



## Automation interrupted: How autonomous vehicle accidents transform the material politics of automation



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### ABSTRACT

This paper develops our geographical understanding of the material politics of automation. Through the empirical site of the autonomous vehicle, the paper argues that dominant understandings of the politics of contemporary automation draw on a restricted understanding of materiality where political agency is concentrated in the hands of powerful individuals or institutions. However, this focus potentially obscures the complex material agencies of the systems of automation themselves. In response, this paper develops the conceptual potentials of the accident to bring these overlooked interruptive material agencies to the fore. This provides us with an opportunity to appreciate how the sites of power in systems of contemporary digital automation are more multiple and dispersed than is often assumed. In making this argument, this paper seeks to contribute to political geographical research that has turned to questions of ontology to pluralise the sites of politics and diversify the agents of political change.

### Introduction

In March 2017, online media was abuzz with reports of yet another incident involving an autonomous vehicle. In this case, an Uber driverless car was involved in a high-speed crash in Tempe, Arizona. It was reported that the accident happened when the driver of a second vehicle failed to yield to the Uber car when making a turn. The two vehicles collided causing the autonomous car to roll onto its side. This accident happened in the wake of a series of other accidents involving autonomous vehicles being tested by other major technology companies, including Google, Tesla and NuTonomy. Journalistic commentary at the time became preoccupied with debating the safety of autonomous vehicles, intensifying the already heated debates amongst lawyers and insurance companies about the legal dimensions of evaluating who is responsible when autonomous cars crash. That this was an Uber vehicle also raised pressing concerns about the labour implications of the development of autonomous vehicles.

Autonomous vehicles are a disruptive technology. They have the potential to disrupt a system of mobility that has become hardwired into the economic, social and cultural landscape since the early part of the twentieth century (Dennis & Urry, 2009). They have the potential to disrupt the spatial morphology of cities; the discipline and control of vehicle occupants; the generation of public revenues through vehicle taxation; the livelihoods of currently employed drivers; the power geometries of access; and the viability of other modes of transport. Over the next few decades, autonomous vehicles are expected to become a

major part of everyday life (Lipson & Kurman, 2016). Yet relatively little attention within geography has been devoted to evaluating the politics of automation, leaving many questions unanswered about the social transformations that automation is giving rise to.

This paper is motivated by profound unease about technologically determinist accounts that imply that disruptive automation is both inevitable and incontestable. Countering popular narratives about the likely impacts of intensified automation that stress automation's efficacy, this paper takes the autonomous vehicle accident that happened in Tempe as an opportunity to enhance our geographical understanding of the sites and operation of power in automated systems. By tracing some of the material agencies of the accident, this paper explores how we might become more attuned to the multiplicity of sites and operations of power in complex automated systems. It considers how the conceptual potentials of the accident might not only be a privileged epistemological moment that helps us to *locate* power, but also an ontological event that *transforms* the contours of power in both explicit and subtle ways. Drawing our attention to the inventive material agencies that are implicated in processes of technological change, this paper invites us to think anew the spatialities of automation.

Conceptually, this paper is situated within the turn in political geography to questions of ontology which are concerned with exploring the nature of how things are. Research within this turn has sought to pluralise the sites of politics and diversify the agents of political change beyond the state, thereby introducing new and intriguing objects of analysis for political geography. One important strand of this work has

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been to rethink geopolitics through the complex and diverse materialities of force relations rather than just social relations (Meehan, Shaw, & Marston, 2013; Shaw & Meehan, 2013; Fregonese, 2017), opening up political geography to a broader ecology of distributed, interacting agencies and inhuman material forces (Woodward, 2014). This turn has therefore helped to problematize previous geographical understandings about the nature of power's operation, which is less premised on the determinate identities of things, people or institutions, and more an effect of the modulation of indeterminate capacities (Anderson, 2014).

Inspired by this turn to ontology, this paper develops two themes of political geographical enquiry. The first theme is the politics of new digital technologies. This is a nascent field concerned with exploring the emergent power dynamics of a diverse range of new technological forms. Influenced by posthumanist theories, this body of work has sought to replace determinist accounts of technology's power with more messy and fragmented theorisations of the agencies of the technological nonhuman and its role in the emergence and transformation of urban life (Ash, 2015, 2018; Richardson, 2017, 2018; Rose, 2017). The second and related theme is the politics of future mobilities. This field has consistently emphasised the significance of relations of movement and stillness for our geographical understandings of space. Research in this field has been concerned with evaluating the diverse enablements and constraints experienced by the bodies caught up in these movements, and speculating on the effects that new technological developments may have on these power relations (Adey, 2017; Sheller, 2016; Urry, 2008).

My overall argument is that we need to develop a more expansive understanding of power that acknowledges how the material agencies of the systems of automation themselves might not necessarily be reducible to the intentions of powerful individuals or institutions. Automation's accidents bring these overlooked material agencies to the fore, providing us with an opportunity to better appreciate how the sites of power in systems of contemporary automation are more multiple and dispersed than is often assumed. My argument also seeks to provide a corrective to accounts of technological change that stress the efficacy of such technologies. Immanent to the concept of the accident is a *negative* that is often overlooked when tracing the operation of power and evaluating political agency (Philo, 2016). As Rose reminds geographers concerned with the technologies and capacities of state power, we have a tendency to 'become over attentive to what power does and blind to that which power fails to do' (2014, p. 217).

My argument unfolds in four sections. The first section sets the scene by describing how popular technologically determinist discourses about automation have been countered by geographical research that has sought to trace the more complex power relations at play in automated systems. The second section moves forward by suggesting that there is an overlooked ambivalence concerning the *materiality* of automation that requires new methodological and conceptual tools. The third section introduces the accident as one such conceptual tool for thinking about automation differently, by bringing the thought of Bernard Stiegler and Catherine Malabou into dialogue to foreground its inventive capacities. The fourth section speculates on what the Tempe autonomous vehicle accident produced along four different lines, drawing attention to the multiple sites of material politics. The final section evaluates the role of ontological thought in opening up possibilities for progressive and democratic intervention concerning the ongoing evolution of systems of automation.

### Political geographies of automation

Automation has been prominent in recent popular debate, influenced by a series of recent high-profile reports that prophesise how a high proportion of jobs will be lost to new forms of technological automation (Brynjolfsson & McAfee, 2014). Frey and Osborne (2015), for instance, predict that almost 50% of existing jobs in the UK are at risk as a result of automation over the next two decades. These reports have

been accompanied by popular commentary that argues that intensified digital automation will invariably give rise to a chilling dystopia (Ford, 2015). The power of these 'strong' proclamations has contributed to a genre of thinking about the role of technology which Urry (2016) terms the 'new catastrophism'. Though the changes that these reports predict have yet to unfold, such prophecies have influential performative powers (Anderson, 2010). Referring to the current intensification of digital automation, Wajcman (2017) notes how the power of affectively-charged language in these accounts such as 'scary', 'frightening', and 'a perfect storm' are an indication of the torsion of pleasure and pride that we seem to take in the idea that a robotic utopia or dystopia is on its way.

A problem with many popular accounts of automation is their technological determinism, where the location and operation of power is typically displaced to the technologies themselves, without due consideration of the possibility of a more complex range of forces at play, including the institutional interests which might be guiding these developments. Through their technological determinism, popular accounts overlook crucial political questions about the sites of power and combinations of forces that might be critical to understanding how contemporary automation is evolving. The advent of new forms of automation, such as the autonomous vehicle, clearly intensifies the need for more nuanced thinking about the *politics* of contemporary automation. In this section, I set the scene by describing some of the key geographical contributions to these emergent debates.

Geographical thought contains key legacies that can help us to situate automation historically. Economic geographers have consistently underscored Marx's observation that the intensified mechanisation of production increases profitability for capitalists as the relative demand for labour falls (Peet, 1975). However, the geographical implications of automation is complex, as Massey's (1984) work on the spatial divisions of labour demonstrated. Her work highlighted the need to consider changing production processes in industry-specific ways which could then help to understand transformations in the specific kinds of labour that were required, their gendered composition, and their geographical recomposition. Writing at around the same time as Massey, Wallace (1985) summarised some of the major changes taking place in the evolution of agri-food systems, highlighting the geographical distinctiveness of these changes whilst also drawing attention to how automation was having impacting on different parts of agri-food systems.

Cultural geographical enquiry has explored the impact of automation in terms of the more micro-spaces of production themselves. Work on the transformation of manufacture in Taylorist production during the early decades of the twentieth century emphasised how industrial mechanisation was not just about replacing workers with machines, rather it also involved new ways of managing workers. Cresswell (2006) describes how workers in different occupations were increasingly subject to scientific management to improve their efficiency. From bricklaying to cleaning, key here was the excision of superfluous movements, so that bodies could operate more like well-oiled machines. Even domestic practices in the kitchen became the subject of motion studies that aimed to rationalise tasks. Workers in this regard were being invested with new forms of productive power, through the inculcation of new habits and redesigned spaces that enrolled them into labouring in new ways.

Where previous geographical accounts of automation have tended to focus around the spatial and bodily politics of mechanisation, contemporary geographies of automation have foregrounded the pivotal role of digital technologies in changing the politics of automation. The political implications of digital automation have been traced through three new forms of governance. The first of these is algorithmic governance, which spotlights how the algorithm is a new form of political authority used to govern populations. Algorithms here can be understood as 'both technical process and synecdoche for ever more complex and opaque socio-technical assemblages' (Amoore & Raley, 2017, p. 3). Accordingly, algorithmic governance is 'the manifold ways that

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