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## Algorithms, contexts, governance : An introduction to the special issue

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# Algorithms, contexts, governance: An introduction to the special issue

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## Abstract

This introduction to the special issue on algorithmic governance in context offers an outline of the field and summarizes each contribution to the issue.

## Keywords

Algorithmic governance, algorithmic politics, algorithms, context, critical algorithm studies

Today, algorithms are seemingly everywhere. Often, merely mentioning the term spawns immediate reactions. These range from expectations of a smoother, more intelligent, more efficient, and greener societal organization (Dauvergne, 2020) to warnings against hitherto unseen possibilities for control that would extend the capillary reach of

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the state and major corporations into every corner of the world and even people's minds and bodies (Zuboff, 2019). In the latter scenario, algorithmic systems are thought to cause distress and enable new forms of segregation and exclusion, as well as unprecedented forms of oppression and exploitation (Eubanks, 2018; O'Neil, 2016; Yeung, 2018; Black, 2021). We position ourselves somewhere in-between the utopian and dystopian extremes on the abovementioned scale.

In this special issue, we start from the assumption that algorithms and the new forms of governance they enable are here to stay—for better and for worse. Academics, activists, decision-makers, and everyone else need to keep the inherently ambivalent and ambiguous dimensions of this new technology in mind. Algorithms won't save us and (most likely) won't destroy us. As all technology, they operate in context and the varying contexts they are used in have an influence on their ultimate consequences and effects. This special issue seeks to initiate debate about how to meaningfully identify and operationalize these manifold contexts. Rather than stating *that* context matters, the contributions collected in this special issue offer new empirical evidence and theoretical approaches to show *in what ways* this is the case.

As Tarleton Gillespie (2014) alerts us, in essence algorithms are nothing more than sets of instructions that transform a certain input into a particular output. As such, for instance, both a handwritten cooking recipe and a saving-throw-table printed in a *Dungeons & Dragons* manual are algorithms. In this special issue, we and the contributing authors are concerned with computational algorithms and, more precisely, with how a variety of contexts predispose and otherwise interfere with their operations, causing different and often both unexpected and unintended effects and outcomes. To adequately understand algorithmic governance, and to retain the ability to control their operations, we assume (1) that we need to perceive them as components of wider sociotechnical entanglements that are realized in and through everyday practices (e.g. Seaver, 2017), and (2) that what people believe algorithms do is no less important than what the algorithms actually do in technical terms (e.g. Bucher, 2018; Ytre-Arne and Moe, 2021). In her book *Atlas of AI*, Kate Crawford (2021) offers two concrete examples to explain the contingency of algorithms upon wider socioeconomic, cultural, political, and epistemological frames—Hans the Horse and the Mechanical Turk. According to Crawford, both these cases illustrate a series of assumptions about algorithms that prestructure our engagement with them in both individual and collective terms.

Hans the Horse lived in the beginning of the 20th century in Germany. After having been trained by his owner for years, he had seemingly acquired the capability of executing even complex mathematical calculations. These abilities were repeatedly tested and evaluated but all critics ended up with the same conclusion: the horse could actually count and calculate. What really happened, however, was that Hans had merely learned to read the minute facial and other expressions of his owner and other humans watching his performances. When offering the result by stamping one of his hoofs on the ground, he would simply stop when the micro-expressions he noticed suggested the result was correct. What looked like calculation was something completely different.

Crawford uses the example of Hans the Horse to illustrate the difference between understanding a phenomenon in context and merely recognizing patterns. Algorithm-driven

machine learning or artificial intelligence (AI), she argues, in essence simply do what Hans did—identify patterns and only we humans then a posteriori interpret these actions as a form of intelligence. In contrast to Hans, however, who was a mere attraction, today's complex big-data-based pattern-recognition systems produce outputs that are operationalized both by other machines and by humans. This way they entail real-world (and often negative) effects to those entities governed by means of their calculations.

The second example used by Crawford, the Mechanical Turk, was a mechanical chess player built by Hungarian inventor Wilhelm von Kempelen in 1770. The human-resembling robot could apparently play chess well and won most of his matches against various human contenders at the court of Empress Maria Theresa in Vienna. In reality, however, a small man and chess-master was sitting inside the machine determining which moves to take and signaling the results via a mechanical arm. According to Crawford, the Mechanical Turk illustrates the necessity of largely invisible human labor for the functioning and operability of complex algorithmic systems. From establishing training sets for image recognition or language processing to controlling results of apparently automatic and autonomous sorting mechanisms, (usually underpaid) human labor remains at the core of what appears to be automatic and self-directed. At second sight, Crawford summarizes, artificial intelligence appears to be neither artificial nor intelligent.

Based on these insights, we will now move on to conceptually situate the term algorithmic governance and explore in more detail how the role of context in this new set of sociotechnical practices can be understood. Finally, we align this introductory discussion with the articles constituting the main body of the special issue.

## Putting the context into algorithmic governance

Questions related to algorithmic governance are explored within a wide variety of disciplines, such as media and communication studies, sociology, political science, public administration, and law. The interdisciplinarity of the field is necessary and beneficial, yet also risks conceptual fragmentation. What most approaches have in common is that they point to the political nature of algorithmic decision-making.

The concept of algorithmic governance is arguably the broadest way to conceptualize the power of algorithms. Compared with more focused terms such as algorithmic regulation (Ulbricht and Yeung, 2022), algorithmic governmentality (Harkens, 2018; Rouvroy, 2011), or the business-related algocracy (Aneesh, 2009) and algorithmic management (Galieri, 2020), algorithmic governance has been used to describe a variety of sociotechnical practices aimed at assessing, directing, regulating, and managing the behavior of both human and non-human agents (Danaher, 2016; Katzenbach and Ulbricht, 2019). In these practices, computational calculations, automated recommendation or decision-making, and machine learning stand central. As Katzenbach and Ulbricht (2019: 2) put it, “algorithmic governance is a form of social ordering that relies on coordination between actors, is based on rules and incorporates particularly complex computer-based epistemic procedures.” Hence, whenever algorithmic systems intervene into social ordering, we can speak of “algorithmic governance.”

Most scholars doing research in this field agree that the use of algorithms and machine learning in public and other forms of decision-making has profound implications and can recalibrate power relations and lead to often unintended and unforeseen consequences (Beer, 2017; Crawford, 2021; Eubanks, 2018; O'Neil, 2016). Kitchin (2017: 15), for instance, warns against new dynamics in both political and economic terms stating that algorithmic governance "will play an ever-increasing role in the exercise of power, a means through which to automate the disciplining and controlling of societies and to increase the efficiency of capital accumulation," while Danaher et al. (2017: 2) argue that "algorithms are increasingly being used to nudge, bias, guide, provoke, control, manipulate and constrain human behavior."

Often discursively framed as more objective, faster, and more precise than purportedly flawed human analyses and decision-making, algorithmic forms of governance and management have been presented as a more efficient and more reliable option for states and businesses interested in saving costs and increasing the speed of bureaucratic and other procedures (Kuziemski and Misuraca, 2020; O'Reilly, 2011). However, on the flip side of what can be termed a tech-utopian hype, a series of critical scholars have drawn attention to significant biases, self-replicating errors, power imbalances, and new forms of exclusion and marginalization connected to an uncritical rollout of large-scale sociotechnical systems of management and control. Eubanks (2018) and Crawford (2021), for instance, have investigated how small biases in training sets replicate and lead to major flaws in automated recommender systems, while O'Neill (2016) has shown how groups are marginalized and excluded through opaque processes that do not allow for challenges or appeal. In all these issues, understanding the contexts in which algorithms are used, and through which their implications become palpable, is a crucial task for the critical observer.

While we agree with Seaver (2015: 1101) that the importance of context in such studies is "uncontroversial," the question of how exactly this context matters for various enactments of algorithms and how it can productively be explored often remains unaccounted for. The contributions collected in this issue add critical insights from a variety of disciplinary and empirical vantage points to this debate. They are brought together by the shared understanding that, to adequately understand the complex implications and ambivalent consequences of algorithmic governance, one needs to see this new set of sociotechnical practices *in context*. Following, for example, Gillespie (2014), Bucher (2018), Seaver (2017), and others, we assume that technology and society, algorithms, and individuals are intrinsically connected, that they constantly act upon one another, and can only be meaningfully studied in tandem. Algorithms in and of themselves are empty shells that acquire functions, power, and therefore political valence only when they are enacted as part of complex sociotechnical arrangements. Furthermore, algorithms that govern are themselves in need of governance and also in such endeavors, context matters.

Following Dourish (2004), we understand context as "interactional"—a relational property defined dynamically, specific to each occasion, and arising from concrete activities in those occasions. The context is thus "not just there waiting to be characterized or quantified, but it is rather a localized achievement" (Seaver, 2015: 1105);

it is not a “piece of reality” out there that we can delineate and study, but a conceptual construct that we choose to address.

The articles collected here illustrate a variety of different vantage points from which the issue of context in algorithmic governance can be approached: (1) as the context of the technical design of algorithms; (2) as infrastructure through which algorithms operate; (3) as the societies, cultures, and economies in which they function and unfold their effects; and (4) as the everyday practices and discursive environments in which they are enacted and understood. These categories emerge from the papers included into the special issue and are, therefore, by no means comprehensive. Rather, our heuristic roadmap, summarized below, highlights the need for proper interdisciplinarity in the field of contextual studies of algorithmic governance.

### *Design-context of algorithms*

Technology is always made by someone for some purpose. The situatedness of the individuals and groups shaping algorithmic solutions for governance matters for how this technology can be made operational and whose interests it serves. Therefore, analyzing the relations of class, gender, race, age, and other categories that implicitly or explicitly factor into the design of algorithmic systems is key to understanding this technology’s functionalities in various contexts of use.

### *Context in technical systems*

Technical systems such as those used in algorithmic governance cannot be understood independently of the humans working with or being processed by them. However, neither can these systems and their implications be adequately investigated without attention to how other machines and technical systems constitute varying contexts for these operations. Consequently, questions such as how algorithms interfere with other technical components of complex systems (such as database structures and server capacities) become important. Machines to a growing extent interact with other machines that thus mutually predispose and prestructure functionalities and outcomes of their operations. The question of how to govern systems of algorithmic governance is an important area of focus in this respect.

### *Context in sociotechnical, cultural, and economic systems*

The effects of decisions made or predisposed by algorithmic systems cannot be reduced to the immediate purposes they are deployed to serve but have repercussions that reverberate across wider segments of society, culture, politics, and the economy. Studying algorithmic governance in context, therefore, means taking seriously the implications of these technical systems in other and often apparently unrelated areas. Furthermore, algorithmic systems of decision-making are often imbued with an aura of objectivity and impartiality. Perceiving their effects in context also means to address intrinsic biases and investigate how these allegedly neutral tools affect different constituencies and different identities in distinct ways.

### *Discursive contexts and contexts of everyday beliefs*

Algorithms become effective not only in accordance with their overt design and technical characteristics but also due to how they are perceived by human beings in various contexts. Analyzing the discourses and everyday practices through which algorithms are understood, enacted, and become functional across sectors and domains becomes an important aspect of assessing their consequences and implications. How do discursive frames, beliefs, attitudes, fears, and dreams impact legitimacy, acceptability, and therefore the scale of deployment of algorithmic governance?

### **Introducing the articles in this special issue**

This special issue consists of eight papers that adopt different methodological, theoretical, and empirical vantage points to approach the complex issue of algorithmic governance in context. Taken together, the contributions assembled here resemble a heuristic roadmap. The contributing authors are brought together by shared convictions (1) that contextualizing algorithmic governance is a prerequisite for adequately understanding its de facto implications; (2) that detailed empirical studies of algorithmic governance in context contribute important insights that can facilitate better control and regulation of this technology of power; and (3) that the further development of interdisciplinary theories and methods is a necessary condition for an adequate understanding of algorithmic governance and its varying effects in different contexts of application.

The first group of papers offers new empirical insights into how specific instances of algorithmic governance function in particular contexts. Anu Masso, Martha Chukwu, and Stefano Calzati, in their contribution “(Non)negotiable Spaces of Algorithmic Governance: Perceptions on the Ubenwa Health App as a Relocated Solution,” explore the transnational context of the development and deployment of a Ubenwa health application designed to detect birth asphyxia in newly born children. Bringing together a developer team from Canada, training data from Mexican babies, and a local test population located in Nigeria, the Ubenwa health app constitutes a valuable case offering insights into adaptations of technology to a specific national or regional context. Through a series of in-depth interviews, the authors demonstrate how an app developed on the premise of universality creates tensions when being deployed in local contexts. Based on their findings, the authors corroborate the view that algorithmic governance does not have a universally valid “global” base that remains independent of cultural, societal, political, and economic factors.

In the second contribution, Krishnan Vasudevan and Ngai Keung Chan explore the dynamics of control and subversion in algorithmic forms of managing labor. Their article, “Gamification and Work Games: Examining Consent and Resistance Amongst Uber Drivers,” offers a case study of how the rideshare company Uber attempts to manage and control its workforce by means of an app. The Uber app gamifies work relations and pits workers against one another in relations of competition based on automated feedback, often without possibilities for appeal. The authors contrast app design with ways through which workers trick or game the system, detailing practices of micro-resistance available to those controlled. The article takes up the important aspect of resistance to algorithmic



governance which emanates from everyday contexts of implementation and use. Based on interviews and observations, the authors show how human agency can be retained in encounters with algorithmic systems that favor managers and capital owners above workers.

Completing the first set of papers, Bidisha Chaudhuri's "Programmed Welfare: An Ethnographic Account of Algorithmic Practices in the Public Distribution System in India" investigates similar issues of situatedness in algorithmic governance through the case study of welfare benefits allocation in India. She argues that, even though algorithms appear to be fixed computational procedures, their true nature only emerges once they are enacted in the context of everyday practices. Tracing the use of the Aadhaar-enabled Public Distribution System for welfare allocation across a variety of locations in India, her case study offers a detailed account of the contingencies of algorithmic governance in context. In conclusion, she points out how such an attentiveness to context can facilitate the development of better and more sustainable technical systems.

The second group of articles comprises two papers that throw light upon uses of algorithmic governance across different contexts in the public sector. In her contribution "Constraining Context: Situating Datafication in Public Administration," Lisa Reutter traces imaginaries of data-driven algorithmic governance across two instances of public administration in Norway. For 2 years, she followed and interviewed teams working on the implementation of data-driven solutions in the public sector. The result is a detailed account of how algorithmic governance is discursively framed as efficient and beneficial while it, at the level of everyday practices, creates tensions across various contexts and institutions. Her study illuminates the concept of "data assemblages" as a composition of discursive and material elements that produce a new "datafied" reality. In conclusion, she argues that the visions collectively held in groups of public-sector employees translate into material arrangements by virtue of such "data assemblages." Reutter attributes the mismatch between the discursive ambitions and the material implementation to the contingencies of varying contexts of development and implementation.

Tiziano Bonini and Eleonora Mazzoli's article "A Convivial-Agonistic Framework to Theorize Public Service Media Platforms and Their Governing Systems" proposes a theoretical framework to rethink the form and functions of public service media's online and personalization services in times of datafication, drawing upon Chantal Mouffe and Ivan Illich. Offering a discussion of advantages and shortcomings of European public broadcasting systems in their encounters with rapidly expanding private streaming services, the contribution proposes a series of innovations in organization and access that can help build viable alternatives to a sector now dominated by for-profit data gathering and the commodification of user data. Inquiring into how such practices can be bent toward serving shared collective interests rather than private profit, the authors present an example of how governing specific algorithmic processes can create different effects across different contexts.

The next two contributions offer a perspective on the governance of algorithms by studying sociotechnical imaginaries and technical tools that steer the deployment of algorithmic systems in different spheres of life. Mariëlle Wijermars and Mykola Makhortykh's article "Sociotechnical Imaginaries of Algorithmic Governance in EU Policy on Online Disinformation and FinTech" compares how EU policy documents



imagine the implications of datafication and algorithmic systems of governance in different policy fields, in this case the financial sector and the regulation of social media platforms. Arguing for the importance of questioning the assumptions on which the evaluation of algorithmic governance within different domains is based, the authors highlight significant differences in the collective imaginaries that predispose the development and implementation of technologies.

In their study “Not All Who Are Bots Are Evil: A Cross-Platform Analysis of Automated Agent Governance,” Mykola Makhortykh, Felix Münch, Aleksandra Urman, Amélie Heldt, Stephan Dreyer, and Matthias Kettemann focus on automated agents, such as bots, and their role in governing access to content and services on commercial online platforms. Due to their growing importance, the authors argue, a need for appropriate governance of these automata arises that goes beyond merely policing their undesired or unlawful functionalities. The study introduces a multidimensional framework for the assessment and evaluation of agent governance across nine online platforms drawing conclusions with relevance also to other segments of the currently rapidly growing digital platform ecosystem. The authors show that the multifunctionality, often non-deterministic nature, and undefined legal status of automated agents operating on commercial platforms create limitations for their governability. The analyses reveal among other things that agent governance lacks transparency and coherence as separate solutions are often developed and executed by each commercial platform, thus creating an unmanageable multitude of different rules and mechanisms.

The final contribution in this special issue develops theory, concepts, and methods applicable in analyses of algorithmic governance in context. Loup Cellard, in his article “Algorithms as Figures: Towards a Post-Digital Ethnography of Algorithmic Contexts,” proposes four ethnographic strategies through which algorithms and their various functions and effects can be studied and intervened in: (1) observing observers, (2) mapping and creating algorithmic figures, (3) drawing relations across contexts, and (4) analyzing transformative effects of algorithmic governance. Introducing the idea of the algorithm as a figure, the emergence of which is tightly coupled to a variety of contextual factors, his methodological interventions offer important guiding lights for scholars interested in looking deeper into the diverse modes of procedural governance often subsumed under the shorthand algorithmic.

In sum, the contributions collected in this special issue highlight various approaches to studying algorithmic governance in context. From new empirical insights offered in case studies via developments in theory and method to an exploration of tensions between practices and domains, the articles offer new insights into what is at stake when computational methods are used for administration, management, and regulation. We hope that this special issue can inspire and facilitate further critical research into the complex relation between humans, societies, and algorithmic technologies.

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