Dangers of Designing with Data

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ABSTRACT

In an analytical discussion structured by the framework of social justice, we scrutinize the shift of attention and focus in the HCI and interaction design communities towards "designing with data". Specifically, acknowledging social justice as a horizon for design research to work towards [10], we investigate the six strategies for social justice as developed by Lötter [24], namely, *recognition*, *reciprocity*, *enablement*, *distribution*, *accountability*, and *transformation*. For each of these dimensions, we demonstrate how the inherent features associated with data-oriented design processes may be a substantial impediment to our attempt toward a more just society.

CCS CONCEPTS

• **Human-centered computing** → **HCI theory, concepts and models**; **Interaction design process and methods**; **HCI theory, concepts and models**.

KEYWORDS

Designing with Data; Social Justice; Ethics; Research Design Methods

1 INTRODUCTION

The future of our domain, design research, is bound with advances in data science, particularly shaped by how we adopt data-oriented methods in our practice [14]. In recent years, there has been a widely acknowledged shift of attention towards "designing with data", grounded in the premise that data can be an optimal tool to understand contextual needs, inform the design process, and assess the design solution [18]. This, we argue, should not be taken at face value. While recognizing the benefits that the practice of interaction design research can gain by capitalizing on advances in data science, we aim to cast light on some of the unintended consequences of this trend. Operating from the standpoint that Human-Computer Interaction (HCI) is an action science seeking

"to advance the human values and priorities" [7], this paper scrutinizes "designing with data" against a major human priority — social justice.

We borrow our analytical framework from the influential work of political philosopher H. P. P. Lötter [24], where he describes six "distinct categories that feature prominently in the current (2011) philosophical literature on justice". This framework has been taken up and developed in the HCI literature, notably by Dombrowski et al. in their 2016 article "Social Justice-Oriented Interaction Design" [10], which is also a guiding inspiration to the discussion presented in this paper. Concretely, we pose questions about the impact of "designing with data" on the research design goals for social justice along the six categories of *recognition*, *reciprocity*, *enablement*, *accountability*, *distribution*, and *transformation*.

In the interest of clarity, we would like to emphasize that the forthcoming discussion is strictly focused on the inherent features associated with design processes whose operation hinges on large data sets. For example, the suggestion that data is inherently an asset and a substantially *profitable capital* to be possessed by powers; that there is an inherent desire for *classification* (or *profiling*) embedded in data science; the inherent *obscurity* of models trained by AI neural networks, the inevitable *obsolescence* of data sets, and so forth. However, this analytical work by no means should be taken as a complete work. It is rather meant to be a starting point, a provocation for further research on the already-observed consequences of mass-use of data in interaction design as well as the future studies of those (possibly exacerbated) dangers in various social realms and applications.

2 SOCIAL JUSTICE AND DESIGNING-WITH-DATA

Social justice is a complicated evolving concept, with no single agreed-upon definition. In a broad sense, it can be seen as a confluence of interrelated concepts that together create a mechanism for "thinking through how power, privilege, and access affect social structures" [10]. Lötter asserts that "to ask questions about justice is to ask what everyone is due" [24]. On such bases, he takes an applied approach and highlights the necessity of pushing the agenda beyond making "a proper assessment of what is due to whom and for what reasons" to generating facilities for properly implementing new (sometimes political) decisions [24]. This is also manifested in the framing and elaboration of the six strategies that he describes, in his 2011 book *Poverty, Ethics and Justice*, as the main constituents of systemic solutions that may guarantee a just society. Such a pragmatic perspective is what renders his framing particularly interesting and appropriate for bringing this discussion to the domain of HCI.

In the following, for each of the six strategies we first briefly recall the description of the strategy and then discuss whether and

how designing with data could introduce a danger or have an adverse impact on that specific dimension of social justice. In addition, related to each dimension of social justice and associated risk, we ask questions about the future of interaction design, particularly to understand how the practice of design can steer the application of data to ensure social justice.

2.1 Justice as *Recognition*

The first strategy deals with recognizing the humanity of fellow beings and acknowledging their dignity and worth. Consequently, it is about recognizing social justice as a human priority to work towards. In a social justice-oriented design agenda, therefore, recognizing the need for *change* should be central, identifying systemic social issues, unjust social constructs, practices, and policies, and then framing the problem as to how change could be brought to problematic inequities and power relations. Design is inherently about change, engaged in the process of creating new realities through new (technological) objects and environments that afford new practices at the individual and social levels [11, 26]. As such the ideology of design is "transformation", to change the state of a situation from current to a more desired one depending on the values of design.

Data-oriented methods, in contrast, are inherently about describing already existing reality with an inherent power of solidifying the current state of the situation. Eventually, technologies operating on knowledge gained from previous/current states of reality are acting in a world that will no longer exist. Extrapolating what is learned predominantly from data points, their operation leads to the re-entrenchment of the existing system of relations made more optimized and more efficient rather than bringing substantial *change*. This has been acknowledged as a danger of designing for the status quo [4], and criticized extensively by scholarly works that demonstrate signs of amplified racism-sexism surrounding the notion of "fairness of machine learning methods" [5, 8, 21]. This has been exacerbated by the emergence of generative AI, which creates the illusion of change through changing nuances rather than substances. The involvement of such methods is foreseen to proliferate in various social domains and take over practices of design that traditionally have been constructed in a (less "efficient") process of creative tinkering that recognizes the need for (sometimes radical) change. Such processes in the competition for speed and "efficiency" are likely to leave their role to generative AI which carries the exact issues of re-entrenchment of injustice, this time rather latent, behind the new promise of producing change.

2.2 Justice as *Reciprocity*

Reciprocity is to determine the terms of cooperation towards facilitating inter-personal and inter-group relations that are "fair". Abstracting the challenge of defining "fairness", at the core of the notion of reciprocity is interaction and connection at the individual as well as community levels, to underline the grounds of similarities and to work towards resolving segregated understandings of what we owe one another. This can be seen also as a growing interest in the HCI and Interaction Design communities, manifested in projects that seek to acknowledge human diversity and inclusion and support them to flourish.

In data science, however, there is an inherent desire for and power of clustering and categorization. Although categorization is a central aspect of human everyday life and the way we make sense of social reality [12, 30], the orderly procedures of natural language and embodied interaction that establish and maintain social categories are much more dynamic in comparison with the rather static ontologies of data science. There are many data-oriented projects that dangerously apply classification methods to social settings. This has been seen in the distribution of online material on social networks based on the users' classified profile, which has created disconnected sociopolitical circles; it is also entering the physical spaces of our social interactions, for example at the urban scale through route-planning applications that tune their suggestions based on the outcome of personal profiling algorithms, assigning urban spaces to similar profiles —a road to segregation [28]. While reciprocity is about closing the social gaps into situations of interpersonal encounters that are rich in diversity, the direct deployment of classification methods in the social realms can lead to the very opposite direction, that is the direction of segregation amplifying the idea of similarities and dissimilarities as a basis for design, the effects of which we have been witnessing in the increasingly worrying political polarization of societies [15, 22].

2.3 Justice as *Enablement*

Developing opportunities for everyone to fulfill their potential or helping them take advantage of existing opportunities are the paths to *enablement*. This is tightly linked to the recognition that some individuals or groups are deprived of certain opportunities and agencies: "[J]ustice as enablement concerns the extent to which institutions, laws, policies, and human behavior enable or constrain the self-development or self-determination of people in society" [24]. Oppression, i.e. constraining people from engaging in developing their own capacities, and dominance, i.e. constraining people's agency, are the common modes of the injustice of disablement [24]. Furthermore, oppression and dominance are grounded and reproduced in everyday interaction and in tacit expectations that are taken for granted but not explicated [29], and thus they might not be reflected in data collected about the world and society. Designing for human agency at the level of individual interactive experiences as well as creating new opportunities for engagement, action, and partnership in projects that impact society have been at the core of interaction design objectives. This draws on the literature on the psychology of agency [3] which has established the impact of the perception of control on the perception of quality of an experience in various domains. For example, in the domain of smart buildings, control over the environment (e.g. operable windows) has been shown to have a substantial positive impact on the feeling of comfort at home or in the office space [6]. On the contrary, data-oriented methods tend to push design toward automation, taking the agency away from humans with the rationale that automated systems can function more efficiently. This trend can have a wide span of consequences, from examples of living and working in automated environments where the complexity of human subjective individual and social experiences are overlooked and replaced with the promise of energy optimization, to larger-scale issues such as implementing social policies that diminish

citizen's engagement and local knowledge in decision making [33]. The challenge, therefore, manifests itself in the following question: How can designers ensure that users' agency is not diminished through the promise of efficiency in data-oriented automation, and more broadly, that the power generated by possessing data does not magnify the existing systemic dominance and act as a lever for oppression?

2.4 Justice as *Distribution*

Another strategy for social justice is to work towards the equitable distribution of goods and services. How can design researchers ensure that their contributions to data collection campaigns produce equal opportunities for everyone to access data as a public good [17]? In economic terms, a "public good" refers to a collective benefit that serves the interests of the general public. Similar to knowledge, it is generated and utilized through shared processes, meaning its production coincides with its consumption, therefore the creation and utilization of a "public good" are intertwined. Furthermore, a "public good" is characterized by its non-rivalrous nature, meaning its consumption by one individual does not diminish its availability to others. An illustrative instance of a "public good" in an urban context is public space, which is collaboratively shaped by its users; the utilization of public space contributes to its formation. For instance, pedestrians actively contribute to the existence of public spaces by engaging with them, being present, or traversing through them [1, 27]. The realm of design, including interaction design, has always been concerned with creating public good. The question for "design with data", however, is whether data can be encapsulated as a product that the whole society, not only a privileged layer, benefit from. There is evidence that this has not been achieved to date. An example is the way in which smart city projects have unfolded, notably in developing countries, relying on massive efforts of data generation with no concrete plan for making available the data that is essentially about the citizens and their environments, and in many cases not even a concrete plan for transparency about the use of the data [19, 32]. This may be due, at least in part, to the fact that data is a highly profitable capital, inherently a capitalistic idea – generating a strong gravity towards unbalanced and unjust distribution. In this respect, rather than the original sense of data as something that is 'given' (*datum* in Latin), data become something that is 'taken away'.

2.5 Justice as *Accountability*

The focus of this dimension is to hold responsible those who refrain from actions that are required by justice. The broad objective is to ensure humans comply with a shared conception of justice, to assign responsibilities, and to be able to hold responsible any individual, actor, or institution.

Models trained by deep neural networks, and more broadly quantitative analytical and decision-making methods, embody inherent obscurity and can obfuscate the meanings of responsibility. The "black-box" mindset characteristic for contemporary data-based technologies makes it often impossible to link particular actions to their resources, in terms of justification and reasonability, and therefore to objectively evaluate the moral value of these actions. In certain contexts, this challenge has already been acknowledged,

for example, in the discourses of ethical issues surrounding autonomous vehicles [2, 13, 23]. The danger of obfuscating responsibilities or de-responsibilization of non-human decision-making actors, however, extends beyond direct cases such as car accidents; and could extend its reach to other realms such as health care, education, and politics. Despite the recent efforts towards explainable and interpretable "artificial intelligence" [31], the fast-paced advances in machine learning models and the proliferation of their applications in various domains forecast a further distancing from an ideal situation in which the functioning of data-oriented methods can be part of the collective intuitive understanding. Such comprehension is crucial for maintaining individuals' active involvement in upholding accountability within political and social frameworks.

2.6 *Transformation* of Justice

The final issue relates to the idea that social justice is not a stable concept. It should evolve over time with improved conceptions of justice, to reflect new social norms and to rectify past injustices. It is recognized that what used to be considered just decisions or actions in the past may match with the current collective conception of justice and likewise, what is considered now as just will evolve in rather unforeseeable directions in the future.

In the discussion of designing with data, the critical question is: who drives the transformation in the design plan? The fluidity and subjective nature of justice suggest a principal role for the designer in striving to create an updated and contextually appropriate conception of justice which shapes the direction of change that the design project seeks to introduce. This is reflected in what Dombrowski et al. describe as commitments of the researchers to a design practice that (a) acknowledges the conflict, even though politicizing design might be a hindrance to the progress of the project [16], (b) recognizes the designer's reflexivity and positionality, and (3) draws on an understanding of ethics and politics in the studied temporal and social situation. Given this standpoint, the role of design research is an intellectual, ethical, and political one. This is also our position. The danger of over-relying on data in the process of design is to reduce the role of the design researcher from an intellectually proactive and politically reflexive actor to a performer of data collection and analysis techniques – a labor of data.

3 CONCLUDING REMARKS

Investigating the six dimensions of social justice, as introduced and developed by the political philosopher H. P. P. Lötter [24], the discussion presented in this contribution sought to evaluate the impact that grounding design in data may have on the ways in which HCI and interaction design practices work towards the horizon of social justice. For each dimension, our aim has been to highlight some of the risks of making design processes dependent on methods that rely on the collection of large data sets. In addition, related to each dimension of social justice and associated risks, we tried to put forward questions relevant to the future of interaction design, particularly to understand how design can steer the application of data in social realms to ensure social justice. This, however, is only an initial step. The discussion presented neither provides a complete list of dangers nor does it cover the elaboration that each

mentioned point deserves. In addition, the definitional framing of social justice that we borrowed for our analysis is not the only existing endeavor of its kind. The reason we picked this framework is twofold: first, it has already influenced the discourses surrounding the role of social justice as a design horizon in HCI and interaction design research, and second, it provides a schematism that has been of pragmatic use for structuring this discussion.

It is also worth noting that, by only listing the dangers of data-oriented methods, we do not mean to suggest that there are no positive sides to what data science can bring to the path towards social justice. Attending to the very same dimensions of social justice, one may be able to elicit several points in employing data techniques in design that are conducive to resolving systemic injustice. For example, data-oriented methods could help identify systemic social injustices (e.g. [9]) and describe them by their nature, significance, and root causes. Notable studies have shown that such data-enabled descriptions can have substantial contributions to general awareness and serve as a starting point for igniting change (e.g. [20, 25]). Our objective in this paper, nevertheless, has been to demonstrate that the promised advantages of data should not be taken at face value and to provoke reflections and further discourses that eventually lead to a more just adoption of data-oriented tools in our design practices.

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