Analyzing algorithms: some analytical tropes

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From hype to analytics

Algorithms are everywhere. Hardly a day passes without reports on the increased digitalization and automation of society and culture. As we know these processes are fundamentally based on algorithms (Kichin 2012). Today, there is also a proliferation of research on the social aspects of algorithms: on census taking (Ruppert 2012), predicting and preventing crime (Ferguson 2017), credit assessment (DeVille & Velden 2015), pricing water (Ballestero 2015), machine-learning (Burrell 2016), email spam filters (Maurer 2013), dating services (Roscoe & Chillas 2014) to mention a few. The focus of these researchers have in different ways been algorithms and their profound impact (cf. Kockelman 2013). However, in this algorithmic world, it seems to us that we are moving in a landscape where we find familiar tropes of technological hype, determinism, and of evil technology run wild.

For this workshop we wish to foster a conversation about the specificities of algorithms in our research. Our aim is to ask: How do we—as researchers of society and culture—study algorithms? Thus, we aim to deal with algorithms as objects of research. Here we agree with Paul Dourish (2016) who points out the need for awareness about how we approach algorithms to avoid treating everything as an algorithm. In our view there is a dire need to sort out how we approach algorithms as analytical objects in society and culture.

In this paper we outline a few ways to approach and analyze algorithms. The aim is to get an analytical conversation started. We want to ask: How can we understand how these emerging technologies of algorithms are part of society and culture? How can we understand how people work together with digital artefacts, databases, and data mining technologies?

Some ideal types

Today, there is a proliferation of analytical perspectives that seem to be relevant to analyzing algorithms, as ethical, as opaque, as objective, as vehicles of automation. As a starting point for thinking about analyzing algorithms, we want to move forward by going back.

Figure 1. Going under the hood?

Historically, in STS and elsewhere, a huge amount of ink and energy has been expended to understand technologies as part of society and culture. In this paper we briefly outline five ideal typical accounts of technology in society. We want to explore how old analytical tropes might be relevant in relation to new hyped technologies such as algorithms. The goal of this exercise is to give some analytical distance to the hype of new technology.

In doing this, we propose some ideal types to illustrate our point. Of course, we risk foregrounding some perspectives while forcing others into oblivion. We also risk being a bit too harsh in the ideal typing. So bear with us if we do violence to more nuanced and multifaceted perspectives when we pull some things apart and push some other things together.

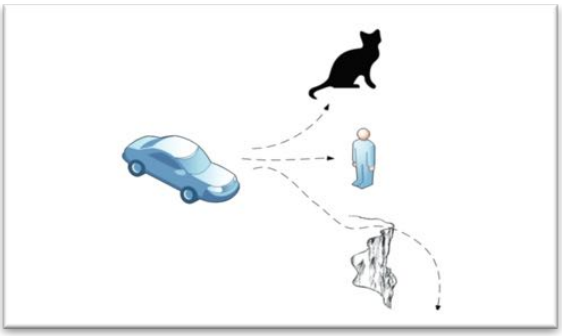

Figure 2. Inherent politics? Killing a cat, the driver, or another human?

Under the hood: the inherent politics of algorithms

A number of researchers maintain that we must analyze the algorithm itself and go under the hood in order to understand the inherent politics of artefacts. It seems to us that a number of analysts of new technologies, such as algorithms or big data, gather in this analytical camp. Analyses drawing on for example inherent (bio)politics or inscribed choices of self-driving cars abound.

In this ideal type the materialities of algorithms appear like a *deus ex machina*; impinging on society's deep-rooted material politics of categorization and organization. This analytical position draws on analytical logics like Winner's inherent politics of artefacts. Here the analytical trope urges the analyst to see artefacts as laws of society that redefine how we think and act "for generations to come" (Cf. Winner, 1980).

In this type of analysis, the politics and ethics of algorithms becomes foregrounded. A crucial task becomes to analyze the "laws of robotics" in order to understand how algorithms make politics. However, perhaps, in this ideal type, we risk losing sight of the practices, negotiations, and human action that systems of classification are intertwined with.

Constructing the hood: performativity and algorithms

On the other side of our constructed spectrum of ideal types we can place ethnomethodological analyses of the achievement of social order. Goodwin's detailed analysis of interaction around classification of dirt through so-called Munsell color charts could perhaps be seen as emblematic (Goodwin, 2000). In this interactive/performative vein, we could perhaps argue that algorithms need to be understood as achievements in social practice (cf. Ziewitz, 2015). Algorithms here would emerge as "contingent upshot of practices, rather than a bedrock reality" (Woolgar & Lezaun 2013:326).

Figure 3. An algorithmic talk-walk (Ziewitz, 2013)

The talk and action around the practices of classification become foregrounded in this ideal type. It is a perspective that elegantly sidesteps the incessant discussion about what algorithms are. The human politics of drawing on contexts, materialities, or devices become foregrounded. The decoding of an "inherent politics" becomes irrelevant or perhaps even misleading.

However, what we might lose sight of here is how classification systems and associated artefacts might have quite nefarious politics built into them, such as in algorithms constructed for example by the gambling industry (Schüll, 2012). Do we then risk omitting what the algorithms are constructed to do?

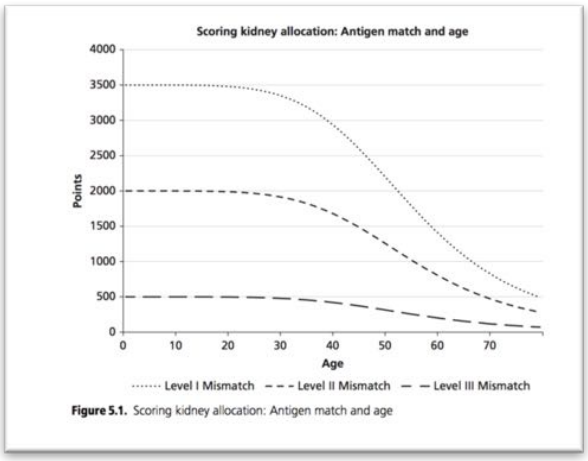

Figure 4. Kidney allocation algorithm (Roscoe, 2015)

Lives around hoods: ecologies, social worlds & torque

In a lateral move from our hood metaphor, to "around the hood"—we can also perceive a long-standing interest in technologies of classification and how they interact with human biographies. These types of analyses highlight how people's lives become twisted by classification systems. For example, how the classification systems of the South African apartheid regime affected human lives (Bowker & Star, 1999), or for that matter how activists relate to and subvert classification systems—as for example Baki Cakici has shown through the emergence of the Jedi knight census-phenomenon (Cakici, 2014).

A highly thought provoking study in this vein is Philip Roscoe's work on kidney transplant algorithms (Roscoe, 2015). In this study he shows how the question "Who is the worthy recipient of a kidney?" is answered in algorithmic form. But of course the algorithm—just as apartheid color classification—is tied to human valuations of worthy recipients. Just as neighbors could sometimes band together to challenge a color classification in South Africa (cf. Bowker & Star, 1999), so can hospital staff game the algorithm for a "worthy" recipient, but also use it as an ethical "way out" of heart wrenching decisions on life and death.

In this ideal type, the interaction between human lives and classification systems become foregrounded. The infrastructural sorting of humans, on race, sexuality, or other traits and the effects on their lives. How their lives are intertwined with infrastructural systems and ecologies of classification. What we might lose sight of here is the detailed interactions of how social order is maintained in practice. A risk is that a focus on infrastructures leads to seeing algorithms as having inherent politics that impinge on the lives of human biographies, thus foregrounding the functioning of the system over the very detailed human practices, or infrastructural work.

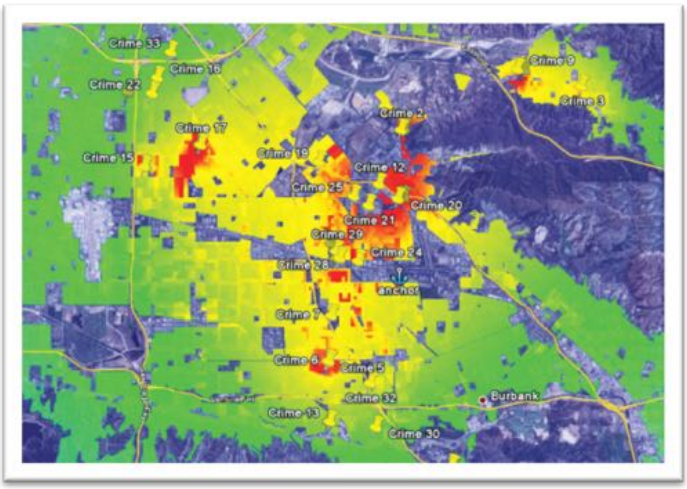

Figure 5. Predpol. Predictive policing.

Hoods in relations: material semiotics & black boxes

Fourthly we deal with the ideal type of material semiotics which focuses on relational effects of human/non-human relations, for example Haraway's metaphor of the "Coyote Trickster" (1992) as well as John Law and Michel Callon's work on *Agency and the hybrid collectif* (1995). These positions

compel the analyst to deal with relational networks and assemblages that produce facts and artefacts. For example, Bruno Latour's *Pédofil of Boa Vista* (1995) traces the work that dirt scientists, *pedologists*, do to go from dirt to fact through a series of classification machineries. Each successive machinery of classification—starting with grid lines in the forest and ending with published facts—moves soil from locality and particularity to generality and standardization.

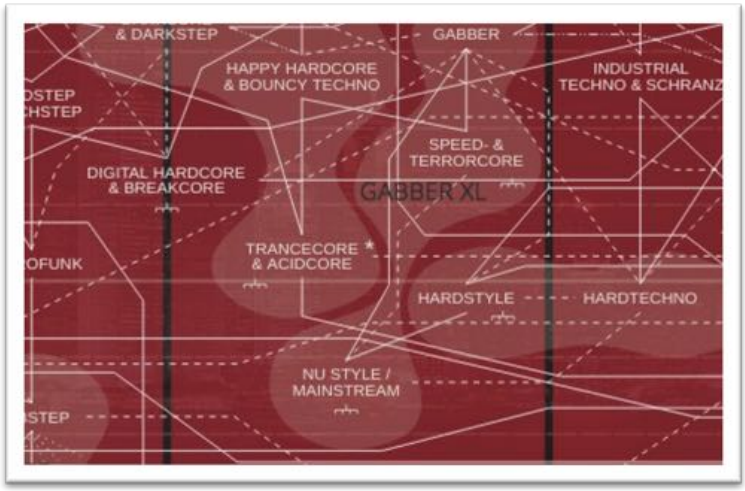

Figure 6. "admiral! we're entering the gabber cluster!" @npseaver

In paying attention to the painstaking practices of relational ordering, we can get hold of the achievements of human-machine networks. This means questioning the naturalization of categories and of representations. Using this perspective, we could perhaps show how categories are contingent upshots of practices, while also granting some agency to the machineries of classification? Yet, the risk is that we lose out on the meaning of these classification systems for humans whose lives are torqued in classification systems. In this perspective humans might be seen as slaves to the machinery, or as masters of nefarious systems of world domination (cf. Star, 1991).

I can't open the hood! Inscrutable learning machines and android epistemologies

Our last perspective we deal with here is linked to opacity and inscrutability. Solon Barocas, in his 4S 2013 talk on *Anti-Social Analytics*, discussed how machine learning involves "correlations that don't make sense because they don't involve characteristics that already possess cultural associations". In this, Barocas draws on Katja DeVries (2013) who writes about the computational turn and contrasts human constructed algorithms and algorithms constructed through machine learning. According to DeVries, these algorithms go beyond human understanding and "opens up a field which can be called 'android epistemology'". This is because "profiling machines are more of a companion to their users (in the same way as a dog can be a companion to its owner) than an extension" (Devries, 2013).

Figure 7. Fritz Lang's Maria. An inscrutable machine?

However, these speculative perspectives on classification are often tied to a discussion of morals, ethics, and fairness, thus returning us to algorithms seen as the political artefacts that we started out with. Our question then becomes: do we need to study the inscrutable learning machines as Haraway's *companion species* (2013) rather than as classification machineries?

Perhaps, if we cannot understand these alien beings, we would be forced to return to the ethnomethodological injunction to study situational talk and interaction? Here perhaps Nick Seaver's work on the "inter-

pretability" of music recommendation systems can stand as a possible line of inquiry: how can we study the interpretability of classifications?

In Conclusion

By twisting and turning the metaphor of the hood we can ask an array of questions. How do we pay attention to algorithms in our research? At what level of understanding? How do we make them matter? How do we deal with algorithms in theory, in method, and as issues in society? What delineates this approach from other possible avenues of inquiry? What were the challenges of dealing with them in this manner? What are the benefits? How does this approach relate to previous work on theory or method? Regardless of our theoretical approach—be it inspired by ANT, infrastructures, ethnomethodology, ethnography, etc—the aim of this workshop is to explore how we approach algorithms as part of a larger research question.

We now ask: How have you approached algorithms in you research?

In order to start this discussion, we ask you to prepare a **one-page provocation piece based on your own research** where you see algorithms playing a role. These provocation pieces will be the basis for organizing our workshop, but also form the pieces of how we move forward in the future. In the provocation it we ask you to deal with algorithms as a theoretical object, as a methodological problem, and as an issue in society and culture. Please delineate what you see as the burning issues: What is at stake in analyzing algorithms? Be specific. Be playful. Be provocative. Be creative.

Hoodedness: A useful metaphor to think with?

- Under the hood
- What hood?
- Lives around the hood
- Hoods in relations
- I can't open the hood!