I’ll Remember You in a Streetlight:

Data, temporality, and the spectral city

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1. Introduction

Investments in technological innovation are a growing part of urban governance. As rapid urbanization forces cities to address problems like traffic congestion, aging infrastructure, and climate change, many policymakers are turning to the promise of artificial intelligence and data-based technologies to improve city services (Shelton et al., 2015; Glasmeier and Christopherson, 2015). In the United States, for example, Kansas City, Missouri has used investments in pothole-predicting algorithms and sensor-based parking regulation to declare itself a “living lab” for prospective firms aiming to test new products (Williams, 2019).

This movement towards so-called “smart cities” has been fuelled what Mager (2012: 770) calls a “techno-euphoric climate of innovation.” Integrated technologies are increasingly seen as an effective way to not only address urbanization but, also, build competitive and sustainable futures through the optimization of urban governance (Krivý, 2018). In turn, as more communities embrace the “smart city” mantel, its utopic connotations breed further pressure to adopt technological solutions and appear contemporary on the global stage. As Hollands (2008: 304) reflects, in a world where cities must compete with one another to attract talent and business, “what city does not want to be smart or intelligent?”

Yet, as investments in technology grow more popular, critics of the movement have highlighted a profound dissonance between the idealized smart city and the more complicated reality of technocratic interventions. The growing popularity of artificial intelligence, for example, has been heavily criticized for its lack of transparency and the implicit biases often baked into algorithmic decision-making (Vincent, 2019; Rieland, 2018; Crawford, 2018). The unprecedented level of data-collection involved in designing, training, and implementing such technology also raises important questions about privacy and data ownership that policymakers are only beginning to address (van Zoonen, 2015; Chandler, 2015; Farivar, 2018).

Though these criticisms are well-founded, however, focusing exclusively on the dissonance between the Smart City ideal and the many projects currently underway can be misleading. Without engaging the Smart City imaginary directly, it is easy to view problems as the product of poor application rather than a flaw with the vision itself. This has been the common approach among Smart City advocates, who often seem to suggest that the perfect iteration is just a matter of time (Halpern and Günel, 2017; Cardullo et al., 2018).

In truth, many of the complications described above can be traced back to the ontological and ideological underpinnings of the movement itself. I argue in what follows that the limitations of the Smart City Movement extend from its utopic framing of the technocratic city and the positioning of this neoliberal, capitalist ideal within an understanding of time as sequential and progressive. This framing overlooks the interconnections between past, present, and future that necessarily shape and limit algorithm-based technologies and urban governance. As such, the path towards equitable cities requires more than just innovative ideas about new technologies or criticisms of the remaining gap between the Smart City ideal and “actually existing smart cities” (Shelton et al., 2015: 14). While these can be a useful place to start, cities must also begin drawing from an alternative vision more open to the assemblages of individuals and temporalities currently being paved over by the Smart City.

The second half of this paper is therefore driven by a simple normative question: what type of city should we have in mind as we make decisions about urban problems and the possibility of technological solutions? By bringing the current Smart City literature into conversation with recent, more critical work on the relationship between time, technology, and responsibility, I lay the groundwork for an alternative model. Turning specifically to the work of Karen Barad, I argue that alternative notions of temporality developed in modern physics provide an imaginative opportunity to reorient urban technology towards more equitable goals. *Rather than the instrument by which we attempt to leave the past behind, the technology characteristic of urban development can, in fact, be an opportunity to reflect on our indebtedness to the past, the ever-incomplete nature of municipal development, and the manifestation of these temporalities in unique spaces*. It is by embracing such alternative temporalities that we might replace the ideal of the Smart City with the more corruptible image of the spectral city – an incomplete city haunted by the ghosts (and composts) of the past.

1. Temporality and the Smart City Imaginary

I am not the first to suggest that time is important to city life. May and Thrift (2003), for example, suggest that urban life is composed of unique temporal rhythms produced by everything from seasonal and circadian cycles to formal work schedules and religious calendars. Others like Adam (2004) argue that cities are clusters of “temporal relations” such as tempo, sequencing, and scheduling that alter the way residents navigate daily life (in Kitchin, 2019). In short, as Kitchin (2019: 778) writes, “cities and everyday life unfold through cycles of polymorphic and concatenated temporal rhythms that produce a sense of continuity, stability, or disjuncture.” Engaging the Smart City imaginary requires at least a preliminary exploration of the way technology is being incorporated into these unique rhythms.

To begin, technological innovations build and shape municipal orchestras in unprecedented ways. Developments in information and communication technology have accelerated the pace of city life by increasing the speed, efficiency, and distance at which certain activities can be carried out (Virilio, 1997). The result is what Datta (2016: 1) calls “fast cities,” with technological innovation accelerating the tempo of many instruments in the city orchestra.

Developments in connectivity have also produced more fundamental changes to the rhythms of city life. The significance of traditional timetables to social and professional schedules has faded in a world where people are almost always connected (Hassan, 2007; Castells, 2011). As a result, new technologies have empowered “faster and more temporally flexible subjects,” characterized by the delocalized, spontaneous, and uninterrupted flow of information (Kitchin, 2018: 26).

Increasingly, municipalities are entrusting technology to not only contribute to the municipal orchestra but, also, conduct it. In response to the dyssynchronization and disharmony that arises from the overlapping and competing patterns of city life, municipal governments are turning to new technologies to “augment and regulate the multiple rhythms of cities, to limit arrhythmia and produce eurythmic systems that maintain a refrain” (Kitchin, 2019: 778).

This growing interest in so-called “algorhythmic governance” is part of an overarching shift in the focus of urban politics (Coletta and Kitchin, 2017: 4). Governments increasingly view cities as a collection of “constituent parts and processes” that can be measured, modelled, and corralled into balanced and optimized patterns (Kitchin, 2018: 20).

It is within the context of this governmental shift that the Smart City Movement promises technological dominion over the competing spatio-temporalities of urban life. Through the ever-increasing speed and autonomy of managing technologies, the ideal Smart City establishes and maintains balance between city systems without delay or interruption (Kitchin, 2018). As Kitchin (2018: 21) writes:

the appeal and promise of smart cities is that they constitute ‘real-time’ cities, composed of systems that work 24/7 and are reactive to unfolding events in order to optimize performance and gain efficiencies. It is this temporal condition that the progressive development of smart urbanism… has been striving to achieve through each iteration of innovation – the instantaneous control of space and spatial relations in real-time.

Within the Smart City, each moment is coordinated for optimal productivity. Any potential changes to a city’s rhythm, such as an unanticipated traffic accident threatening to delay commuters, are seamlessly brought back into order through immediate adjustments at either the source of disjuncture or elsewhere in the system (Kitchin, 2018). Inconvenient dissonances and delays are recuperated into the fold and wasted time is replaced by convenient, efficient, and seamless movement.

The idealization of the Smart City is not only based on its speed but, also, on the presumed rationality and optimality of its managing technologies. By collecting and analyzing data on an unprecedented scale, with progressively little human intervention, urban technologies promise results seemingly free from the political and economic biases of human actors. As Halpern and Günel (2017: 7) write, one of the core assumptions fuelling the enthusiastic integration of technology into urban governance is the belief that “increasing computation and data flow in the environment will somehow overcome the problems and limits of human decision-making and control.” In this way, the Smart City is a technocratic ideal reminiscent of the transhumanist promise to overcome historical and material limitations with prosthetic technologies (Braidotti, 2013).

Paradoxically, this promise to liberate urban governance from spatio-temporal limitations implicates the Smart City Movement in the same “tunnel of time” that has historically celebrated science and technology as the vanguard of an enlightened Western civilization (Harding, 1994: 23). The difference between disharmony and harmony is recuperated within a simple and corresponding divide between past and future, with interventions in the present justified by the belief that technology will actualize a future in which the limitations of human governance are overcome once and for all. Cities from around the world are then positioned along a single, universal timeline, with those more willing to embrace experimental technologies presumed to be further along in escaping spatio-temporal constraints than those relying on traditional methods of governance. As Datta (2019: 394) writes, “the vision of the future constructs a linear trajectory of progress, which sees history as slow and organic, and the future as an algorithmic spatio-temporality marked by speed and scale of action.” Within this progressive narrative, the real-timeness promised by the Smart City is not so much a challenge to linear models of temporality as it is its culmination – a future liberation from the current constraints of delay and disorder.

In sum, even as new technologies transform the way we navigate and relate to time, the ideal of the Smart City recuperates these innovations within a simple, linear narrative of progress. Technological interventions in the present are justified by the idea that they might move cities one step closer to dominion over, and liberation from, the temporal rhythms that flow through cities and produce dissonances within their streets.

1. The Impossibility of the Smart City

The eagerness to leave behind the limitations of the past leads advocates of the Smart city to overlook the many ways in which technology is shaped, and constrained, by the past, present, and future. For starters, and contrary to the archetypal cases that have often defined the Smart City Movement, urban initiatives are frequently an exercise in retrofitting, renovation, and piecemeal construction. Unlike greenfield projects such as South Korea’s Songdo or Masdar in Abu Dhabi, the prototypical technologies of private vendors are often incorporated into pre-existing infrastructure and service models (Shelton et al., 2015). Consequently, while digital ventures may promise real-time reactivity, the capacity of these devices is often limited by the bandwidth of existing infrastructure and wireless networks.

Interventions also constrain future possibilities, with current tech becoming the baseline on which future developers must build (Uprichard, 2012). Early decisions about data policy, for example, can have significant ramifications for what types of projects municipal officials can pursue moving forward (Haggart, 2018).

Even with so-called greenfield sites, the notion of a “fresh start” is misleading. Presumably unoccupied lands have complex spatio-temporal histories of their own, interwoven with practices of colonialism and displacement (Barad, 2018). The progressive and sequential timeline of the Smart City Movement erases these complex cultural and geopolitical histories, replacing them with a futuristic technocracy unconstrained by the decisions or mistakes of the past.

*The Hiatus*

While many of these problems are recuperated within a linearity that paints current shortcomings as part of an iterative progression towards the ideal, I believe they point to a more fundamental flaw in the “real-time” promise of the Smart City Movement. More specifically, they reflect the more complicated spatiotemporal politics of contemporary technologies.

For starters, even with seemingly instantaneous technologies, there is a distancing between observation, interpretation, and action. There is, as Derrida would say, a “hiatus” or “spacing” between observation, processing, and output such that the algorithm must always occupy the dual role of observer and sense-maker – a duality held in tension by processing prone to disruption and latency (Derrida, 2000). While this gap can be compressed through advancements in computer processing and broadband infrastructure, it is never done away with completely.

On the one hand, this means that that urban technologies are always-already dependent on the data they are fed. In this sense, they are what Derrida calls “systems of calculation and repetition,” wherein each output is based on a revisit to the very same past from which real-time technologies promise relief (Derrida, 2004: 49). As such, they are also haunted by the oversights and erasures that limit and bias their outputs.

This distancing between observation and action also implies that Smart City technologies are not the a-temporal, objective decision-makers they were promised to be. Rather, they are interpretive lenses created by, and traced over, the unique spacetimes in which they operate, categorizing and acting on the information they observe. As Ananny (2016: 108) writes, algorithms are “assemblages of institutionally situated code, practices, and norms with the power to create, sustain, and signify relationships among people and data.”

The hiatus between input and output means that this portrayal of the world is always indirect, mediated by a system that chooses what to measure and what it means (Derrida, 2000).

If we are to rehabilitate technology, we must therefore do more than simply highlight the limitations of contemporary tech. We must also move beyond the predominance of the real-time and embrace alternative temporalities – alternatives through which we might come to more fully understand, appreciate, and recalibrate the relationship between past, present, and future in the technology we use.

1. The Spectral City

In an essay entitled “Troubling Time/s and Ecologies of Nothingness,” Karen Barad argues that contemporary quantum physics has complicated traditional conceptions of spacetime and provided rehabilitative possibilities. Bringing together contemporary work in the field with her own deconstructive sensibility, Barad highlights the way research into temporal diffraction, quantum superpositions, and quantum entanglements collectively suggest that “the new and the old… are diffractively threaded through and are inseparable from one another” (Barad, 2018: 221). The goal is not to reject linearity per se, but to challenge the conventional belief that “moments exist one at a time, everywhere the same, and replace one another in succession” (Barad, 2018: 223). Past, present, and future remain interconnected, influencing one another in complicated and unique ways.

For Barad, the individual cannot leave this embeddedness behind. They remain situated in, and constituted through, the complex entanglements of “multiple time-beings” interwoven with histories of colonialism, erasure, and violence (Barad, 2018: 241). In fact, the very ability of the subject to conceive of themselves as *here* and *now* depends on their capacity to identify these other moments as *there* and *then*. In this sense, the constitution of the self as present depends on the paradoxical rendering of those times, places, and peoples anew such that, as Derrida writes, “to follow is to similarly exist alongside” (2002: 379). Idealizing a present and future unconstrained by the past renders these complex entanglements invisible, and it is here that notions of progressivity are most damaging. Accordingly, the path towards more equitable development must begin with something akin Derrida’s aporetic temporality – a hauntology in which the ghosts of the past and phantoms of the future are allowed to flow through the present and time itself can be “out of joint” (Wood, 2018: 37; Derrida, 2006).

Opening ourselves up to this indebtedness is a difficult task. It requires a preliminary acknowledgement of the violence and erasure on which neoliberal understandings of time, and our position within it, have for so-long depended on. It means calling into question the destruction that has been allowed to persist under the name of progress and “[coming] to terms with the infinite depths of our inhumanity” (Barad, 2018: 242). Within the context of urban governance, it means replacing the ideal of the Smart City – along with its quest to leave the past behind – with that of the *spectral city*, wherein the multiple and overlapping temporalities of urban spaces are acknowledged rather than rejected and the roots connecting current developments to the past are cultivated rather than paved over.

From the outset, embracing the spectral begins with an acknowledgement of the many ways in which urban technologies are haunted by what they do not know. Facial recognition trained on exclusively white faces is unable to differentiate people of colour (Rieland, 2018). A sector dominated by white, affluent men has, unsurprisingly, reinforced many of the structural and institutional inequalities that produced these exclusions in the first place (Crawford, 2016). As Barad (2018: 229) writes, “attempts at erasure always leave material traces: what is erased is preserved in the entanglements, in the diffraction patterns of being/becoming.”

Rather than overlooking these erasures and traces in the name of progress, a more spectral imaginary builds around practices of “remembering” (Barad 2018: 229). This act of remembering takes seriously the histories of colonialism, racism, and speciesism that underpin notions of objectivity, rationality, and technology so central to the Smart City movement. It emphasizes the interconnections between people, places, times, and nonhuman beings that have been ignored for the sake of Eurocentric privilege. It is, in short, a “work of mourning” for all those left behind, harmed, or destroyed by the negligence of urban development (Barad, 2018: 242).

Mourning under the guise of the spectral is always incomplete (Barad, 2018: 241). There are always more to be remembered in more detail, and each iteration or output of new technologies, even those aspiring to rectify previous oversights or erasures, nevertheless leave others unaccounted for. There are those who can no longer be counted, whose cultures, livelihoods, peoples, or species are gone forever (Colebrook, 2018).

As such, there is a similarity between remembering and what Donna Haraway calls “staying with the trouble”: investing ourselves in a work of revisiting, reconfiguring, and reconciling with those around us that is messy, complicated, and unfinished (Haraway, 2016: 4). The spectral city is thus, in truth, a spectral-city-to-come, haunted as much by a future that is always, already out of reach as it is by the past.

Within the context of urban development, this means also recognizing the extent to which technological decision in the present will extend into, and constrain, the future. There is no guarantee that the technology we choose to implement today will not become obsolete (or problematic) at some point in the future (Saxe, 2019). While we are responsible to the cities and peoples of the past, then, we will also be held to account by those whose lives will be shaped by the decisions we make in the present (Peterson, 2018).

1. Conclusion

To conclude, I do not propose the spectral city as a homogenous ideal. Whereas the Smart City Movement has emphasized a decontextualized and technological model believed to be equally applicable regardless of location, the emphasis of the spectral city is on the unique temporalities and overlapping rhythms that intersect in urban spaces around the world. There is no one municipal song, and cities must be cognisant of the unique spatio-temporal context in which they are developing. Future research should therefore focus on the “actually existing” spectral cities of the world and the way the more equitable goals of spectral development ought to be operationalized within these local contexts. If urban governance is akin to ghost-hunting, then scholars must recognize that the ghosts of each house are different. Only by listening for unique points of dissonance can scholars ensure that each instrument is accounted for in the municipal orchestra.

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