
The emergence of iBorder: bordering bodies, networks, and machines

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Abstract. This paper scrutinizes the interrelation between technology and processes of bordering. In particular, it addresses the ways through which biometrics, dataveillance, predictive analytics, and robotics enlist the human body, networks, and human–machine assemblages in practices of inclusion and exclusion at the contemporary dislocated and ‘smart’ border. Through a description of the sociotechnical apparatuses underlying biometric, algorithmic, and automated border work, the paper develops the term iBorder, and connects its specific affordances to an emergent late-modern regime of security. With reference to the notion of cultural technique, the paper argues that contemporary technologically facilitated practices of bordering coconstitute, rather than merely process, contingent subjectivities and frames for practice.

Keywords: bordering, iBorder, biometrics, dataveillance, predictive analytics, biopolitics, bodies, patterns of life

Introduction

This paper addresses the role of new technologies of identification, surveillance, and automation in processes of bordering. More precisely, I will develop the term iBorder to conceptually grasp how biometrics, dataveillance, predictive analytics, and robotics impact upon and change contemporary deterritorialized regimes and practices of inclusion and exclusion.

Current advances in network surveillance, biometric identification, robotics, and algorithmic analytics facilitate processes through which the border disperses and becomes independent of territorial confinement and topographical location. New mobile regimes of inclusion and exclusion target individual bodies wherever they are, while algorithmically determined risks and threats increasingly inform and predispose human decision making. The paper suggests that the protocols, operations, and procedures that underlie the above-mentioned developments form the core of a fundamental cultural technique of bordering that not only processes given contingent identities and patterns of life, but also actively coconstitutes them.

Bordering as cultural technique

Stiegler (1998; 2009) has criticized a fundamental dichotomization between organic life and inorganic matter in Western philosophy. He elaborates the framework of such thinkers as Husserl, Heidegger, and Simondon to “permit the hypothesis that between the inorganic beings of the physical sciences and the organic beings of biology, there does indeed exist a third genre of ‘being’: ‘inorganic organized beings’, or technical objects” (Stiegler, 1998, page 17). Technical objects are thus brought forth as entailing their own fundamental dynamic that cannot be reduced to instrumental categories such as ends–means relationships. On the contrary, due to a growing technicalization of the contemporary world, technology reveals an increasingly formative power that affects all aspects of human life and practice. Humanity and technics, argues Stiegler (2009, page 2), are ‘indissociable’, and humans

emerge as ‘prosthetic beings’ coconstituted in and through technical surroundings.⁽¹⁾ This idea of a mutually constitutive relation between formed matter (technology) and human subjectivity resurfaces in a recent strain of German media theory that centres on the concept of cultural technique.

According to Winthrop-Young (2013, pages 5–7), the term cultural technique emerged from the translation of the German term *Kulturtechnik* and incorporates three distinct yet interrelated conceptual trajectories. Firstly, uses in the field of agricultural science point to such areas of practical knowledge as irrigation techniques and other forms of environmental engineering. The underlying root is derived from the term’s Latin origin *cultura* (verbal form *colere*), indicating an act of tending or cultivating. Thereby, cultural technique becomes intrinsically connected to the drawing of a dividing line between nature and culture. Following Winthrop-Young (2013), this focus opens up the question of whether the act of drawing the line itself is a part of culture or nature, or whether it points to something preceding, and creative of, this very distinction and the two opposed fields it implies, namely a set of cultural (or enculturating) techniques: “A proper understanding of culture may require that the latter be dissolved into cultural techniques that are neither cultural nor natural in any originary sense because they generate this distinction in the first place” (page 5).

Secondly, cultural technique refers to general competencies required to handle technological devices, and was later extended to describe fundamental operations such as writing, counting, music, speech, and so on. This widened understanding of technique beyond the confinement of technology and agriculture entailed a questioning of the relations between humans, objects, machines, and the operations interconnecting them (Winthrop-Young, 2013, page 8). In this respect, for instance, the operation of handwriting interconnects human subjects and the technological instruments of pencil and paper in a mutually constitutive relationship that supports the formation of certain subjectivities and forms of agency and constrains others. The same is true for technologically facilitated procedures of identifying, categorizing, filtering, tracking, and sorting that form the operational core of what I, in this paper, term iBorder. The sociotechnological apparatus of iBorder, I argue, is at once constitutive of, and constituted by, the subjectivities, technological instruments, and operations it affords.

This leads over to the third meaning inherent in the term cultural technique—the sets of temporarily institutionalized, contingent practices and procedures that predispose processes of constant formation and reformation of complex assemblages of humans and technology. Somewhat reminiscent of Stiegler’s approach, this focus on the constitutive interrelation between subjects, objects, and procedures therefore entails a reconceptualization of terms such as human agency and subjectivity. According to Winthrop-Young (2013, page 10), “what we call the human is always already an emergent product arising from the processual interaction of domains that in time are all too neatly divided up into the technical and the human, with the former relegated to a secondary, supplementary status.”

Like Stiegler, Winthrop-Young argues for the significance of technology in sociopolitical and cultural processes of subject formation. However, the latter’s approach to cultural techniques does not posit a fundamental ontological change from a human–machine division to a new hybrid form. Rather, Winthrop-Young highlights the components involved in complex processes through which humans, machines, and the operations interconnecting them mutually frame and constitute one another. In the era of iBorder, humans are not transformed into border cyborgs, but new and more pervasive technological apparatuses of identification, management, and control establish new frames that constrain agencies and influence the formation of subjectivities in unprecedented ways.

⁽¹⁾Making a similar argument, Hayles (2012) refers to such processes of coconstitution of humans and (digital) technologies as technogenesis.

This dynamic and processual understanding of the interaction between humans, technology, and procedures enabled by the concept of cultural technique does not lead to technological determinism. As Geoghegan (2013, page 69) argues, cultural techniques are a way of understanding “by what processes numbers, scales, or a ploughshare reciprocally and recursively modify and formalize the practices of counting, singing, and farming that generated them”. These contingent practices again sediment into institutionalized patterns of support and restraint within which various subjectivities can unfold. This approach does not posit the priority of either the one or the other unit, but describes them as mutually constitutive and constantly changing, and as interconnected in and through particular formative procedures. Thus, the study of cultural techniques articulates a postfoundational framework (Marchart, 2007) and “moves ontology into the domain of ontic operations” (Siegert, 2013, page 57), enabling attention to process, contingency, and change. Analysis of the object is thus replaced by attention to the precarious and ongoing processes of objectification enabling various possible emergences of this object.

Winthrop-Young (2013) argues for the significance of cultural techniques for the formation of a dividing conceptual boundary between humans and animals: “Once you move from doors, gates and portals to fences, pens and corrals—that is, once you consider the elementary cultural techniques of creating enclosed spaces for catching, keeping, and breeding animals—you are creating operative thresholds that effectively generate different species confronting each other across that divide” (page 11). Sedimented and institutionalized practices and procedures of dividing and categorizing become constitutive of the very entities they are the alleged result of. This logic applies not only to the boundary that divides humans from domesticated animals, but also to the various borders and their technological instruments, operations, and agencies that distinguish particular groups of human beings from one another.

In the present paper I argue that bordering is a fundamental cultural technique. Thus, distinctions between citizen and migrant or between trusted traveller and terrorist threat do not emerge as a priori givens that necessitate certain practices, procedures, and regimes of profiling, tracking, sorting, and filtering, but the division itself becomes conceivable as the contingent result of these formalized operations. The concept of iBorder is an attempt to understand and systematize the sociotechnological apparatus behind such coconstitutive impacts of contemporary cultural techniques of bordering.

Bordering bodies, networks, and machines

Presently, borders have lost much of an earlier dependence on territoriality and physical impenetrability (Johnson et al, 2011; Parker and Vaughan-Williams, 2009; Perkins and Rumford, 2013). With notable exceptions of such sites as the West Bank wall or the US–Mexican border fence—the function and effectiveness of which, however, remains a debated issue (Brown, 2010)—contemporary regimes of inclusion and exclusion are often decoupled from concrete locations.⁽²⁾ Scholarly focus is redirected towards processes of bordering (Van Houtum and Van Naerssen, 2002) and towards dislocated and globally dispersed regimes of security and control (Popescu, 2011; Van Houtum et al, 2005; Vaughan-Williams, 2010; Vukov and Sheller, 2013). Recent advances towards an understanding of complex, multimodal, and multidimensional borderscapes locate bordering processes on various scales, from politics and economics to culture and everyday practices (Brambilla, 2014; Rajaram and Grundy-Warr, 2007).

⁽²⁾For a historically inflected argument for a perpetuated ‘global primacy’ of traditional state borders, see O’Dowd (2010, quote page 1031). For a continuous salience of state actors in virtual bordering processes, see Bauman et al (2014), who assert that the recent NSA surveillance scandal has caused geopolitical dynamics that make states “thicken their digital borders” (page 130) to protect national interests.

Contemporary technologies afford new dynamics of transnationalization, privatization, and digitization (Bauman et al, 2014 page 126) that rearticulate borders and blur distinctions between state and business, private and public, inside and outside, inclusion and exclusion. As Côté-Boucher et al (2014) express it,

“while modern borders have been taken to express the power of the nation-state ... state power is nowadays exercised by delegating practices of state sovereignty to local, transnational and private actors outside the state apparatus and away from traditional state actors” (page 196).

Perkins and Rumford (2013, page 270) term this change of focus a “vernacularisation of the border” that provides “a role to ordinary citizens in the bordering process” (page 269) and that operates by temporarily fixing contingent regimes of inclusion and exclusion as reified “operative fictions” (page 272).⁽³⁾ The border emerges as ‘multiperspectival’ (Rumford, 2012, page 889), enabling both contact and division, and as enacted in top-down as well as bottom-up practices (Bigo, 2014; Côté-Boucher et al, 2014; Walters, 2011).⁽⁴⁾

Recently, the role of technology in such vernacular processes of dislocating and dispersing borders has attracted increasing attention. Vukov and Sheller (2013, page 225), for instance, note a transformation of borders toward “sophisticated, flexible, and mobile devices of tracking, filtration, and exclusion”. According to the authors, “new technologies of bio-informatic border security and remote surveillance” (page 226) lead to a paradigm shift that demands “sustained attention to the technocultural and communicative infrastructure of these bordering devices and technologies” (page 227). Therefore, a vernacularization of border studies as the one called for by Perkins and Rumford (2013) has to include a nonhuman dimension that critically addresses recent technological changes and their potential impacts. The term *iBorder* enables such a widened perspective in that it affords a systematic description of the changing technological environments within which emergent regimes of late-modern bordering operate. The concept allows for attention to nonhuman, machinic forms of agency and facilitates a critical investigation of their roles in contemporary cultural techniques of sorting, profiling, categorizing, predicting, and filtering.⁽⁵⁾

According to Thrift (2004), late modernity is faced by a fundamental “shift in the basic conditions of life” (page 177) that entails the transition from a 19th-century standardization of time to a contemporary “standardization of space” in and through the technologically and logistically driven emergence of a “track-and-trace model” (page 182) for organization and management. This transition has three major features that are relevant to the present inquiry, and that Thrift summarizes as (1) ubiquitous computing that makes calculation “a constant backdrop to everyday life” (page 183), (2) new forms of address where “addresses are moving with human and non-humans actants” (page 182), and (3) responsive technical environments that allow for constant feedback loops, enabling unprecedented forms of

⁽³⁾Seen from this perspective, borders become resources that temporarily stabilize inherently contingent identities and positions in that they provide “practical everyday methods for navigating indeterminate pluralities” (Perkins and Rumford, 2013, page 272).

⁽⁴⁾Bigo (2014, page 211), for instance, identifies “three different social universes” in which contemporary EU border controls operate: a “military strategic field” that implies a notion of borders as stabilizing protective barriers; an “internal security field” that sees borders as semipermeable membranes filtering and managing flows and movements; and a “global cyber-surveillance social universe” that implies a “virtualization of border” in the service of preventive agendas.

⁽⁵⁾It has to be acknowledged that this study puts particular emphasis on the practice of bordering as inherently divisive and, therefore, to a certain degree falls prey to an “underlying assumption of consensus in border studies” identified by Rumford (2012, page 889) that precludes attention to their function as sites of contact that facilitate cultural encounters. For an exploration of this connective potential of borders and the hybrid identities and cosmopolitan affiliations they enable, see, for instance, Rovisco (2010).

“hypercoordination and microcoordination” of human and machinic activities (page 185). Thrift (2004) intimately ties these features of fundamental change to specific technological innovations and their affordances: affective interfaces, human–machine and machine–machine networks, the bar code, .sig-files, SIM-cards, and radio frequency identification devices (RFID). Taken together, these elements form what Thrift terms a “technological unconscious” (page 177) that predisposes human and nonhuman agencies.

Below, I will specify the technological unconscious behind the apparatus of iBorder along three different axes—biometrics, dataveillance, and robotics. Through a description of key technical advances and their specific affordances, two tendencies in the contemporary cultural technique of bordering will emerge. One consists of new technologies and operations that allow for an improved identification of specific individual subjects, while the other is based on the mining and subsequent analysis of data-sets at population level with the aim of predicting and, if necessary, preempting abstracted patterns of life. Both tendencies are facilitated by the sociotechnological apparatus of iBorder and constitute core elements of bordering as a cultural technique.

Biometrics: bordering bodies

The human body has always been an important site and source for various practices of inclusion and exclusion. In his brief historical trajectory of the emergence of biometrics as a component of modern security regimes, Maguire (2009) defines the term as “the recognizing of humans on the basis of intrinsic physical or behavioural traits” (page 9). Maguire lists face, fingerprints, and iris as the most established markers, but also directs attention to recent technological advances that allow for identification and profiling on the basis of “vascular patterns, hand geometry, DNA and even body odour” (page 9). Brought together with behavioural biometrics that focuses on handwriting, voice and keystroke patterns, or gait recognition, and checked against rapidly growing and increasingly interconnected databases as well as remotely accessible RFID-equipped passports and ID cards, this technologically facilitated cultural technique of bordering enables an increasingly pervasive identification, tracking, and sorting (out) of mobile bodies.

In a historically inflected approach to the biopolitical underpinnings of biometrics, Pugliese (2010) has argued that this practice invests the biological body with the assumed capacity to truthfully speak for itself and reveal an identity proper. This assumption, Pugliese warns, carries with it potentials “for the discrimination of non-normative subjects” (page 2) and is built upon “the metaphysical presuppositions ... of the body as absolutely unique in the identity of its self-presence” (page 20)—a presupposition that implicitly excludes the possibility of error or fraud, and therefore opens up certain constitutive potentials inherent in this practice.

In both mobilities studies and border research, airports have been seen as pivotal sites for such technologically facilitated processes of bordering centred on the human body and its biological and behavioural characteristics (Adey, 2009; Amoore and Hall, 2009; Muller, 2008; Salter, 2006). Technologies and practices such as trusted traveller programmes, prescreening, RFID-equipped biometric travel documents, and interoperational databases facilitate the often tacit identification and categorizing—the “digitised dissection” (Amoore and Hall, 2009, page 448)—of moving bodies at a semipermeable, tiered border that allows certain subjects to pass unhindered while others are slowed down or, in the last instance, stopped and detained.

During the global war on terror these practices have increasingly been dispersed and dislocated and developed into apparently ubiquitous cultural techniques of control (Ajana, 2013; Pugliese, 2010; Vukov and Sheller, 2013). As Vukov and Sheller (2013) point out, “surveillance, biometric tracking, and predictive policing ... overspill the airport and enter

all aspects of society” (page 228). As a result, the process of bordering becomes pervasive and unlimited precisely through its immediate connection to individual bodies. “[T]he body”, argues Amoore (2006), “becomes the carrier of the border” (pages 347–348). Hence, the biometric border is everywhere. It becomes “a condition of being” and is “never entirely crossed, but appears instead as a constant demand for proof of status and legitimacy” (page 348).

The introduction of biometrics in border control has two main objectives (Ajana, 2013, page 3; Popescu, 2011, pages 110–111). Firstly, the aim is to *verify* identities by comparing passport or ID card information with the biometric characteristics of the individual carrying the documents. Secondly, the purpose is to *establish* identities. This second purpose requires databases that contain the biometric characteristics of a large, and rapidly growing, number of people, and demands “additional information about people’s everyday lives that can be electronically mined to reveal patterns of behaviour and association” (Popescu, 2011, page 111). Seen from this perspective, the biometric border constitutes an “interface between the corporeal, or materially manifested self, the body, and the data-double, or dossier it represents” (Muller, 2008, page 128). Through these technologies, each human body potentially becomes constitutive of a variety of data-doubles, the enactments of which entail real material effects.

Biometrics as a form of identity management transforms the body into “processable, storable and retrievable information” (Ajana, 2013, page 7). According to Ajana, “this blurring [of] boundaries between ‘the body itself’ and ‘body as information’” (page 7) carries significant ethical and political implications. In biopolitical regimes of security, biometrics as a technique of bordering gives rise to a “biometric citizenship” that is “‘disjoining’ and ‘thinning’” (page 158) the original concept’s political dimension. Within a framework characterized by neoliberal governance, argues Ajana (2013, page 13), the increasingly ubiquitous deployment of biometrics is justified through the constant mobilizing of affects such as fear from terrorism or distrust of the other that coconstitute the subjectivities of both a docile and ‘hyper-vigilant’ biometric citizen and an excluded and demonized global immigrant.

As a salient dimension of iBorder, the technological apparatus and institutionalized social practices of biometrics informationalize bodies and afford an individuation of the bordering process in that the border dislocates and attaches itself to human beings wherever they move. While improving permeability at actual state borders for privileged normative subjects, these mechanisms of security prove problematic, and at times indeed fatal, for individuals whose profiles do not correspond to an implied norm.

Dataveillance: bordering networks

Adey (2009) has pointed out that contemporary techniques of bordering are characterized by two distinct tendencies—individuation and massification. On the one hand, as I noted in the section above, biometric technologies make possible the verification and establishment of specific individual identities. On the other hand, however, new forms of profiling enable a massifying trajectory that enlists abstracted patterns of life in anticipatory forms of governance directed at populations. Here, massively gathered data feed into predictive analytics and a politics that is aimed at anticipating and preempting potential future behaviours on the basis of probabilistic assessments (Andrejevic, 2007; 2013; Lyon, 2014; Mayer-Schönberger and Cukier, 2013; Pötzsch, 2014).

Today’s societies are characterized by pervasive information and communication technologies that are “embedded in just about anything” and that “will often be invisible and ... undetected by the casual observer” and that not only receive but also constantly emit data that “can go anywhere” (Pimple, 2014, page 2). Smart phones, computers, credit cards, e-tickets, and GPS-based maps become increasingly ubiquitous tools that improve everyday life, but at the same time often tacitly collect and emit data about their users. These data

are mined and analyzed by way of algorithms that identify patterns and possible deviations to inform security-related and business-related practices (Andrejevic, 2013; Lyon, 2014; Mayer-Schönberger and Cukier, 2013).

Amoore and De Goede (2005, page 160) have argued that “a conjunction of targeted governance and dataveillance” presently transforms the border into a boundless “virtual site through which the behaviours and daily practices of populations can be made amenable to intervention and management”. At the ubiquitous and embodied contemporary border the ability of state agencies to gain access to, and productively process, population-level communication and connection data becomes pivotal to regimes of security and control. The recently revealed capacity of the US National Security Agency (NSA) and its British counterpart, the Government Communications Headquarters (GCHQ), to clandestinely survey global communications provides a good example for this “Big Data/surveillance link” (Lyon, 2014, page 4) that efficiently fuses state practices and commercial conduct in the management of populations.⁽⁶⁾

NSA and GCHQ programmes and units such as PRISM and tailored access operations are targeted at key nodes of global networks and directly tap into material infrastructures such as fibre-optic cables, cell-phone towers, and computer hardware. The agencies acquired routine access to the servers of technology companies such as Microsoft, Google, Yahoo, Facebook, and Skype and successfully compromised security applications, router services, and encryption tools. NSA and GCHQ data mining and mapping applications such as XKeyscore, Boundless Informant, Co-Traveller, and Tempora are employed to sift through the vast amounts of assembled data and identify suspicious patterns and deviations, and to create digital fingerprints of individual users that can be tagged and tracked worldwide (Appelbaum et al, 2013; Ball et al, 2013; Gallagher, 2013; Gellman and Soltani, 2013; Greenwald and MacAskill, 2013). The introduction of Deep Packet Inspection Internet protocols that enable routine access by Internet service providers to the content of data packages they convey bring even more types of information into the reach of these agencies (Bendrath and Mueller, 2011; Fuchs, 2013).

Besides information extracted from routinely surveyed data flows, supposedly protected networks, and hardware, users’ emotional and affective responses to day-to-day stimuli are increasingly moved within the purview of data miners. Adey (2009, page 275), for instance, notes the significance of “microgestures and outward expressions of emotion ... like shock, surprise, disgust, or confusion” for airport security, while Andrejevic (2013, pages 56, 80) points to new forms of data acquisition and data mining that not only target users’ conscious online activities and social networks, but also register preconscious and unconscious expressions of sentiment or track eye movements and body language. These attempts to “decode everyday life” in all its aspects (Berry, 2013, page 35) open up a new form of anticipatory politics that draws not only upon users’ deliberate expressions and explicit social networks, but also instrumentalizes unconscious traces of affect and emotion.

The purpose of this shift from “targeted surveillance ... to generalized surveillance in which everybody can be monitored all the time” (Andrejevic, 2014, page 55) is not to identify and, if need be, hold, contain, or destroy specific individuals, but to produce “actionable information” (Andrejevic, 2013, page 26) on potentially threatening patterns emerging from the statistical aggregates of clandestinely surveyed mass behaviours, affective engagements, and unconsciously expressed preferences. In other words, one no longer has to know who a person (really) is to be able to assess a degree of assumed threat. Rather, a tracking of movement and association, combined with a mapping of behaviour and affective responses, serves as the basis for an identification of algorithmically determined deviations from a

⁽⁶⁾The files leaked by former NSA contractor Edward Snowden can be accessed here: http://en.wikipedia.org/wiki/PRISM#The_Slides. For an in-depth interview carried out by German television channel NDR with the whistleblower, see https://archive.org/details/snowden_interview_en

calculated norm that triggers increasingly automated mechanisms of inclusion and exclusion. As a consequence of this, “the physical jurisdictional border seeps into data and databases” (Amoore and De Goede, 2008, page 176). Mundane practices of everyday life become the implicit basis for predictive designations of the exception that potentially extend and redraw the border “across ordinary spaces [and] the routines of daily life” (page 177).

Adey (2009) argues that, unlike biometrics, algorithm-driven forms of bordering posit the individual not as a static entity that can be properly identified, but as being in a process of constant becoming—“as in-formation” (page 285)—with contingent, yet increasingly predictable trajectories. Within this regime of security, Adey continues, “the indeterminacy of the body constitutes a sort of threat [and] thus needs to be secured via a preemptive logic of predicting” (page 285). This indeterminacy, however, also opens up a constitutive effect of these technologies that, in framing practices and agencies, might become productive of the very intentions and patterns of life they allegedly merely serve to identify.

The sheer amount of data assembled by the applications discussed above by far exceeds the processing capacity of human interpretation and, therefore, increasingly necessitates algorithm-driven forms of analysis to extract actionable information that can inform decision-making processes. Thus, in the era of iBorder, machinic forms of perception and cognition to a growing extent predispose practices and regimes of inclusion and exclusion.

Automation: bordering machines

Late modernity is characterized by an increasingly intimate interconnection of humans and technology. From notions of humans as prosthetic beings that are individuated by technologically afforded processes of retention (Stiegler, 1998; 2009) to descriptions of responsive and proactive technical environments that enable new forms of distributed cognition and a coevolution of humans and machines through technogenesis (Hayles, 2012), the impact of pervasive information and communication technologies on virtually all areas of life and practice has been widely acknowledged. Additionally, in contemporary regimes of biometric and algorithmic bordering, advanced robotics and algorithmic forms of cognition play increasingly important roles. The sociotechnological apparatus of iBorder, it seems, acquires the capacity to see, think, and act by itself.

According to Singer (2009), after a computational revolution from the late 1970s onward, we are now faced with a revolution in robotics that is “fundamentally different” from all preceding technologically afforded changes and will lead to “even more momentous” sociopolitical and cultural transformations (page 7). Present situations where “AI systems are ... making life-and-death and/or multi-million-dollar decisions without direct human intervention” pose reason for concern, Pimple argues (2014, page 1), while Bauman and Lyon (2013, page 86) assert that a growing remoteness and automation of acts of violence entail a “progressive and perhaps unstoppable liberation of our actions from moral constraints”. Robotic ‘human-out-of-the-loop’ weapons and surveillance systems are increasingly salient features of contemporary border control and warfare (HRW, 2012, page 2) and lead to “a crisis of juridical categories” (Chamayou, 2013, page 291) that demands a reconsideration of fundamental questions regarding humanism, responsibility, and ethics.⁽⁷⁾

The emergence of ‘smart’ borders in the US and EU, for instance, entails a growing automation of bordering processes.⁽⁸⁾ Increasingly interoperable systems such as NEXUS,

⁽⁷⁾ My translation; French original reads: “une crise des catégories juridiques”.

⁽⁸⁾ Apparent advantages of ‘smart’ borders such as avoidance of human error, reduced corruption, increased speed of assessments, and less involvement of emotions, might quickly revert to their opposite. For instance, increased speed might entail less accuracy and an inability to include individual context, while less emotion might translate into a reduced capacity to make ethical decisions. For the positive sides of current EU migration management regimes, see, for instance, Favell (2014).

TSDB, Eurodac, or Schengen Information System II (SIS II) enable a prescreening, sorting, and categorizing of travellers “‘upstream’ of the actual location where documents may be checked” (Lyon, 2008, page 42). The contemporary smart border is, therefore, predicated upon a growing technological capability to combine RFID-equipped biometric passports and ever-more interoperational databases with algorithm-driven predictive analytics to tier border-crossing procedures and tacitly select particular individuals for further screening or, ultimately, detention.

A majority of these processes are performed without the knowledge of travellers and form a ubiquitous background activity that tacitly increases permeability for ‘trusted’ travellers and slows down the traffic of patterns of life and identities that are algorithmically determined as posing potential risks (Amoore and De Goede, 2008; Broeders, 2007; Muller, 2008; Popescu, 2011). These new techniques of bordering outsource control procedures to both citizens and the private sector, often emerging at points of intersection between economic and state-based interests, actors, and institutions (Côté-Boucher et al, 2014; Sparke, 2006).

The technologies of automated data acquisition and assessment at the various dislocated ports of entrance in the US, EU, and other industrialized countries have not yet come to full fruition. Often, technical problems, privacy regulations, and varying national jurisdictions and capabilities hamper fully automated and interoperable machinic border work (Tsianos and Kustner, 2012; Walters, 2011). Still, as Lyon (2014) has argued, the increased potentials to fuse commercial and state practices of tacit surveillance and data collection for security purposes enable a form of algorithm-driven “categorical suspicion” (page 10) that carries severe consequences for certain nonnormative subjects. This becomes particularly palpable in the use of big data predictive analytics in contemporary drone warfare.

Studies taking up the interrelation between drone warfare and borders often revolve around the way in which unmanned aerial vehicles deterritorialize warfare, blur distinctions between military and police action, and subvert the sovereignty of nation states (Alston, 2011; Gregory, 2011a; Neocleous, 2013). However, drones also emerge as integral elements of contemporary processes of bordering. Like the smart border, drone technology implies an increasing influence of autonomous acquisition and algorithm-driven assessments of population-level behavioural data and connection data on sovereign practices of inclusion and exclusion.

US drone strikes today are carried out on the basis of a disposition matrix, or kill list—a constantly evolving database that brings forth two types of targets and strikes (Chamayou, 2013; Holmqvist, 2013; Shaw, 2013): Firstly, personality strikes, that are directed at specific individuals that have been ‘manually’ identified by Pentagon or CIA operatives, and secondly, signature strikes where targets are not personally identified but exist merely as “digital profiles across a network of technologies, algorithmic calculations, and spreadsheets” (Shaw, 2013, page 540). These latter strikes target specific “patterns of life” and “behavioural potentialities” (page 548), including the blurry designation “affiliate” (page 545), that emerge from autonomously compiled and analyzed sets of globally acquired and exchanged sets of big data. Specific knowledge about individual identities in context is, in these cases, replaced by automated correlations of abstracted patterns—a form of “militarized rhythmanalysis” (Gregory, 2011b, page 195)—as the basis for threat assessments and life-and-death decisions.

In spite of apparent tactical advantages in relation to the management of borders and battlefields, recent developments in robotics, drone technology, and automated target acquisition entail ethical, political, and strategic consequences that need to be addressed (Bauman and Lyon, 2013; Benjamin, 2013; Chamayou, 2013; CIVIC and HRC, 2012; HRW, 2012). Chamayou (2013), for instance, asserts that the “problem [with automated target acquisition]—epistemological as well as political—resides in the alleged capacity to adequately convert an image constructed through a compilation of probabilistic indices

into an ascertained status of legitimate target” (page 74).⁽⁹⁾ Andrejevic (2013), on the other hand, cautions that algorithm-driven big data analytics “reframes sense-making according to a very narrow definition” (page 34) and leads to a “privileging of prediction over explanation” (page 24) that brushes over contingencies and precludes attention to the specific, individualizing contexts and frames of situated phenomena.

In a “post-comprehension era of information processing” (Andrejevic, 2013, page 35), algorithm-driven techniques of data mining and predictive analytics increasingly challenge and gradually replace human interpretation and understanding as the preeminent means for establishing factual grounds for policy recommendations and economic decisions. As a “speculative faith in systems designed to read ‘big data’” (Bauman et al, 2014, page 125) becomes increasingly common, more and more areas of life and practice are predisposed by probabilistic assessments that reduce contingent processes of understanding to allegedly objective results of mathematical calculations (Sharkey and Suchman, 2013).

The practices of signature strikes and algorithmic categorization at the smart and tiered border provide renewed urgency to critical questions regarding an axiomatic differentiation between the human and the nonhuman. According to Holmqvist (2013), the networked “drone’s capacity to ‘see’ and ‘interpret’” (page 544) calls into question a traditional “subject–object distinction” (page 544) that neatly distinguishes between human agents and supposedly passive dead matter. The drone as part of a complex human–machine assemblage acquires “agentic capacities” (page 545) in that it autonomously filters available information, selectively informs decision-making processes, and autonomously executes strikes (Bauman and Lyon, 2013, page 88). Under epistemological conditions such as these, Amoore and De Goede (2008) warn, governance is deferred “into a series of calculations” (page 180) and detached from democratic institutions and processes.

In ubiquitously networked and sensor-saturated, responsive technical environments, machines become important actors in the bordering process. As the examples above have shown, a significant portion of border work today is executed by autonomous, interoperational technologies that, among other things, “algorithmically designate and classify the population” (Amoore and De Goede, 2008, page 179). Such developments entail a dispersion of sovereign power and governance not only across a docile populace increasingly disciplining and controlling itself (Van Houtum, 2012), but also across complex machinic networks and human–nonhuman assemblages. The various human actors who practise vernacular forms of inclusion and exclusion at the dispersed localities of the contemporary borderscape (Bigo, 2014; Hall, 2012) are therefore accompanied by machinic ones that exert an algorithmically predisposed agency through networks, filters, and databases.

The increased capacity of robots and machinic forms of perception and cognition to inform contemporary border work claims a new understanding of vernacular processes of bordering that point beyond a preponderance of human agents. Not least Stiegler’s (1998; 2009) ontological category of formed matter and the approaches to cultural techniques associated with the work of, for instance, Winthrop-Young (2013), Siegert (2013), and Geoghegan (2013) draw attention to potential coconstitutive impacts of the machinic operations and procedures of iBorder.

The emergence of iBorder

The “hip, tricky little ‘i’” (Andrejevic, 2007, page 4) in iBorder points to a series of technologically afforded tendencies in contemporary bordering that interconnect subjects, operations, and machines in complex coconstitutive assemblages (see table 1). Firstly, iBorder

⁽⁹⁾My translation; French original reads: “Mais tout le problème—problème épistémologique, problème politique—réside dans cette capacité revendiquée de convertir adéquatement une image construite par compilation d’indices probables en statut certain de cible légitime.”

informationalizes the body and enables its virtual emergence as “data-doubles” (Muller, 2008, page 128) in interoperable databases. Secondly, iBorder *individualizes* the border. It attaches itself to mobile bodies by means of increasingly transparent technical interfaces and biological and behavioural markers. The body thus becomes “the carrier of the border” (Amoore, 2006, page 348) that moves along wherever subjects may go. Thirdly, iBorder *implicates* subjects in the bordering process in new ways. New technologies of ubiquitous surveillance and dataveillance in a “digital enclosure” (Andrejevic, 2007, page 2) record, and subsequently exploit, day-to-day practices to establish implicit norms against which potential deviations can be measured. Fourthly, iBorder is *interactive* in that its constitutive technologies afford constant feedback loops that afford ever more sophisticated forms of “hypercoordination and microcoordination” (Thrift, 2004, page 185). Fifthly, iBorder *infringes* upon personal rights and constitutively undermines the private sphere of citizens, and lastly, iBorder is *intimidating* in that its techniques and applications are justified with reference to allegedly pervasive threats and dangers creating the discursive basis for a “neurotic citizenship” (Ajana, 2013, page 143). As a consequence of these tendencies, borders as bounded topographical locations or zones recede and reemerge as iBorder—an ephemeral, technologically afforded aura that attaches itself to the subject and that transforms Agamben’s (1998) overflowing spaces of the exception into a pervasive relational ‘banopticon’ in the sense of Bigo (2007).

iBorder refers to a sociotechnological apparatus that employs techniques of biometric and algorithmic bordering to validate, establish, and indeed produce, identities and patterns of life. The deployed practices enlist individual subjects as both target and source in bordering processes that disperse locally as well as across transnational space. In these processes, individuals become objects of governance to be analyzed and assessed, but also serve as implicit contributors to the databases enabling algorithm-driven mappings of patterns of behaviour and association.

So far, I have conceptualized the sociotechnical apparatus of iBorder to highlight the technological infrastructure implying a potential for pervasive transnational surveillance and control. However, as Walters (2011) rightly points out, researchers should avoid apocalyptic stances that take at face value the pretensions of a global security apparatus composed of clandestinely operating state actors and private companies with vested economic interests. Rather, Walters (2011, page 55) suggests, critical research should focus on “the fissure and limits” of sociotechnical systems of control and show that these systems “are often not as purposeful and coherent as they might sometimes appear”.

Table 1. Sociotechnical dimensions of iBorder

iBorder		
Biometrics	Dataveillance	Automation
Physical biometrics	Network ubiquity	Predictive analytics
Behavioural biometrics	Data mining	Responsive technical environments
Remote scanning	NSA (for example, XKeyscore, Boundless Informant, and Co-Traveller)	Robotics: drones, border bots, spyware
Biometric and RFID-equipped passports/ID cards	GCHQ (for example, Tempora)	Patterns of life analysis (signature strikes, upstream profiling)
Interoperational databases	DPI	
Bordering bodies	Bordering networks	Bordering machines

Making a similar argument, Bigo (2007; 2014) points to the fact that contemporary border research exhibits a “lack of attention to the dispositions of the agents and the contexts” of bordering processes (2014, page 211), and therefore often remains oblivious of the ‘microphysics’ of power and of the capacities “of the weak ... to subvert the illusory dream of total control” (2007, page 12).⁽¹⁰⁾ As Raley (2013, page 131) points out, all “constellations of control are imbricated with constellations of expressive resistance”.

Walters (2011, page 58) proposes an alternative methodological template to direct empirical attention to what he terms ‘technological work’—the mundane day-to-day activities and performances that “go into making technology function” (page 59) or that might compromise their outcomes (page 54). Articulating a similar criticism to Perkins and Rumford (2013) in their appeal for a vernacularization of border research, Walters (2011) asserts the significance of everyday practices for processes of bordering, but extends the scope into a highly technologized area of surveillance, management, and control.

The following section will focus on the mundane practices that coconstitute and constantly negotiate the apparatus of iBorder. In redirecting attention from a description of sociotechnological frames to an exemplification of the ontic operations that constantly actualize and subvert the various potentials inhibiting these frames, I also shift attention from technology to cultural technique. This move enables me to highlight, with concrete examples, the mutually constitutive impact of technologies, operational practices, and subjectivities.

From sociotechnical apparatus to ontic operations: practices of iBordering

In a description of potential political dynamics connected to the sociotechnical apparatus of iBorder, ambitions of comprehensive surveillance, management, and control must be carefully separated from the often messy realities of their incremental day-to-day implementation (Bigo, 2014; Côté-Boucher et al, 2014; Walters, 2011). Even though, for instance, a transition from Schengen Information System I (SIS I) to SIS II and the gradual extension of programmes and databases such as NEXUS, TSDB, EU-LISA, and Eurodac bear witness to a tendency of further integration that constantly brings new types of data and new groups into the purview of increasingly interconnected security agencies, a flawless functioning and comprehensive interoperability of these technologies has not been reached. Posing the question of the ontic operations that underpin the sociotechnical apparatus of iBorder means, in this context, to address the limits and fissures of biometrics, dataveillance, and automation, and to look into the day-to-day practices through which these techniques are implemented, negotiated, and subverted by both human and machinic actors.

Drawing on the example of the Eurodac fingerprint database, Walters (2011), for instance, notes the complex technical, political, and socioeconomic negotiation processes behind the establishment and effectuation of common standards that enable the interoperability of databases and registration technologies. At the same time, he directs attention to the concrete, material practices that underlie the use of these technologies in the context of day-to-day migration controls by both border guards and migrants. Summing up his main points, he writes,

“All these practices of scanning, inspecting, profiling, investigating—practices which form the material substrate of any control regime, and of any attempt to normalize migration flows—depend in turn on the ability to normalize the size of the photo in the passport, the look on the face of the bearer, the exact location of the photograph in the passport and of course the many other protocols governing the way it encodes and transmits data” (page 65).

⁽¹⁰⁾ Bigo (2007) directs this criticism specifically at Agamben’s (1998) notions of sovereignty and the exception.

Walters (2011) illustrates how the mundane technological work of border control frames subjectivities and predisposes practices along normative lines implied by a sociotechnical apparatus.

Tsianos and Kuster (2012, page 35) also use the example of the Eurodac system to highlight the “internal complexities of the digital border”. In their report on EU border work at locations in Germany, Greece, and Italy they detail migrants’ strategies to avoid registration, point to erroneous manual categorizations of travellers and to the problems posed by halting transitions from analogue to digital filing systems, and show how European treaties such as Dublin II create implicit incentives for local agents to appropriate technological solutions for the purpose of misrepresenting migration routes in order to avoid national responsibilities. Taken together, their empirical findings suggest “a fundamental split in the desire for digital control” (page 23) that is drawn between ambitions of comprehensive management and the contingencies inherent in daily control practices, shifting technical standards, and resistant counterperformances.

Shaw (2013), Gellman and Soltani (2013), and Greenwald and Scahill (2014) have pointed to some of the everyday, pragmatic realities behind, and challenges to, the sociotechnological practice of signature strikes. Gellman and Soltani (2013) and Shaw (2013) assert a fundamental contingency, and therefore inherent ambiguity, of association data generated by NSA programmes such as Co-Traveller that map parallel movements of mobile phones to target so-called ‘affiliates’ (Shaw 2013, page 545), while Greenwald and Scahill (2014) detail some of the strategies deployed by insurgents in Afghanistan and Pakistan to elude automated target acquisition processes—for instance, by randomly exchanging or distributing SIM cards.

Examples such as the ones above point to an apparent gap between rhetorics of effective ubiquitous surveillance and control on the one hand, and limited technological capabilities, errors, and effective countermeasures on the other. Such attention to unavoidable inconsistencies, contingencies, and failures also brings to light constitutive potentials inherent in the practice of bordering as a fundamental cultural technique.

For instance, the repeated errors, deliberate misidentifications, and effective countermeasures detailed in Tsianos and Kuster’s (2012) report lead to compromised inputs into databases and thereby to flawed assessments that, nevertheless, inform policies and day-to-day performances. Yet, as Walters (2011) shows, technical standards and procedures often predispose the enactment of the subjectivities they assess and process, while Greenwald and Scahill (2014) note the fact that data acquisition devices can be tricked to generate flawed targets that, nevertheless, cause material impacts and, in this way, might become generative of counterbehaviours that, in the long run, coalesce into patterns algorithmically resembling ‘guilty’ forms of life.

Current technological border work often responds to challenges, threats, and risks that exist only as patterned information in large-scale databases that are riddled with errors and ambiguities (Devereaux and Scahill, 2014; Tsianos and Kuster, 2012). Nevertheless, these patterns of digital information entail real consequences that feed back into the agencies of subjects and, so, become coconstitutive of the social world. As De Goede et al (2014, page 416) put it, preemptive and predictive approaches to security are “performative in the sense that they attempt to produce the effects that they name”.

Making reference to the roles of dataveillance and big data analytics in the global war on terror, Raley (2013, page 128) asserts that “our data bodies are repeatedly enacted.” As a result, she continues, “data is ... performative: the composition of flecks and bits of data into a profile of a terror suspect, the regrounding of abstract data in the targeting of an actual life, will have the effect of producing that life, that body, as a terror suspect.” In first digitally dissecting (Amoore and Hall, 2009) and then reassembling complex identities, the automated

operations of biometric and algorithmic border work have the capacity to performatively actualize various possible versions of contingent subjectivities that, nevertheless, entail material effects. In these processes, argues Bigo (2014, page 219), nonnormative populations are transformed into “prisoners of data-double associations and virtual anticipations” that, in framing perceptions and performances, become partly productive of the very categories they purport to identify.

Paraphrasing Geoghegan (2013, page 69), one can argue that the agents, technologies, and operations that constitute the current cultural technique of iBordering “reciprocally and recursively modify and formalize” one another. The patterns giving rise to categories such as trusted traveller or terrorist threat are not necessarily revealing actual features of the world but form the basis for the practical implementation of measures that provide posthoc relevance to these patterns. In other words, the sociotechnological apparatus of iBorder not only processes given practices that actively coconstitute contingent subjectivities and patterns of life, but also predisposes these practices.

A similar logic amounts to the ways through which contemporary technological border regimes and procedures form and mould the agents implementing everyday border work. The subjectivities of, for instance, border guards or detention officers are predisposed by the input and affordances of machinic operations and legal procedures that frame their performances and in this way actualize particular contingent identity potentials (Hall, 2012). Here, the cultural techniques of contemporary bordering “generate the subjects that, retrospectively, come to understand themselves as the preconditions and nodal points of their very operations” (Macho, 2013, page 44). Thus, what emerges through the concepts of iBorder and iBordering is a form of power that is not only limiting and oppressive, but productively operates on the agency of subjects and, consequently, becomes coconstitutive of relations, practices, and subjectivities.

Conclusion: bodies, populations, and power at the border

Foucault (2007, pages 1–11) distinguishes between three mechanisms of power: the legal system, disciplinary mechanisms, and security apparatuses.⁽¹¹⁾ The legal system is vested in binary distinctions between allowed and prohibited, and relies upon coercion and punishment to maintain order. Disciplinary mechanisms still maintain forms of coercive punishment, but supplement those with logics of surveillance as well as penitentiary techniques to correct perpetrators. Both the politico-juridical and the disciplinary mechanism are “essentially centered ... on the individual body” (Foucault, 2004, page 242) and mould individual subjectivities and performances. Security apparatuses, however, aim at regulating populations. Foucault (2004, page 243) claims that “after the first seizure of power over the body in an individualizing mode, we have a second seizure of power that is ... massifying, that is not directed at man-as-body but at man-as-species.” As a consequence, practices of detention, incarceration, discipline, and, if need, be eradication are supplemented by future-oriented regulatory regimes vested in statistical assessments of abstracted risks to populations and the cost–benefit ratios of these risks.

This change in the mechanisms of power initiates a transition in politics from a disciplining “anatomo-politics of the human body” to a preemptive “biopolitics of the human race” (Foucault, 2004, page 243), where the latter “derive[s] its knowledge from, and define[s] its power’s field intervention in terms of, the birth rate, the mortality rate,

⁽¹¹⁾ Following Bauman and Lyon (2013, page 52), who criticize an overuse of Foucault’s concept of the panopticon to explain surveillance, I explicate the underlying logics of iBorder and iBordering with reference to three forms of power and their varying coconstitutive relations to technologies, agencies, and subjects. In this context, the panopticon would describe only the *modus operandi* of disciplinary power.

various biological disabilities, and the effects of the environment” (page 245). Biopolitics, therefore, draws upon phenomena that are accessible merely through statistical approaches generating forecasts and estimates, and looking for patterns of actionable information. What at an individual level remains aleatory and unpredictable (such as the actual life span of an individual, or the true intentions of a particular traveller) exhibits constants and becomes amenable at a collective level. In this line of thought, the threat of death is supplemented by attempts to influence mortality rates, while a focus on actual perpetrations is accompanied by probabilistic assessments of possible intentions to manage potential future behaviours.

According to Deleuze (1992, pages 4–5), the rapid spreading of digital technologies entails deterritorializing dynamics that lead to a gradual transition from state-based and institution-based disciplinary societies to inherently boundless, market-based ‘societies of control’. In this process, power is no longer productive of docile individual bodies alone, but also of digitized data-doubles, or ‘dividuals’, whose contingent identity potentials entail performative sociopolitical effects that feed back into the bodies, subjectivities, and agencies they originated from. Such coconstitutive relations between technologies, agents, and operations also lie at the heart of an understanding of bordering as a fundamental cultural technique.

According to Pugliese (2013, page 21), contemporary mechanisms and regimes of management and control disperse power globally “across multiple and mobile governmentalities”. As a result, former distinctions between inside and outside, public and private, or exception and normalcy are increasingly blurred. A pervasive form of governance extends the “capillary reach of state violence into the quotidian sites of civilian life” and establishes a form of “ubiquitous carcerality” that denies subjects “the promise of an elsewhere ... that would offer refuge” (page 26) from these conditions. An imminent “function-creep” of technical systems of surveillance and control entails “a spillover from exceptional spaces ... to the general body of humanity” (Ajana, 2013, page 6), transforming them into a “normative all-encompassing practice”. In this context, Agamben’s (1998, page 38) warning that “the state of the exception ... has transgressed its spatiotemporal boundaries and now, overflowing outside them, is starting to coincide with the normal order” appears to gain renewed urgency.

The concept of iBorder developed in this paper highlights the sociotechnical apparatus that affords the coconstitutive cultural technique of bordering in emergent control societies. Juridical and disciplinary aspects produce obedient and docile individuals through such mechanisms as biometric identification, ‘trusted’ traveller programmes, and ubiquitous (self-)surveillance, as well as the constant threat of decelerating searches, detention, and ultimately death. At the same time, a technologically facilitated biopolitical component draws upon algorithm-based predictive analytics and robotics to regulate flows of categories by identifying implied norms against which suspicious deviations can be measured, thus not only predicting and potentially preventing the occurrence of threatening patterns and compensating for their effects, but also framing and predisposing the very performances through which such patterns are brought forth and made relevant in the first place.

I argue that, in the same way that, according to Winthrop-Young (2013), corals, pens, and fences become productive of species of domesticated animals, contemporary technologies of identification, tracking, mapping, and mining that constitute the cultural technique of iBordering entail a biometric and algorithmic identity production that actively shapes the contingent bodies, subjectivities, data-doubles, and patterns of life they purport to identify and process.

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