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Algorithmic resistance: media practices and the politics of repair

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ABSTRACT

The article constitutes a critical intervention in the current, dramatic debate on the consequences of algorithms and automation for society. While most research has focused on negative outcomes, including ethical problems of machine bias and accountability, little has been said about the possibilities of users to resist algorithmic power. The article draws on Raymond Williams' work on media as practice to advance a framework for studying algorithms with a focus on user agency. We illustrate this framework with the example of the media activist campaign World White Web by the Swedish artist and visual designer Johanna Burai. We suggest that user agency in relation to algorithms can emerge from alternative uses of platforms, in the aftermath of algorithmic logics, and give birth to complicit forms of resistance that work through 'repair' politics oriented towards correcting the work of algorithms. We conclude with a discussion of the ways in which the proposed framework helps us rethink debates on algorithmic power.

The drama of algorithmic culture

In 2015, the Swedish design student Johanna Burai embarked on a project to change Google Image search results. After experiencing continued frustration with the racial bias in the search results – while, for example, searching for depictions of hands – she developed the idea to test and correct the misrepresentation presented by the tool. And she succeeded in this. Launching a website offering images of non-white hands for download, in combination with a media campaign directed at traditional and online news outlets, she was able to boost her images among the top results for Google Image searches for hands. Taking this project as a starting point, the article engages with the question of user agency in algorithmic culture, which is based on the increasing delegation of cultural tasks to algorithms. Suggesting the notion of media practices of repair, we re-insert the user in the formation of complex socio-technical systems. Unfolding in the aftermath of algorithmic logics, media practices of repair are tactics to correct existing shortcomings *within* algorithmic culture

rather than by producing alternative pathways. In that sense, they establish reactive user agency in an algorithmic aftermath.

User agency is often neglected in the emerging discussion of the consequences of algorithmic culture, which is increasingly wrapped in a narrative of drama. Scholars, journalists, and citizens alike have raised concerns about the closing and isolation of digital public spheres through divisions generated by preemptive taste management curated by algorithmic logics (Morris, 2015); the reproduction of biases against race and gender in search engine algorithms (Noble, 2018); and the suppression of ethics and the management of everyday experience in favor of commercial logics based on politics of satisfaction and normalization of the average (Ananny, 2016). As algorithms assume a dominant role in the mediation of power, it becomes increasingly important to consider to what extent and in what ways their power can be resisted. Hence, this article engages with mundane user encounters with algorithms that can be inspirational for political projects that embrace – rather than denounce – the algorithmic power embedded in platforms and channel it to both serve specific political ends and act upon biased algorithmic output.

The extent to which power and biases are embedded in and run through technologies like algorithms might appear to be a novelty. As such, the possibilities to object to such power could seem out of reach of ordinary users. Yet, debates about the social construction of technology, which played out already in the 1980s, refused deterministic accounts of technological diffusion and made clear that, despite technology representing one of the major sources of power in modern societies, practices of use can alter its dominant social meanings and add variety to prescribed uses embedded in technological design (Bijker, Hughes, & Pinch, 1987; Feenberg, 2002; MacKenzie & Wajcman, 1999). Indeed, it is well known that designers project specific meanings onto technologies under development, 'configuring' imagined and idealized users (Balsamo, 2011; Nardi, 1993; Winner, 1999; Woolgar, 1990). At the other end of the scale, users also engage in negotiations of the meaning and functionality of technologies through multiple uses that may comply with or deviate from the 'original' meanings envisioned by designers (Feenberg & Hannay, 1995; Oudshoorn & Pinch, 2003). Design scholars are increasingly aware of these processes in the context of algorithms. For example, users can develop 'folk theories' or popular understandings of the workings of algorithms and make them work toward specific, user-defined ends (Eslami et al., 2016). In short, algorithms and their users co-construct and counter-curate each other:

> Just as the Facebook News Feed algorithm is likely trained by the act of clicking "like," so is the Facebook user trained by the algorithm's dissemination of some posts and not others. In this way, content curation is co-produced by both users and machine. (Eslami et al., 2016)

These co-production principles are often extended beyond the platform itself and form a 'like economy' across the web that enhances certain practices of engagement while constraining others (Gehl, 2015; Gerlitz & Helmond, 2013).

By acknowledging the mutual co-construction of algorithms and their users, and by zooming into some of the alternative uses of algorithms, we reframe the public and scholarly debates on algorithmic power, which have taken a rather dystopian turn grounded in an instrumentalist understanding of technology. As a way of balancing the growing literature that discusses the power of algorithms, with this article we instead locate the possibilities for agency and algorithmic resistance within practices of use of the platforms within

which algorithms are embedded. Specifically, we foreground the significance of mundane user encounters with algorithms through which users can develop tactics (see 'de' Certeau, 1984) of resistance through alternative uses. These tactics can be based on users complying with algorithmic logics but resisting their output, 'tricking' algorithms to work toward unintended ends through what we call 'repair politics,' or the politics of partial and improvisational correction of biased results of algorithmic work. By foregrounding some of the ways in which 'repair' politics can be performed, we contribute to an epistemological reframing of the debate on algorithms, through which we can start charting more hopeful approaches to managing their power in everyday life.

We develop the argument in several steps. In the first section of the article we bring together debates on algorithmic power with the emerging, yet still scarce scholarship that has focused on user agency in relation to algorithms across platforms. We then continue by shifting attention away from the technicality of algorithms and putting emphasis on their embeddedness in *practice*, drawing on the work of Williams (1974). In the subsequent section, we illustrate one way in which users have resisted the structuring power of algorithms; specifically, we look at the case of Swedish design student Johanna Burai and how she tried to tweak Google's image search algorithm as a way to propagate alternative search results in an act of resistance to the politics of representation. With this case as a point of departure, we continue with a discussion about the forms that agency and resistance against algorithmic power can take, conceptualizing these as tactics that can work as a form of 'repair' politics that emerge – to invoke Jackson (2014, p. 223) – in 'the aftermath', working within the framework of an algorithm to induce a partial correction of biased results. We conclude with a discussion of the implications and limitations of these forms of algorithmic resistance.

Algorithmic power and the politics of algorithmic use

Algorithms have always been an intrinsic part of digital media and information technologies. However, given the increasing role that they have come to play in structuring everyday online communication, in organizing and recommending media content, or exercising the power to make decisions instead of humans in areas such as public administration, their power over the self and society has grown tremendously (Ananny & Crawford, 2018; Beer, 2017; Chu, Gianvecchio, Wang, & Jajodia, 2010; Gillespie, 2014, p. 20; Kitchin, 2017). At the same time, ontologically, their presence and governing capacities seem to have remained invisible and impossible to penetrate, provoking what some have termed 'a crisis of control' (Bodo et al., 2018).

Algorithms form part of the 'technological unconscious' (Thrift, 2005) that underpins the fabric of social life, while their logics most often remain black-boxed and difficult to trace or question (Kitchin, 2017; Pasquale, 2015). The invisibility of the structuring power of algorithms is a key feature that has been argued to represent a new form of hegemonic power operating on the basis of generative rules, or 'virtuals that generate a whole variety of actuals' (Lash, 2007, p. 71). Scott Lash explains that the logics of code that are embedded in algorithms act as conduits of capitalist power, making power increasingly embedded *in* the algorithm. As such, for Lash power in society becomes ontological, embedded in code, and hence more difficult to object to, subvert or undermine through means that have traditionally been used against hegemonies. One consequence of such

a reorientation of power has been the eclipse of the commonly acclaimed participatory potential of social media and online spaces in favor of its algorithmic regulation (Beer, 2009; Langlois, 2013). An urgent question for scholarship became to understand how the new forms of algorithmic governance operate, for example, by studying their ethics (Ananny, 2016) and ways of creating accountability (Sandvig, Hamilton, Karahalios, & Langbort, 2016), or by elaborating methods to study algorithms in the first place (Bucher, 2016; Kitchin, 2017; Seaver, 2014). The scholarly concern with the power and workings of algorithms has shown that this power lies as much in their code as in the meanings that algorithms are attributed in society. These meanings can vary broadly – from the ontological definition of algorithms and the production of their authority (Beer, 2017; Kitchin, 2017; Lustig & Nardi, 2015; Mackenzie, 2006) to the ways in which their production impacts the present and the future. Future-oriented concerns are almost exclusively related to the automation of work and crucial societal functions in ways that cannot live up to democratic, modernist ideals of transparency (Ananny & Crawford, 2018). In this context, Rossiter and Zehle (2015) have rightfully raised the question about what could constitute political action when disruption is seemingly absorbed as a normative condition within systems of calculation and control that render resistance futile. Whereas this critical body of scholarship has defined algorithms as objects to fear, a pressing question is still the extent to which everyday media users are only subjects and victims of algorithmic power. Are they so powerless against the workings of algorithms?

In order to address the question of the possibilities for resistance against algorithms, we must shift focus away from the algorithms as such. Instead we should examine the relationship between users and algorithms. Two scholarly observations need to be taken into account here. First, algorithmic power, however obscure, is geared toward evaluating and regulating what becomes visible and what remains out of sight, and to whom (Bucher, 2012). Second, this particular regulatory logic, however specific in terms of the computational media within which it is embedded, ultimately resembles the logic of traditional media, such as publishers, libraries and broadcasters, which have the ability to amplify or suppress voices (Gillespie, 2017, p. 75). Hence, the dominant politics through which algorithmic power functions is an attention politics that defines dominant meanings and representations of objects, people and events.

At the same time, what counts as worth being promoted or demoted by algorithms is shaped in a complex interplay between them and users. Algorithms are dependent on users for the queries that make them work and for the generation of data. User-generated data must be produced and aggregated so that algorithms can start to 'define which information is to be included in an analysis; [and] envision, plan for, and execute data transformations' (Ananny, 2016, p. 98). On the other hand, users are not passive observers in this process. They increasingly recognize the role that they play in shaping the workings of algorithms, and they have begun to strategically intervene in political, commercial or playful ways in the algorithmic politics of attention. For example, the growing industry of search engine optimization caters to the need of businesses to stay on top of algorithmic visibility logics (Draper, 2019). New content producers, such as influencers and online celebrities, are also finding increasing possibilities to stimulate or boost their popularity within the regulatory structure of algorithms on platforms such as Instagram (Cotter, 2018). Often, as Cotter (2018) argues, influencers feel an obligation to know how algorithms work in order to be able to be part of the 'visibility game' and to engage in gearing

algorithmic workings toward their own benefit; this manifests, for instance, in crafting an influencer online identity. Hence, just as algorithms study user behavior to promote commercial interests, users' study algorithmic behavior in order to advance their own interests.

In some cases, these interests can be geared toward the development of identity and taste, rather than toward commercial practices. In the context of everyday practices such as mundane music listening, users embrace algorithms in what some have called 'a symbiotic relationship' (Karakayali, Kostem, & Galip, 2018), in which users relate to algorithms as companions and advisors that can help them to cultivate their taste in music. At the same time, in such relationships algorithms may also take advantage of users by imposing ideas of neoliberal productivity through music-recommendation systems (Eriksson & Johansson, 2017). In yet other cases, mundane encounters with algorithms can provoke users to develop tactics to trick algorithms to work toward unintended ends (Bucher, 2017). Such acts can have profound effects when put to use by political activists, as demonstrated by an activist campaign that promoted alternative meanings of a US politician's name for more than a decade in Google's search results (Gillespie, 2017). Algorithmic power can be further resisted through activist techno-political practices, or algorithmic activism (Treré, Jeppesen, & Mattoni, 2017), as demonstrated in examples of the Indignados in Spain, whose activists design complete media ecologies of independent outlets and platforms, ranging from websites to independent social networking sites. As Treré et al. (2017) note, activist work also leverages existing algorithms, like Twitter, to achieve goals of resistance, increasing the visibility of political causes without challenging the algorithmic logic as such. To these ends we should add human–computer interaction and interface designers, who employ algorithms of popular social media platforms in order to advance alternative conceptions of interface design based on more technological transparency rather than ideals of 'seamless,' opaque design (Eslami et al., 2016).

Algorithmic systems amplify or suppress voices. Therefore, for a plethora of users who struggle for online visibility, or who *work with* algorithms to develop their identities and tastes, they have become both an arena and an object for political efforts. Hence, in order to expand our understandings of the power of algorithms and the possibilities of user agency to act on this power, we must recognize the myriad of practices through which people act with and on digital technologies and infrastructures. As Kubitschko (2017) argues:

> Looking beyond what actors do with media and including why and how they act on media allows for more adequate recognition of power structures as it emphasises and at the same time scrutinises the role of actors' practices in contemporary media environments. (Kubitschko, 2017, p. 26)

Kubitschko's proposal resonates with Kitchin's (2017) suggestion that studies of algorithmic production need to focus not only on the contexts where algorithms are designed but also on the plethora of situations in which people 'resist, subvert and transgress against the work of algorithms, and re-purpose and re-deploy them for purposes they were not originally intended' (Kubitschko, 2017, p. 26). Resistance against and subversion of the dominant logics of algorithmic governance tend to happen precisely by means of users mobilizing algorithms toward ends that were not originally intended, ultimately directing politics of attention toward other objects that users might consider more important to be amplified than those that have been calculated by algorithms as deserving attention.

In the next section, we draw on Raymond Williams' (1974) discussion of agency and technology to build a framework for understanding user intervention and political resistance in relation to the work of algorithms.

Locating user agency: algorithms as technologies

Few authors involved in the debate about algorithms conceptualize them in terms of technologies. Most often their ontology is thought of in relation to code, socio-technical assemblages, as imaginaries, or as conduits of power. Ziewitz (2016, p. 6) summarizes the definitional problem of algorithms with the comment that 'we don't know [what an algorithm is], but surely it is very powerful.' A fruitful way of addressing this issue is to return to the more established and conventional understanding of algorithms as technologies; as Seaver (2014) points out, this is also the way that key textbooks introduce algorithms to computer science students. Furthermore, following Napoli's (2014) proposal that some algorithms can be conceptualized as media institutions, it should not be perceived as uncommon that they can be resisted, subverted and questioned by the broader public. After all, processes of public institutional criticism have been at the core of liberal democracy for decades. Taking algorithms as technologies, an entrance point to discuss their relationship to questions of agency is Feenberg's (2002) critical theory of technology.

Feenberg's critical theory of technology departs from the premise that ideas about technological rationalization that aim to support capitalist organization of labor are embedded in the very core of machines. He suggests that the problem of technological hegemony is one that stretches far beyond a mere critique of the property system, being one in which power rests on the technical mediation of social activities. This argument precedes Lash's (2007) idea of post-hegemonic power based in algorithms, although essentially reflecting the same notion of technological hegemony (and thereby power) as embedded at the core of technologies and operating within them. Similarly to Lash, Feenberg admits early on that what is new about modern technology is neither the reduction of objects to raw materials – think of the algorithmic conversion of audiences into objects to mine (Gillespie, 2014) – nor the technical control of some human beings by others and the scale at which this happens, but the ever-increasing centrality that these features take. Feenberg's proposition to subvert established rationalities embedded in technologies is to focus on 'the experience and needs of individuals resisting a specific technological hegemony' (Feenberg & Hannay, 1995, p. 18). His conceptualization of resistance is not concerned with a contest for wealth or administrative power but 'technical politics,' which he defines as 'a variety of struggles and innovations with significant consequences for the structure of major technical institutions and the self-understanding of ordinary people' (Feenberg, 2002, p. 24). He adds that such politics is 'a struggle to subvert the technical practices, procedures, and designs structuring everyday life' (2002, p. 19). Hacking, technological disruption and obfuscation could be some of the paths through which the functioning and purpose of technologies are redefined, collectively and politically. But techno-politics can also be exercised through media practices.

Recent developments in media theory that have embraced and developed further the 'practice turn' from sociology have increasingly acknowledged the breadth of media practices through which users can *act on* technologies and infrastructures. The analysis of media practice is loosely defined as the study of human action in relation to media across

a whole range of situations and contexts (Bräuchler & Postill, 2010; Couldry, 2004). Media practices stand for 'what people are doing in relation to media in the contexts in which they act' (Couldry, 2012, p. 35).

Historically, Raymond Williams noted already in 1974 that '[p]ractice [...] has always to be defined as work on a material for a specific purpose within certain necessary social conditions' (Williams, 1974, p. 160). This means that media practices emerge in conjunction with the properties of media technologies. These properties, according to Williams, are cultural, but they also shape cultures through the intentions embedded in technological production, which often are those of corporations with military, political and commercial aims. Hence, technological production is an intrinsic part of capitalist production, which subjects it to a pressure for constant innovation, defining new consumer needs through new machines. These consumer needs, Williams argues, do not represent a form of structural imposition that turns consumers into passive recipients. Rather, technology can assume a breadth of meanings in practices of use.

Indeed, as Silverstone and Haddon (1996) have argued, the emerging character of a new technology is shaped both by the intentions of designers who 'configure' (Woolgar, 1990) users by creating mental maps of their potential engagements with a technical object and by users' actual practices, which are influenced by the social, cultural and economic contexts within which they are situated. By analogy, even though algorithms are designed to have governing capacities and to orient users toward specific modes of engagements with the platforms within which algorithms operate, it is impossible to determine and fully predict the ways in which users might employ algorithms or give them a different meaning and function than prescribed by their designers. In a revision of the classic debate about the social construction of technologies, Oudshoorn and Pinch (2003) emphasize that we can never take the use of a technology for granted. Just as designers configure users through their technologies, a process which may lead to exclusionary practices of certain users, users in turn also configure designers by means of unintended or alternative uses. In addition, resistance is a common feature of processes of socio-technical change which involves the creation of new social relations around specific technologies (Oudshoorn & Pinch, 2003). In order to understand socio-technical change, it becomes important to analyze the forms that such resistance can take. In the context of algorithms, one such form of resistance is offered by the case of the World White Web project, which we present in the next section.

The World White Web project

In 2015, Swedish design student Johanna Burai needed an image of a hand for a graphic design assignment [1]. She did the most obvious thing and turned to Google's image search, but was struck by the results, which consisted only of white hands or pictograms. At first, she assumed that it was her location in Sweden that had led to a personalized, overwhelmingly white search result, so she asked a friend, located at the time in South Africa, to perform the same search. The result was identical, and Johanna kept searching. A search query for 'black hand' primarily returned pictograms or illustrations of black hands; another query for 'African hand' returned images of white hands holding or stretching toward black hands with overtly racist or colonial representation codes.

At that time, the theme of the racial bias of algorithms was still generally overlooked in scholarly and public attention. Today, there is an increasing understanding about the pervasiveness and complexity of the problem with the algorithmic shaping of bodily politics, one that has led some to call Google's search algorithms 'algorithms of oppression' (Noble, 2018) that cause ethical harm and need for the development of an ethics of algorithms (Sandvig et al., 2016). Rather than simply rather than just leaving the problem after discovering it, Burai decided to try to change the results of Google's image search algorithm and introduce greater racial diversity by launching a project which she called the 'World White Web.' She describes her intervention as experimental, stemming from the position of a layman without much understanding of the technical workings of algorithms. At the core of her project was the idea that – since Google's search results are generated on the basis of a ranking criteria assigned through the PageRank algorithm – the inclusion of certain alternative images of hands could be realized by generating a high enough PageRank through a media campaign. Burai took six photos of non-white hands of friends (see Figures 1–6). All images are taken by Johanna Bura and reproduced here from her project World White Web, worldwhiteweb.net

She consulted a few individuals who work on search optimization to develop an understanding of how to get her pictures to the top of the search results. Along with being told that it is nearly impossible to affect Google in this way, she learned that the images needed to be uploaded and shared (without changes in the file names) by many websites with a top PageRank in Google's system. PageRank is one of the algorithms that has gained the greatest 'fame' in scholarly discourse (Beer, 2017). While its workings have been increasingly veiled and opaque, it is considered to be among the most important sources of visibility on the web, which works based 'on a cultural assumption about relevance and importance that, to a large extent, relies on the amount of incoming links by other websites and their perceived authority' (Bucher, 2012, p. 1162). Burai learned that large international news outlets like *The Guardian* or the *BBC* have the highest PageRank and are considered of high importance by Google's search algorithm, while local news media are less important.
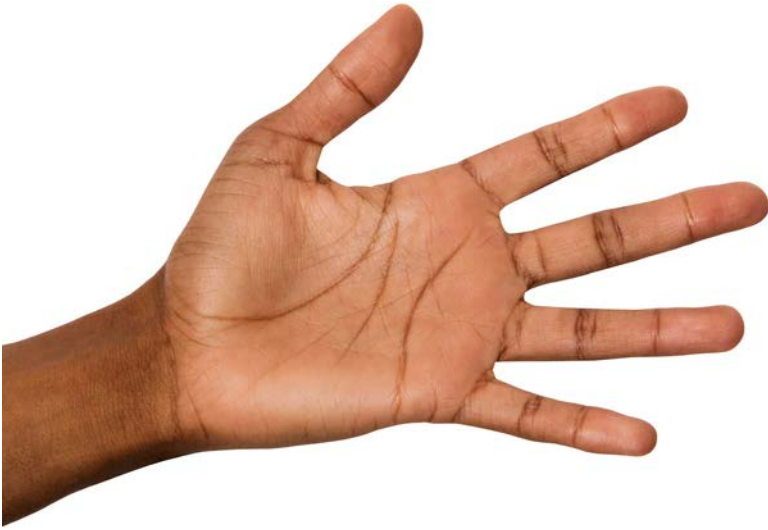

Figure 1. Hand.

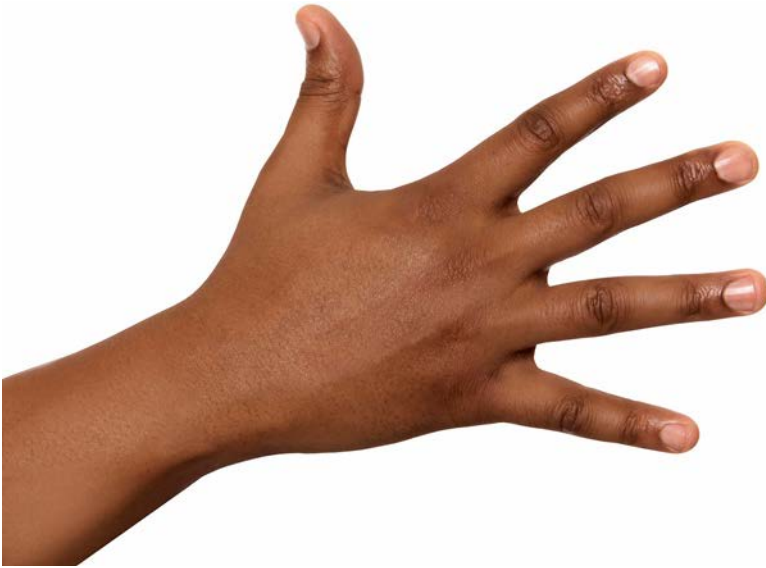**Figure 2.** Hand.

Figure 3. Hand.

Figure 4. Hand.

Figure 5. Hand.

In May 2015, Burai launched a campaign through which she aimed to get her six images uploaded and shared by as many top-ranked websites as possible. She deliberately bought a.net top-level domain name instead of a national one for the website; she produced a press release in which she described the problem with Google's discriminatory search results; and she asked a few friends to share information about her project through Twitter and Facebook. The attention that the project received was striking. The online popular culture newspaper *Dazed* swiftly published an article about the project but also uploaded and shared Johanna's six photos of non-white hands (Meinking, 2015). The BBC's music community website *Fader*, as well as *Buzzfeed*, followed suit (Storey, 2016). Al Jazeera produced a 30-minute piece on the topic of racial biases in technology. The Swedish national public broadcaster and public service radio interviewed Burai and spread her

Figure 6. Hand.

images further. In a matter of months, thanks to the significant media attention she gained, several of her images climbed to the top results in Google's image search, where some of them still remain. Burai admits that their position changes, and which of her six images makes it to the top varies, but since the launch of the campaign some of them are usually among the top ten results. The unusual success of her intervention led her to assert at a lecture for students at a Swedish university, 'Together, we can change Google.'

Burai's intervention was directed toward only one specific search query, leaving unchanged the racial or sexual biases that other keyword searches may trigger. Yet, her case is not unique. At the moment of writing this article, another artistic project has been taking place, where artist Gretchen Andrew has pushed to the top of Google's image search results her paintings of the suffering and effect of cancer patients with the aim to provide variation from a predominantly clinical representation of searches of 'ovarian cancer.' Likewise, she intervened in Google's image search results of representations of specific geographic and artistic spaces, making Google's search engine into an exhibition gallery of her own art projects. The artist noted, 'Definitions are highly manipulatable if you know how to structure information' (Andrew, 2018). Rogers (2018) also points to an even greater variety of artistic projects which, in different ways, have engaged with manipulating or expressing criticism of Google's search engine results, including those of its image search function. What projects such as Burai's and Andrew's tell us is that even though power might run through algorithms, resistance to the governing power of algorithms, and in particular to the politics of attention that they conduct, takes place from *within* the logic of the algorithm. Although starting from the premises of the algorithm, both Burai and Andrew subvert the rationalities embedded within the algorithm and hence constitute 'technical politics' in Feenberg's (2002) sense. Their version of technical politics – namely what we call media practices of repair – should be considered along

hacking, technological disruption and obfuscation that have been identified as carying the potential to redefine the meanings and values of technologies.

User tactics and repair politics

In his seminal work 'Weapons of the Weak,' Scott (1985) argues for the need to rethink dominant conceptions of resistance that take place within systems of hegemony and domination. Scott stresses that resistance is often thought of in terms of organized collective action with substantial, revolutionary consequences that negate the foundation of domination itself. However, more often than not, resistance is cautious and remains within the limits of what he terms 'calculated conformity' (Scott, 1985, p. 241). It is incidental, unorganized, unsystematic and individual, opportunistic and self-indulgent, with no revolutionary consequences. While such forms of resistance 'imply, in their intention or meaning, an accommodation with the system of domination' (Scott, 1985, p. 292), and thus do not pose a fundamental challenge to the dominant power source of inequality, they represent a constant process of testing its limits and contesting power relations. Scott wrote about resistance in the context of a peasant's everyday class struggle in a village in Malaysia – a context which in many ways is very different from the relation between algorithms and uses. Nevertheless, his presentation of complicit forms of resistance is useful for an understanding of the possibilities of user agency to object to the power of algorithms.

The extent to which search algorithms such as Google's image search have been institutionalized in everyday media makes conventional forms of resistance very difficult, if not impossible. Burai's intervention was not revolutionary – it was an example of an incidental and, to a large extent, spontaneously organized media campaign with no dramatic consequences – but it tested the limits of dominant meanings produced by Google's image search results and represented a small act of power negotiation in relation to algorithmically produced racial biases. Burai's project was complicit with the logic of the algorithm, and yet it used the technology to produce an outcome that was different and unintended, at least in terms of the system. Michel de Certeau (1984) notes how in everyday contexts of oppression and dominance producers of consumption maintain their difference 'in the very space that the occupier [is] organizing' (de Certeau, 1984, p. 32). Within this space, difference is established through plurality and creativity enacted through tactics. For de Certeau, tactics are calculated actions 'determined by the absence of a proper locus' (1984, p. 37) that take place within existing structures. They are maneuvers 'within the enemy's field of vision' (p. 37), operating 'in isolated actions, blow by blow,' taking advantage of 'opportunities' and depending on them, 'being without any base where it could stockpile its winnings, build up its own position, and plan raids.' As de Certeau continues,

> It must vigilantly make use of the cracks that particular conjunctions open in the surveillance of the proprietary powers. It poaches in them. It creates surprises in them. It can be where it is least expected. It is a guileful ruse. (1984, p. 37)

Burai's intervention was tactical, incidental, and sporadic. Her production of alternate results for a hand would most likely not last in the long run. Yet, it represented an alternative use, a tactical intervention that created a small difference, 'blow by blow,' within the biased politics of attention exercised by Google's image search algorithm. As such, it

represents a tactical application of a politics of 'repair.' Repair here should not be understood literally as an intervention on malfunctioning technical code or 'broken' design (Graham & Thrift, 2007; Jackson, 2014). Burai did not repair or alter the code of the algorithm in any way. Thus, we understand repair politics as a corrective work that works through improvisations, patches and ingenuity, together with and within algorithmic systems, to make them generate unintended, alternative outputs to respond to the 'brokenness' or biased representational politics of algorithms. Tactical repair politics concerns agency that takes place in 'an aftermath' (Jackson, 2014, p. 223) and provides a means to induce small corrections with and from within the system.

We are not suggesting, of course, that it is the *responsibility* of users alone to try to change and act on power asymmetries produced by algorithmic systems. Yet, the complexity of the system makes the user an equally important figure in discovering and intervening in the politics of algorithms (including, for example, those embedded in search engine results). Users are thereby not only part of the process of the creation of large datasets on which algorithms operate and perform their power, but they can also tactically work with algorithmic interfaces to influence algorithmic processing to be conductive to specific politics, such as repair politics, which are part of a broader struggle for gender equality and balanced representation, as in the case of Burai.

Resisting algorithmic power

The aim of this article was to develop a critical intervention in the ongoing and somewhat biased debate about the consequences of delegating cultural labor – such as sorting, evaluating and making decisions – to algorithms. In light of the arguments and case presented so far, we return here to the scholarly concerns about the eclipse of possibilities for resistance when algorithmic power becomes ontological and embedded in technologies like algorithms.

Algorithmic power may be ontological, but it is also a media power. Many algorithmic systems have been argued to resemble aspects of media institutions because algorithms such as Google's search engine increasingly behave like political and cultural institutions that operate with politics of attention (Gillespie, 2017; Napoli, 2014; Noble, 2018). Hence, it should not be a surprise to find that questions about the politics of media representation are becoming an issue for algorithmic systems, too, and in this way an object of contestation by activists like Johanna Burai. Yet, unlike traditional forms of resistance, which in the past have resorted to 'alternative' media where suppressed voices might find an arena for expression, cases like the World White Web project show that algorithmic resistance evolves in conjunction *with* the properties and logics of technologies that channel media power (see Williams, 1974). It is a complicit form of resistance, one that does not deny the power of algorithms but operates within their framework, using them for different ends. Such resistance necessarily has to evolve and adapt, as the algorithms eventually evolve and are adapted by their designers, too. The ontogenetic and evolving nature of algorithms pushes resistance into what Steve Jackson – writing about the work of repair – calls 'an aftermath' or 'the margins, breakpoints, and interstices of complex sociotechnical systems as they creak, flex, and bend their way through time' (Jackson, 2014, p. 223). The aftermath of algorithmic curation forces resistance to be articulated through 'repair' politics of acting upon the cultural politics of attention generated *after* datasets

have been aggregated, computed and curated. The notion of 'repair' is a metaphor that signifies the symbolic act of correction of a perceived 'brokenness' of an algorithmic system, through which the dominant meaning of algorithmic systems may also be challenged. As Burai's case shows, Google Images can simultaneously be a tool for searching the web and a tool for political activism against the very politics of web searches. While the actual, measurable result of such politics might seem quite insignificant (such as changing one set of results for one query), the large media attention upon which such forms of resistance depend makes it paradoxically into a strong intervention in the politics of algorithmic attention as such – by both attracting media attention to problems such as algorithmic biases and making small corrections in the search output precisely thanks to this attention.

Our analysis also points to important interlinkages between seemingly new and cutting-edge technologies with more traditional media institutions. In Burai's intervention, as in similar cases (see Gillespie, 2017), practices of traditional media campaigning were central for the reshaping of the datasets on which the Google algorithm crafts its output. Hence, we can note that while in the age of 'participatory media' activists were searching for 'alternative' media outlets to amplify marginal voices, in the age of algorithmic governance resistance might be increasingly *dependent* on collaboration *with* traditional media. Burai's case emphasizes the continuous crucial societal role that traditional media outlets such as the press and television play in shaping and influencing the politics of attention, including those regulated by algorithms. Traditional media outlets can serve as platforms to empower activist projects through scaling up the production of certain types of data that ultimately alter the content generated for users on the web (see Neyland, 2015). Instead of blaming search engines for competing with news and editorial content, traditional media must compete with algorithms for attention and become more aware of its own strategic role in 'repairing' biases of algorithmic curation.

Of course, we must admit that traditional media and political projects like Burai's might also 'break down' algorithmic curation toward progressive political change. To the extent that the politics of attention are cultural politics, they can be embraced toward multiple ends, including the strengthening of already existing biases or the amplification of violence and extremism. It is yet to be seen how such potentially harmful uses of technologies and 'repair politics' might play out, particularly in light of the mechanisms with which platforms aim to police harmful online content (Gillespie, 2017).

We conclude with three suggestions for theoretical possibilities and future studies. First, more empirical and theoretical research is needed for strengthening the understanding of the role of traditional media outlets and campaigning in shaping the output of algorithms. Second, we should be attentive to the ways in which users engage with algorithmic systems across contexts, and further explore the media practices and politics through which political agency works with and through algorithms, reshapes their output and attempts to redefine their social meaning. Technology is not a thing but 'an ambivalent process of development suspended between different possibilities' (Feenberg, 2002, p. 15), always in the making, remaking and unmaking. The engagement with technology as always in the making would also include a mapping of different forms of resistance toward the intended usage of technologies.

Resistance being an intrinsic part of the shaping of technologies demands more attention, especially in the context of algorithmic culture. We have traced a very specific form of algorithmic resistance that emerges from within the system, a tactic that is reformist rather

than revolutionary (de Certeau, 1984). Many other ways of resisting algorithmic power – and in that way shaping algorithmic culture – are thinkable (e.g., more structural approaches advocating for regulation at the policy level or individual tactics of obfuscation). In all these possible cases, it will be crucial to continue to recognize the co-constructed nature of algorithms and to keep locating user agency and resistance in relation to them as they, their uses and resistance co-evolve.

Lastly, it might be worth revisiting earlier theoretical work on media power and examining the extent to which it can inform and complement debates about algorithmic power (Lash, 2007), particularly in light of the increasing recognition of the shared properties that media and algorithms have in terms of their key role in the politics of public attention.

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Disclosure statement

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