VULNERABLE BODIES: RELATIONS OF VISIBILITY IN THE SPECULATIVE SMART CITY

Debra Mackinnon
University of Calgary

sava saheli singh
University of Ottawa

Abstract

From wearables, IoT sensors, apps, platforms and cameras, we "shed" various forms of data as we navigate our increasingly networked and *smart* environments. Recent discussions of urban data have focused on post collection practices of translation and circulation – following data threads, journeys and exhaust as they enact urban life. We seek to further complicate these *thick* data accounts focusing on movement, bodies and embodiment. As our bodies become information, the accuracy and affordances of these data portraits remain critical sites of inquiry. *How do surveillance technologies, map, render and perform human and non-human interactions; moreover, exacerbate injustice?* In this paper, adding to the rich discussions of future-ing, anticipatory imaginaries and implications on the urbanite body, we offer a critical interrogation of the oligoptic gaze and the relations and politics of visibility. We do this through the narrative of Frames [https://www.sscqueens.org/projects/screening-surveillance/frames] – a speculative near future account of mapping a body through the various lenses of a smart city. Focused on what is included (and excluded) from the "frame", we navigate domains of aesthetics and politics in order to foreground the embodied experiences, decisions and interactions which are mapped by these surveillant spatial locative technologies. We contend these renderings or simulacra of a 'singular' knowledge politic serve to stabilize and normalize ways of seeing, knowing and control. Yet, these rationalities are irrational – potentially producing inefficient, inaccurate and unjust portraits.

The body is a model that can stand for any bounded system. Its boundaries can represent any boundaries which are threatened or precarious. [We must be] prepared to see in the body a symbol of society, and to see the power and dangers credited to social structure reproduced in small on the human body (Douglas 1966 cited in Eubanks 1996, 73).

Technologies have long promised to render bodies, societies and geographies obsolete (see: Haraway 1991; Graham 2004, Marvin 1997). In particular, the *technological fantasies* (Crang and Graham 2007) and *anticipatory urban imaginaries* of smart cities highlight the confluence of these dematerializations as well as their securitization (Leszczynski 2016). As these visions actively propel inequality and injustice forward in space and time, obscuring human agency and socio-material implications (Barns 2012; Leszczynski 2016) what happens to bodies?

To "flesh out" and "thicken" discussions of smart city future-ing, we foreground the urbanite body as a site of insecurity, risk and power, through an exegesis of *Frames* – a near future speculative account of big urban dataveillance. This companion paper places the film amidst contemporary discussions of smart cities, surveillance and vulnerabilities. Through a brief summary of the film we highlight how surveillance technologies map, render and perform human and non-human interactions, and project injustice. We focus on three themes to ground our discussion: 1) point of view (POV) and visibility, 2) transactional data and the economics of the smart city and 3) coded norms. Given that "we are closer to the beginning of the smart city journey than to its end point" (Karvonen, Cugurullo and Caprotti 2019, 291), this future-ing project seeks to interrogate this point of departure – the irrationalities and vulnerabilities of big data urban surveillance.

Smart Cities: The "Human" spoke of IoT?

Already sites for the control of the complex flows of people, vehicles, goods and capital – code, data and algorithms – power the latest range of urban entrepreneurial and technological "solutions" (Monahan 2018). These smart city and urban big data initiatives, designed to address inefficiencies and insecurities, further *place* cities into the big data-security-surveillant-urban-assemblage (Aradau and Blanke 2015; Leszczynski 2016). Sold as real-time, continuous monitoring and data-driven decision making, surveillance technologies and logics become hardwired into the city (Kitchin 2015; Monahan 2018). Automating processes of social sorting, dividuated city flows – decontextualized and constituted by their *data shadows* (Graham 2005) – are understood and categorized in terms of perceived risk and value (Leszczynski 2016; Lyon 2004). This *algorithmic governmentality* secures existing and unequal knowledge politics, which (re)produce inequalities and injustices (Amoore 2011; Leszczynski 2016). As Mattern (2013) explains these urban *data derivatives* epistemologically frame the city,

The default recourse to datafication, the presumption that all meaningful flows and activity can be sensed and measured, is taking us toward a future in which the

> people shaping our cities and their policies rarely have the opportunity to consider
> the nature of our stickiest urban problems and the kind of questions they raise (8).

Far from neutral these data-based accounts frame understandings, as well as potentials (Monahan 2018). In other words, they limit what can be imagined and inferred, and impact what a subject can become (Amoore 2011). Beyond normative conceptions of system vulnerabilities (see Kitchin and Dodge 2019), these limits serve as another vulnerability. From human experience to emotion – data collection, processing, and analysis excludes things that are not easily translated and transformed into data (Monahan 2018). What cannot be counted, does not count. More than producing dividuals, big data surveillance highlights our relations to data as *partial connections* (Strathern, 2005). Increasingly part of this human and nonhuman constellation, the data portraits painted by these partial oligoptic systems (see: Murakami Wood & Mackinnon 2019), tend to exacerbate existing social issues around race, gender, socioeconomic status, and mental health.

Framing the Smart City

As part of the Big Data Surveillance project, the Surveillance Studies Centre produced a series of short films speculating the impact of surveillance on our near future everyday lives. *Frames,* explores the intersections of smart city solutionism and mental health, and was conceptualized and co-produced by sava saheli singh, written by Madeline Ashby, and directed and co-produced by Farhad Pakdel.

In the film, we follow a woman as her movements and activities are tracked, mapped, monitored, and analyzed by the interoperating systems of the smart city (e.g. cameras, biometric readers, near field communication, sensors, etc.). However, as we keep watching, we start to see how the system's interpretations of her actions do not always reflect her motivations, and may not be drawing an accurate picture of her. Please note: the content of the film and this analysis addresses suicide.

Theme 1: POV and Visibility

Figure 1. Aerial shot from StarlightExtCam03 of the woman leaving her building

Shot from the perspective of smart city cameras – a technique used in other surveillance related films – the film illustrates near-continuous geosurveillance of the protagonist. The film follows her as she is handed off from one surveillant system to another (see Fig.1). Offering a visual depiction of the smart city black box, the viewer is left to interpret what the system "sees". An incomplete and sometimes confusing account, this purposeful lack of clarity calls into question the quality of data the system collects; and hence, the inferences it draws. For instance, early in the film a shot from a camera in the woman's apartment (CASACAM1215) shows the system scanning an object it doesn't recognize (highlighted in red, on the dining table). However, the meaning and importance of this object in relation to events at the end of film, is lost on the system (see Fig.2).

Figure 2. Interior of Apartment from CASACAM1215 scanning an unrecognized object

Throughout the film, what technologies render visible and how we are made visible to them – relations of visibility – result in a *politics of visibility* (Crang and Graham 2007). While the woman is watched by the system, what is made visible or comprehensible is limited by the protocols of the system, and this in turn generates a limited interpretation of the person being watched. Chuen (2018) notes that, "the distinction between *being seen* and *being watched* is powerful because it articulates a nuanced, yet enormous dichotomy – one that ultimately boils down to who is granted permission to be perceived as human." However as depicted, visibility in a smart city depends on the POV of a system that is incapable of "seeing" humans. Oligoptic and producing dividuals, the partial connections the system is able to map, are limited and simplistic; the mess and complexity of being human is potentially read as noise and filtered. This puts the system and those tracked by it at odds with each other, rendering aspects of the watched unseen and so, invisible and uninterpretable. While intervention may be predicated on visibility (Scott 1998), as the protagonist demonstrates moving through the city, the economic POV of the system prevents her actions from being correctly interpreted.

Theme 2: Transactional Data and the Economics of the Smart City
In addition to surveillance cameras and spatial and locative technologies, the woman's transactions are tracked through various sensors like her building's elevator, the bus card reader, a store window beacon, and point of sale systems. Primarily focused on monitoring economic transactions (rent status, bus fare, transferring money, paying bills, etc.), the system privileges economic security, and codes her as a consumer or customer. This coded bias is shown throughout the film where our protagonist (and others) interact with the system and the system notes their financial standing or user level. As noted by Monahan (2018) obscured in code and

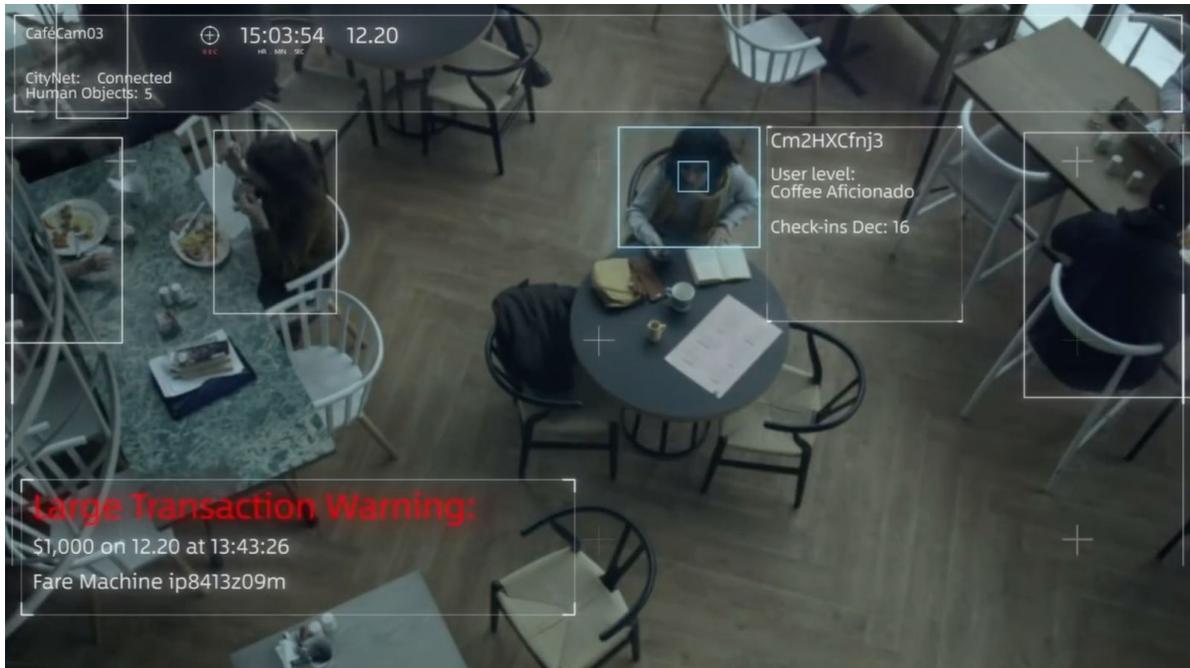algorithms, the logics of the smart city normalize neoliberal arrangements – from behaviour to relationships.

Figure 3. Large Transaction Warning from Fare Machine ip8413z09m

The system has set parameters for what is classified as a "normal" transaction. For example, when the woman transfers a large sum on the bus and leaves a large tip at the café, the system flags these behaviors as possible errors (see Fig.3). While her it defers to the woman's verification of the action, the system does not interpret her charity as a potential warning sign of other things. In fact, the system codes this behaviour as benevolent. *Frames* not only highlights potential issues with the economic logics that underpins these smart systems, but also how social issues are left out of the frame.

Theme 3: Coded Norms: Community Cohesion and Social Proximity
Often evoking the *good city* (Amin 2006) or the good citizen, smart city initiatives reinforce a (neo)liberal subjectivity. *Frames* depicts this through the smart city's social point system called "community cohesion" and in the system's attempt to gauge the likelihood of interaction between people. Activities like tipping, donating, giving up a seat on a bus are (mis)coded as measures of good behaviour and, evoking the behaviorist roots of these systems, inhabitants are rewarded points to encourage further community-focused behaviour (see Fig.4).

Figure 4. FareCam653694 the woman is awarded community cohesion bonus for giving up her seat

When confronted with behaviour that doesn't fit what the system has been programmed to log as "normal", the human is asked to verify the action, which, by its very nature is a limited response allowing her only to either flag the transaction as an error or verify it (see Fig.5).
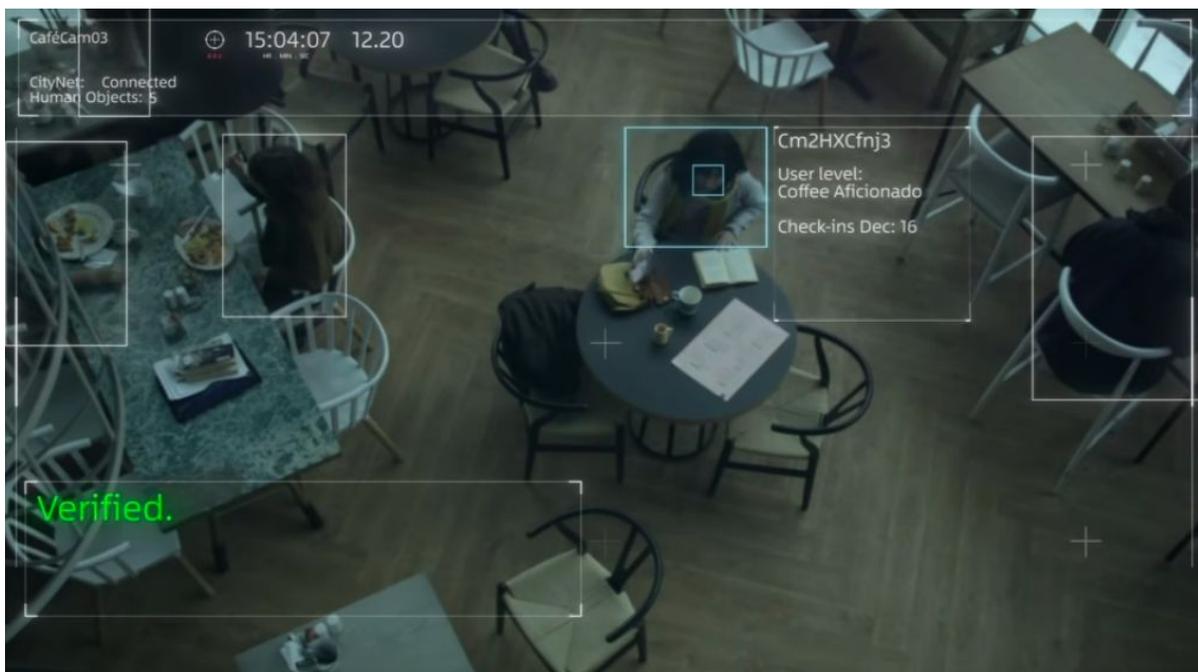

Figure 5. Transaction Verification CafeCam03

By verifying the transactions, the woman participates in the system both as a way to conform to the parameters set by the system and as a way to obfuscate her true motives, further confounding an already inaccurate interpretation. While focused on promoting cohesion, this credit-based structure does little to remedy isolation.

In scenes where the woman is walking, we see the system calculating the "connection possibility" between her and people she passes (see Fig.6). This calculation is based on the number of times they've crossed paths or inhabited a shared space – implying that if they frequent similar locations, they must have enough in common that could lead to interaction. The system uses socio-metric big data and previous social proximity as a metric of socialization. The fact that the woman does not interact with people she passes points to the potential inaccuracy and failure of this approach.

Figure 6.CityCam8751M5 Measurement of social proximity

Beyond these examples of system fallibility, as demonstrated by China's social credit system, a social credit-based surveillance system may lead to issues of access to public services and reduced capacity for people to challenge the system (Fan, Das, Kostryuk and Hussain 2018). Coded social norms, while ostensibly based on human interaction and behavioral dynamics, are an incomplete measure of human emotion, behaviour, and mental state. Instead of the system supporting human habitation and an appreciation of partial connections, we run the risk of creating an antagonistic system that forces humans to comply with prescriptive systems; which are often based on biased and limited understanding of human behaviour, and where white, cis-gendered males are coded as default.

Outside of the Frame

With increasing social attention paid to mental health, *Frames* offers a cautionary tale of technological intervention; moreover, the capability of technology to address social issues. To some viewers, the film might depict the failure of the smart city to adequately map human behaviour and needs. And failure might further a resolve to improve machine learning algorithms and interventions. It is critical to point out, however, that arguing for better surveillance technologies was not the creators' (or the authors') intention. Instead the point is to critically depict the logics and irrationality of these systems and stress the importance of questioning the social good or efficiencies these technologies are promoting, as well as identify the human costs.

McFarlane and Söderström (2017) note that addressing mental health issues in a smart urban setting must foreground local community knowledge over big data analysis. Being mindful of how data derivatives can further reinforce inequalities (Amoore 2011), this is especially important for populations already marginalized because of their race, class, gender, and other demographic markers, as well as their inclusion in or exclusion from the technological landscape of the smart city.

While many call for productive imaginaries of smart cities, this project calls into question the need for these sociotechnical imaginaries that are, more often than not, exercises in maintaining and extending corporate control in the smart city (Sadowski & Bendor, 2019). Is the smart city necessary, or are our cities *already smart enough* (Green, 2019)? Do we need these technological solutions? Moreover, are these technological solutions at odds with livable and enlivened cities (Hamraie 2018)?

Citations and Works Cited

Amin, Ash. 2006. "The Good City." *Urban Studies, 43*: 1009–1023.

Amoore, Louise. 2011. "Data derivatives: On the emergence of a security risk calculus for our times." *Theory, Culture & Society, 28*(6): 24-43.

Aradau, Claudia, and Tobias Blanke. 2015. "The (Big) Data-security assemblage: Knowledge and critique." *Big Data & Society* 2(2). doi:10.1177/2053951715609066.

Barns, Sarah. 2012. "Retrieving the spatial imaginary of real-time cities." *Design Philosophy Papers*, *10*(2): 147-156.

Chuen, Lorraine. 2018. "Watched and Not Seen: Tech, Power, and Dehumanization." *GUTS magazine*, December 3, 2018. http://gutsmagazine.ca/watched-and-not-seen/.

Crang, Mike, and Stephen Graham. 2007. "Sentient cities ambient intelligence and the politics of urban space." *Information, Communication & Society* 10(6): 789-817.

Eubanks, Virginia. 1996. "Zones of dither: Writing the postmodern body." *Body & Society 2*(3): 73-88.

Graham, Mark. 2013. "The virtual dimension." In *Global City Challenges: Debating A Concept, Improving The Practice*, edited by Michele Acuto and Wendy Steele, 117-139. London: Palgrave.

Graham, Stephen. 2004. "Introduction: From dreams of transcendence to the remediation of life." In *The Cybercities Reader*, edited by Stephen Graham, 1-31. London; New York: Routledge.

Graham, Stephen, 2005. "Software-sorted geographies." *Progress in human geography*, *29*(5): 562-580.

Green, Ben. 2019. *The Smart Enough City: Putting Technology in Its Place to Reclaim Our Urban Future*. MIT Press.

Hamraie, Aimi. 2018. "Enlivened City: Inclusive Design, Biopolitics, and the Philosophy of Liveability." *Built Environment*, 44(1): 77-104.

Haraway, Donna. 1991. *Simians, cyborgs, and women: The reinvention of nature*. New York: Routledge.

Karvonen, Andrew, Federico Cugurullo, and Federico Caprotti, eds. 2019. *Inside Smart Cities: place, politics and urban innovation*. London; New York: Routledge.

Kitchin, Rob. 2015. "Spatial big data and the era of continuous geosurveillance." *DIS Magazine*. http://dismagazine.com/blog/73066/rob-kitchin-spatial-big-data-and-geosurveillance/.

Kitchin, Rob, and Martin Dodge. 2019. "The (in) security of smart cities: Vulnerabilities, risks, mitigation, and prevention." *Journal of Urban Technology*, 26(2): 47-65.

Leszczynski, Agnieszka., 2016. "Speculative futures: Cities, data, and governance beyond smart urbanism." *Environment and Planning A: Economy and Space*, *48*(9): 1691-1708.

Liang, Fan, Vishnupriya Das, Nadiya Kostyuk, and Muzammil M. Hussain. 2018. "Constructing a Data-Driven Society: China's Social Credit System as a State Surveillance Infrastructure." *Policy & Internet* 10(4): 415-453.

Lyon, David. 2004. "Introduction: Surveillance in the city." In *The Cybercities Reader*, edited by Stephen Graham, 299-305. London; New York: Routledge.

Mattern, Shannon. 2013. "Methodolatry and the Art of Measure: The New Wave of Urban Data Science." *Places*. https://placesjournal.org/article/methodolatry-and-the-art-of-measure/.

Marvin, Simon. 1997. "Environmental flows: Telecommunications and the dematerialisation of cities?" *Futures*, *29*(1): 47-65.

McFarlane, Colin, and Ola Söderström. 2017. "On alternative smart cities: From a technology-intensive to a knowledge-intensive smart urbanism." *City 21*(3-4): 312-328.

Monahan, Torin. 2018. "The image of the smart city: surveillance protocols and social inequality." In *Handbook of Cultural Security*, edited by Yasushi Watanabe, 210-226. Cheltenham, UK: Edward Elgar.

Murakami Wood, David, and Torin Monahan. 2019. "Platform Surveillance." *Surveillance & Society*, *17*(1/2): 1-6.

Murakami Wood, David. 2015. "Smart City, Surveillance City." *Computing & Law*. https://www.scl.org/articles/3405-smart-city-surveillance-city.

Murakami Wood, David. 2015. "Vanishing Surveillance: ghost hunting in the ubiquitous surveillance society." In *Negotiating (In)visibilities*, edited by Henriette Steiner and Kristin Veel, 281-300. Oxford: Peter Lang.

Murakami Wood, David, and Debra Mackinnon. 2019. "Partial Platforms and Oligoptic Surveillance in the Smart City." *Surveillance & Society 17*(1/2): 176-182.

Scott, James C. 1998. *Seeing like a state: How certain schemes to improve the human condition have failed*. Yale University Press.

Sadowski, Jathan and Frank Pasquale. 2015. "The spectrum of control: A social theory of the smart city." *First Monday*, *20*(7).

Sadowski, Jathan and Roy Bendor. 2019. "Selling Smartness: Corporate Narratives and the Smart City as a Sociotechnical Imaginary." *Science, Technology & Human Values, 44*(3): 540-563. https://doi.org/10.1177/0162243918806061.

Strathern, Marilyn. 2005. *Partial connections*. Walnut Creek, CA: AltaMira.

Trencher, Gregory, and Andrew Karvonen. 2018. "Stretching "smart": advancing health and well-being through the smart city agenda." *Local Environment*, *142*(0), 1–18.