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ARTICLE

Algorithmic Value: Cultural Encoding, Textuality, and the Myth of "Source Code"

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Abstract

In this article, I provide a Spivakian analysis of computational algorithms. Building upon Gayatri Spivak's claim that the value coding of late capitalism extends beyond the economic realm to the cultural and affective, I show that it seeps into the algorithmic as well. The recent proliferation of algorithmic applications has been met by an increased scholarly interest in their underlying mechanisms. Several critics of predictive algorithms, for instance, proceed as though the racial and gender discrimination that a given algorithm enacts upon execution can be positively attributed to -- and mitigated through a re-coding of – either its training data or its "source code." There is little denying that the logic of computation undergirds much of our sociality. But, as I argue in this article, to concentrate the source of an algorithm's action in its semiotic representations is to hide and legitimize the value codings that lend these representations their efficacy. My aim in this article is two-fold. First, to show how seemingly benign investments in algorithms can reproduce, in a larger network, the exploitative value systems that manage the worth of knowledge, epistemologies, labor, and

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bodies. Second, to raise a question of methodology: What antitechnocratic, nonhegemonic engagements with algorithms might feminists produce that do not privilege the algorithmic as a site of intervention?

Introduction

Across the United States, police departments have adopted a new kind of software that they claim can be used to prevent crime before it happens. Called "predictive policing," this software is data driven. Its algorithm is trained to make predictions that are consistent with the patterns it observes in historical crime data. What this means is that the potential criminal activities the software identifies are informed by biases in police data. In fact, researchers from the Human Rights Data Analysis Group have shown that PredPol, one of the most widely used predictive-policing software,[1] disproportionately targets black neighborhoods (Lum & Isaac, 2016). While police departments have historically used police data to forecast crime[2]—thereby perpetuating racialized policing practices under the guise of facts-based crime analysis—the current use of algorithms further shrouds these systemic practices in the legitimacy of science and technology. Algorithmically generated predictive models serve to explain and justify racialized policing practices; it becomes as though the police surveil black neighborhoods simply because the predictive model tells them to do so. In positing predictive-policing software as the very source of their policing activities, the police systematically elide the larger racial logics of the "war on crime" within which surveillance technologies operate.

The desire to see software as source is not limited to predictive-policing practices, but is replicated in critiques of predictive policing as well. Critics of PredPol, for example, have focused their attention on the racial biases in the training data, suggesting that fixing the data could fix the algorithm's predictions (Kirkpatrick, 2007, pp. 21–23). This argument simply shifts the source of the police's discriminatory behavior from the algorithm, and the predictive model it generates, to the training data. A

similar dynamic is at play within critical analyses of code. A growing body of scholarship in media studies seeks to expose and analyze the "source code"—the human-readable representation of an algorithm, which itself is just a collection of instructions—animating computational programs.[3]There is little denying that the logic of computation undergirds much of our sociality, and that there is political value to understanding computational code. But to concentrate the source of a program's action in its "source code" is to overlook the larger institutional logics and infrastructures that lend "source code" its efficacy. Algorithmic representations—whether they are instructions in a "source code," the zeroes and ones in a predictive model, or the "facts" in a training data—cannot be the source of any action. Their agency is constrained and enabled by the social relations within which they are embedded.

As Wendy Chun argues, "source code" has to be *made* executable before it can act (Chun, 2008, p. 299). Enunciations within ordinary language, according to J.L. Austin's speech-act theory, are executable in the sense that they have concrete effects (Austin, 1962, pp. 4–11). The imperative "open the door," for example, has material consequences – assuming that the imperative is intelligible to its intended audience. Similarly, algorithmic instructions are executable in that they produce material changes in the circuitry of the machine in which they run. For an algorithmic instruction to be executed by a machine, it first has to be encoded into binary code via a process of translation called *compilation*. During compilation, the coding conventions of a programming language encode human-readable instructions in binary code so as to make them intelligible to—and therefore executable within—the machine in which they run. As Lucas Introna explains, programming codes, legal codes, moral codes, cultural codes, financial codes, and grammar are all different forms of encodings: rule-based enactments that, when performed, produce meaningful results (Introna, 2011, p. 116). These codes offer varying degrees of freedom: while programming codes have strict constraints that need to be met in order for "source code" to compile and perform correctly, social codes are more negotiable.

Notwithstanding this difference, they all form the necessary conditions for enactments to be read as pattern as opposed to noise—in other words, for enactments to become executable.

In this article, I unpack the cultural artifice of "source code," arguing against the idea that the effects of an algorithm's execution can be positively attributed to a source. Furthermore, I show that there are coding conventions besides those stipulated by programming languages that encode algorithmic representations and render them executable within social systems.[4] In order to examine the social executability of algorithmic representations, I borrow from Gayatri Spivak's framework of "value coding." For Spivak, value coding refers both to a system of representation and to a mechanism of encoding worth and interest. The language of value coding is useful for examining how textual representations are laden with interests.[5] In her essay "Scattered Speculations on the Question of Value," Spivak writes, citing Marx, that value is not just a representation but also a differential—"a differential representing itself or being represented by an agency" (Spivak, 1985, p. 77). Value is not a fixed entity but a representation of how something—labor, a piece of work, or even just a word—is differentiated from other things in order to be made representable, exchangeable, and (we could add) executable. Value coding, then, can be understood as the ways in which value, as a differential, not only expresses economic value in the narrow sense but also makes representation in a wider sense possible.

> "Value-form" is the name of that "contentless and simple [*einfach*]" thing by way of which Marx rewrote not mediation, but the possibility of the mediation that makes possible in its turn all exchange, all communication, sociality itself.… [Value is] the possibility of mediation (through coding) so that exchange and sociality can exist.…Marx's point of entry is the economic coding of the value form, but the notion itself has a much more supple range. (Spivak, 1993, p. 69).

Cultural and economic values facilitate the process of making algorithmic representations intelligible and executable. We can think of the police

surveillance of black neighborhoods in the United States as an enunciation that is made executable by the racialized encodings of a criminal justice system that denies value to black lives. These non-algorithmic enunciations are not very different from the algorithmic representations found in PredPol—the specific instructions in the "source code," the "facts" in the training data, and the assumptions built into the decision-making model—in that both need to be made executable by a larger network of encodings. Race is a structural mode both of codifying difference and of distributing value to different lives; it is the value (en)codings of race that make PredPol socially executable. Technocratic discourse and practice treat algorithms as an inherently executable form of language and, in so doing, fix and legitimize the cultural and economic value codings that are implicated in their compilation and subsequent execution. While the value codings of race operate as a differential and cannot be positively pinned to a source, the PredPol application—and the technocratic discourse in which it is entrenched—proceed as if they can be positively coded, fixed, and operationalized. The racial profiling resulting from the algorithm's predictions is then attributed to the "source code" and not to the larger encodings of racial surveillance that make this code executable. Technocratic practices, in so doing, treat algorithmic value—the value that a particular bit takes or the distribution of value in memory addresses—as a secure anchor for cultural and economic value codings, such as the distribution of value to different lives along lines of race, gender, and ethnicity, among other things.

New-media scholar Alexander Galloway, who writes about the inherently executable nature of "source code," argues that the representation of a value in human-readable code is identical to its representation in binary. Uncompiled "source code," according to Galloway (2004), is "logically equivalent" to machine code; a hexadecimal number and its representation in binary, for him, "are simply two expressions of the same value" (p. 167). Wendy Chun (2008), however, argues that the process of compilation—whereby the value of a hexadecimal number is represented in binary—is a material process of

translation, in which the physical circuitry of a machine transforms: addresses of memories change, electrons move, and voltages fluctuate. This process is discontinuous, riddled with noise and contingency. Building upon Chun's argument, this article addresses questions of how cultural and economic values translate into the value of bits. Furthermore, it articulates value as an indeterminate differential, rather than as a substance that can be brought into presence—from one language to another.

Following Gayatri Spivak's claim that the value codings of contemporary capitalism extend beyond the economic realm to the social and affective, the first part of this article argues that these value codings seep into the algorithmic as well. In the context of this article, "algorithmic" refers to the *automation of judgment using algorithms*; in the case of data-driven algorithms, this includes the generation and representation of training data as well as the assumptions built into the decision-making model. The second part of this article looks at how the treatment of algorithms as the source of any action works not only to hide and legitimize the implicated value codings but also to give them an originary status. The second section also puts Spivak's framework of value coding in conversation with Barad's framework of agential realism, in order to show how processes of materialization—such as the materialization of zeroes and ones in memory addresses during compilation—are also processes of value determination. Working against the technocratic treatment of "source code" as a secure anchor for establishing the fixity of cultural and economic value codings, the third and final part describes the textuality, and the concomitant open-endedness, of value determinations.

Value Coding

Spivak (2010) argues that mode-of-production narratives cannot write the lives of those women whose values fall outside of capital's logic (p. 21). These narratives are coded in economic terms that render exchangeable

only those values that are consistent with (capitalist) relations of production. The discourse of "digital divide," continuous with such narratives, draws a line between those who have certain forms of access to technology and those who do not. Its division of the world into technological "haves" and "have-nots" establishes technology as a commodity to be owned.[6] Do women working in assembly lines, whose labor is exploited to make technological innovations what they are, have "access" to socio-technological networks? Their interaction with technology is not representable as "access"—or at all—within the language of "haves" and "have-nots" because they entail neither consumption nor ownership.

Within mode-of-production narratives, marginal populations come to be seen as deprived not just of technological commodities but also of the values those commodities circulate. This is not to say that marginal populations are better off without technology or that their values should not be influenced by it—a presumption Spivak (2010) describes as the romantic preservation of subalternity (p. 65). As she argues, it is to be desired that lines of communication be established between marginal groups and hegemonic institutions. There is no denying that technology increases people's mobility. However, the distribution of information technology is discursively coded as the distribution of knowledge and skills to marginal communities; this discursive coding works to hide the underlying distribution of value to different epistemologies. Seen in this light, the discourse of marginality is a form of what Spivak calls an *epistemic value coding*:

> "Marginality," as it is becoming part of the disciplinary-cultural parlance, is in fact the name of a certain constantly changing set of representations that is the condition and effect of it. It is coded in the currency of the equivalencies of knowledge. That currency measures the magnitude of value in the sphere of knowledge. (Spivak, 1993, p. 69)

The discourse of marginality, along with its attendant "practicalities," renders certain knowledge systems to be "marginal" to the center. The

"practicalities" of Western academia transform the question "What is worth [the German word for value] studying, teaching and talking about?" to the more innocuous-sounding "What can best be parceled out into a fourteen- or ten- week format?" "What are the best available textbooks?" and "What are the most manageable paper topics?" (p. 69). In these examples, we can see that the language of efficient packaging, accessing, and organizing hides a deeper epistemic value coding and gives the reiteration of this coding the appearance of rationality. As Spivak suggests (Danius, Jonsson, & Spivak, 1993), the equivalencies of knowledge — their indeterminate but systemic valuation — naturalizes the international division of labor under which the labor of "marginal" communities is devalued and exploited (p. 38). In other words, the representational process of "marginality" is an "efficient coding" of mode-of-production narratives (Spivak, 2010, p. 21) — a cultural value coding that manages the economic value coding whereby cheap labor is efficiently produced, exploited, and appropriated.

This language of efficiency that Spivak describes finds a parallel in the technocratic discourse of Development Gateway—the World Bank's online platform that aims to accelerate development by facilitating the exchange of knowledge between communities. Development Gateway runs a central database where users publish their knowledge.[7] The editorial committee then reviews the entries and publishes those it thinks are relevant. Within this framework, "what knowledge is worth sharing" appears as "credible quality content" (Walker, 2003, p. 11) and as "the best knowledge available" (World Bank, 2011, 1); the systemic disavowal of value to subaltern epistemologies appears as a humanitarian effort to "extend the reach of knowledge" (World Bank, 1998, 25). The developers of Development Gateway claim that poverty is the result of a knowledge gap that their technology promises to reduce. But a technological practice that carries "benefits" across a knowledge gradient is relevant only as long as the gradient exists. If such a practice is to be relevant in the long term, it has to reproduce the very gradient it claims to destroy. In other words, marginality has to be animated through the platform itself.[8]

How an organization conceptualizes knowledge, control, and access is often consistent with its network architecture. In a peer-to-peer network, users are connected in a ringlike formation. This topology could potentially decentralize information and uniformly distribute control and access across the network. Development Gateway, however, works on a server-periphery architecture whose centralized control creates opportunities for censorship and editorial interventions (Velden, 2005, p. 107).[9] This architecture treats knowledge as a public good and communication as product delivery; products are first received at the center and then cleaned, packaged, and efficiently dispensed to the "beneficiaries" at the periphery. What users submit to the central database is edited and rendered valuable by knowledge experts—an explicit case of epistemic value coding. These knowledges are edited so that they meet certain standards. The assumption here is that there is one standardized model of knowledge that people need, which, if dispensed efficiently, could accelerate (economic) development. This project proposes an efficient market solution to the systemic problem of poverty. It is not surprising that Development Gateway's productivity-enhancing network architecture is similar to those of FedEx and Walmart—companies concerned with the efficient packaging and delivery of goods (Brown & Duguid, 2000, p. 29).

A more recent example of an internet platform that implements a corporatized model of "access" is Free Basics. A joint venture between Facebook and six mobile-phone companies, Free Basics (previously named internet.org) is a mobile-based portal that aims to provide rural communities in the Third World free access to "basic" internet services. Facebook's handpicking of these services has been widely criticized for violating net neutrality. Tech activists in India, for instance, rejected Facebook's app when it was first launched in India (Rajmohan, 2015). Supporters of net neutrality argued that content providers should not selectively choose online services that they think are essential for everyone. Development Gateway has been similarly criticized for deciding who gets access to what knowledge and at what speed (Mehta, 2001, p.

189; Thompson, 2004, p. 103).

Another technology platform based on the premise of efficient product delivery that has met with far less opposition is Google's search engine. Google maintains what is called a webgraph—a graph with web pages as nodes and URLs as the links between them. Despite its seeming randomness, the webgraph's structure is scale-free: the web contains few nodes—namely the hubs—that have a large number of neighbors, and a large number of nodes that have few neighbors. If a new webpage were to attach itself randomly to this network, it would have a high probability of attaching itself to a hub. This also means that if you were to start from a random node and go on a random walk in the network, you would be more likely to encounter the hubs than the peripheries.[10] While these are mathematical properties of scale-free networks, it is important to note that the scale-free property of the webgraph has been historically produced by platforms such as Development Gateway and Free Basics, for example, that have the economic means not just to be well connected in the webgraph but also to determine the visibility of other pages. Google's sorting algorithm further exploits the scale-free property of the webgraph. When a query is made on Google's search engine, the PageRank algorithm outputs a list of matching results, ranking the pages most likely to be encountered on a random walk—that is, the most popular pages—as the most "relevant." Because the popular pages are brought under the purview of the users, they become even more popular (or "relevant"), while the pages at the margin become more marginal. While this should be of concern, it is generally considered acceptable due to the order and linearity that the PageRank algorithm imposes on the web of heterogeneous knowledge and the efficiency of search it makes possible (see, for example, Page et al., 1999, pp. 13–15). This confirms Spivak's observations regarding the (efficient) epistemic coding of value and the "marginality" such coding creates and is, in turn, created by.

Capitalist mode-of-production narratives—and their attendant values of rationality and efficiency—are implicated in the technocratic

practices of Development Gateway and Free Basics as well as in the marginalization effected by the PageRank algorithm. PageRank's automated generation of knowledge hierarchies—as opposed to the human gatekeeping of relevant knowledge within Development Gateway and Free Basics—is widely accepted as democratic and legitimate.[11] Automation creates the impression that algorithms are autonomous, that their operation is unmediated by social relations. This belief, salient within not just technocratic practices but also the popular discourses surrounding them, is what allows algorithms to hide and reproduce the value codings mediating their operation.

Source Coding

In her essay "Getting Real: Technoscientific Practices and the Materialization of Reality," Karen Barad describes reality as what sediments out of the process of making the world intelligible through certain material and discursive practices and not others. Within her framework of agential realism, agency is construed as the reconfiguration of such practices and the reality that they materialize. Barad draws on Niels Bohr's work on quantum physics to arrive at this formulation. Building upon Bohr's observation that light looks either like waves or like particles depending on the conditions of an experiment, Barad argues that the referent of an experiment—in this case, "light"—is not an observation-independent object but the phenomenon through which an object is made intelligible (Barad, 1998, p. 97). This phenomenon is constituted by the material and discursive arrangements of the experiment, which include not just the apparatuses used but also their interpretive grids. Barad further outlines how boundary-drawing practices, specific to any material-discursive arrangement, differentiate a phenomenon through internal exclusions to produce discrete objects and subjects. In other words, boundary-drawing practices materialize a phenomenon into discrete bodies with inherent properties.

Within Barad's framework of agential realism, a sonographic "fetus" does not refer to an observation-independent object but to the

process of its intelligibility: the political discourse on the autonomy of the fetus and the material development of the sonogram in terms of speed, resolution, and magnification. These discursive and material arrangements have historically shaped each other and the sonogram's development as an apparatus of body production. In its current form, the sonogram materializes—in "real time"—the fetus as a rights-bearing subject. Responding to Judith Butler's articulation of matter as a discursively constrained process of materialization (Butler, 1993, pp. 7–8), Barad adds that there are also material constraints on what matter *can* mean. Following Butler's description of sonography as a form of medical interpellation whereby an "it" is initiated into a discourse that continuously materializes "it" into a "girl" or a "boy," Barad adds that among the impoverished class in India, the sonogram inserts the "girled" fetus not only into discourse but also into the gendered international division of labor, often leading families to abort the "girled" fetus. The sonogram as an apparatus of bodily production, Barad (1998) writes, "does not simply map the terrain of the body: it maps geopolitical, economic, and historical factors as well" (p. 93). To paraphrase and reinterpret Barad, the representations on a sonogram screen are mediated by the value codings implicated in its rendition—in the making-executable of the sonogram. This includes the value codings of the gendered international division of labor that devalues not just the labor of subaltern women but also their lives. The "real-time" materialization of the fetus as a rights-bearing subject, similarly, is mediated by the value codings of rights-based, pro-life discourses that dislocate value from the mother's body to the fetus's. This interpretation of boundary-drawing practices resonates with Spivak's description of value as a process of differentiation, suggesting that processes of materialization—which differentiate a phenomenon into discrete entities with inherent characteristics—are also processes of value determination.

Like sonograms, military drones have historically been developed as apparatuses of body/value production. Manned drones, for instance, provide an interface that creates subjects on the controllers' side of the

screen and objects on the other, *as* the other. The interface and what can be seen on it are the sediments of a history of material and discursive developments. In their current form, drones produce racialized bodies as observable (and even threatening) objects of knowledge. Substantially separated from ground realities, they create distanced representations of the people they track, and the act of surveillance itself produces those on the ground as threats. As Prasse-Freeman argues (2015), the logic of drones is consistent with the American Empire's "inability and unwillingness… to perceive the political lives of others." Before they kill, drones create killable subjects. Material developments—improvement in speed, resolution, features, and magnification—create realistic-looking representations of ground realities that further exacerbate the viewer's ability to dehumanize the targets so rendered. In this state of affairs, improved drone vision, ironically, diminishes what can be seen, whereas improved algorithmic efficiency translates into a more efficient kill.

Automated drones add another layer of legitimacy to the military's production of racialized targets. In his essay "Ecologies of Empire," Jake Kosek (2010) describes how drone contractors, as well as the US military, have increasingly grown to view the involvement of humans in technological warfare as "inefficient and laborious," often times expressing a wish for adaptable swarms that are "less mechanical and more organic" (p. 667). Kosek writes how, in order to realize this wish, the Pentagon has reached out not to entomologists but to mathematicians developing algorithms that mimic bee behavior. These algorithms use digital pheromones, information-carrying chemicals secreted by bees in order to communicate with one another, to automatically coordinate drones. Manually controlled drones already distance military actors from the act of killing, but automated drones that mimic bee behavior add further levels of mediation between the two, providing more efficient methods for the US military to impinge on the political sovereignty of other nations. The distancing effect automated drones have is also conceptual; that these drones are beelike means that they are not like the humans coding them.[12] Furthermore, swarming drones produce a

mimetic dynamic wherein their inhumanness is presumed to match that of terrorist organizations. We can see here how the human/nonhuman divide, which Kosek claims is central to the War on Terror, lends swarming drones their cultural executability. By allegorizing this divide, mimetic algorithms *materialize* certain populations as killable insects, while also legitimizing the cultural logics in which they achieve this function. It is through this iterative process that drones have taken up their current forms.

While boundary-drawing practices ascribe efficiency to algorithms as an inherent property, they exclude what Spivak (1985) calls the "historical ideology of efficiency" (p. 83), which makes efficient algorithms relevant in the first place. It is perhaps because of this economic unhinging of algorithms within computer science research that faster algorithms, regardless of their application, are generally seen as having an inherent benefit, a use-value. In her essay "Scattered Speculations on the Question of Value," Spivak critiques the romantic tendency within cultural discourses to deploy use-value as a "secure anchor" for fixing the notion of value outside capitalism's circuits of exchange—the tendency, for example, to see certain works as having an uncontested literary value. Literary canon formation, she argues, "works within a much broader network of successful epistemic violence," wherein certain "subject-effects [are] systematically effaced and trained to efface themselves so that a canonic norm might emerge" (p. 74). The rhetoric of "use-value" within canon formation masks the presence of the economic in its operation and, in so doing, reproduces exploitative practices in a larger network. Much in the same way, seemingly benign investments in the pursuit of efficiency—for example, on the part of an academic solely concerned with improving the efficiency of the PageRank algorithm or of drones—reproduces the exploitative value systems that manage the worth of knowledge, epistemologies, labor, and bodies.

The materialization of algorithms as inherently efficient entities helps proliferate the cultural-economic ideology of efficiency. More generally, the materialization of algorithms as inherently executable elides

and proliferates the cultural and economic value codings implicated in the process of making them executable. It is in this sense that "source code," like literary canon formation, works as an apparatus of value production. The materialization of swarming drone algorithms as "source code," for example, excludes the rhetoric of the human/nonhuman divide that lends swarming drones their cultural executability, effectively reproducing the racialized coding of (the worth of) bodies represented on drone interfaces. What makes "source code" particularly potent as an apparatus of value production is the epistemic authority granted to the supposedly autonomous "internal" logic of algorithms.

The cultural artifice of "source code" creates the impression of a source from which the truth—not just of the algorithms but also of the relations they animate upon execution—can be accurately retrieved, thereby *doubly* invisibilizing the social relations undergirding their performance. For instance, the PageRank algorithm hides and legitimizes the implicated discourse of marginality as it melds epistemic violence with the efficient organization and advancement of knowledge. Additionally, it creates the appearance of an underlying source code from which a complete description of the platform can be derived, as though it is *because* of the ranking mechanism of the algorithm that the webpages are hierarchized the way they are and their value transformed. Crime-forecasting algorithms, similarly, work to legitimize racialized policing practices by creating the impression that the police surveil certain neighborhoods simply because the algorithm tells them to do so. The coding of racialized difference into computational models is in line with a long history of "biological essentialist" frameworks that white Europeans developed in order to code racialized difference into the "biological body." If, at one point, anatomical difference was used as an explanation for the genocide characteristic of European imperialism (Markowitz, 2001, p. 392), today we see how algorithmically generated difference is used as an explanation for—or even as the very *source* of—racialized policing practices.

This is another way in which "source code" becomes a secure

anchor for cultural and economic values: technocratic practices that treat algorithmic procedures and their predictive models as the source of the algorithm's actions work to *reduce* the logic of value codings to the logic of algorithms in order to automate as well as justify processes of value determination that the algorithm enacts upon execution. Spivak's elaboration of the textuality of value provides an antidote to this assumption that cultural and economic values can be captured in executable statements and put into operation.

Contingencies in Coding

In her discussion of canon formation, Spivak refuses to make an argument for opening up the canon and according literary value to works outside of it. She questions the very process of value determination instead, opening up Marx's chain of value and showing how the discontinuities and contradictions in this chain throw the very category of value into crisis. Spivak (1985) specifically examines use-value, which she claims is both "outside and inside the system of value determinations" (p. 80), as a site that reveals the randomness of value determinations.

> It is use-value that puts the entire textual chain of Value into question and thus allows us a glimpse of the possibility that even textualization (which is already an advance upon the control implicit in linguistic or semiotic reductionism) may be no more than a way of holding randomness at bay. (p. 80)

Spivak's analysis of the moments of indeterminacies and discontinuities in the chain of value serves two functions. First, it offers a critique of economic determinism and challenges the idea that the economic offers a final description of social relations. Second, it shows that the economic is, in fact, implicated in the cultural, but that the determination of value in the economic realm, as in the cultural, is open-ended. Following Spivak, I have aimed to demonstrate a similar open-endedness in the algorithmic as well—arguing against the idea of "source code" and the algorithmic determinism that it implies. The cultural artifice of "source code" draws a causal link between written code and its performance, and thereby

imagines algorithms as complete in and of themselves. Challenging the "semiotic reductionism" characteristic of this technocratic imagination**,** I have used Spivak's framework of value coding in order to open up algorithms to the textuality of value determinations.

An understanding of the textuality of value has implications for how we critique technocratic practices in general and data-driven practices in particular. Data-driven algorithms are widely used for recognizing patterns in data and for making decisions based on these patterns—from deciding whether someone gets a job or a loan to whether there is criminal activity at a particular location. Since these algorithms produce the future in the image of the trends in the data, they work to reproduce, in a feedback loop, the social inequalities surrounding the generation of the training data. The technocratic assumption underlying this mode of control is that algorithmic representations, whether they are the "facts" represented in the training data or the zeroes and ones constituting predictive models, can capture social relations and the cultural and economic values mediating their operation. These values, as Spivak's analysis shows, cannot be positively pinned in the representations in a dataset and then seamlessly translated into the zeroes and ones of the algorithmic model. Rather, these values are what textualize algorithmic representations, opening them up to the possibility of a recoding. This recoding, however, need not be located in the realm of the algorithmic. *That algorithms are open to a recoding means that their performance is in fact contingent upon the encoding logics of the wider network within which they are embedded, and that a mutation in this network will produce a mutation in the algorithm's performance.* What we are grappling with here is a question of methodology: What antitechnocratic, nonhegemonic engagements with algorithms might feminists produce that do not privilege the algorithmic as a site of intervention?

Historian Ben Schmidt (2015), for his part, shows how data-driven algorithms can be used to understand social relations, not change them. The particular algorithm Schmidt uses is Word2vec—a procedure used in natural language processing to encode words in a given text corpus as

vectors. The algorithm maps semantically similar words to nearby points in a continuous vector space to obtain what is called a *vector space model*. A special property of these models is that the difference between vectors, itself a vector, also has a semantic meaning. In his work, Schmidt analyzes the gendered differences in a vector space model obtained by training the Word2vec algorithm on more than 14 million reviews on ratemyprofessor.com. Any pair of words whose difference is along the directionality of the vector separating *male* from *female*, Schmidt notes, is gendered. The vector difference between *he* and *she*, for example, is the same as that between *man* and *woman* and between *king* and *queen*. Schmidt performs what he calls "rejecting the gender binary" in order to modify the word embedding so that it is no longer structured around these gendered differences. He does this by transforming each word in the space in a way that there aren't any pairs of words whose vector difference is along the directionality of the vector between *male* and *female*. This new embedding, he shows, further reveals the varied roles (binarized) gender plays in meaning-making. This method reveals, for example, that students describe women as *goddesses* and men as *geniuses*, or women as *nasty* and men as *disgusting*, and that they are likely to refer to men as *professors* and women as *teachers*; it also shows that students have a relatively more extensive vocabulary to criticize women for being "unprofessorial." In rejecting the gender binary, Schmidt allows us to "hyperfixate on gender as a category of textual analysis," revealing the ways in which seemingly nongendered differences map onto gender to produce legible patterns.

If this vector space model were to be used for deciding whether or not to allocate tenure to faculty, women would be at a serious disadvantage. While both *genius* and *goddess* are used as compliments, an academic—as Schmidt notes—might benefit more if called the former. The word embedding, along with the decision it produces, could thus legitimize the already prevalent systemic devaluation of women's labor within academic institutions. It is in this sense that the value codings of gender are implicated in not just the algorithmic model and the data it

represents but also in the reviewing patterns producing the data. It is important to note that Schmidt's purpose for "rejecting the gender binary" is not to create a model that is without gender bias, one that would let us "tap into some world of unrestrainedly polymorphous perversity" (2015). In fact, Schmidt's work suggests that a word embedding that is devoid of the textuality of gender would not be legible, given gender's role as an organizing principle in a sociolinguistic field. Such an embedding, if used for decision making, would produce results that could seem random.

More recently, scholarship within machine learning has aimed to produce predictive models that are without racial or gender bias. Kamiran et al. (2013), for instance, describe techniques for altering the training data, for changing the algorithmic code so as to limit the search space to nondiscriminatory models, and for adjusting discriminatory models in the post-processing phase. These techniques *locate* discrimination in the algorithmic realm. My point here is not to argue against the use of antidiscrimination techniques, but rather to show that their focus on the algorithmic systematically elides the larger social logics that lend predictive models their efficacy. Police departments across the country believe that predictive policing can be used to reduce racial bias; while some departments are focused on using better algorithms, others are focused on improving the quality of the historical crime data. Former Pittsburgh police chief Cameron McLay, for instance, sees the use of big data in predictive policing as providing a "palliative for policing's ills" (quoted in Hvistendahl, 2016). McLay came out of retirement and returned to his policing job after white police officer Darren Wilson killed Michael Brown in Ferguson, Missouri. McLay was convinced that the improved use of data in policing, as well as the use of algorithms capable of predicting future hot spots, could lessen racial bias in policing practices. Such liberal "police reform" efforts, which focus on reducing bias in policing, fail to challenge the larger logics of the War on Crime that actively reproduce state-sanctioned racial discrimination.

The racial logic of predictive algorithms has less to do with the

instructions in the algorithm or the representations in the data than with how these enactments are made executable by the racialized encodings of the criminal justice system. Suppose, for instance, that the training data for the algorithm was adjusted to be without racial bias, in the sense that the hot-spot map generated by the algorithm showed all neighborhoods to be equally susceptible to a given type of crime. The police, in this case, wouldn't patrol all the identified neighborhoods, since the very purpose of hot-spot mapping is to improve policing efficiency. The police's discretion regarding which areas to patrol would introduce biases in subsequent predictions of the algorithm, as the police are likely to record new crimes in the areas they decide to patrol. Even if we were to suppose that the police would decide to patrol all neighborhoods equally, they are still more likely to record crimes in black neighborhoods. As John Fiske (2016) argues, the "seeing eye" of the modern surveillance state is white, and "street behaviors of white men…may be coded as normal and thus granted no attention, whereas the same activity performed by Black men will be coded as lying on or beyond the boundary of the normal, and thus subject to disciplinary action" (p. 69).

This is what critiques of crime forecasting software that locate the training data as the site of discrimination often overlook: the agency of the training data is enabled by the racialized value codings of a surveillance state that has historically constructed notions of criminality and danger around blackness.[13] As long as crime gets associated with street crime and with particular bodies on the streets—and not with, say, white-collar financial crime—crime-prediction algorithms will invariably work to reproduce class and racial inequalities, no matter how much we recode the training data, the predictive model, or the procedures in the algorithm. A larger systemic recoding of what crime means, however, could perhaps break and expand what crime-prediction algorithms can do. A recoding of "criminality" informs the crime-prediction application White Collar Crime Risk Zones, which criminalizes not poverty but wealth (Tseng, Clifton, & Lavigne, 2017). For the application to be the source of any action, this recoding has to be yet more widely accepted and

implemented.

Conclusion

This article expands the concept of value as a mediating process—as the process of making algorithmic representations executable. The idea that the effects of the execution of code can be traced to a specific source elides the social relations on which code depends for its relevance and efficacy. Neither "source code" nor machine code, nor even the "facts" in a training data, can be the source of any action, because their agency is enabled and constrained by a larger network of cultural and economic encodings that render them executable. These encodings, and their institutional logics, maintain certain configurations of value—of worth, relevance, and significance. Algorithms legitimize, upon execution, the value codings that render them executable.

While cultural and economic values are implicated in the compilation and subsequent execution of "source code," they cannot be positively pinned to and seamlessly translated between different forms of representations. Rather, *these values are what textualize the algorithmic—mediating what algorithms do upon execution, while also opening them up to the possibility of a recoding.* We could recode the instructions in an algorithm or the patterns in a data, but what they do upon execution is wholly contingent upon a wider configuration of value within which they operate. Value codings mediate—both materially and discursively—not just what algorithms do but also what becomes conceivable to us as something they can do. To introduce a mutation in the network of value codings, then, is to reimagine and expand the uses of algorithmic "texts."

Notes

[1]PredPol derives its popularity, in large part, from the belief that it is without racial bias. The historical crime data used in PredPol represents

individual data points in terms of time, place, and crime type. Using this data, the software identifies neighborhoods where a given type of crime is most likely to occur in the future. The algorithm's representational mechanism creates the impression that the identity of potential arrestees is not implicated in how the algorithm operates.

[2] The notion of crime forecasting was first put forward by sociologist Clifford R. Shaw and criminologist Henry D. McKay in their 1931 book *Juvenile Delinquency and Urban Areas*.

[3] As Wendy Chun describes, the "software studies" move within media studies imagines instructions in a "source code" as the "ultimate performative utterance"—the literal source of an action (Chun, 2008, p. 299). Lev Manovich (2001, pp. 48–49), for instance, emphasizes the need to turn to computer science to understand the inner logic of media. Alexander Galloway (2004, p. 165), in a somewhat different vein, claims that computational code is inherently executable.

[4] Chun makes a similar argument: 'source code is never simply the source of any action; rather, source code is only source code after the fact: its effectiveness depends on a whole imagined network of machines and humans' (Chun, 2008, p. 299).

[5] In "Can the Subaltern Speak?" Spivak shows how geopolitical and economic factors inscribe textual representations. The non-exploitative Power that Foucault and Deleuze and Guattari theorize, according to Spivak, does not inhabit the "Third World" and serves the interest of an economic situation that requires "interests, motives (desires), and power (of knowledge) [to] be ruthlessly dislocated" to the "First World" under the international division of labor (Spivak, 2010, p. 35).

[6] The discourse surrounding the "digital divide" has been thoroughly critiqued; see, for example, Gunkel (2016).

[7] When it was first established in 1999, the organization ran on a single portal. Today it works through a series of country gateways (independent national-level organizations), each with its own editorial committee that assesses the quality of development knowledge.

[8] It is perhaps important to note that Development Gateway does not animate marginalization by increasing "poverty"; in fact, the algorithm's performance is optimized against evaluation metrics that define "poverty" in very specific ways and that aim to alleviate it through the distribution of very specific "benefits." However, the platform produces, and is in turn produced by, the representational process of marginality, which, as argued above, has concrete ramifications, even though they might not be measurable within Development Gateway's evaluation metrics.

[9] It is worth noting that, with the implementation of certain protocols, power *can* be relatively decentralized and resources distributed evenly even in a server-periphery network.

[10] For more on scale-free networks, see Barabási and Bonabeau (2003).

[11] There are, however, exceptions to this; for a thorough critique of corporate political power in general, and Google Search in particular, see McChesney (2014, pp. 102–129).

[12] Another consequence of this formulation, as Kosek notes, is that drone operators can more easily evade legal and moral codes (p. 668).

[13] For an analysis of how modern surveillance practices are underpinned by the methods of policing black bodies, as well as black social life, under chattel slavery, see Browne (2015).

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Bio

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