Breaking Fake News and Verifying Truth

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INTRODUCTION

How to distinguish between fake news or not? How to verify information whether it is true or not? The goal of this article is to review online fact-checking studies on fake news. The core of this matter is how to progress fact-checking on misleading information and vague knowledge (Viviani&Pasi,2017; Shao, et al., 2018; Vosoughi, Roy&Aral, 2018). This procedure is crucially managed by manually or some computational mechanisms. The burden of proof should be evaluated truthiness by scientific ways included objectiveness and falsifiability. It never accepts neither solipsism nor agitating manners. In addition, it should take carefully to extract the most importance from the truth whether it is manually or mechanically, and it also reconsiders those backgrounds. For sound democracy, mediated knowledge brings the facts for citizens, and it should encourage them to ponder their directions of governances in nation (DiResta,et al.,2019; Howard, et al., 2018). Using ICT, it should properly facilitate fundamental educations for them.

BACKGROUND

The world is the totality of facts, not of things (Wittgenstein, 1922). Fake news recently reminds us this renowned sentence. Wittgenstein also said that the world consists of a set of facts, and facts are determined by truth or false as a proposition style. He casted questions on world cognition, provable logics, facts and knowledge. However, to date, fake news and post-truth are too far from truth, facts, impartiality and fairness. Any assertions of fake news are never valid and those contents are almost based on malicious intentions or misunderstandings. Moreover, fake news can spread faster than other reliable information through social networks (Doer,Fouz&Friedrich,2012; Roozenbeek&Linden,2018).Especially, these mediated information which recognized as fake news can be found in the fields such as politics, medical health, socioeconomics, ethnicity, ideology, gender and other sensitive topics. Regarding populism, some governors demonstrate 'self-first' actions and they sometimes use it as political propaganda against their opponents (Bobo,2017; Lamont, Park&Ayala-Hurtado, 2017; Wang,Luo,Niemi&Li, 2017).

Lexically, Oxford dictionary defines 'post-truth' as *"relating to or denoting circumstances in which objective facts are less influential in shaping public opinion than appeals to emotion and personal belief*". And Nielsen&Graves(2017) identified types of fake news such as *satire, poor journalism, propaganda, some advertising* and *false news*. Similar concepts can enumerate stereotypes (Lippmann,1922), prejudice and rumor. Moreover it definitely claims that it also lacks falsifiability (Popper, 1963) and it seems a kind of solipsism of each claimant.

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FOCUS OF THE ARTICLE

When borrowing Marx's proverbs, a specter is haunting the Worlds -the specter of fake news. All the powers of global communities have entered into a holy alliance to exorcise this specter. At 2nd Feb. 2017, AAAS (American Association for the Advancement of Science) held in an academic symposium for discussing the fake news and post-truth. As through social media, they argued that our contemporary society has vulnerability against verification on fact and credibility of information sources. And of course, Facebook, Twitter and other social media sites have already launched eligible regulations and managements in verifying submitted contents and fact-checking.

However, there will be a stumbling block against those objectives. Renowned mathematician Hilbert believed that all statements in mathematics can be proven as true or false. But please recall the fact on Turing Machine (Turing, 1937; Copeland&Shagrir, 2019). Similarly, revealing fake news seems possible, it is not easy tasks. Whereas our constraints are within finite calculation time and efforts, fake news has been growing steadily with enormous contents and its derivations added each day. Will it be possible to verify all of them within finite time? As Turing machine proved, it is hard to demonstrate certainly truth regardless of the limits of manpower or computer. For example, if one finds the fact that it is not fake news by verifying target statements (for example, from 1 to N) within each content suspected to be certainly fake news, however it cannot be concluded that all of them are true, just because such disproof is not found in that time. In the future, by adding N + 1, it might turn out fake news. Then, these verifications on the bases of inductive reasoning and 'evidence of absence' are still harder for us.

The goal is the very clear. In the context of finite space, computable and manageable constraints, the core of this matter is how to progress fact-checking on those fake information and uncomfortable knowledge online (Viviani&Pasi,2017; Shao, et al, 2018; Ciamapglia, 2018). Principally, breaking fake news is to distinguish between subjective belief and objective facts. The former is trust and belief in our cognitive system and it justifies our world of view. The latter is fact and evidence, and it shall stress on scientific verification and prioritized importance rather than public preferences for acceptances. And some reasons in fake news problems such as scientific process and human mental model as belief system makes it more difficult. Can be strict matching both truths between subjective and objective perspectives consistent with each other? As extracting only important things from worthless matters in massive online sources, how to evaluate the true fact in ordered by some confident prioritizations?

In brief, any fact-checking process requires decisively at least below methodologies. If and only if empirical verified evidences and its reexamination processes are ensured, it can been regarded as canonical manners of scientific knowledge.

1. *Experimental*
2. *Detection*
3. *Estimation*
4. *Collective*
5. *Third party Authentication*

Regarding these concerns, there are reasons systematically to study fake news. That is, there are some definitive categories to consider at least.