International Workshop on Data for the Wellbeing of Most Vulnerable at ICWSM 2024

Yelena Mejova[1], **Kyriaki Kalimeri**[1 2], **Daniela Paolotti**[1]

[1] ISI Foundation, Via Chisola 5, Torino, Italy
{first.last}@isi.it
[2] UNICEF, New York, NY, USA
kkalimeri@unicef.org

Abstract

The focus of this workshop are the vulnerable populations including children, elderly, racial or ethnic minorities, socioeconomically disadvantaged, under-insured or those with certain medical conditions, who are often absent in commonly used data sources. The aim of this workshop is to encourage the community to use new sources of data as well as methodologies to study the wellbeing of such populations. Below we outline the proceedings of the fifth International Workshop on Data for the Wellbeing of Most Vulnerable that took place at ICWSM in 2024.

Introduction

The scale, reach, and real-time nature of the Internet is opening new frontiers for understanding the vulnerabilities in our societies, including inequalities and fragility in the face of a changing world. From tracking seasonal illnesses like the flu across countries and populations, to understanding the context of mental conditions such as anorexia and bulimia, web data has the potential to capture the struggles and wellbeing of diverse groups of people. Vulnerable populations including children, elderly, racial or ethnic minorities, socioeconomically disadvantaged, underinsured or those with certain medical conditions, are often absent in commonly used data sources. Further, data and algorithmic biases, especially in the light of the recent generative AI models, spotlight the awareness needed to build inclusive and fair systems when dealing with crisis management.

Thus, the aim of this fifth installment of the ICWSM Workshop on Data for the Wellbeing of Most Vulnerable is to encourage the community to use new sources of data as well as methodologies to study the wellbeing of vulnerable populations. The selection of appropriate data sources, identification of vulnerable groups, and ethical considerations in the subsequent analysis are of great importance in the extension of the benefits of big data revolution to these populations. As such, the topic is highly multidisciplinary, bringing together researchers and practitioners in computer science & AI, epidemiology, demography, linguistics, and many others.

The workshop took place on June 3, 2024 in Buffalo, NY. The program included two invited keynotes, one short and 7 long papers, and 3 abstract presentations. Below, we outline the themes and outcomes of the workshop.

Keynotes

The first keynote speaker was Dr. Jun Zhuang, who is the Morton C. Frank Professor of Industrial and Systems Engineering at the University at Buffalo, and the Director of the Decision, Risk & Data Laboratory. His talk, titled "Game Theory, Data Analytics, and Disaster Management" provided an overview of the application of game theory and data analytics to a variety of applications involving vulnerable populations. One such application is the understanding of strategic advantages of adopting new technology in the defence against terrorism (Hunt, Agarwal, and Zhuang 2022). Another is finding optimal strategies for the official agencies and social media companies to decide which rumor to clarify and when to clarify it (Agarwal, Al Aziz, and Zhuang 2022). Additional applications span the emotional communication during crises, optimizing networks of humanitarian organizations, and others. For more, see https://www.eng.buffalo.edu/~jzhuang/research.htm.

The second keynote was Dr. Miguel Luengo-Oroz, the Founder and CEO Spotlab.ai, Professor at the Doctoral School of the Universidad Politécnica de Madrid, and Ashoka Fellow and Obama Foundation Europe Leader. Focusing on "AI and Mobile Technology to Fight Neglected Tropical Diseases (NTDs)", Dr. Oroz recalled his journey to make an impact in humanitarian response in global health. His work involved participating in the decision-making and humanitarian ecosystem to produce actionable policy impact. His startup Spotlab.ai is an AI platform for clinical research and universal diagnosis. To assist in the data collection on the ground, his team developed an adaptor to align a phone with a microscope that digitizes microscope images. From his experiences, Dr. Oroz emphasized that any AI or new technological experience needs to be tested in the field to gauge its true impact and usability. Such testing would allow for a "validation in context", and inform possible new regulations, as well as quality control. In summary, Dr. Oroz emphasized three directions necessary for real-life impact: community building, clinical evidence, and market creation. For more, see https://www.miguel.wiki/.

Contributions

All contributions were reviewed by 2–3 members of the program committee (14 in total), most of whom specialize in computer or data science, and especially in the studies relevant to a vulnerable population. The contributions can be broadly grouped into studies of social media use by vulnerable populations, tracking signals around vulnerable populations using novel data, and auditing studies revealing biases and effects of AI tools and recommender/search systems. Interestingly, an additional meta-examination contribution examined the researchers themselves as a potentially vulnerable population. We summarize each contribution in turn below.

Social Media Use by Vulnerable Populations

Reddit Fried et al. (2024) presented an abstract regarding "sexualized cannabis use" on Reddit. Their analysis used the LIWC risk category and a custom 'risky sex' lexicon, revealing discussions on motivations, including enhancing sexual experiences and using cannabis as a pretext for casual sex, while also revealing several misconceptions that may cause harm.

Similarly on Reddit, Bouzoubaa and Rezapour (2024) examined "emotional resonance and shared substance use experience" of viewers of the popular HBO show Euphoria, which depicts addiction and drug use. The authors compared the language between viewers active on drug subreddits (ED) and those who are not (EE), revealing a focus on the impact of drugs in the ED community. Their analysis revealed five key themes: how addiction is portrayed, mental health and trauma experiences, character development and relationships, exploration of youth identity, and the show's artistic style. The authors conclude that the show may have perpetuated harmful stereotypes and advocate for future study of response to drug-related media.

Using social media (again, Reddit) as a resource to study language use by possible immigrants, Vitiugin et al. (2024) approach designed to automatically detect code-mixed messages in migration-related discussions. Code-mixing here is defined as when multilingual speakers interleave two or more languages when communicating. The authors use their tool to examine the prevalence of code-mixing in migration-related threads compared to other thematic categories on Reddit, shedding light on the topics of concern to migrant communities. They hope their work will help to address digital inequalities and linguistic diversity.

TikTok Examining TikTok videos around eating disorders, Bickham et al. (2024) investigate the prevalence of moderation evaders that use coded hashtags to avoid being detected and post possibly harmful material. The authors find that the moderation evading and mainstream hashtags can appear in the same pieces of content, making it possible for users interested in mainstream terms coming in contact with the evaders. The videos by such evaders tend to show a wider range of emotions, including heightened negative ones. The authors hope such insights will help in platform moderation efforts and future interventions.

Using TikTok, Pinto et al. (2024) have examined the content generated after the attempted coup by the former Peru President Pedro Castillo on November 20, 2022. The authors relate the data to the Armed Conflict Location and Event Data (ACLED) and find that the locations mentioned in the video transcripts correspond to the locations of the demonstrations on ACLED. Topical analysis revealed discussions about the emergency curfew instituted after Castillo's arrest.

Tracking Signals Around Vulnerable Populations Using Novel Data

Zhou, Peng, and Ferrara (2024) create a dataset of job postings from eight regions across the United States spanning 2006-2024 that catered to Chinese-speaking immigrants. Using this dataset, the authors aimed to "uncover human trafficking patterns" in cases when the job opportunity advertised is fake. The authors investigate types of advertised opportunities to find suspicious ads. They also find that external events such as health emergencies and conflicts appear to strongly correlate with increased volume of suspicious job posts. The researchers hope the online job boards and communication platforms will take action, lest they become "unwitting facilitators of human trafficking".

Voukelatou (2024) proposed a machine learning model for identifying populations at risk of inadequate micronutrient intake using secondary household survey data, and climate data. She has tested the model on Ethiopia and Nigeria, achieving F1-score of 0.76 for the former and 0.71 for the latter. The model was also tested in cross-country settings, examining the trade-off between precision and recall, which may be adjusted according to the needs of the decision-makers. In future work, the author will incorporate the ACLED conflict data, and will attempt to build a more general model that could be applied in data-constrained countries.

Auditing Studies Revealing Biases and Effects of AI Tools and Recommender/Search Systems

Nogara et al. (2024) examines the Perspective API, and especially whether it is biased towards the German language. The authors compare the toxicity scores for tweets originating from German-speaking countries, in comparison to those from other countries, finding a significantly higher toxicity level detected by the tool. They then translate English-language tweets into German, showing that the tool detects significantly lower toxicity for English (although their meaning remains the same). The authors are concerned about how such a bias may impact moderation strategies aimed at reducing online toxicity.

Liu et al. (2024) provide "a comparison of online search engine autocompletion in Google and Baidu", with a focus on social groups. They find that both engines exhibit the potential to perpetuate and promote derogatory and negative stereotypes across a wide range of social groups and categories, including age, gender, lifestyle, nationality, peoples (broadly, continent of origin), political inclination, religion, and sexual orientation. The findings point to more refined, "culturally sensitive" moderation strategies.

An experimental study was described by Bouleimen et al. (2024) who recruited 183 students who were invited to browse the internet after seeing a news item, and who were asked to assess the veracity of information. As the title of the contribution states: "Online search is more likely to lead students to validate true news than to refute false ones". Their study also reflected that most participants relied on online sources to obtain information and read the news, though those that got their information from books and internet browsing were most accurate in assessing the veracity of a news item. The authors hope their study will contribute to building tailored digital information literacy strategies for young people.

Meta-Examination of Researchers as a Vulnerable Population

Doyle (2024) provided a meta-analysis of the way researchers who are studying sensitive topics (such as suicide) may themselves be vulnerable to the negative effects of their research. The author presents an auto-ethnography describing the emotional duress of their research team during an analysis of an online community providing suicide bereavement support. Informed by the experience, the author proposes several recommendations for such research: having a plan during the initial study design to maintain the wellness of the researchers, slowing down data collection and analysis as necessary, and embedding formal debrief spaces within the process to combat the feelings of isolation amongst the members of the research team. The contribution elicited a lively discussion around the management of one's own emotions and mental health during the study of sensitive topics.

The proceedings of the workshop are available at https://workshop-proceedings.icwsm.org/.

Workshop Organization

The workshop was organized by researchers from ISI Foundation, a nonprofit research institute in Turin, Italy, and UNICEF HQ, NYC, USA:

- Yelena Mejova, a Senior Research Scientist at ISI Foundation specializing in tracking health-related signals in text and social media.
- Kyriaki Kalimeri, who is a Senior Research Consultant at UNICEF, and researcher at ISI Foundation working in the areas of Computational Social Science and Humanitarian AI.
- Daniela Paolotti, a Senior Research Scientist ISI Foundation, an expert in computational epidemiology and participatory disease surveillance.

For more information on the workshop, please see its website at https://sites.google.com/view/dataforvulnerable24.

References

Agarwal, P.; Al Aziz, R.; and Zhuang, J. 2022. Interplay of rumor propagation and clarification on social media during crisis events-A game-theoretic approach. *European Journal of Operational Research*, 298(2): 714–733.

Bickham, C.; Kazemi-Nia, K.; Luceri, L.; Lerman, K.; and Ferrara, E. 2024. Hidden in Plain Sight: Exploring the Intersections of Mental Health, Eating Disorders, and Content Moderation on TikTok. *Proceedings of the ICWSM Workshop on Data for the Wellbeing of Most Vulnerable*.

Bouleimen, A.; Luceri, L.; Cardoso, F.; Botturi, L.; Hermida, M.; Addimando, L.; Beretta, C.; Galloni, M.; and Giordano, S. 2024. Online search is more likely to lead students to validate true news than to refute false ones. *Proceedings of the ICWSM Workshop on Data for the Wellbeing of Most Vulnerable*.

Bouzoubaa, L.; and Rezapour, R. 2024. Euphoria's Hidden Voices: Examining Emotional Resonance and Shared Substance Use Experience of Viewers on Reddit. *Proceedings of the ICWSM Workshop on Data for the Wellbeing of Most Vulnerable*.

Doyle, D. T. 2024. Computing Vulnerability: Recommendations for Supporting the Emotional Wellbeing of Computational Researchers. *Proceedings of the ICWSM Workshop on Data for the Wellbeing of Most Vulnerable*.

Fried, Z.; Giorgi, S.; Earleywine, D.; Osseyi, P.; and Curtis, B. 2024. Exploring Sexualized Cannabis Use on Reddit: Patterns, Motivations, and Public Health Implications. *Abstract at the ICWSM Workshop on Data for the Wellbeing of Most Vulnerable*.

Hunt, K.; Agarwal, P.; and Zhuang, J. 2022. On the adoption of new technology to enhance counterterrorism measures: an attacker–defender game with risk preferences. *Reliability Engineering & System Safety*, 218: 108151.

Liu, G.; Pinoli, P.; Ceri, S.; and Pierri, F. 2024. A comparison of online search engine autocompletion in Google and Baidu. *Proceedings of the ICWSM Workshop on Data for the Wellbeing of Most Vulnerable*.

Nogara, G.; Pierri, F.; Cresci, S.; Luceri, L.; Petter, T.; and Giordano, S. 2024. Biases in black-box toxicity detection models: the case of Perspective API. *Abstract at the ICWSM Workshop on Data for the Wellbeing of Most Vulnerable*.

Pinto, G.; Burghardt, K.; Lerman, K.; and Ferrara, E. 2024. Fighting for Democracy: The Attempted Coup in Peru through the lens of TikTok. *Proceedings of the ICWSM Workshop on Data for the Wellbeing of Most Vulnerable*.

Vitiugin, F.; Lee, S.; Paakki, H.; Chizhikova, A.; and Sawhney, N. 2024. Unraveling Code-Mixing Patterns in Migration Discourse: Automated Detection and Analysis of Online Conversations on Reddit. *Proceedings of the ICWSM Workshop on Data for the Wellbeing of Most Vulnerable*.

Voukelatou, V. 2024. Bridging Data Gaps: Predicting Inadequate Micronutrient Intake with Machine Learning. *Abstract at the ICWSM Workshop on Data for the Wellbeing of Most Vulnerable*.

Zhou, S.; Peng, J.; and Ferrara, E. 2024. Tracing the Unseen: Uncovering Human Trafficking Patterns in Job Listings. *Proceedings of the ICWSM Workshop on Data for the Wellbeing of Most Vulnerable*.