card, 1999). In other words, when individuals look for information, they attempt to maximize the value of information gained and minimize the cost associated with obtaining the information (e.g., time costs and opportunity costs) using a particular sense-making strategy. The IFT has three important concepts: (1) *information scent*, (2) *information diet*, and (3) *information patch*. *Information scent* refers to the approximate information or cue that helps an individual determine the potential value of specific information (Pirolli & Card, 1999). An information scent in this study can be a textual or a visual representation of the fake news, which will be presented in the next section. *Information diet* denotes the combined set of information with a particular perceived value to an individual, who then pursues the collection of information and ignores the rest (Pirolli, 2007). For example, if an individual has a fake news diet, such as fake news presentation format and fact-checking websites, he/she will ignore the information. *Information patch* represents a physical and/or conceptual space for information (Pirolli & Card, 1999). An information patch can be a news webpage, fact-checking webpage, or social media page. Thus, in this study, the social media fake news identification process is seen as a set of foraging and cognitive processes that assimilate the information and decide whether to share or not.

THE ANATOMY OF FAKE NEWS SHARED ON SOCIAL MEDIA

Developing effective fake news identification requires an in-depth understanding of the anatomy of fake news shared on social media. Prior studies have shown that the perceived presentation of the information such as engaging and catchy news headline, news source highlight and ratings, sensational and fake images (or fake videos) as well as repetitive news appearance found to influence the users' fake news sharing behaviour (Kim & Dennis, 2019; Pennycook *et al.*, 2018). The news content presentation is vital for fake news identification. Researchers like Zhang and Ghorbani (2020) and Wu *et al.* (2019) have methodically identified fake news presentation formats on social media.

According to the first researcher (Zhang & Ghorbani, 2020), every piece of fake news generally contains both *physical* and *non-physical* content. The *physical contents* are the carriers and formats of the news, including the news title, the main body of the news, and the other elements such as images or videos of the news. Every component in the online social data, such as a Uniform Resource Locator (URL) of a web page, a hashtag, a mention signal, an emoji, an image, and a video, are all considered the physical content of the news. *Non-physical content* is the crucial ideas, feelings, and views that the news creators want to pass to the readers (Zhang & Ghorbani, 2020). Sentiment polarity is another

vital feature of non-physical content for fake news. To make their news persuasive, authors often express strong positive or negative feelings in the text body (Devitt & Ahmad, 2007). Apart from different categories and sentiment polarities, fake news may target certain domains and themes like social, financial, and IT news.

Meanwhile, from the second researcher, Wu *et al.* (2019) 's perspective, fake news can be identified using four ways: (1) *content* (i.e., detecting text, images, and videos of the information); (2) *context* (e.g., detecting contextual information like locations and time); (3) *propagation* (i.e., detecting the circulation patterns of the information) and (4) *early detection* (i.e., detecting in an early stage before it becomes viral, usually without adequate data or accurate labels) (see Figure 1).
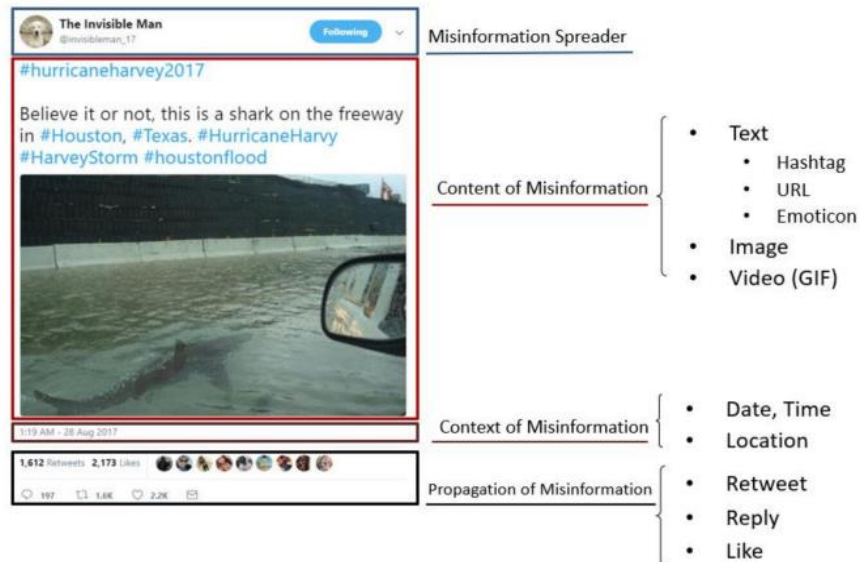

Figure 1: Example of fake news categorization by Wu *et al.* (2019)

DEVELOPMENT OF THE CONCEPTUAL FAKE NEWS IDENTIFICATION MODEL

Following Zhang & Ghorbani (2020) 's proposed fake news elements, this study suggests that fake news' approximate information or cues (i.e., fake news scent) can help an individual quickly determine the truthfulness of specific news shared on social media. Figure 2 shows the conceptual fake news identification model of this study.
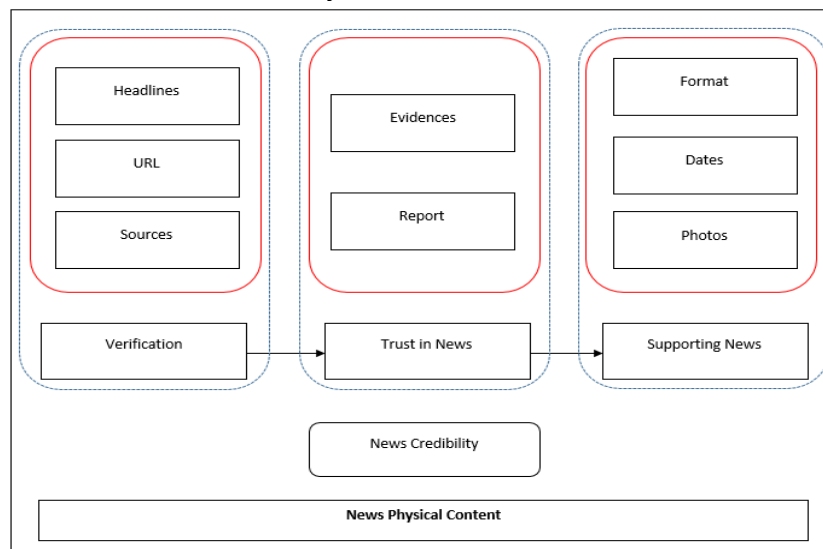

Figure 2. The Conceptual Fake News Identification Model (FNIM)

To identify whether news shared on social media is fake or not, the following eight elements should be reviewed:

- *Headlines:* Fake news headlines are often eye-popping and sound too good to be true (Zhang & Ghorbani 2020). Also, they are written in all caps and with exclamation points.
- *Uniform Resource Locator (URL):* URL plays an essential role in detecting fake news. Fake news website usually does not look professionally designed. No author or sponsoring organization is listed either on the main page or in the "About Us" section in fake news. Sometimes websites usually stated the disclaimer information on the page to prove its credibility (Zhang & Ghorbani 2020). Fake news pages contain much advertising to promote the ads.
- *Sources:* The new sources are vital to prove the information's credibility. Most of the time, real news is dispersed with citations, whether it is the official or the original news.
- *Evidence.* Readers' trust in the news can affect the news sharing intention. By citing the original news, the reader can easily compare the news, and the credibility of the news is highly guaranteed. Evidence can be found through the sources cited at the end of the news.
- *Report.* The report is referring to another journalist's paper. Many journalists will update their articles/news according to the original news. During the writing, some journalists might unintentionally add or reduce the original facts. Hence, some readers will be confused or completely trust the news. By checking multiple similar reports, the probability of trusting the news is higher.
- *Format.* Real news contains a fixed format which is formal. The writer's name will be included in the article news. Sources link to original news are provided in the news.
- *Dates.* It is essential to check the date when the original news was distributed. In social media, the user will keep sharing the news although it was outdated released articles.
- *Photos.* News with photos aims to grab readers' attention. Some photos can be intentionally deceptive and impact the trust of the reader toward the news. Studies have shown that readers are more likely to believe the news written with photos than without photos (Zhang & Ghorbani 2020).

DISCUSSION

By referring to the FNIM mentioned above, we collect two pieces of news from Sebenarnya.my and provide a detailed explanation of how to identify the eight elements of a social media fake news format.

Fake News 1 (Twitter and Facebook)

Figure 3 shown a fake news that has been circulated on social media as Malaysians received the first batch of "Pfizer-BioNTech" vaccine to fight against the COVID19 pandemic. The headlines of a fake news are eye-popping, especially with the presence of question marks at the end of the news, with the intention to grab the reader's attention in which can cause misinformation if the reader shared the news without checking the content. The sources, reports, and evidence can be found on the link below the news. By citing the original news or referring to an official that has highly influenced the citizen, the credibility of the news can be enhanced through the sources – as evidence to the fact that has been written. Some journalists provide multiple reports to ensure the readers know the news they have read is a piece of real news. The photos in this fake news were created by an irresponsible can easily manipulate reader as it looks so real. The writer's name and date are written for the reader references if they have any inquiry and make sure the news they read is up to date news. The formal format of new consists of the title, writer's name, date, the link of sources, and evidence to prove the news.
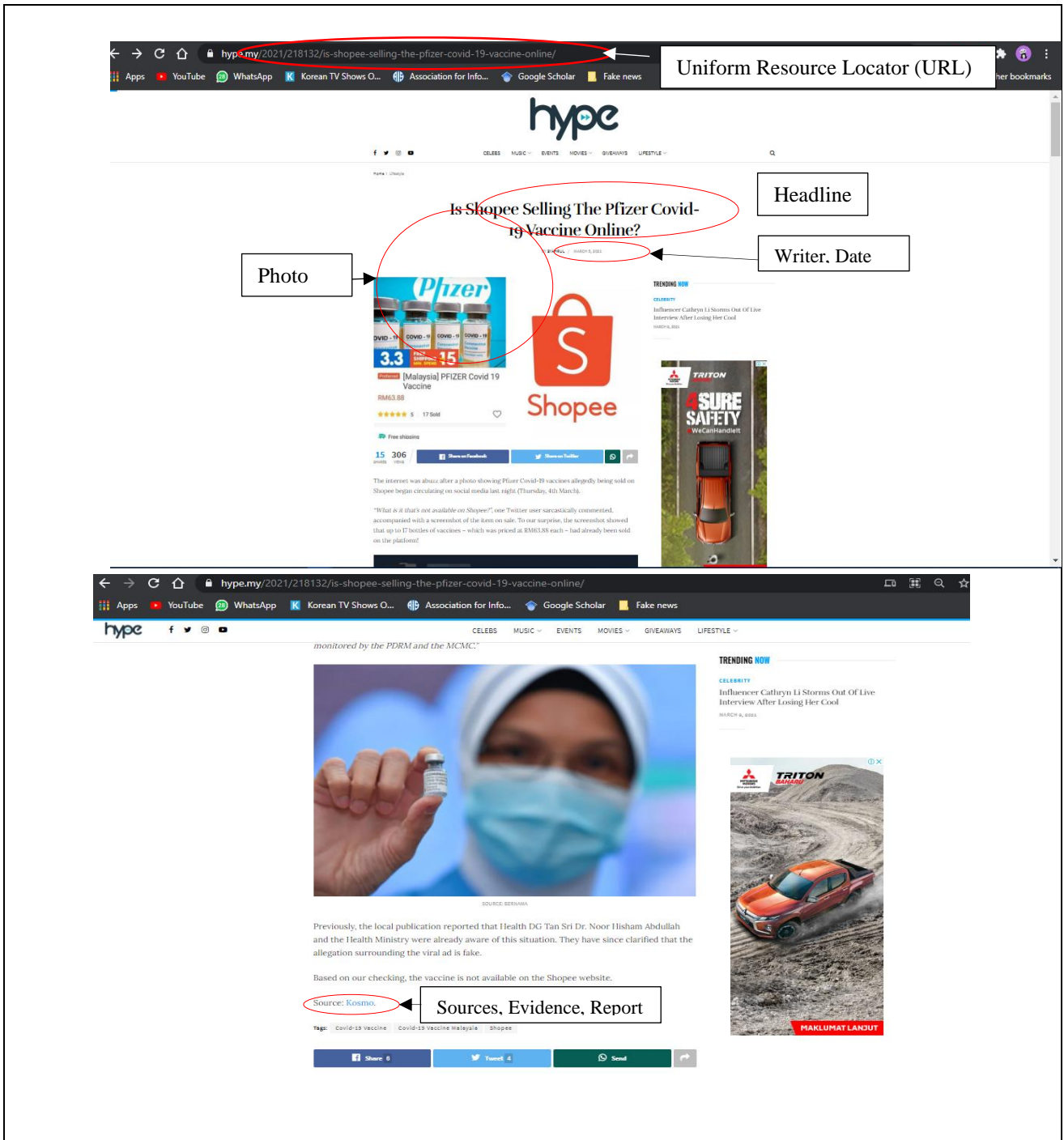
Figure 3: First Example of Fake News

Fake News 2 (Facebook)

Figure 4 shown another example of fake news, which the original headline was about Serdang Hospital's plan to have "Influencer" like the first batch to receive the COVID19 vaccine "Pfizer-BioNTech. This headline has caused chaos as a citizen disagrees with the decision. The Minister of Health Malaysia has spoken and denied that the "influencer" will receive an early vaccination. From the date and time when the news was leased, we can conclude that the headline has been changed due to the fake news. The influencer that was mentioned in the news is the clinical head departments. A screenshot (photos) posted by Khairy Jamaluddin – a credible source, references - was included as proof to deny the false statement. Malaysian health minister department said there is no "Cutting queue" in vaccine distribution. Ministry of Health Malaysia's Facebook page (credible source) wrote that there would be no cutting queues and non-medical influencers included, including admin staff.
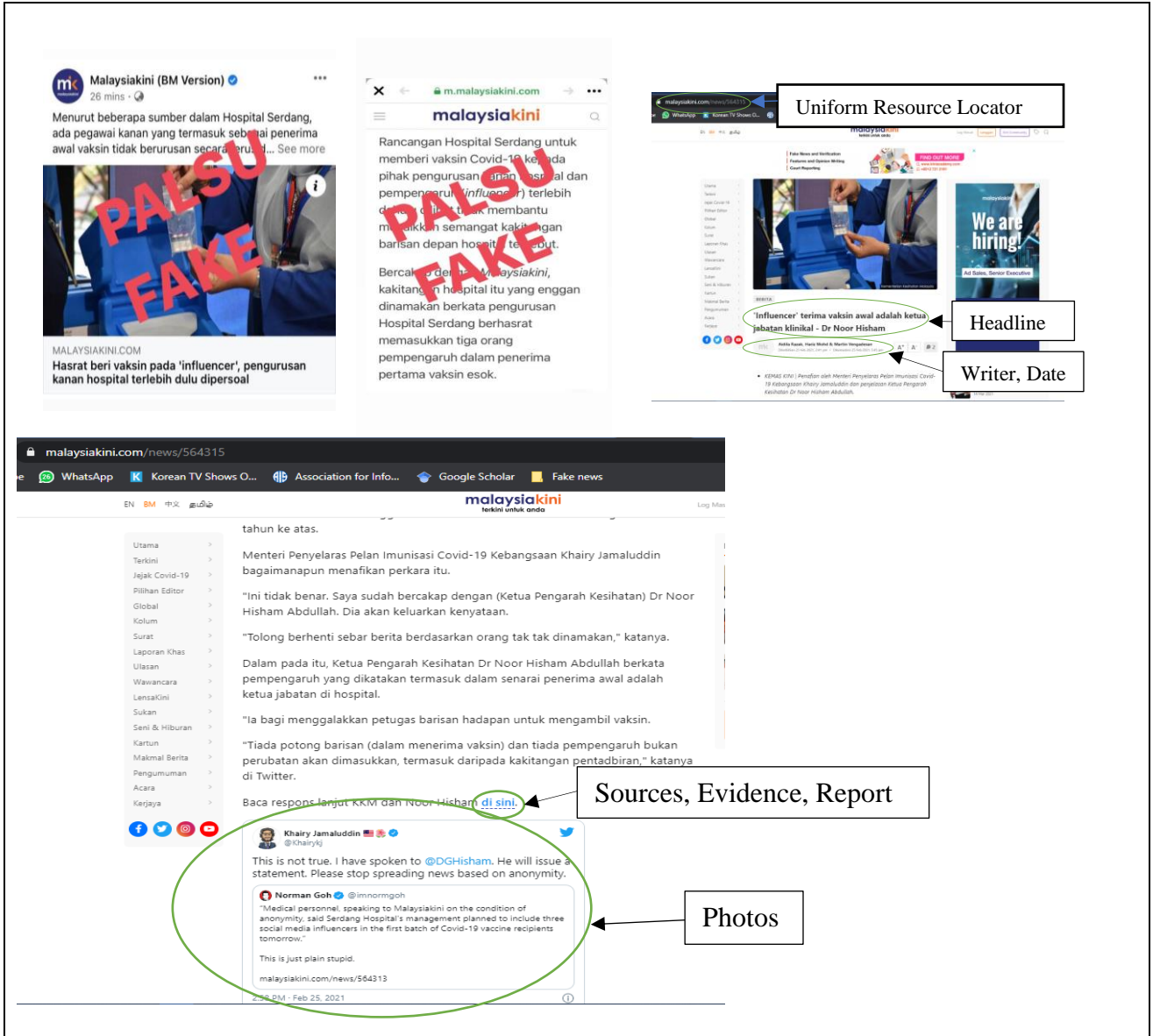
Figure 4: Second Example of Fake News

CONCLUSION

The fake news phenomena on social media platforms are getting intense as most online users tend to use it as one of the trustable platforms to consume information. From the theoretical lens of IFT, this study throws some light on how an individual can identify and evaluate whether the information shared on social media is fake or not through the fake news cues identified in FNIM. For this preliminary study, we did not distinguish fake news cues from different social media platforms such as Facebook, Twitter, and also WhatsApp, however this is an example of future development. Further, a deeper investigation of the information diet and information sources may provide more insight into how individuals in the fake news cues arrive at judgments on the information they received on social media. It is vital for individuals to be widely educated on spotting fake news and why they should prevent themselves from spreading it to others. However, by referring to our FNIM, individuals can filter which news they should trust before sharing the news. Thus, this action reduces the dissemination of fake news on social media as they are aware that some news is fake.

REFERENCES

[1] Allcott, H. & Gentzkow, M. 2017. Social media and fake news in the 2016 election. *Journal of Economic Perspectives*, 31(2), 211-236.

[2] Howell, L. 2013. *Digital wildfires in a hyperconnected world* (http://reports.weforum.org/global-risks-2013/risk-case-1/digital-wildfires-in-a-hyperconnected-world/). Last accessed on 14 April, 2020.

[3] Janze, C. & Risius, M. 2017. *Automatic Detection of Fake News on Social Media Platforms*. 21st Pacific-Asia Conference on Information Systems (PACIS 2017). 16-20 July, 2017. Langkawi Island, Malaysia.

[4] Kim, A. & Dennis, A. R. 2019. Says Who? The Effects Of Presentation Format And Source Rating On Fake News In Social Media. *MIS Quarterly*, 43(3), 1025-1038.

[5] Kim, A., Moravec, P. L. & Dennis, A. R. 2019. Combating Fake News on Social Media with Source Ratings: The Effects of User and Expert Reputation Ratings. *Journal of Management Information Systems*, 36(3), 931-968.

[6] Moravec, P., Minas, R. & Dennis, A. R. 2018. Fake News on Social Media: People Believe What They Want to Believe When it Makes No Sense at All. *MIS Quarterly, 43*(4), 1343-1360.

[7] Pennycook, G., Cannon, T. D. & Rand, D. G. 2018. Prior exposure increases perceived accuracy of fake news. *Journal of experimental psychology: general*, 147(12), 1865.

[8] Pirolli, P. & Card, S. 1999. Information Foraging. *Psychological Review*, 106, 643-675.

[9] Shao, C. Ciampaglia, G. L., Varol, O., Yang, K. C., Flammini, A., & Menczer, F. 2018. The spread of low-credibility content by social bots. *Nat Commun*, 9(1), 4787.

[10] Vicario, M. D., Bessi, A., Zollo, F., Petroni, F., Scala, A., Caldarelli, G., Stanley, H. E. & Quattrociocchi, W. 2016. The spreading of misinformation online. *PNAS*, 113(3), 554-559.

[11] Vlachos, A. & Riedel, S. 2014. Fact checking: Task definition and dataset construction. *Proceedings of the ACL 2014 Workshop on Language Technologies and Computational Social Science.* 26 June, 2014. Baltimore, Maryland, USA. pp. 18–22

[12] Vosoughi, S., Roy, D. & Aral, S. 2018. The spread of true and false news online. *Science*, 359(6380), 1146-1151.

[13] Wu, L., Morstatter, F., Carley, K. M. & Liu, H. 2019. Misinformation in social media: definition, manipulation, and detection. *ACM SIGKDD Explorations Newsletter*, 21(2), 80-90.

[14] Zhang, X. & Ghorbani, A. A. 2020. An overview of online fake news: Characterization, detection, and discussion. *Information Processing & Management*, 57(2), 102025.