Workshop on Critical Data Science

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Abstract

In this workshop, we seek to bring together data scientists from computer science and the social sciences to engage one another around frameworks for responsibly carrying out data science on social phenomena, creating critical and yet sustainable ways of interdisciplinary collaboration. Thus the workshop should enable a productive intersection of cultures of critique with those of practice. We provide both *a forum* for presenting and discussing personal reflections and position pieces, which is an integral part of the research process, and *a group-based activity* to help scholars engage in a reflection of their own and neighboring scientific practices and to create opportunities for further cooperation.

Themes and topics

The social world is far messier than technical training prepares one for. Among data scientists trained in fields like computer science and statistics are those experiencing a sense of *vertigo*: they start to realize both the ways in which modeling breaks down on human beings, requiring different notions of rigor, and the potentially negative social impacts of modeling, requiring responsible engagement and activity.

To tackle those challenges and create robust methodological frameworks it is necessary to set up interdisciplinary or crossdisciplinary cooperation. Knowledge generated should not only be reliable and in line with principles of scientific integrity, but also "socially robust" (Nowotny, 2003). This requires systematic engagement with other scientific domains and with the knowledge of end-users, ethical and legal standards, and criteria of reliability and usefulness across multiple domains.

For scientists to do this in isolation, however, is enormously challenging, as described by Philip Agre (1997):

> "As an AI practitioner already well immersed in the [AI] literature, I had incorporated the field's taste for technical formalization so thoroughly into my own cognitive style that I literally could not read the literatures of nontechnical fields at anything beyond a popular level. The problem was not exactly that I could not understand the vocabulary, but that I insisted on trying to read everything as a narration of the workings of a mechanism.
> …
> "My first intellectual breakthrough came when, for reasons I do not recall, it finally occurred to me to stop translating these strange disciplinary languages into technical schemata, and instead simply to learn them on their own terms.
> …

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"I still remember the vertigo I felt during this period; I was speaking these strange disciplinary languages, in a wobbly fashion at first, without knowing what they meant – without knowing what *sort* of meaning they had… in retrospect this was the period during which I began to 'wake up', breaking out of a technical cognitive style that I now regard as extremely constricting."

We seek to create the bridges and collaborations to prevent such struggles of trying to understand frameworks from other disciplines in isolation. We adopt the term "critical" both to echo Agre's own proposed solution for a space for reflection in AI that he called a "critical technical practice," and to connect to the emerging fields of Critical Algorithm Studies (Gillespie and Seaver, 2016; Beer, 2017; Sandvig et al., 2014) and Critical Data Studies (Dalton and Thatcher, 2014; Iliadis and Russo, 2016). These fields provide a setting to systematically investigate legal, ethical and social challenges of data science, exploring the ways in which data, algorithms, and models do not create "simply neutral, objective, independent, raw representations of the world, but are situated, contingent, relational, contextual" (Kitchin and Lauriault, 2014) and interact with social worlds. However, despite engagements between this literature and data science (Lazer et al., 2009; King, 2011; boyd and Crawford, 2012), there is still a lack of **productive intersection of cultures of critique with those of practice** on the solution oriented, computational end of the spectrum.

This workshop aims to bridge cultures of critique with those of practice, discussing the necessary features of interdisciplinary cooperation and the resources and incentives required to bring those teams together. We follow the call to step out of isolation and ignorance and foster "serious engagement between the communities" (Watts, 2016).

There are already efforts to connect Agre's work to data, specifically in two separate introductions of 'critical data practice' (Feigenbaum et al., 2017; Gray and Bounegru, 2019). However, these examples, along with data feminism (D'Ignazio and Klein, 2019) are around critical engagements with *data*, but not yet with the *modeling* that constitutes a central part of practice in data science, machine learning, and statistics and which is a key component of how these disciplines use data to make claims about and act on the world. Still, these efforts, along with feminist HCI (Bardzell, 2010), critical technical practice in HCI (Sengers et al., 2015), and critical design (Bardzell and Bardzell, 2013), provide valuable frames that we incorporate for guidance, and for developing a better understanding of how critical perspectives can be applied to the practice of data science.

Relevant topics for the workshop include any issues related to critical data practices and interdisciplinary cooperation, including but not limited to the following questions:

- How can we design collaborations in critical data science?

- What *should be* standards and practices both of methodological rigor, and of respect for subjects, when carrying out computational research on social systems?

- What role can discussions of methods and instruments (Lipton and Steinhardt, 2018; Baeza-Yates, 2018; Cohen and Ruths, 2013; Gayo-Avello, 2012; Gayo-Avello, 2011; Ruths and Pfeffer, 2014) play in larger critiques of the limitations of data science?

- What are points of fundamental disagreement or diverging orientations/priorities between disciplines? (Borgatti et al., 2009; Hidalgo, 2016; Wallach, 2018)

- What can we learn from the long tradition of critical scrutiny in statistics? (Cox, 1990; Mallows, 1998; Breiman, 2001; Freedman, 2009)

- What combinations of experiences and/or readings has led data scientists to recognize, and perhaps even adopt, 'non-technical' ways of framing the world? (Agre, 1997) How do and can these ways of knowing interact with a modeling approach?

- What philosophical commitments or normative orientations, if adopted by data scientists, would produce a principled data science? (Hardt, 2013; Rogaway, 2016; Green, 2018) How can those be realized in interdisciplinary teams?

- What might it look like to use modeling critically and reflexively, or to contextualize what we can or cannot know from modeling from within the modeling process? (Bamman et al., 2014; Malik and Pfeffer, 2016; Malik, 2018)

- What can we learn from works looking at the social impact of implemented model-based systems? (Eubanks, 2018)

- What sorts of practices, coalitions, and collaborations can include marginalized voices into data science (Patton et al., 2019) rather than exclude them (Lanius, 2015)?

- Beyond a space for critical reflection (Agre, 1997), what can be the positive project of a critical data science?

Workshop format and activities

The half-day workshop will be conducted in three main activities, and a wrap-up.

We start with a welcome and brief thematic introduction. Then, the first activity includes a short round table where each participant will be invited to give a brief biographical reflection and/or take a normative position on the roles and responsibilities of a data scientist (potentially excerpted from a longer submission), and discuss their own experiences in interdisciplinary projects and their own expectations of a critical data science.

After the introductory round robin, there will be two sprints. The first addresses the question: what are the key challenges of doing critical data science? The second sprint is dedicated to the options we have to address the identified challenges. Both sprints are based on a card-based discussion method (Felt et al., 2018) for reflecting on cooperation and responsibility in data science. Finally, the wrap-up session is dedicated to the question of prioritization: what should we do next and how? What should be planned for long-term?

The workshop will conclude with a wrap-up, where participants can discuss what future outcomes they would like to see, in terms of fostering cooperation among computer sciences with social sciences and humanities; coordinating future efforts to continue organizing a community around critical data science; and producing resource guides or further biographical reflections or position pieces. The workshop will produce a draft compilation of best practices and a list of priorities for further engagement.

Submission and evaluation

Submissions should take a critical, reflexive stance, and also may provide an outlook on how to tackle a topic, such as a particular ethical or methodological challenge in an interdisciplinary setting.

All submissions must be in English.

Submissions may either be non-archival 2-page statements of interest or motivation, or archival papers up to 4,000 words. Accepted archival papers will be published in ICWSM Workshop Proceedings, a special issue of the journal *Frontiers in Big Data*. Open Access publishing fees will be waived for authors without institutions support for covering these fees.

Statements of interest or motivation Statements of interest or motivation should not exceed 2 pages and can be submitted in any format. They will be non-archival (not included in the ICWSM workshop proceedings), but if accepted, the author(s) have the option of publishing on the workshop website. Topics chosen should resonate with the relevant topics listed above. The statement should include an explanation of interest in the topics and why participation in the workshop is desired.

Full papers Full papers should be 500 to 4,000 words, according to *Frontiers* guidelines. Authors may submit as either a "Perspective" or as a "Brief Research Report." If accepted, these submissions have the option of being included in the Workshop Proceedings of the 13th International AAAI Conference on Web and Social Media published by Frontiers in Big Data.

For the specific layout, typesetting, and format, authors are encouraged to use the *Frontiers* templates:

- LaTeX template at http://www.frontiersin.org/design/zip/Frontiers_LaTeX_Templates.zip

- Word template at http://www.frontiersin.org/Design/zip/Frontiers_Word_Templates.zip

According to the *Frontiers* site, "These templates are meant as a guide, you are of course welcome to use any style or formatting and Frontiers journal style will be applied during typesetting"; accordingly, while we request using the templates above, we will accept other styles/formatting.

In addition to addressing the **relevant topics** above, papers may be:

- Reports of best practices in regard to responsible data science

- Descriptions of novel interdisciplinary settings and methodologies (e.g. participatory or citizen science settings), supported by prior own work or a short state of the art description

- Case studies of social, ethical or legal challenges faced

- Frameworks and principles for active and responsible engagement with stakeholders potentially affected by applications of data science

Evaluation and selection Submissions will be evaluated on the basis of their fit to the workshop theme and will be reviewed by the workshop organizers, involving external reviewers when necessary. Selections will be made on the basis of the number of submissions, with a priority given for inclusion.

Related workshops

This is the first workshop of its kind to be offered. While we substantially relate to prior ICWSM workshops on methodology or on ethics, and our approach will build on existing calls for ethical, politically engaged practice, and for greater methodological care and rigor, we hope that our approach will provide a deeply rooted foundation for upcoming interdisciplinary collaboration.

Specifically, we build on the workshop Standards and Practices in Social Media Data (2015)[1], where the main contact author presented and which had an attendance of about 15. There has not been a follow-up workshop to this yet, although interest in standards and practices is only growing (Lipton and Steinhardt, 2018; Baeza-Yates, 2018).

Ethics workshops were held in 2016 (Ethical Social Media Research[2]) and 2018 (Exploring Ethical Trade-Offs in Social Media Research[3]), respectively with 11 and 10 attendees. The organizers of these workshops are not submitting a proposal for an ethics workshop this year, such that our workshop can serve potential attendees in this space.

Outside of ICWSM, relevant workshops include:

- The March 2015 "Seventh Workshop on the Philosophy of Information," whose theme was "Conceptual challenges of data in science and technology"[4] and which led to a special issue of the journal *Big Data & Society* on critical data studies (Iliadis and Russo, 2016).

- The 2018 Association of Internet Researchers (AoIR) workshop "Digital Research Ethics Collaboratory for Networked Intimate Publics: Storytelling, Materiality, Ethics & Praxis"[5]

- The European Association for the Study of Science and Technology (4S/EASST) tracks "The Potential Futures of Data Science: A Roundtable Intervention" and "Critical data studies"[6]

- The Digital Culture and Communication section of European Communication Research and Education Association's (ECREA) 2017 "Digital Culture Meets Data: Critical Approaches" Conference[7]

- The Data Power conference series[8,9]

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[1] https://aaai.org/Library/Workshops/ws15-18.php
[2] https://icwsmethics2016.wordpress.com/
[3] https://sociotechethics.wordpress.com/icwsm-2018/
[4] https://web.archive.org/web/20170312163447/http://www.socphilinfo.org/workshops/wpi7/program
[5] http://www.drecollab.org/digital-research-ethics-collaboratory-for-networked-intimate-publics/
[6] https://easst.net/tag/data-science/
[7] https://dccecrea.wordpress.com/2017/11/24/
[8] https://carleton.ca/datapower/about/
[9] http://citizenmediaseries.org/2018/09/30/call-for-participants-3rd-international-data-power-conference/

Bio and relevant expertise

Dr. **Momin M. Malik** is the Data Science Postdoctoral Fellow at the Berkman Klein Center for Internet & Society at Harvard University. He holds a PhD in Societal Computing and a Master's in Machine Learning from the School of Computer Science, Carnegie Mellon University, an MSc in Social Science of the Internet from the Oxford Internet Institute, and an undergraduate degree in history of science from Harvard University. He was a 2017 Data Science for Social Good fellow. His dissertation work (Malik, 2018) attempts to lay out a research agenda for using modeling in critical and reflexive ways, as well as connect this agenda to relevant precedents and parallel projects. During his PhD, he was a facilitator for Bias Buster @ CMU, a program for inclusivity workshops based on materials from and made in collaboration with Google Pittsburgh. He helped manage logistics to run a "Train the Trainers" one-day workshop at Google Pittsburgh with an attendance of about 50, and also was part of 4-facilitator teams running Bias Busters Train the Trainers sessions at the Tapia and WEPAN conferences.

Dr. **Katja Mayer** trained as a sociologist and works at the intersection of science-technology-society. She studies the interactions of social scientific method and its publics. Currently she is investigating open practices in Computational Social Science and Big Data for her habilitation project at the Department of Social Studies of Science and Technology at the University of Vienna. Until 2019, she was a postdoc at the School of Governance, Technical University Munich. She also works as a senior scientist at the Centre for Social Innovation in Vienna, serves as an expert for the European Commission, and is an associated researcher for the Responsible Research and Innovation in Academic Practice platform at the University of Vienna. Furthermore, she has been teaching sociology of knowledge, STS, and critical data studies since 2008 at various universities, and was a visiting fellow at the Carnegie Mellon University's School of Computer Science. She is core member of OANA (Open Access Network Austria) and co-leads the working group on defining a national strategy for the transition to Open Science. During 2011-2013, she was scientific advisor to the president of the European Research Council (ERC). She is co-editor of a forthcoming special issue on Critical Data Studies in *Frontiers on Big Data*.

Hemank Lamba is a PhD student in Societal Computing, and a Master's student in Machine Learning at School of Computer Science, Carnegie Mellon University. Previously, he was a Research Engineer at IBM Research Labs, New Delhi. His research is focused on the understanding and modeling the user behavior on social media - specifically characterizing the deviant user behavior on these platforms, and understanding the effects of such behavior on the society. He has also been a fellow with multiple Data Science for Social Good initiatives (University of Chicago and IBM Research), where he has tackled problems related to food insecurity in U.S. and understanding the ecospace of philanthropic projects. In his time at Pittsburgh, he was a board member for the student organization Students for Urban Data Systems (SUDS), facilitating student projects on non-profit organizations and city's open data. Hemank holds a B.Tech in Computer Science from IIIT-Delhi, India.

Prof. Dr. **Claudia Müller-Birn** is the head of the research group Human-Centered Computing (HCC.lab) at the Institute of Computer Science at the Freie Universität Berlin. Before her appointment at FU Berlin, she undertook a post-doc at the Carnegie Mellon University, based on a Feodor Lynen Research Fellowship of the Alexander von Humboldt-Foundation. Her interdisciplinary research advances the fields of Computer-Supported Cooperative Work (CSCW) and Social Computing. Her research entails both an empirical and an engineering dimension. One objective is to contribute to a value-based socio-technical systems design that fulfills the specific needs of an application area, such as in ideation, and visualization. Besides, Claudia advocates the use and development of open source software, the principles of open science in her research work, and the open access to scholarly knowledge. She served as (co)chair of a number of conferences such as ACM OpenSym.

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