article

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# of techno-ethics and techno-affects

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abstract

As digital labour becomes more widespread across the uneven geographies of race, gender, class and ability, and as histories of colonialism and inequality get drawn into these forms of labour, our imagination of what these worlds contain similarly needs to expand. Beyond the sensationalist images of the 'brogrammer' and the call-centre worker lie intersecting labour practices that bring together histories of bodies and materiality in new ways. In the recent past, these entanglements have yielded oppressive results. As scandals over predictive policing, data mining and algorithmic racism unfold, digital labourers need both to be accounted for in analyses of algorithmic technologies and to be counted among the designers of these platforms. This article attempts to do both of these by highlighting particular cases in which digital labour frames embodied subjects, and to propose ways digital workers might train themselves to recognise ethical problems as they are emerging. I use the idea of attunements as a way to grasp what these forms of care might look like for the digital worker.

keywords

ethics; digital technologies; data; labour; race; attunements

> No one can predict exactly what tomorrow will bring (though somewhere in the tech world, someone is no doubt working on it.) So until we get that crystal ball app, the best we can hope to do is anticipate the long-term social impact and unexpected uses of the tech we create today.[1]

Calls for practicing ethics in technological domains seem to increase with each new scandal over data privacy, surveillance, election manipulation and worker displacement. Some of the most visible responses to date, such as that of the Ethical OS, created by the Institute for the Future, a non-profit think tank located in Palo Alto, California, distil ethics into a series of tests that can be administered by companies' leadership teams to 'future-proof' their products. While such efforts emphasise the long-term effects of digital technologies, they provide little guidance—apart from declaration by company fiat—on how ethical concerns might be incorporated into technical processes. These approaches moreover treat ethics as a series mandates from the top, to be developed by CEOs and applied by designers. A robust techno-ethics requires that these top-down trends be reversed.

By drawing on a theory of attunements developed by feminist affect theory, I offer 'rules of thumb' instead of rules of behaviour, approximations that are subject to adjustment. Feminist theory, in conversation with queer, postcolonial and decolonising science and technology studies, have developed a relational approach to ethics, which asks whose knowledge counts—and in what ways—in technical domains (Harding, 1992; Haraway, 2016; Chakravartty and Mills, 2018). These disciplines centre gendered, raced and disabled bodies to produce radical approaches to ethics (Chan, 2014; Keeling, 2014; McGlotten, 2016 [2014]; Benjamin, 2019). As Jarrett Zigon (2014, p. 19) suggests, moving from rules to attunements allows us to reframe ethics as being about maintaining relationships and broaches the question of what kinds of beings, both human and non-human, are presupposed in any ethical arrangement.

Techno-ethics can be revitalised through techno-*affects*. In my fieldwork and the fieldwork of others, three themes surface in the elaboration of techno-ethical approximations: corporeality, sovereignty and glitches. By moving through a series of examples, I offer a techno-ethics that treats those marginalised within technical systems—like immigrant debuggers and victims of drone strikes—as holding the kind of knowledge needed to make better decisions about the social, environmental and embodied costs of digital economies. I am not arguing that techno-ethics should be replaced by techno-affects. Rather, I am suggesting that attention to affect—how subjects and technologies are aligned and realigned, attached and reattached to one another—is a method for practising ethics that critically assesses a situation, imagines different ways of living and builds the structures that make those lives possible (Fornet-Betancourt *et al.*, 1987; Ahmed, 2004; Dave, 2010).

My argument proceeds in two parts. First, I detail how we can fold the insights gleaned from global feminist critiques of science and technology into a discussion of ethics. Second, I use the idea of attunements, the drawing together of technical and human beings in a particular context, to draw out three contemporary sites where techno-ethics are being developed today.

techno-ethics as rules for decisions

The Ethical OS—OS standing for operating system—is a laudable attempt to bring a discussion of ethics into the boardrooms of tech firms. The toolkit identifies major areas of concern in the development of

[1] Ethical OS, https://ethicalos.org/ [last accessed 15 May 2019].

new technologies, ranging from predictive sentencing of prisoners based on racial and gender markers to the use of artificial intelligence (AI) to produce fake videos. It then asks companies to consider how their products in development might contribute to any of these eight risk zones. Once a company has identified an area of risk, the toolkit guides it towards strategies to assuage that risk. These strategies include: requiring students of computer science and related fields to take a training sequence in tech ethics, developing a Hippocratic oath for data scientists, paying employees for identifying major potential social risks of new products, developing a list of possible red flags, developing metrics to gauge the health of technology platforms, and requiring a licence for software developers.

While this approach has several advantages, it also reproduces the problems that have produced unethical technology in the first place. The Ethical OS is consistent with a line of thinking on technological ethics that emerged from the profound crises that beset mid-century Euro-American science, including Nazi experimentations on concentration camp prisoners in Germany and the Tuskegee Syphilis Experiment in the United States (Russert, 2019). Much of this ethical practice culminated in institutional safeguards such as review boards to protect human subjects in scientific research and in theories of planetary symbiosis (Roy, 1995; Haraway, 2016). One initiator of this period's work on techno-ethics, Mario Bunge (1975, p. 70), encapsulated these efforts as working against the foundational irony that the scientists, designers and engineers who have shaped the modern world often eschew responsibility for the effects of their designs, conceiving of themselves as 'mere instrument[s]' who are 'morally inert and socially not responsible' (see also Matthews, 2003).

Like Bunge's (1975) techno-ethical imperatives, the Ethical OS has the advantage of showing technologists directly how they might take responsibility for the things that they make; however, such rules-based approaches do little to solve the underlying problem of producing the conditions necessary to change this belief in technological instrumentality. The toolkit provides little guidance on how to know what problems the technology embodies or how to imagine technologies that organise life otherwise, in part because it fails to address who should be asked when it comes to defining ethical dilemmas. The approach, which addresses only three groups—trustees or board members, engineers and designers, and computer science professors—reinforces narrow definitions of who gets to make decisions about technologies and what counts as a technological problem.

Formulating techno-ethics through causal rules sidesteps discussions about how such things as 'worthy and practical knowledge' are evaluated and who gets to make these valuations. Postcolonial and decolonising feminist theory, on the other hand, moves the discussion of ethics from establishing decontextualised rules to developing practices to train sociotechnical systems—algorithms and their human makers—to begin with the material and embodied situations in which these systems are entangled, which include from the start histories of race, gender and dehumanisation (Weheliye, 2014; Benjamin, 2019). This principle is important for techno-ethics, because it both admits human imperfectability into the practice of ethics and suggests that imperfectability is the starting point for an ethical practice that is recursive and open to revision from below (Barad, 2007; Wajcman, 2010, p. 143; Zigon, 2018, p. 158).

The Ethical OS describes what Lorraine Daston (2017) calls the narrowing of the modern rule to its widest generality. In the history of rules that Daston explicates, rules have not always aimed for universal applicability. Until the late nineteenth century, bringing generalisation and example together made a

good rule, one that could move from particular to particular to make sense of context, define the shape of a category and define a general principle's applicability to extant cases (*ibid.*). Taking a page out of Daston's book, I now turn to attunements to illustrate how connecting particularities can create flexible generalisation, which can help determine an ethical course of action.

from rules to attunements

An attunement is an 'atmosphere for living' where actors come to feel that something is happening or becoming fixed (Stewart, 2011, p. 449). As Kathleen Stewart (*ibid.*, p. 452) affirms, attunements describe both an orientation among people, technologies and environments, and an opportunity for people to try to create new 'potential ways of living through things'. In this latter, active practice of attunement, the senses are trained through human actors and technical systems, both of which prompt different kinds of ethical engagements. I think of these attunements as training the senses, producing an embodied practice of recognising and then being able to act in technical situations, akin to a pianist who does not produce congealed labour but does, for Marx (1993 [1857/1858], p. 305), 'produce and satisfy our musical ear' and 'even to a certain extent produce[s] the latter'.[2]

For a project on techno-ethics, the idea of attunements has a further advantage: it proceeds from all the factors that go into creating a particular alertness to a situation. These factors include social relations; affective, political and climatic winds; and the labour that both humans and technical systems do. As a mode of pursuing ethics, attunements propose recurring attention to changing sociotechnical environments (Ahmed, 2004; Chan, 2014).

To tease out some of the particular atmospheres that emerge within digital, automatic and data-driven environments, I will use the remainder of the article to describe three kinds of attunements: corporeal, sovereign and glitchy. Of course, there are as many attunements possible as there are kinds of technical systems and relations to them. Indeed, new atmospheres are always in formation. I treat in depth these three because they tune the senses to technical systems as they move across a varied landscape of privilege and dissent.

corporeal attunements

Corporeal attunements elicit our sense of how bodies are trained, moulded and erased in the everyday operation of technological systems. Most often, designers of technical systems begin with a standard user and, in doing so, set into motion patterns of discrimination that are hidden by the assumption of system neutrality (Rosner, 2018). Bringing bodies into the story of technological development shows both how humans are shaped by technological systems and how these same bodies might become a resource for imagining a different future (Amrute, 2016).

This section analyses three scenes of corporeal attunements that cohere around South Asian subjects to show how bodies are trained and erased in the operation of sociotechnical worlds. The first scene

[2] Dipesh Chakrabarty (2002, p. 103) discusses this passage in his article 'Universalism and belonging in the logic of capital'.

describes how upper-caste, upper-class programmers from India are mobilised to be endlessly adaptable to the needs of industry and to changing immigration regimes. These adaptations train such programmers to be attuned to risk and risk mitigation. The second scene describes how lower-class Muslim women in India are erased from scenes of global participation in tech economies because of algorithmic filtering. In the third scene, I address a moment of training technological attunements to notice the different positioning of bodies in tech economies. I discuss a case of protesters in San Francisco combatting anti-immigrant sentiment in the tech industry. I further argue that corporeal presence is easier to tune in to than its erasure, in part because practices of erasure play a considerable role in the operation of the next attunement I discuss, that of sovereignty.

In my research on coders from South Asia living in Berlin, Seattle and San Francisco, I found that the continually changing visa regimes regulating coding labour contributed to programmers from India pursuing several different migration routes simultaneously. The protagonists of my ethnography would move from one project within a firm to another in order to extend the length of their visas, even while exploring possible temporary work visas for other countries should this strategy prove ineffectual (Amrute, 2016). For these workers, pursuing risk unfolded against an increasingly precarious visa regime, where, for instance, in the latest change to visa law, the US administration rescinded the H4 visa allowing spouses of visa-backed workers to also seek employment (Bhatt, 2018). Programmers from India adapted to moving from one bet to another and, within their jobs, to taking their social and technical tacit knowledge and making it available to the firm to monetise. Some of these strategies have yielded an entire industry to meet them, such as courses in cultural streamlining that train migrant tech workers to look, smell and talk in the 'right' way to be appealing to employers.

These kinds of attunements shape a self practised in the art of taking chances as a way of life, both to capitalise on qualities of personhood and to simply survive (Tadiar, 2013). Within these attunements, risk is 'something somatized as a way of being' (Martin, 2007, p. 21). Programmers from India come to embody risk as a habit of working to fit themselves into legal regimes that are designed to keep them moving from one site of labour to another.

Reema, a programmer from the city of Rajkot (in Western India), tells me about her particular strategies to take advantage of risky situations. She is currently enrolled in a school in California so that she can have a work visa, but she lives in Seattle. While she is studying, her visa also allows her to work, and she uses this loophole to maintain her job in Seattle. The MBA programme she is enrolled in is entirely remote; in fact, this programme was set up to cater to immigrants like her, and she found it while looking for jobs in the United States from India. She pays them about US$4,000 per semester for these barely existent courses. While this university has a campus and does run in-person classes, their online offerings require minimal work and result in certificates in various programming languages and business administration. Reema has to travel to California twice a year to attend an on-campus seminar to secure her place on these programmes. When I ask Reema why she feels she must continue with this arrangement, she shrugs and tells me she simply would not know what to do with herself if she did not work.

Reema was born into a middle-class Gujarati family with a long tradition of women who work outside the home. Her mother is a doctor who was encouraged by both her parents to study after high school in Bombay.

Reema began working right after her university degree in business administration with a specialisation in information technology. From her home in Rajkot, she started a business processes firm for Indian companies with some friends from college. Although the company did well enough to run several successful integration campaigns for their clients—where they would take a business and provide ongoing website support and build interfaces for users—after running the HR department for this company for a few years, Reema began to get restless. She looked for a new opportunity and decided to try California, where she enrolled in school and simultaneously went on the job market. Reema has internalised this pattern of life to such an extent that she changes jobs about every two years and plans to continue to work and study until she can become a permanent US resident. She also tries to tell her sister, who is still living in Rajkot, that she too needs to work harder in her programming classes. Reema tells me that she plans to employ her sister in her Indian firm as lead engineer, but only if her sister starts taking her studies seriously.

Reema's way of being in the world has been shaped by her strategies to capitalise on risk. These strategies push her, and even cause her to push her sister, to embody that risk by shaping her daily habits and long-term strategies to take advantage of all opportunities to convert short-term visas into permanent residency. Meanwhile, her employers and mercenary educational institutions produce capital from her corporeal attunement towards risk in the form of lower wages and temporary benefits as well as the tuition she pays yearly as the cost of maintaining her legal visa status.

Though mainstream Western discourses might frame Reema as a materialistic scofflaw, her attunement towards risk-taking intersects with a particular history of women's work in India. Reema and several other women with whom I spoke told me they had to convince their families that they should continue studying into their late 20s. One woman I interviewed in Seattle had studied graphic design in Mumbai, earning an MFA before getting married to a software engineer she met while in college. Together, they immigrated to the United States, she on a spousal visa and her husband on a temporary work visa called an H1-B. This woman, named Vimmy and in her early 30s, told me when we talked on the phone in our first interview that she was not ready to have children. She worked for a local corporation on her spousal visa as part of a web design team, but she now felt her work visa was under threat. The current administration had threatened to cancel all work permits going forward for spousal visas, called the H4ED visa. Vimmy had begun to organise a campaign to save the spousal work visa. When I sat down with her to talk about the protest campaign, Vimmy told me that for her and for many of the other women who come to the United States on spousal visas, sitting at home and not working 'is like moving backward'. After everything she did to prove to her parents that they should support her working and studying, Vimmy felt that if her right to work disappeared, her struggle would be devalued. She told me of another woman who fell into a deep depression when she lost her right to work due to changes in visa laws.

Her depression is one kind of techno-affect, an intense attachment that produces an alignment between a specific technological formation and a particular kind of subject. In this case, depression expresses how programming jobs signify freedom for Indian middle-class women, since this feeling is backed by histories of familial struggle against gender norms. This techno-affect describes the way these formations of gender meet the demands of becoming a risky subject, a union that passes through the global coding economies that concomitantly hold out the promise of programming jobs as sites of liberation and self-making, extend that promise only to certain categories of migrant, and withdraw that promise as a technique of economic efficiency.

While Reema and Vimmy attune themselves to capital economies by shaping themselves into the perfect risk-taking workers for corporate technical labour, Indian women from lower-class Muslim backgrounds must labour to be recognised as legitimate users of those technologies. In 2015, anthropologist Kathryn Zyskowski (2018) shadowed working-class Hyderabadi women from Muslim backgrounds as they sat through computer-training programmes to advance their careers. While their coursework covered the basics of word processing and using apps for photo editing and data collection, Zyskowski found that many women thought about computer literacy holistically. Their discussions included how to dress professionally as a Muslim woman and how to avoid cyberstalking. Many women regarded becoming computer literate as an aspiration towards entering an Indian middle class, and therefore not only strictly pursued career skills but also the technological and social trappings of a middle-class lifestyle. However, the very systems to which they aspired often applied sociotechnical filters to keep them out. In a particularly telling example from Zyskowski's (*ibid.*) research, a young woman named Munawar who enlisted the researcher's help to set up a Gmail account was rebuffed at several points. First, Munawar's chosen email address, which contained the auspicious number 786 (standing for Bismillah-hir-Rahman-nir-Raheem, in the name of God the most gracious the most merciful), was rejected because of the quantity of addresses using that number. Then, over the course of sending several test emails to Zyskowski, the email address was deactivated. Google's spam filters deemed the address a likely fake and automatically disabled it. Finally, after Zyskowski sent several emails to the account, taking care to write several lines and to use recognisable American English-language spacing, punctuation, forms of address and grammar, the address was reinstated. Zyskowski (*ibid.*) hypothesises that her interlocutor's imperfect English grammar, location, name and lack of capitalisation caused the spam filter to block the account.

The spam filter, as a kind of 'sieve', separated out 'desired from undesired materials' (Kochelman, 2013, p. 24). It did this work recursively, making correlations between a set of traits and fraudulent behaviour. As it did, the filter developed a 'profile' of a fraudulent account that also marked a population. For Munawar, the population was hers—Muslim, Indian, non-native English speaker. Once identified, the Google algorithm automatically suspended her account. Zyskowski—with her proper grammar, her United States location and her Westernised email address—was able to retrain the algorithm to recognise the new address as legitimate. This example shows one of the fundamental forms of corporeal attunement, namely the way bodies are trained to fit the profile of successful digital subjects. Those bodies that cannot form themselves correctly may not even know they have been excluded from its forms and react with perplexity to these exclusions (Ramamurthy, 2003). Notably, Munawar's other bodily comportment towards an everyday spirituality as embodied in the 786 had to be erased in order for her to be recognised as a member of a technological contemporary. Those without the correct comportment, which Munawar would not have achieved without the intervention of the US-trained anthropologist, become risky subjects to be surveilled at the peripheries of sociotechnical systems.

Such examples proliferate across algorithmic space. Faith in the results of algorithmic decision-making makes it seem like such filtering results are neutral effects of unbiased platforms. Meanwhile, that neutrality hides systemic bias that perpetuates negative stereotypes of minorities in policing, banking and hiring (Chun, 2013; Citron and Pasquale, 2014; Benjamin, 2019). In Munawar's case, the Google algorithm makes standard practices of the American nation state legitimate in order to filter out illegitimate users. Munawar, displaying the signs of Muslim threat to this standard, becomes a body unable to participate in global technological practices as simple as sending and receiving emails.

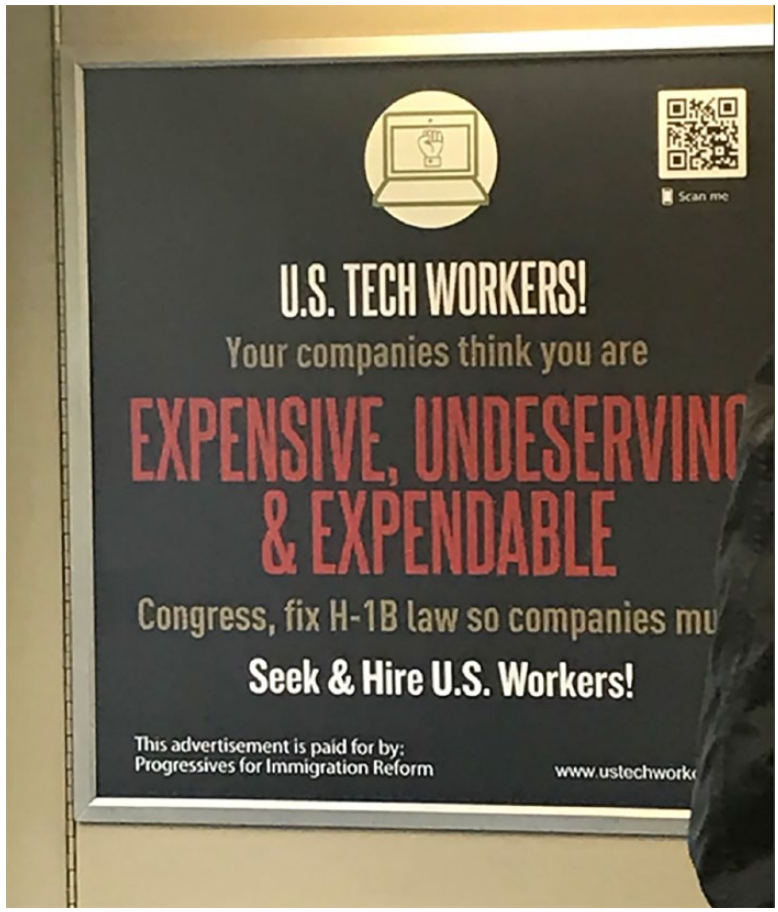

Figure 1 Anti-Immigrant Tech Worker poster, San Francisco
Source: Photograph courtesy of the Tech Workers Coalition (TWC)

Training corporeal attachment to bet on oneself as a way of being draws on uneven relations across and within national geographies. Munawar's position in these geographies makes her more vulnerable and simultaneously less visible within technological economies than Reema and Vimmy. Her position in global regimes of technological production emerges from procedures in the global regulation of technologies that associate the daily practices of Islam with illegitimacy. For Reema and Vimmy, their status is more ambivalent. Even while they are privileged because of their class and educational status, which in turn relies on their religious Hindu background and upper-caste status, they are exposed to populist, anti-immigrant regimes of hedging against risk. While Indian programmers take new assignments as risk becomes a way of life, in doing so they laminate together their corporeal attachment to the coding economies' valuation of risk and their racially marked non-white bodies. This lamination can result in immigrant vilification, as the following story shows.

In early 2018, posters appeared in San Francisco with the following message: 'U.S. TECH WORKERS! Your companies think you are EXPENSIVE, UNDESERVING & EXPENDABLE[.] Congress, fix H-1B law so companies must Seek & Hire U.S. Workers!' (see Figure 1).

Figure 2 Counterposters ready to be deployed in the Muni, San Francisco's public transit system
Source: Courtesy of the Tech Workers Coalition (TWC)

While the posters bore union and progressive symbols—the raised fist, red and black colours—the message was anything but democratic. The group lobbied to end immigrant visa programmes and for the protection of white-collar jobs for American citizens. Faced with this duplicitous messaging, a worker's rights organisation created its own poster, circulated electronically, available for download and ready to be plastered over the previous one (see Figure 2).

While the look of the poster mimics its rival, this second poster messaged differently. It specifically called for immigrant rights, and made the fight for more liveable conditions in San Francisco a shared goal across occupation and migrant status.

Battles such as these show the kind of politics that can emerge from a practice of corporeal attunement. Here, attunement to the thickening of an atmosphere around H1-B legislation denotes an ability to catch the 'dog whistle' of white supremacy. In this way, feminist theories of technoscience, which begin from the bodies that are constructed, commoditised and made expendable in a technical moment, can help form these attunements to bodies and technologies. Yet, this example also delimits practices of attunement. Some subjects cannot be tuned into because their position is filtered out of sociotechnical situations. Technical training programmes attempt to make lives legible within these situations but, as Munawar's story demonstrates, constructing that legibility is a fraught and fragile process that depends on unseen procedures. Enabling these procedures are regimes of sovereignty that target Muslim populations globally and sideline the health and safety needs of Black and Indigenous communities within the United States.

sovereign attunements

There is a rich literature on sovereignty from which I take inspiration to discuss how technologies help decide which bodies come to be recognised as killable (Agamben, 1998; Mbembe, 2003; Butler, 2010) and how groups who have been deemed killable counter these decisions. I will illustrate sovereign attunements through discussion of Lucy Suchman (2013, 2015) and Lilly Irani's (2018) recent work on drone technologies, and of Yeshimabeit Milner and Lucas Mason-Brown's project Data for Black Lives.[3] These stories illustrate the use of some technologies to shield populations from harm even while other populations are left to manage without those same protections.

Lucy Suchman is a historian of technology whose work shows how humans are shaped by and help shape the systems they design and use in their everyday lives, and Lilly Irani is a science and technology studies scholar who investigates the ethical imperatives of design. While Suchman's early work (see, for example, Suchman, 1987) focused on everyday office objects like photocopiers, her most recent work turns to the humans and machines that make up the technological world of military drones. In a recent essay, Suchman (2013) describes reading a caption in the *New York Times* in 2010 about incorporating robots into warfare; as Suchman relates, the caption read, 'remotely controlled: some armed robots are operated with video-game-style consoles, helping keep humans away from danger'. This phrasing alerted Suchman to a particular framing of war machines through which some humans were to be kept away from danger and some would be rendered killable:

> it's the implied universality of the category 'human' here—who would not want to keep humans away from danger? Along with the associated dehumanization or erasure of those who would of course be the targets of these devices, that is my procreation, my starting place in the research. (Suchman, 2013)

In a series of articles, Suchman (*ibid.,* 2015) and Irani (2018) outline how the use of remote-controlled war machines creates at least two different kinds of populations (see also Researchers in Support of Google Employees, 2018). One population is insulated from violence while another is exposed to violence. That exposure takes place through human-robot decisions that determine what suspicious activity looks like. Suchman and Irani take as their example the mistaken killing of civilians in Afghanistan, targeted because they were praying and were 'military age' men. Suchman (2015, pp. 19–20) shows how 'messy assemblages' between humans and machines increase the fog of war, as drone warfare 'presuppose[s] the recognizability of objects at the same time that those objects become increasingly difficult to define'. In other words, drone warfare trades on the promise of the precision that unmanned technologies allow, even as in practice drones are a means of making populations defined by fuzzy characteristics killable.

Based on their analyses of these technologies in operation, Suchman, Irani and their colleague Peter Asaro went on to organise researchers to join already organising tech workers to limit the development of drone technologies. The most well-publicised success in this effort is the decision, spurred by internal critique from Google employees, for the company to end Project Maven, a contract with the US Department of Defense to use machine learning to analyse drone footage. Suchman and other researchers emphasised the many problems with automated killing, including the tendency to perpetuate gender and racial discrimination and to remove institutional review from the use of drone

[3] See Data for Black Lives, http://d4bl.org/ [last accessed 15 May 2019] and @Data4BlackLives, Twitter page, https://twitter.com/data4blacklives?lang=en [last accessed 15 May 2019].

technologies as war machines (Researchers in Support of Google Employees, 2018). 'If ethical action on the part of tech companies requires consideration of who might benefit from a technology and who might be harmed', their protest letter avers, 'then we can say with certainty that no topic deserves more sober reflection—no technology has higher stakes—than algorithms meant to target and kill at a distance and without public accountability' (*ibid.*).

Such work is an example of how attunement as a practice can be used to point out technologies of the sovereign decision. Sovereignty enfolds technologies and develops them to extend state control over geographic space and to decide what kinds of subjects will be protected within state power. Because current sovereign attunements like drone warfare are designed to keep the violence of state coercion away from protected citizens, Suchman and Irani believe that this attunement produces a particular task for the insulated citizens in Europe and the US—to make visible how robotic warfare elevates protected humans over erased ones. Irani deepens this argument through her orientation to this project as a person of Middle Eastern descent. She was attuned to the specificities of geography in the way drone technologies get deployed to bring certain populations rather than others into targeting range. To turn this attunement into action required, for Irani, building collaboration across her scholarly and technical communities.[4]

The second sovereign attunement, found in the movement Data4BlackLives, takes up the project of killability from the perspective of those who have been consigned to the margins of state protection. Yeshimabeit Milner conceives of this project as bringing together data scientists to use data differently (Data for Black Lives, 2017). Data technologies have historically disenfranchised minority communities. As media studies, communications and law scholars show, data that is fed into algorithms is often already biased and the operation of algorithms that select for certain qualities often exacerbate these biases. In some recent egregious cases, advertising algorithms have favoured pornographied images of Black women in simple searches for the term 'black girls' (Noble, 2017), predictive policing algorithms have targeted Latino and Black men based on where they live and who their friends happen to be (O'Neil, 2016), and working-class citizens have lost medical insurance coverage due to systemic errors (Eubanks, 2018). Data for Black Lives reverses these trends in algorithmic bias to produce a different kind of data.[5]

In situations where algorithmic protocols erase the particular histories of Black communities, Data for Black Lives looks for ways to produce data that cannot be ignored. Milner's (2013) experience with this attunement to practices of data sovereignty began in Miami, where she worked with the Power University Center for Social Change to produce an analysis of Black mothers' experiences with breastfeeding in local hospitals. Their procedures used 'mixed methods research performed under the leadership and oversight of Black mothers' to 'interview 300 women who had given birth at a Miami-Dade County hospital' (*ibid.*, p. 8). The results showed that Black mothers received hospital gift bags containing formula at a higher frequency than average (89.1 per cent compared to 57 per cent), were less frequently shown breastfeeding techniques (61 per cent compared to 83 per cent) and were asked less frequently if they had a breastfeeding plan (59 per cent as compared to 90 per cent). Presented with this data that

[4] Lilly Irani, personal communication, 12 August 2019.

[5] The group's projects include changing psychological treatment AI chatbots that currently have the algorithmic potential to call police to a user's location; for communities who have experienced police abuse, such a protocol paradoxically increases risk of harm. See Data & Society Research Institute, `Tune into the Tech Algorithm Briefing with Mutale Nkonde, Yeshimabeit Milner, Data & Society Media Manipulation Lead Joan Donovan, and postdoctoral scholar Andrew Selbst', video, https://www.facebook.com/dataandsociety/posts/tune-into-the-tech-algorithm-briefing-with-mutale-nkonde-yeshimabeit-milner-data/861242714083788/ [last accessed 11 October 2019].

showed clear evidence of bias in treatment and advice about breastfeeding for Black mothers, the county initiated new guidelines for teaching breastfeeding in hospitals.

Suchman and Irani's drone project and Data for Black Lives illustrate two modes of sovereign attunement. One finds modes of sovereignty arranged around the decision to make some life killable. The other finds opportunities for counter-conduct, spaces where the rules of the organisation of populations through technical means can be exploited to achieve different ends and to highlight different ethical decisions (Foucault, 2004; Amrute, 2017). As cameras show drone pilots images of possible targets, those fuzzy visual cues coalesce into a decision about which kinds of bodies can be killed. The sovereign decision happens through the interaction between human pilots, their supervisors and multiple streams of computer-generated surveillance information. Suchman and Irani's experience studying human-machine interactions and thinking with the history and politics of the Middle East make them particularly attuned to how material entanglements between people and machines produce messy interactions that are then simplified within narratives of technological progress. Tuning in to these processes means, making visible these practices of erasure. In Milner's (2013) work for Black mothers, a sovereign attunement means looking for the way a technical system presumes equality in how it treats people. Taking up gaps in actual treatment—and showing via the very means that produces those gaps in the first place that they exist—can yield hard-to-deny evidence that procedures need to change. These sovereign attunements make it possible for an ethical practice to turn towards how technical systems intersect with the decision to preserve some life at the cost of other life.

glitchy attunements

The last attunement I will discuss comes from glitches. A glitch is a break in a digital system, where business as usual pauses, comes undone and shows its imperfections. Corporations like Google and Facebook often use the idea of the glitch to claim that their systems occasionally malfunction but are otherwise blameless (Noble, 2017). However, beyond the corporate discourse of fixable glitches, the idea of the glitch indexes hidden memories, unrecognised populations and latent ideologies within technological systems (Russell, 2012). A glitch is a temporary 'malfunction with a capacity to reorder things that can, perhaps, [...] make what was legible soar into unpredictable relations' (Keeling, 2014, p. 157).

The theory of the glitch—developed through transgender and queer rewritings of code—can identify 'incoherent identities in all their acts of resistance and love' and redirect them towards new possibilities (Barnett *et al.*, 2016). These misdirections can turn the black box of unquestioned technologies into a black box of desire organised around expansive world-making projects (McGlotten, 2016 [2014]). It can also recentre other kinds of intimacies away from the corporatisation of love that guides attachment towards working (even in the mode of entertainment) all the time (Gregg, 2013).

I will discuss two examples of glitchy attunements: the first is an attunement to glitch as tragedy; the second might be called an attunement to farce. In my first narrative, attunements reveal how environmental waste is a precondition of corporate coding economies. In the second, attunements reveal the cracks in the kinds of masks that those in power don in the name of those they rule.

In a study of cloud computing, Tung-Hui Hu (2016) notes that the idea of the cloud masks the very real relations of power and material histories supporting virtuality. The idea of the cloud evokes an instantaneous movement of data through the ether from one place to another, sidelining the hardware, its energy needs and the labour needed to service the hardware—until the cloud breaks (*ibid.*, p. ix). Breakdowns are glitches that Hu follows to place the 'new' in the frame of what it pretends it has superseded: labour, violence and environmental loss.

I met Millie, a young programmer working at the Microsoft campuses in Redmond, who used a similar analysis of glitches to achieve a small but significant change in her workplace surroundings. Millie grew up in Oregon, went to school in Portland and began working as a designer for accessible technologies on Microsoft's Xbox team. She was working on a project to help visually impaired gamers interact with the popular videogame consoles. Millie herself was visually impaired; she could see very well at close distances and what was in front of her but had very poor peripheral vision. Her abilities made programming a very rewarding job, and Microsoft's campus was well adapted to her needs. Millie would eat at the closest cafeteria to her workstation every day and order lunch from one of several stations with multiple food choices. Sitting with friends over lunch, Millie gradually realised she was missing something—the clink of glasses and the metallic clang of silverware on ceramic plates. The campus cutlery was all plastic; the coffee cups were all paper. For Millie, the loss of sound was a breakdown in her otherwise well-designed workday. It stood out as a glitch in her meaningful work focus on disabled populations. Millie did a few quick calculations estimating the number of cups thrown away every day in the cafeteria. She then went on to investigate how the environmental cost of throwing away paper cups and plastic utensils compared with the water costs of washing dishes for the cafeteria. Millie then began a yearlong campaign to replace paper and plastic with washable cups, plates and utensils in her Microsoft cafeteria, which was successful after she was able to get the support of over one-hundred other workers in her building. Millie followed the glitch in her workplace, revealed through her attunement to the convivial sounds of clinking dishware. Her love for that sound brought attention to waste in her cafeteria in comparison to the ethic of inclusion in her disability gaming projects. She accomplished this attunement by centring her own 'glitch' of making a world for herself through listening.

The glitch can also function as a powerful map of failure and as a sign of the assumptions and power relations built into these systems. To demonstrate the range of glitchy attunements, I will end my discussion of glitch with comedy. 'Zuckmemes' is a collection of humorous images and texts located on Reddit, an online discussion board.[6] As the name implies, all of these images, called memes, use pictures of Mark Zuckerberg, CEO of the social media company Facebook. Meme creators on 'zuckmemes' add captions, change the images and cut and splice pictures and videos together to mock certain aspects of Zuckerberg's self-presentation. Zuckmemes' contributions peaked during Zuckerberg's congressional testimony resulting from a corporate debacle—widely known as the 'Cambridge Analytica scandal'—in which a researcher was allowed to collect data from users and friends of users through an application offered on Facebook. This data was then sold to the political media firm Cambridge Analytica, which then tried to use it to influence the US presidential election through, among other things, suppressing election participation among Black voters. Zuckmemes, however, did not focus on the scandal itself.

[6] r/zuckmemes, http://www.reddit.com/r/zuckmemes/ [last accessed 15 May 2019].

Contributors instead mocked Zuckerberg's affect. Numerous memes riffed on his robotic behaviour, including Zuckerberg's obsessive water drinking during his testimony.

A Redditor who goes by the username jsph_05 took an image Mark Zuckerberg posted on his Facebook feed and added the following narration that represents him as a replicant, android or cyborg—not human but masquerading as one:

> Like most normal human males, I enjoy charring meat inside of an unpressurized vessel behind my domicile. The slow screech of burning bird muscle is associated with patriotism and mortar shells in my core memory. Once the animal carcass reaches a temperature sufficient to destroy bacteria and viruses that would pose a threat to my empire, I will consume the flesh to replenish my stores of energy.[7]

Several other memes point out that Zuckerberg's performance during the testimony was as a malfunctioning AI—the water, the half-smiles and awkward demeanour pointing out the glitch in his programming.

A meme, as An Xiao Mina (2014, p. 361) suggests, is an 'in joke … [that] temporarily suspends hierarchies'. As such, comedy can reveal fractures along which sociotechnical systems split open in different ways for different participants (Amrute, 2019). Within the context of a monopoly on media content, memes 'provide a rupture in hegemonic' representations through 'participatory creative media' (Mina, 2014, p. 362). As Mina argues, the creativity of memes can rupture seemingly unyielding presentations of a singular point of view. In the case of zuckmemes, that point of view is represented by corporate technocultures that insist on deflecting ethical problems in favour of user participation on their sites and for the sake of monetising data collected from users for advertising (Horvath, 1998; Noble, 2017).

Zuckmemes tune into the glitches in this presentation by means of the idea of a mis-programmed, or failing, AI. As comedy, these images can be interpreted in myriad ways and may contribute to ever-narrowing silos across the US political spectrum.[8] Here, these memes signal at once corporate control over the narrative of technical progress and its slippages. These zuckmemes put on display the overblown power we have given engineers to shape our social, technical and ecological worlds (Dunbar-Hester, 2016).

ethical attunements and the post-human

As a practice of training the self to become the kind of subject who can make an ethical decision, attunements may help us use affective noticing 'as a political and social gesture' that maintains our cognisance of the erasures of modern technocultures that make some people killable and leave others perplexed in the face of their failed technological aspirations (Barnett *et al*., 2016). At the same time, attunements maintain our memory of the kinds of pleasures we can find in working through our own glitches towards different possibilities.

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[7] r/zuckmemes, http://www.reddit.com/r/zuckmemes/ [last accessed 15 May 2019].

[8] Some themes in these memes, such as Zuckerberg as lizard, trade in anti-Semitic stereotypes and conspiracy theory, and can be used in far-right circles to criticise what these sites believe is Facebook's leftist bias.

Many calls to techno-ethics recommend maintaining focus on the humans behind the algorithms as a pressure point. Making humans accountable for the algorithms they design shows that the biases algorithms produce are far from inevitable. However, an exclusive focus on humanness can also misfire. That is, the more blame for ethical failure is placed on one side of the human-technology equation, the more it might seem that either getting rid of humans altogether might prevent ethical failures in the present or elevating some humans to the position of social designers will solve these problems.

Demands for human responsibility might reignite calls for techno-utopianism, as long as those calls fail to treat human-technical systems as crosscut by interaction (Davies, 1991). As 'techno-utopics … propose the thing as a surrogate human', they fail to integrate 'human thought and labor, as well as the historical, economic, and imperial legacies that create categories of objects and people as needed, desired, valuable or disposable' (Atanasoski and Vora, 2015, p. 16) into discussions of materiality and the human. In other words, for the cases I discuss, the technical and the human cannot be separated out as mute tool and agentive maker. In each case, algorithms develop, through recursive loops, in ways unexpected by their designers. The piano player *and* the piano tune a listener's ear.

An ethics addressing the particular problems that Bunge (1975, p. 78) identified as 'many-sided and complex' requires that technologists be practised, as Bunge suggested, in the arts of thinking about the public good. Yet, the drive to produce fixed rules to make decisions belies the very complexity that Bunge stressed. A techno-affective attunement, designed as a series of exercises to focus attention on emerging complexity, brings into the field of techno-ethics the question of who gets to count as human, and brings that question into conversation with how technological artifacts presume and remake which lives come to matter.

Reformers such as those who developed the Ethical OS ask us to focus on regulating technological designers. Corporate regulation can restrict how contracts—such as terms of service agreements—are constructed to produce more robust forms of consent, and regulation can force algorithmic accountability so that algorithms are tested before applied to such uses as predictive policing. Yet, putting all our ethical focus on the training of technicians to abide by regulations will always fall short, because technical systems have unpredictable results and because technicians view the systems they build from a particular standpoint. Holding onto the human as uniquely blameworthy will only reinforce the utopian dream of elevating a class of experts above the raced, classed and gendered digital workers scattered across the globe at the same time that this dream's endpoint imagines transcending the human fallibility that cause ethical failures in the first place. Working through affective attunements means asking digital labourers to think across a field marked by technically mediated decisions. It is precisely the instability of the relationship between algorithms and their designers that makes such attunements possible.

Techno-affects shift ethics beyond narrow generalisations about the effects of technical systems, bringing into focus the multiple environments for living created through these systems. Techno-ethics revitalised by techno-affects reveals how a given attunement can stabilise, and how it might be undone. When subjects' alignments with machines become disorientated, critical attention turns towards building the structures that make new orientations possible.

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