

Undergraduate Thesis Prospectus

Automating the Ranking of Article Visibility through Crowdsourced  
Trustworthiness

(technical research project in Computer Science)

Reducing Online Political Polarization in America

(sociotechnical research project)

by

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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*Technical advisor:* Daniel Graham, Department of Computer Science

*STS advisor:* Peter Norton, Department of Engineering and Society

## **General Research Problem**

*How may political polarization among Americans be reduced?*

Americans are politically polarized (Hetherington, 2015). The Pew Research Center (2014) saw the amount of consistently liberal and conservative Americans double to 21% over twenty years. Polarized Americans are more politically active than the ideologically mixed, and 27% of Democrats and 36% of Republicans believe the other's "policies threaten the nation" (Pew Research Center, 2014). 63% of consistent conservatives and 49% of consistent liberals only have friends that share similar political values (Pew Research Center, 2014). More than ever, Americans are increasingly partisan, less flexible, and more susceptible to widespread confirmation bias, notably through social media. Social media fosters cognitive, confirmation, and popularity biases based on user-tailored information (Ciampaglia & Menczer, 2018). Users pick their news sources, echoing knowledge regardless of quality within their networks. Malicious social bots exploit the recommendation algorithm, creating "filter bubbles" that may decrease access to diverse sources of information and fact-checker exposure (Ciampaglia & Menczer, 2018). Created by Skider et al. (2020), a social network model demonstrated "that a lack of confirmation bias can ensure that small biased minorities much more easily hijack and dictate public discourse." A densely connected society promotes "a greater amount of biased reasoners" before polarization takes place (Skider et al., 2020). Completely eliminating

confirmation bias is not the solution. Increasing exposure to diverse sources of information, fact-checkers, and knowledge of disinformation may prevent political polarization.

## **An Application for Evaluating Consumer Media Accuracy Using Machine Learning**

*How can machine learning and web programming languages improve the accuracy of consumer media?*

Upsorn Praphamontripong of the Computer Science department will be the primary technical advisor on this capstone project along with the secondary advisor Daniel Graham of the Computer Science department. Christine Baca and I will be utilizing machine learning and web programming languages to fulfill the capstone requirement and to implement an application that evaluates the accuracy of consumer media.

”Big Data” presented in consumer media is increasingly tailored to users through machine learning and artificial intelligence (Guarda et al., 2018). Fact-checking is indispensable when a majority of Americans use social media as a primary source of news (Ciampaglia & Menczer, 2018). The capstone project is constrained to solutions using machine learning and web programming languages. Social media platforms and users currently use fact-checking applications like FactCheck.org and PolitiFact to evaluate consumer media accuracy. Fact-checking applications may benefit from more in-depth descriptions, accurate labeling, and different evaluation metrics of social media information. A custom machine learning classification model can create better information labeling, and a solid design using web programming languages allow for efficient and easy usage by users.

If successful, this application will be competent at labeling data and informing users

about the media they consume. With increased awareness of information accuracy, we hope to reduce political polarization by making it easier for users to avoid confirmation bias. We hope this application can increase accessibility to diverse information that others may utilize.

### **Resistance to Online Disinformation**

*Since 2016, how have anti-disinformation proponents mobilized to counteract what they regard as disinformation in U.S. social media?*

Propagators of online disinformation exploit confirmation bias (Guarda et al., 2018). Selective exposure is the primary driver of “echo chamber” creation, and conspiracy newsreaders reacted very negatively to debunking posts, even interpreting them as acts of disinformation (Del Vicario et al., 2016). Conspiracy newsreaders that first encounter weak corrective efforts may be inoculated against future stronger arguments, increasing their commitment to an echo chamber (Zollo et al., 2017). Several methods of combating disinformation include a rumor classification system (Zubiaga et al., 2018), crowdsourced trustworthiness rating (Pennycook & Rand, 2019), and a related stories algorithm (Bode & Vraga, 2015). Although there is progress on all parts of a rumor classification system, a rumor classifier is not always guaranteed to be correct, and it could mislead readers that unmarked articles are accurate (Zubiaga et al., 2018). User crowdsourced trustworthiness scores, where they rate the trustworthiness of several news sources, were found to correlate heavily with professional fact-checker trustworthiness scores (Pennycook & Rand, 2019). Regardless of political partisanship, a user trustworthiness score at the website level can verify mainstream media from obvious false news and hyperpartisan sources. However, the correlation between fact-checker and user trustworthiness score sharply decreased when discerning between mainstream media outlets themselves (Pennycook & Rand,

2019). Facebook could expose users to corrective media rather than obscure it from readers by using the related stories algorithm (Bode & Vraga, 2015). If there is sufficient credibility and a clear goal to combat misinformation, social media content curation algorithms and “filter bubbles” may be used to correct misinformation (Bode & Vraga, 2015). Facebook can immediately correct misinformation, as immediate response means a higher likelihood of correcting misinformation (Bode & Vraga, 2015). Hameleers (2020) recommends media literacy intervention and fact-checking to discern false news from mainstream media, but the efficacy of misinformation warnings depends on presentation (Guess et al., 2020). Guess et al. (2020) found that skepticism about false news may correlate with skepticism about news from mainstream media (Guess et al., 2020).

Political disinformation campaigns target social media users (Koc-Michalska et al., 2020). Facebook has promised to promote digital media literacy and claims it is “committed to reducing the spread of false news on Facebook” while offering context “to empower people to decide for themselves what to read, trust and share.” (Facebook, 2020a). Facebook uses “both technology and human review” and tries to “promote information literacy and disrupt the financial incentives of spammers” and says they “work with independent fact-checkers who are certified through the non-partisan International Fact-Checking Network” (Facebook, 2020b). Nonprofit fact-checking organizations such as FactCheck.org (FactCheck.org, 2014) strive to decrease confusion in U.S. politics and online deception. FactCheck.org claims it is a “nonpartisan, nonprofit ‘consumer advocate’... that aims to reduce the level of deception and confusion in U.S. politics” (FactCheck.org, 2014). It discloses its financials publicly, promising that it does “not accept funds from corporations with the exception of Facebook ... and Google,

which provided a one-time grant to support ... COVID-19 coverage in 2020” (FactCheck.org, 2014).

Trained journalists at NewsGuard create “Nutrition Labels” and are open to comment from website editors and managers (NewsGuard). NewsGuard writes “Algorithms don’t call for comment,” and they strive to teach news literacy (NewsGuard, 2020). Ad Fontes Media uses a rating system, capitalizing on “humans with subjective biases” evaluating “things that are created by other humans with subjective biases” on a scale (Ad Fontes Media, 2020). This same rating system can be used by educators and Ad Fontes Media claims to value making “news consumers smarter and news media better” (Ad Fontes Media, 2020). Though RealClearPolitics claims they are “dedicated to providing... non-partisan analysis”, RealClearPolitics shows numerous links with headlines on their front page and advertises their multiple brands. RealClearPolitics even has the option for groups to advertise on their website (RealClearPolitics, 2020).

## References

- Ad Fontes Media. (2020). Methodology Summary.  
<https://www.adfontesmedia.com/how-ad-fontes-ranks-news-sources/>
- Bode, L., Vraga, E.K., 2015. In Related News, That Was Wrong: The Correction of Misinformation Through Related Stories Functionality in Social Media. *Journal of Communication* 65, 619–638.. doi:10.1111/jcom.12166
- Ciampaglia, G. L., & Menczer, F. (2018). Biases Make People Vulnerable to Misinformation Spread by Social Media. *The Conversation US*. Retrieved 2020, from <https://theconversation.com/misinformation-and-biases-infect-social-media-both-intentionally-and-accidentally-97148>
- Del Vicario, M., Bessi, A., Zollo, F., Petroni, F., Scala, A., Caldarelli, G., Stanley, H.E., Quattrociocchi, W., 2016. The spreading of misinformation online. *Proceedings of the National Academy of Sciences* 113, 554–559.. doi:10.1073/pnas.1517441113
- Facebook. (2020-a). Tips to Spot False News.

- <https://www.facebook.com/help/188118808357379>
- Facebook. (2020-b). How is Facebook addressing false information through independent fact-checkers? <https://www.facebook.com/help/1952307158131536>
- FactCheck.org. (2014, April 11). Our Mission. <https://www.factcheck.org/about/our-mission/>
- Guess, A. M., Lerner, M., Lyons, B., Montgomery, J. M., Nyhan, B., Reifler, J., & Sircar, N. (2020). A digital media literacy intervention increases discernment between mainstream and false news in the United States and India. *Proceedings of the National Academy of Sciences*, 117(27), 15536-15545. doi:10.1073/pnas.1920498117
- Hameleers, M. (2020). Separating truth from lies: Comparing the effects of news media literacy interventions and fact-checkers in response to political misinformation in the US and Netherlands. *Information, Communication & Society*, 1-17.
- Hetherington, M. (2015). "Why Polarized Trust Matters." *Forum* (2194-6183), 13(3), 445–458. <https://doi.org/10.1515/for-2015-0030>
- Koc-Michalska, K., Bimber, B., Gomez, D., Jenkins, M., & Boulianne, S. (2020). Public Beliefs about Falsehoods in News. *The International Journal of Press/Politics*, 25(3), 447-468. doi:10.1177/1940161220912693
- NewsGuard. (2020). Why Should You Trust Us? <https://www.newsguardtech.com/about/why-should-you-trust-us/>
- Pennycook, G., & Rand, D. G. (2019). Fighting misinformation on social media using crowdsourced judgments of news source quality. *Proceedings of the National Academy of Sciences*, 116(7), 2521-2526. doi:10.1073/pnas.1806781116
- Pew Research Center. (2014, June 12). *Political Polarization, Political Compromise and Divisive Policy Debates*. Retrieved from <https://www.pewresearch.org/politics/2014/06/12/section-4-political-compromise-and-divisive-policy-debates/>
- RealClearPolitics. (2020). About RealClearPolitics. <https://www.realclearpolitics.com/about.html>
- Skider, O., Smith, R. E., Vivo, P., & Livan, G. (2020). A minimalistic model of bias, polarization and misinformation in social networks. *Scientific Reports*, 10(1). doi:10.1038/s41598-020-62085-w
- Zollo, F., Bessi, A., Del Vicario, M., Scala, A., Caldarelli, G., Shekhtman, L., Havlin, S., Quattrociocchi, W., 2017. Debunking in a world of tribes. *PLOS ONE* 12, e0181821.. doi:10.1371/journal.pone.0181821
- Zubiaga, A., Aker, A., Bontcheva, K., Liakata, M., Procter, R., 2018. Detection and Resolution of Rumours in Social Media. *ACM Computing Surveys* 51, 1–36.. doi:10.1145/3161603