Grey Boxes to Control? Cybernetic Surveillance in Urban Design

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Abstract

This paper is a critical essay on the role of intelligent systems in the 21st century and their usage in city optimization that planners and urban designers objectified control. Promulgated in the 2000s in urban design as a form of control, cybernetics became a useful tool and, today, with metropolitan epidemics, transportation, and information fluxes, this field became more visible in the expansion of parametric actions to control and surveil. This evidence had a clear paradox between the determinism of a transparent city and behaviorism of a black-box design, which is commonly sold – and controlled – as a smart city.

Keywords: Grey Box; Surveillance System; Box Theory; Smart City; Cybernetics.

INTRODUCTION

Since the enactment of the idea of smart city promoted by IBM since 2004 (and later patented), the insertion of information and communication systems for spatial control and management in cities has become a political premise in the 21st century. In this paper, I intend to analyze the role of urban design as a creative, social, and also political-remissive act as well a smart city - and how it is configured in resistance to that. It is a question of subverting the premises of this smart design as a surveillance apparatus (Morozov; Bria, 2018) making a physical transformation about the city's problems deconstructing certain dualisms created by the insertion of these smart technologies, which can manage resources and even decrease inequalities. We will call this action the grey box, a mixed version of black and white boxes of technological urban planning.

'' Cities should consider supporting programs for grassroots communities of innovators and startups alongside promoting alternative cooperative models of service delivery. To align technology and innovation capacity with real social challenges, cities must design innovative systems with public purpose and long-term investments in critical social areas such as health, education, transportation, and energy transition. This means rethinking the relation between the public and private sectors, ensuring that the public sector can shape the direction of innovation and allow society to reap the returns of public investment in research and innovation, thus socializing risks as well as rewards.35 The public sector has a strategic role to play in setting the direction of change with which bottom-up solutions can then experiment.'' (Morozov; Bria, 2018 p.43)

As the critic Evgeny Morozov puts it, and, more discreetly, in authors such as Claudio Ratti (2016) and also Fábio Duarte (2017), we will deal with forms of praxis in urban design with surveillance and control technologies that operates experimental conditions between the theoretical relations and the knowledge practiced in the exercise of the city life. About the urban technologies we are dealing with, we will see smart modeling methods that are made in box shapes (Song, Srinivasan, Sookoor, Jeschke, 2017; Costa,

2019). These models - used by designers, hackers, system designers, and urban planners become important to consider how to act, in a democratic way, in the city. The question that extends, in addition to the idea of a smart city promoted by the market and the energy sector, is how technology would monitor our actions and whether people can produce access in these systems of the city. Therefore, what will be proposed here is a discussion of how urban technologies behave and how we can do to understand a different form of political exercise, of course, using urban design as a conceptual tool itself.

The idea of a smart city that Morozov and some authors criticize is the products and services of data production. Neoliberal strategies focused on resource management are some of the achievements that the control problem - more focused on managing the State's performance optimization - makes. The issue about surveillance is proof of this: it is nothing more than a corporate history - government logistical branding (Morozov; Bria, 2018) - that sets itself as urbanism. Made as a dependent, the services of this smart city are not - effectively, architectural modeling or urban design. It is informational modeling through real-time urban data (Song, Srinivasan, Sookoor, Jeschke, 2017) - it must be seen as a tool, a technology that allows visualizing and accessing certain conditions in real-time - a paradigmatic way of viewing the urban problem (Morozov, Bria, 2018).

This practice of the smart city, for Morozov and Bria (2018), as well as Ratti and Claudel (2016) must be rethought because it is restricted to engineers and, to a greater extent, to politicians who aim to hack urban problems such as computer scientists see their artifacts. The greatest example of this is the corporate and urban mobility management projects such as the Autonomous Rail Rapid Transit (ARRT) (Costa, 2019) in addition to the territory mapping relationships in GIS / GPS such as COR-Rio and the technological actuators on the simulative factors of the future (Claudel, Ratti, 2016). These cases not only act in the territory but help in the creation of maps and other content mechanisms of the socio-technical behavior that the information age allows to have.

From this meeting, we will start with the idea of smart cities as disruptive tool products and not as urban planning processes (Morozov, 2019). It is important to bring this distinction before the methodologies of cybernetics - which have been described as smart (Song, Srinivasan, Sookoor, Jeschke, 2017) beyond the logic of project/smart city. That is, the functioning of feedback, conversation, and design are problematic and incipient about technology (Costa, 2019) and how we can propose new thinking. In the modeling methodology of the boxes, we find traces of how we can mix project actions and new forms of subjectivity and urban action. For Greenfield (2017), certain technological actions, such as proposals for the action of reconfiguring and deconstructing certain regulations - in addition to the vision of the domain of certain systems, could only be possible through technology. What the author establishes, however, the practices that are called smart city are perpetuated only as instruments of control of information and data production.

'' We see the strongest and most explicit articulation of this ideology in the definition of a smart city offered by the multinational technology vendor Siemens: "Several decades from now cities will have countless autonomous, intelligently functioning IT systems that will have perfect knowledge of users' habits and energy consumption, and provide optimum service … The goal of such a city is to optimally regulate and control resources using autonomous IT systems." (Greenfield, 2017 p. 52)

Understanding the idea of a smart city is precisely this autonomy. If we look at what was proposed by Ratti and Claudel (2016), the most sophisticated stage of technology, that is, the use of its potentials, would be precisely its ability to act. It becomes visible, for example, in the use of city sensors (face, temperature, traffic), real-time mapping systems (GIS, GPS), in addition to responsive configurations between police and government institutions. After all, the issue here becomes more governor, about the transformation adopted by the Romans in their sense of cybernetics. This formation is made possible precisely by the needs of governments, no longer constituting as special control of surveillance and police, but now of sensing of space activities - which is configured in territorial dispute (Morozov, Bria, 2018).

This is the main perspective adopted by Francesca Bria for the city of Barcelona. In the author's and Morozov's view, the smart city is problematic due to its governance structure that is based on IBM examples, combated by using information, also local and regional, which are beyond the political borders of use and control data from a hierarchy of power. We can see these manifestations in the context of social networks, the GIS mapping of participatory movement, popular control strategies for the actions of their representatives - and other forms of participatory and community control. In Bria's perspective, this is configured in a partial view of information, where nothing more is expected from users than the citizen practice to which they are entitled. And the city may just be a police and mediation institution, reversing practical actions, as it started in Barcelona. These actions show the partiality of information - that is, they take away the idea of the smart city as a market for controlling part of the community technology (Greenfield, 2013).

SURVEILLANCE DISRUPTION

From a horizon where we can skeptically understand the technological urban practices of the smart city from 2004 onwards, we can understand how surveillance has become important. Cisco, IBM, and Siemens are some of the companies that do this in the field of monitoring and control. The ART transport system, for example, is a possibility for optimization and certain participatory controls. A clearer understanding of intentions and a fairer understanding of actions can build a new concept of a smart city. The technology historian and critic Evgeny Morozov in Big Tech warns that, for the strategies of a truth production policy, convenience builds it (Morozov, 2018).

Thus, the dominated and the powers of exception become spaces without information, fed by networks, groups, and applications that concentrate fake news. It is more pleasurable, in the words of Greenfield and Morozov, not to resist the temptations that satisfy both our personalities synthesized in electron flux, as much as in our cold physical reality. However, it is evident that these manifestations need to be differentiated with the due complexities of the liberal discourse of neoliberal mainstream actions or dangerous proposals - and still incipient of the various spatial problems of policing and control (Costa, 2019).

To have a technological disruption like the ones we find in technoutopias, we need to understand the box as a cybernetic procedure. The idea of the box as a metaphor for the problem and the need for solubility of space problems has remained fundamental in cyber technology since the 1960s. This understanding that control systems show us algorithmic segregation of society (Pasquale, 2015) between those who enjoy and consume and those who follow and massify data for the construction of truths and embarrassment - even if the existence of perversity continues. What happens, however, is that today we are aware of some typical mechanisms of control and surveillance of a market field and a market in a field, big tech - the smart city (Morodov, 2020).

Franco Berardi in his book Dopo il Futuro teaches us that a large part of the idea of a society of control systems would be configured on a future '' again'', that is, similar resolutions waiting for the future (Berardi, 2019). In the grey box, it is a question of leveling these relations of futurability and subjectivity, treating the opposite: it is the cybernetic response of a non-linear process. Enacted in the 2000s as a way to control and talk about politics and the policing sectors, smart city cyber technologies become useful for architects and planners to avoid what they understand as order. However, from the perspective of cities with epidemics, transport, and information flow, the field of criticism of technology becomes more visible as the monitoring and parameter creation actions on the territory become extensive in this futurability. Therefore, the condition of simulation, georeferencing, and real-time mapping (GIS, GPS) is more about control conditions and not only about making the agency of communities visible where they become opportune as much as the paradox that had been postulated.

This paradox occurs between the determinism of transparent information and the behaviorism of manipulating urban problems. In other words, it is a project of opportunities: from the black-box that gives rigidity,

hierarchies of information, and an oblique understanding of transparency, which is nothing more than the predictability of behavior sold in the market as police technology (Nunn, 2001) for the technologies or the hyper-sectorized projects that persist in the urban space (Ratti, Claudel, 2016). This idea of an urban practice is based on forecasting and the future that Berardi understands generates, as a primary consequence, two conditions for people's uses.

The first is that which removes the complex and exponential characteristic of urban actions and freedom to the detriment of top-down positions that must be practiced (Song, Srinivasan, Sookoor, Jeschke, 2017) and, in another condition, generates conditions for controlling own social and urban life where people know that they are controlled and that they feel compelled to do so. For this reason, to build another form of surveillance - a kind of surveillance, on the contrary, more based on the sensory actions of the population's instruments for state control, the mediation of the city itself cannot be, at least, determined by future possibilities.

'Futurability is the multidimensionality of the future, the plurality of futures inscribed in the present, and also the changing composition of collective intent. Futurability is the dimension in which a possibility becomes a trend. [...]. We feel caught in a trap of technological and linguistic automatisms, finance, global competition, exaltation imposes and, the many possibilities inscribed in the present are not canceled, although at the moment they seem inert.'' (Berardi, 2019, p. 183)

To deconstruct this representation, we will focus more on the inherent wisdom and intelligence of cities (referring to the idea of intelligence in computer science) to use box theory to approach the use of technological systems to control cities. We will use the critical theoretical review of architects, urban planners, and scientists showing their cybernetic methodologies to approach the surveillance in their design practices. This use permeates the box models and needs to be referred to as the proper use of the technology – in a disruptive sense. This action is a grey box model.

GREY CONTROL

The grey box is the cybernetic methodology for understanding and verifying problems with mixed uses - that is, partial data and information about a condition in any system. There is scientific literature on the various uses of mixed systems (Srinivasan, Sookoor, Jeschke, 2017; Liu, Lin, 2011) and can help in understanding the problems and the partiality of the city's control operations. It can be an almost subjective methodology - in other words, it gives freedom for external processes to be recognized or physiologically adapted as we intend here. More than the objective premise of smart city systems that ICT, GIS, GPS, and general sensing systems do with the city, it is to promote a participatory environment that, in a way, is combined with the participatory problem and urban design as a relevant development factor.

In the same way that the Cisco company in its white paper manifests mixed possibilities of fog computing for its market, mixing hybrid resources for the wider scope of connection and use of data and people. The grey box is the hybridization in favor of deconstructing physical elements towards virtual ones - vice versa, where the answer to social and urban design demands is less rigged and noisy, more focused on design issues than services, or service outsourcing. What is expected, here in this paper, is to understand that social control and hindering the development of projects do not happen through the use of technology, but through the possibilities produced from it. The grey box is just that.
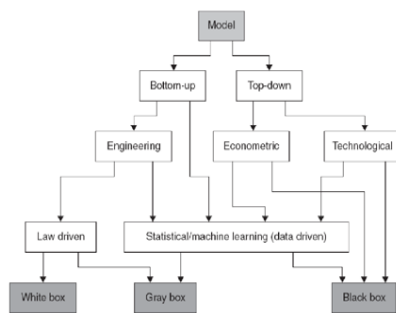

Figure 1: Box model and its planning models. Source: (Song, Srinivasan, Sookoor, Jeschke, 2017).

Where oligarchic controls timely generate bureaucracies or invisibilities of social problems, as they make what is interesting transparent (Morozov, Bria, 2018). Thus, the grey box vision that is sold by the smart cities' design processes needs to mix such transparent actions and data use (black box) and not as some authors also put it (Song, Srinivasan, Sookoor, Jeschke, 2017) as the transparency of the top-down state. The frequent grey box methodology, that is (Fig. 1), which aims to mix assertive knowledge practices, intelligent systems, and contingent practices consider the grey box as a top-down possibility, that is, state action, but this it should only start from learning the model and also from the non-objection of the totality - challenges to find certain evidence that ratifies this new model of boxes.

It turns out that, from the perspective of Cisco and other authors of fog computing or hybrid systematizations, this would increase the capacity of data processing in addition to creating an environment of higher informational speed, as fog computing, for example, is configured in a vision to mix better results for everyone. In the practice of action scenarios, the use of the grey box concept is a methodology to become a chimera product: while storage and virtual resources are distributed (cloud computing), control and surveillance networks are also dispersed.

In short, a grey box stands as a model of intermediating the subjective and indeterminate relations of urban practices (in addition to stochastic mathematics) and using parts of the information as a model of possible viable logical structuring - which aims at another type of development – we can contrast to the logic of the capital, but on the various actors in the city. To this, Morozov and Francesca Bria avoid these contradictory understandings of technological actions (that is, in the partiality and opportunity of each agent involved) to establish a theoretical - but

comprehensive vision about smart cities. As Morozov and Bria show us, disruptive technological practices or some view of contradiction the impositions are established in a different category about thinking about the city, the concept of smart, and about the right to the city itself, based here also on digital and virtual visibility - in the critical view of neoliberal surveillance processes.

Table 1: Table with information about some of the case/problem models for the systems. Here you will find the types of information capture (inside and outside) and the vulnerability of intelligent systems.

Box	Info (In)	Info (Out)	Vulnerability
Black Box	Low	High	High (Rigid)
White Box	High	Low	High (Entropic)
Grey Box	Some	Some	Some (Transformative)

In the table, above we can see some questions about the cybersecurity vulnerability and the problem of actions. Based on standardized penetration tests - that is, permeability tests, we observed some curious factors. First, both of the two usual ethical hacking systems have two characteristics (Engebretson, 2013). The first line is the black box, a concept by Ross Ashby, Norbert Wiener, and the cyberneticists of the past who formulated intelligent systems and obtained little information, in a basic way, from internal systems. This resulted in a high need for information from external agents in understanding. In this rigid system of control of the black boxes is how the usual surveillance systems work under its conceptual aspect, making systems and societies hard and vulnerable and with little resilience. This is what Pasquale asks himself and shows what we, as actors, maintain and constitute. For the author, society, its algorithms, and mainly corporations constitute a black box - from its master plans to, above all, the actions of the common social practice of social life.

'' Still, in their black box structure, and their developing collaboration, the two are more alike than otherwise. There are powerful bosses at the top, managers, analysts, and programmers in the middle, and a vast cast of outsiders watched at will. The same person may spend a few years at a tech firm, then serve in government, and then go back into the business. Their activities ultimately raise similar questions. One is about the flow of information: Can we stop pervasive data collection? I think that the answer to that is probably no. The second question, therefore, is, what do we do?'' (Pasquale, 2015 p. 52)

Ensuring control of external information (and sensing parameters) the black box is the accreditation of the most realistic totalitarian control among the boxes. Both Morozov and Bria show that the black box has little potential for transformation - that is, it responds to parameters that are difficult to control internally, making the black box a problem like the intelligence systems of the end of the last century. Corporations such as IBM and Cisco sell black boxes as apparently translucent white ones - easy to understand how they work (Morozov, Bria, 2018), which are perceived as boxes from the creation of an information supply medium (Costa, 2019). However, they are vulnerable because they are too entropic, with little resistance to external attacks. Its clear and transparent

mechanism of internal informational functioning (where we capture and who are its actors), has little external information and a high level of internal understanding - its transformation in this sense is extremely rigid. These factors are important critics of society - leading to a more entropic than syntropic system, requiring a logic beyond transparency - opacity dualism.

The grey box mixes factors such as the concentration of data and image control, local and subjective characteristics of residents and their communities, in addition to generating, in the motto of digital tools for real-time evaluation, dynamic propositions, but not imposing. Promoted by companies such as IBM, Philips (in the case of lighting, for example) and Cisco (Morozov, Bria, 2018), in addition to the city's operating strategies. Sensing and control are forms of action (Ratti, Claudel, 2016) that can be understood both at the top-down level and in the action of bottom-up practices. These developments have generated, since 2004, a series of control and segregation mechanisms to the agents that interfere and that transform the subjects' behaviors - in a practice called nudging.

CONTINGENCIES

It is important to consider, to continue the construction of reasoning, that information becomes essential, as it gives scope to the systems and functions of regulating urban surveillance that can interfere in the conflicts that permeate society. Mainly, in the behavioral states of these urban actions, we can understand other performance practices such as penetration tests and modification of system states - such as nudging and hacking. For this, it is necessary to understand the manifestations of information and the use of data and how they are currently undergoing a significant contingent transformation - which makes it promising to think about a more hybrid box system. If in Cybernetics we treat problems as boxes, models of behaving and acting on intelligent systems the apprehensions of these problems can help us to understand to overcome the conservative idea of containment and urban control.

This process is fundamental for us to act in a more contingent, less imposing, and more liquid project (Morozov, Bria, 2018). We will only contribute here in the construction of the concept of cash, focusing on the justifications of technology in favor of subjectivity and not on objective submission. The grey box is precisely this threshold, the continuum between the extremes of the black and white box, of the objectivity and subjectivity of the systems that underlie the body of the contemporary city. Thus, the idea of the grey box in an action that does not promote measures of constraint, social injustice, and, above all, urban prejudice, needs to merge practical actions of another paradigm of surveillance that serves the population and not the State - a contrary logic.

For cyberneticists or people with a critical (and non-fetishist) concern about technology, contingency is like the subjectivity of spatial systems for creating process logic. For a non-control project, that is, outside the field of representations (Haraway, 1991), the threshold between understanding and freedom is fundamental. When we make a systematization of environments based on interactions also inside and outside the urban city, measurable or not, the points we will understand are the construction of new ecologies (Bateson, 2004). This

subjectivity of this new space, caused by the idea of dealing with technology as a contingency, decentralizes the architect to his modern objectivity and his spectacle - in Debord's view (Eisenman, 2010). This threshold, between objectivity and subjectivity, is clear to Peter Eisenman in Michael Haneke's 2005 film Caché and similar, from the perspective of an instrument of control and interaction with him, in Ai Weiwei's 2017 Hensel & Gretel. Both can be easily assimilated as criticisms of the smart city, and the idea of an almost category that the conjecture of control-liberalism generates in people's behavior and in the actions, we exercise over space when we are minimally viewed and monitored.

Figure 2: Photograph of the installation Hensel & Gretel, done by Ai Weiwei and Herzog & de Meuron in New York. Source: https://www.designboom.com/art/herzog-de-meuron-ai-weiwei-hansel-gretel-park-avenue-armory-new-york-06-07-2017.

Just as subjectivity permeates between different fields of information, it also permeates surveillance, one of the main problems of the experience of working life as public and private life and with social networks and smart city brandings. Not that this is new, but part of these actions between different subjects and mutual vigilances are recent in view that the government's forms of physical biopower and political action played this role (Preciado, 2020). What happens in this game is what also lies in the critical aspect of the smart monopolism of our corporations and a degrading economy: is there a disruption in the surveillance of these cities? Can we use a smart city to also develop a democracy? (Morozov; Bria, 2018). Perhaps the question is different: can design practices be subjective even with state surveillance? The binary relations of nature-culture / artificial-natural / inside-outside / public-private can be overcome to help us build this surveillance " in reverse " and in the design of the city in the design of box problems

where we need urban information. Thus, in order to not continue in the exploration loop that the other cashier systems have placed on us, we must be understand beyond the black box and the white box as intelligent systems of an intelligent urban community that generates contingencies (Costa, 2020).

If both the subject and the technological apparatus interact, we are suspected of contradicting this (Preciado, 2020). We can produce architectures of our city and build new intelligent or even unintelligible concepts, creating subjects for the next narrative - but we are still subject to our subjectivities. This subjectivity is the complete forensic fascination that the work of filmmaker Michael Haneke, for example, shows us in Caché and that can elucidate us in the idea of the city and surveillance. Just like Ai Weiwei and the Herzog & de Meuron office, they also deal with the project level: certain information is shown and projected in space so that, in the past, we created possible cracks of subjectivity by interacting and manipulating the control systems, in a bottom-up of the top-down system that persists the idea of objectivity over the other. Throughout this narrative of subjectivity, that is, this process of waking and fear, what is inferred here is whether the subject is dubious: whether it is passive or versatile (Preciado, 2020). But how to deconstruct this corporatist idea full of sociotechnical devices with subjectivity? How we create democratic spaces by rethinking the smart city as a cultural process of the population and less invasive. Perhaps the philosopher Byung-Chul Han when thinking about the immunity of our society knows some answers.

'' [...] the immune system does not distinguish between self and non-self, between self and strange or other, but between friendly and dangerous. The object of immune defense is no longer strangeness or otherness as such. Only that strange meddling that behaves destructively within itself is repelled. In this perspective, while the stranger does not attract attention, he is not touched by the immune defense. According to Matzinger's idea, the biological immune system is more hospitable than has been admitted to date. You don't know any xenophobia. It is smarter, therefore than human society with xenophobia. This is a pathologically enhanced immune reaction, even harmful to the development of one's own.'' (Han, 2018, p. 13)

This immunological possibility of mixing things in the grey box is possible and no less urgent, making it possible to mix spatial strategies that lead to communication and information technologies (ICT) and the usual computational development when questioning city views of urbanism in the form of a drawing - besides clear in the fluency of the drawing itself as the algorithm as a possible source. This is the way, as described by Ratti and Claudel (2016), to which the most subjective cyber fields are distanced, and in which many interact with the idea of a more subjective and interactive contemporary city - that is, dynamic - through the identities and our becoming that persist in the relationship in urban objects and spaces. It is a question of cybernetic planning, an interaction between agents and space to constantly transform ecologies, natural or not (Claudel; Ratti, 2016), social or not.

It is not a matter of carrying out a formal project or speech. It is a critical perspective of current practices that enables cyber perspectives on the ecologies we are destroying

(urban or natural). A grey-box city is just a way of looking at the problems that arise from the new processes of transformation and conversation of the distributive dynamism of technology. What we must understand is that we must treat the problems of the city as a process of the ongoing formation of the demands of the built and natural space - intending to converge in ecology as a field of integration between knowledge (Bateson, 2004). This is not a constitutive question; it is the adaptive response of ecological awareness of how we can integrate the complexity and incompleteness that we are facing in society and technology.

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