Towards Designing a Flexible Expert-led Crowdsourcing Framework for Investigating Misinformation

ANIRBAN MUKHOPADHYAY, Virginia Tech, USA
SUKRIT VENKATAGIRI, Virginia Tech, USA
KURT LUTHER, Virginia Tech, USA

Mis- and disinformation can lower trust among members of a society. Investigators in news and fact-checking organizations face a growing volume of such problematic content that they must verify or debunk. To help scale-up investigators' work practice, we design and evaluate a flexible, expert-led crowdsourcing framework. Preliminary results suggest that our framework can augment investigators' work, investigators were excited to use it, and it provided an authentic learning experience for crowd workers.

ACM Reference Format:
Anirban Mukhopadhyay, Sukrit Venkatagiri, and Kurt Luther. 2022. Towards Designing a Flexible Expert-led Crowdsourcing Framework for Investigating Misinformation. In . ACM, New York, NY, USA, 2 pages. https://doi.org/XXXXXXX.XXXXXXX

1 INTRODUCTION

Mis- and disinformation can lower trust in democratic institutions, in science, and in one other. News and fact-checking organizations that serve as gatekeepers to verified information face a growing volume of misinformation online as well as complex social and technical challenges in researching (verifying or refuting) such problematic content [7]. This presents an opportunity to scale up the manual, time-consuming process of debunking misinformation [1].

There currently exist two approaches to scale up misinformation investigations: automation and crowdsourcing [4, 3]. Real-world investigations are complex and dynamic in nature. Thus, automated approaches, though promising [4], are limited by the time and effort incurred in adapting them for changing contexts with little unstructured and unlabeled data [5, 9].

In contrast, online (human) crowds have demonstrated their powerful and adaptive capabilities in supporting investigations, from finding missing pets after crises [12] to catching criminals. However, novice crowds acting without oversight often engage in vigilantism and doxxing. Most closely related to our work, Venkatagiri et al. propose an expert-led crowdsourcing approach [11, 10] that blends the complementary strengths of expert investigators and crowds to promote more effective and ethical investigations.

While prior work has enabled investigators and crowds to collaborate on investigative work, they have focused on relatively constrained tasks and contexts. For example, GroundTruth was designed to support a specific type of image geolocation tasks [11].

Conference acronym 'XX, June 03–05, 2022, Woodstock, NY

ACM ISBN 978-x-xxxx-xxxx-x/YY/MM…$15.00
https://doi.org/XXXXXXX.XXXXXXX

Here we used a design-based research approach [2] to develop a more flexible framework for expert-led crowdsourcing. Our framework enables investigators to easily and quickly scale up investigations into misinformation online. Preliminary results show that our expert-led crowdsourcing framework can be used in a variety of different application contexts while still scaling up investigators' work practice with the help of a crowd.

2 DESIGN PROCESS AND APPROACH

We conducted our study in a classroom context where university students served as the "crowd." There were 30 computer science junior and senior undergraduate students from two universities who participated in five study sessions. Experts joined remotely through a video call and students had the option of joining remotely or being co-located in a classroom. As the study took place in a learning environment, we used a design-based research (DBR) [2] approach to iterate on the collaborative framework for solving the microtasks and finalize how tasks can be assigned and carried out by student teams. Following the DBR model, we conducted "iterative cycles of defining design arguments, implementing the design argument, collecting data, evaluating the design, and refining the design" [14].

We introduced a set of microtasks by following the OSINT analysis process [13] to decompose larger investigations. Open Source Intelligence (OSINT) refers to investigations that use publicly available information and tools to emphasize transparency. We defined two types of tasks related to discovery and verification. The goal of *discovery* tasks was to understand the content and hashtag patterns around the topic, identify important accounts spreading problematic information and collect them systematically. We decomposed the *verification* process based on four tasks that are common across different types of OSINT investigations [8]: source analysis, image analysis, fact-checking, and geolocation.

Each study session, led by an expert investigator, focused on one investigation thread and contained multiple OSINT tasks. The experts' professions included journalists, a law enforcement officer, and a fact-checker.

We employed piggyback prototyping [6], i.e., low-tech, widely available, appropriable social technologies to keep the system flexible, extensible, and robust. Students made submissions to a Google Form tailored for each session. The spreadsheet contained aggregated responses, which experts reviewed in real-time to provide feedback and guidance to the crowd.

Each session was 75 minutes long. First, the investigator gave a short presentation on what they wanted the crowd to investigate. Then, we worked with the expert to assign teams to different subtasks and pointed to resources for research and submission. Students spent the next five minutes strategizing the division of work

within the team, before diving into the actual investigation for an hour. Finally, each student completed a written reflection about their performance and experience.

We collected data from the study sessions to understand the attitudes and performance of the experts and crowd. We recorded our observations during the sessions and analyzed the written reflections. We also conducted semi-structured interviews with each expert, as well as separate focus group interviews with students, after each session.

3 PRELIMINARY FINDINGS

We conducted a thematic analysis of expert and student interviews, observations, and reflections, focusing on the effectiveness of our framework.

3.1 Expert feedback on the sessions:

All experts found the tasks to be useful in the scenarios that they encounter in their investigations. The experts shared examples of previous or future investigations where they could see these tasks being used.

Experts found the sessions to be productive, and mentioned strengths like scaling up the investigation process, gathering new perspectives, getting information from unfamiliar platforms, the high quality and quantity of student submissions, and the quick responses of the class to feedback. For example, one expert noted how our framework helped to speed up their work practice: *"The type of work you guys did in an hour would take us, you know, certainly all day with one person doing it, if not longer."* In terms of improvements, experts suggested longer sessions and pre-sessions to better introduce the topic.

3.2 Student learning and enjoyment:

Students mentioned that working with experts was an authentic and active learning experience. One student described the real-world impact of the class' efforts: *"This was such a cool session because when I opened up Instagram to check the post again, it was hidden for being potentially misleading. When I clicked on why it was hidden, I found [expert]'s article on Politifact scoring the video as Pants on Fire! This makes me so happy because the work we did in class helped identify misinformation and expose the truth to thousands of people!"* Students reported learning from the feedback from the experts and also felt confident while applying the learned skills during the sessions.

4 ACKNOWLEDGEMENTS

This research was supported by the Commonwealth Cyber Initiative and NSF IIS-1651969.

REFERENCES

[1] Petter Bae Brandtzaeg et al. "Emerging journalistic verification practices concerning social media". In: *Journalism Practice* 10.3 (2016), pp. 323–342.

[2] Jody Clarke et al. "A design-based research strategy to promote scalability for educational innovations". In: *Educational Technology* 46.3 (2006), pp. 27–36.

[3] Nicholas Diakopoulos, Munmun De Choudhury, and Mor Naaman. "Finding and assessing social media information sources in the context of journalism". In: *Proceedings of the SIGCHI conference on human factors in computing systems*. 2012, pp. 2451–2460.

[4] Nicholas Diakopoulos, Daniel Trielli, and Grace Lee. "Towards understanding and supporting journalistic practices using semi-automated news discovery tools". In: *Proceedings of the ACM on Human-Computer Interaction* 5.CSCW2 (2021), pp. 1–30.

[5] Fernando José Fradique Duarte, Óscar Mortágua Pereira, and Rui L Aguiar. "Framework for the Discovery of Newsworthy Events in Social Media". In: *International Journal of Organizational and Collective Intelligence (IJOCI)* 9.3 (2019), pp. 45–62.

[6] Catherine Grevet and Eric Gilbert. "Piggyback Prototyping: Using Existing, Large-Scale Social Computing Systems to Prototype New Ones". In: *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems*. CHI '15. New York, NY, USA: Association for Computing Machinery, Apr. 2015, pp. 4047–4056. ISBN: 978-1-4503-3145-6. DOI: 10.1145/2702123.2702395. URL: http://doi.org/10.1145/2702123.2702395 (visited on 03/19/2021).

[7] Melinda McClure Haughey et al. "On the misinformation beat: Understanding the work of investigative journalists reporting on problematic information online". In: *Proceedings of the ACM on Human-Computer Interaction* 4.CSCW2 (2020), pp. 1–22.

[8] Craig Silverman. *Verification handbook: An ultimate guideline on digital age sourcing for emergency coverage*. European Journalism Centre, 2014.

[9] Peter Tolmie et al. "Supporting the use of user generated content in journalistic practice". In: *Proceedings of the 2017 chi conference on human factors in computing systems*. 2017, pp. 3632–3644.

[10] Sukrit Venkatagiri, Aakash Gautam, and Kurt Luther. "Crowdsolve: Managing tensions in an expert-led crowdsourced investigation". In: *Proceedings of the ACM on Human-Computer Interaction* 5.CSCW1 (2021), pp. 1–30.

[11] Sukrit Venkatagiri et al. "GroundTruth: Augmenting expert image geolocation with crowdsourcing and shared representations". In: *Proceedings of the ACM on Human-Computer Interaction* 3.CSCW (2019), pp. 1–30.

[12] Joanne I. White, Leysia Palen, and Kenneth M. Anderson. "Digital Mobilization in Disaster Response: The Work & Self-organization of On-line Pet Advocates in Response to Hurricane Sandy". In: *Proceedings of the 17th ACM Conference on Computer Supported Cooperative Work & Social Computing*. CSCW '14. New York, NY, USA: ACM, 2014, pp. 866–876. ISBN: 978-1-4503-2540-0. DOI: 10.1145/2531602.2531633. URL: http://doi.acm.org/10.1145/2531602.2531633 (visited on 01/12/2015).

[13] Heather J Williams and Ilana Blum. *Defining second generation open source intelligence (OSINT) for the defense enterprise*. Tech. rep. Rand Corporation, 2018.

[14] Haoqi Zhang et al. "Agile research studios: Orchestrating communities of practice to advance research training". In: *Proceedings of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing*. 2017, pp. 220–232.