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# Resilience of Society to Recognize Disinformation: Human and/or Machine Intelligence

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# Resilience of Society to Recognize Disinformation: Human and/or Machine Intelligence

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## Abstract

*The paper conceptualizes the societal impacts of disinformation in hopes of developing a computational approach that can identify disinformation in order to strengthen social resilience. An innovative approach that considers the sociotechnical interaction phenomena of social media is utilized to address and combat disinformation campaigns. Based on theoretical inquiries, this study proposes conducting experiments that capture subjective and objective measures and datasets while adopting machine learning to model how disinformation can be identified computationally. The study particularly will focus on understanding communicative social actions as human intelligence when developing machine intelligence to learn about disinformation that is deliberately misleading, as well as the ways people judge the credibility and truthfulness of information. Previous experiments support the viability of a sociotechnical approach, i.e., connecting subtle language-action cues and linguistic features from human communication with hidden intentions, thus leading to deception detection in online communication. The study intends to derive a baseline dataset and a predictive model and by that to create an information system artefact with the capability to differentiate disinformation.*

**Keywords**: Sociotechnical Systems, disinformation, fake news, machine learning, communicative action, conspiracy, credibility, discourse, information behaviour, natural language processing, resilience, rumours, social media

## 1.0 Introduction

Disinformation and false information, casually referred to as fake news, has a tendency to radicalize American politics (Benkler et al. 2018) and polarize communities around the world (Bodrunova et al. 2019). Political parties regularly utilize false information, or disinformation, to disrupt society. Oxford Internet Institute (2019) reports that an increasing number of countries—70 in 2019 (up from 48 in 2018, and 28 in 2017)—have experienced coordinated social-media disinformation campaigns. China has become one of the major countries to experience "global disinformation disorder." Until the Hong Kong protests[1] in 2019 (Haas 2019), Chinese propaganda was mostly confined to domestic platforms like Weibo and

[1] Hong Kong protest: https://www.technologyreview.com/s/614286/the-new-battle-in-hong-kong-isnt-on-the-streets-its-in-the-apps

WeChat. However, many Chinese have since expanded their social connections using Facebook, Twitter, and YouTube[2] (MIT Technology Review 2019).

As disinformation campaigns grow, the interests and stability of the masses and society are minimized by the preferences and biases of both individuals and corporations. The creation of the societal conflicts through disinformation campaigns can be viewed as "information warfare;" a new form of cyber-attack. Information warfare is on display when military officials were trained by Russian intelligence operatives in Myanmar[3] to manipulate public opinion using social media (New York Times 2018). Similarly, cyber troops from Sri Lanka were trained in India, and employees from the Ethiopian government were trained in China to spread propaganda to the masses[4] (New York Times 2019). The targets of these efforts include disruption of the social fabric, and a sabotaging of civil consciousness. This new type of organized social persuasion—disinformation campaigns—is very different from media bias; a well-studied communication issue.

The Media Bias Ratings system[5] is well accepted in media literacy studies. However, there is not enough attention given to the accuracy of media sources', which is a major aspect of the bias ratings. Although the International Fact-Checking Network[6] (IFCN) established a code of principles for fact-checking, the Media Bias/Fact Check[7] (MBFC) continues to experience challenges in differentiating political opinions/biases from factual accuracy based on the fact-checkers' code (e.g., Is the news source reported factually? Does the news provide evidence for its claims?).

Some fact-checking initiatives have gained publicity. For instance, Lithuanians developed a software app to combat Russian propaganda (The Economist 2019), and mainstream news outlets have started automating their moderation of comments. The Economist and the New York Times have considered and applied

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[2] YouTube removed posts about the Hong Kong protests: https://www.technologyreview.com/f/614217/youtube-has-removed-210-channels-that-posted-about-the-hong-kong-protests/

[3] New York Times (2018) A Genocide Incited on Facebook, With Posts From Myanmar's Military: https://www.nytimes.com/2018/10/15/technology/myanmar-facebook-genocide.html

[4] New York Times (2019) At least 70 countries have had disinformation campaigns: https://www.nytimes.com/2019/09/26/technology/government-disinformation-cyber-troops.html

[5] AllSides ratings of bias in electronic media: https://www.kaggle.com/supratimhaldar/allsidescom-media-bias-ratings

[6] IFCN Fact-Checking: https://ifcncodeofprinciples.poynter.org/know-more/the-code-and-the-platforms

[7] Media Bias/Face Check (MBFC): https://mediabiasfactcheck.com/methodology

Google's Perspective[8]. The German outlet Die Welt has developed a "Comment Moderation" tool (Sterzing et al. 2017). Regardless of the above efforts, unchecked reliance on the news media has also become problematic. As Starbird et al. (2018) pointed out, the current multi-layered news media ecosystem that echoes the news by pushing it out to diverse sites has amplified the problem of re-broadcasting and spreading mis- and (dis-)information.

We thus ask this question: ***How do we model machine intelligence based on human intelligence to learn about disinformation in order to strengthen social resilience***? In this developmental paper, we attempt to conceptualize the tactical impacts of disinformation so we can identify it using human intelligence. Our future study will include conducting social-psychological experiments that collect data in scenario-based situations, based on human intelligence/judgment of disinformation, when buried in "ordinary" (i.e., not criminal or distinctively suspicious) communication.

## 2.0 Theoretical Concepts

Disinformation is not a new phenomenon, but an age-old form of warfare, or a strategy utilized by an ill-intentioned opponent to destabilize a society. For example, this strategy was utilized by Mao Tse-Tung to divide China after World War II (Jones 2018; Katzenbach Jr. and Hanrahan 1955). But the problem of disinformation has been amplified in the 21st century as a result of high speed and connectivity on the Internet, where distorted information can be spread instantly across the world, making it nearly impossible to propagate the truth or a retraction (Allcott and Gentzkow 2017; Tendoc Jr. et al. 2017).

Given this era of social media and the unlimited web, disinformation now spreads faster than ever to larger groups of people. Disinformation has become an alarming phenomenon. Understanding how it is dispersed in social media—and devising mechanisms to stop it—is of the utmost importance (Conroy et al. 2015; Shu et al. 2017).

### 2.1 Definition of Disinformation

Over the course of years, researchers have deliberated as to what constitutes disinformation. Although there is no unanimous agreement on the definition, studies have converged at similar conclusions. Hernon (1995) differentiated between

[8] Google's Perspective: https://www.perspectiveapi.com/#/home

*disinformation* from *misinformation* by a measure of intent. Disinformation refers to inaccurate information as a result of "a deliberate attempt to deceive or mislead, whereas misinformation is defined as the result of an honest mistake (p. 134). Fetzer (2004a) described disinformation as "misinformation with an attitude" (p. 231), and highlighted how fallacious and incomplete information is disseminated in an intentional, deliberate, purposeful effort to mislead, deceive or confuse (Fetzer 2004b, p. 228). Fallis' (2009; 2015) conceptual analysis model considers disinformation as being tantamount to deceptive lying.

The primary goal of developing and disseminating disinformation is to confuse or deceive people (Fetzer 2004b, p. 228). However, it is worth noting that premeditated lies are different than simply mistaken or misleading information. When these criteria exist without the motive of duping people, they are considered *misinformation* (Fetzer 2004a; Hernon 1995). When known to be false with the intention of misleading and/or deceiving, these assertions also qualify to be called "lies" (Fetzer 2004b, p. 232). A fundamental component of disinformation remains that it is intended to deceive and confuse for some sort of gain (Fetzer 2004a), thus giving it the element of ulterior motive (Fetzer 2004b).

### 2.2 Issues of Disinformation in Social Media

Social media has significantly changed people's information behaviour with regards to production, sharing, and fruition of content (Chen et al. 2015). Mocanu et al. (2015) identified that people who tend to interact with conspiracy sources are likely to intentionally spread false claims. Social media has gained popularity and priority in propagating policies (Hernon 1995) in students' sharing of information (Chen et al. 2015), and in many political campaigns (Garrett 2017). In social media, individuals tend to endorse and affirm information they agree with (Pennycook et al. 2018; Stewart et al. 2018). Terms such as "echo chamber" or "filter bubble" have been used to describe such phenomena on social media (Garrett 2017), and this leads to a greater societal threat (Lewandowsky et al. 2013) such as when fake news impacted the 2016 US election.

With the global pervasiveness of social media, fake news circulates more readily and reaches more people (Garrett 2017), and tends to foster a collective credulity because of its pervasiveness (Mocanu et al. 2015). There is a real threat to our understanding of reality as a result of the unprecedented proliferation of conspiracy-related content (Mocanu et al. 2015). The social resources available for fighting disinformation is finite, while its proliferation is accelerating (Garrett 2017).

### 2.3 Detecting Disinformation through Understanding of Communicative Actions

Old rumours are often repackaged into news, and re-tweeted by influential Twitter users so as to gain additional visibility. To detect rumours and disinformation, many computational approaches—such as natural language processing techniques and linguistic analysis—have been employed. Galitsky's (2015) adopted web mining at the sentence level—where each sentence is compared to an original text that is available, while also calculating the syntactic similarity. Shin et al. (2018) studied message sources and temporal patterns regarding how rumours resurface through partisan news websites. However, existing research into disinformation lacks a perspective on information credibility (Hilligoss and Rieh 2008; Jensen et al. 2010; Rieh 2014), quality (Rieh 2002; Rieh and Danielson 2007) and understanding of the communicative intent and action. It is critical to develop a keen understanding of the human intelligence to the extent to which disinformation is deliberately misleading (Fallis 2009), as well as the ways people judge the credibility and truthfulness of information (Pennycook et al. 2018; Pew Research Center 2019). Moreover, based on the understanding of social norms and cultural values, we can then afford machines a way to learn about the dissemination process of coordinated disinformation (Lazer et al. 2018).

Mutual understanding and relationships are the foundations of communicative action (Haberman and McCarthy 1984; Haberman and McCarthy 1987). As communication is dominated by social norms and cultural values (Te'eni 2001), diverse values and attitudes held by different social actors may be used to distort communicative action. If social actors care only that "the end justifies the means," such belief not only endangers a society with no symmetry in the ability to trust one another, but further puts the society at risk with false claims from those with hidden (unknown) intentions and agenda. Habermas (1998) urged that different mechanisms should be investigated and incorporated for interpretation and any corresponding actions so society can be brought together with truthfulness and trustfulness.

## 3.0 Research Methods

We propose to conduct a social-psychological experiment that incorporates mechanisms to capture users' intent and decisions when facing factual accounts vs.

fake news. The result will further development of an inference engine—based on the collected data—that can differentiate between objective reporting and disinformation, to computationally provide "tells" that can identify computer-mediated deception in online communication. The proposed research will analyze different sources and types of evaluation for deceptive vs. non-deceptive online actors.

Participants will be recruited and consent to enter a scenario-based 3-phase study. In phase 1, personality, attitudes and self-importance constructs will be designed into both before- and after- surveys. Motivation and perspectives on particular messages will be included. This short survey will also capture the dependent outcome variables. In phase 2, a mechanism to trace each distributed message and count the number of times that similar messages have been forwarded, shared, liked or disliked, etc. will be incorporated. In phase 3, we will systemically collect participants' longitudinal reaction and interactions with friends via their posts and comments on the system. Conversational linguistic data will then be collected for computational analysis (machine learning) and statistical analyses (such as multilevel modeling).

## 4.0 Conclusion and Contributions

The proposed work is expected to contribute to the computational detection of disinformation—based on speech patterns and linguistic features—in social networks and online communities. Understanding user perceptions of communication patterns and the ability to differentiate types of information (misinformation vs. disinformation) are not simple questions because they involve not only human judgment and perception of truth, but also individual attitudes and social norms, being trusting or suspicious in the communicative action—whether dogmatic or authentic. Based on the sociotechnical system study, social actors' judgment and communicative action will determine the ability to differentiate between factual information and disinformation. Defining actors' characteristics and modelling the detection of disinformation computationally will provide a novel approach to combat disinformation.

The proposed study will derive a baseline dataset and a computational model for predictive research to continue (Ho et al. 2020a; Ho et al. 2020b). This study connects subtle language-action cues and linguistic features from human communication to create an information system artefact (Ho et al. 2015a; Ho and

Hancock 2018; Ho and Hancock 2019; Ho et al. 2017; Ho et al. 2016a; Ho et al. 2016b; Ho et al. 2016c; Ho et al. 2015b; Ho et al. 2016d; Ho et al. 2014). It will serve as a precursor to building a sociotechnical schema. This study will help society to understand and enable trustworthy communication and collaborative information behaviour across social media, as well as our personalized cyber worlds.

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