Metaphors in critical Internet and digital media studies

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Abstract
Since its very early days, metaphors have been used by various powerful social actors to try to convey what the Internet is and what it could be used for, now and in the future. In this short essay, I make a plea for critical scholars of the Internet and digital media to be simultaneously careful and imaginative in their own choice of metaphorical language. I revisit some of the early and recurring metaphors, such as frontier, highway and library, to illustrate the evocative power of metaphor. I then examine the more recent metaphors of cloud computing and (big) data flow to justify why it remains important to focus on metaphors. Scholars in critical and digital media studies not only need to deconstruct the metaphors of the powerful but they also need to contribute new metaphors and new ways of describing and thinking about the future.

Keywords
Big data, cloud computing, digital media, future, Internet, metaphor, science and technology studies

Introduction
Frontier, homesteading, superhighway, consensual hallucination, library, shopping mall, village square, world brain. . . . The list of metaphors for describing the Internet and related technologies is a long one. Which of these have become part of everyday language and which now come as a surprise can be revealing of age, national and disciplinary cultures.
Since its very early days, metaphors have been used by both powerful social actors and by those who challenge their power to try to convey what the Internet is and what it can or should be used for in the present and in the future. In the mid-1990s, when the Internet went public and the World Wide Web became available, many different metaphors were in use as people tried to make sense of the possibilities of this amazing new medium, capable of instantly transmitting data and information around the world. Twenty-five years later, the Internet has become widely diffused in rich countries, and the digital infrastructure underpinning many everyday transactions and interactions is taken for granted (until it breaks down). Nonetheless, language remains important as it shapes understandings of the present and hopes for the future. And, remembering the metaphors used in the past can be a salutary reminder of forgotten dreams and nightmares.

In this short, concluding essay, I build on earlier work (Wyatt, 2004) to make a plea for critical scholars of the Internet and digital media to be simultaneously careful and imaginative in their own choice of metaphorical language. We have known about the performativity of language for getting on for a century (Wittgenstein, 2009 [1953]), so there really is no excuse not to take seriously the power of words, a point to which I return in the conclusion.

By ‘critical scholars of the internet and digital media’ I include critical data or software or algorithm studies, ethics, science and technology studies (STS), philosophy of technology, and, for the readers of this journal, new media studies. In the editorial of the very first issue of New Media & Society, the editors stated their commitment to publish contributions which focused on what they called then ‘media and information technology’:

[t]he changes [that] are both global and local, and have both a past and a future. They require attention to the role of governments and industry as well as to the activities of citizens and consumers. They require attention to structure and agency, as well as to the construction and shaping of meaning. (Jankowski et al., 1999: 6)

Ten years later, reflecting on the journal’s first decade, the editors reiterated their commitment to distancing ‘the journal from the ahistorical and myopic position that information and communication technologies are the drivers of societal change’ (Jones, 1999: 5).

In other words, those I refer to with the umbrella term of ‘critical scholars of the internet and digital media’ are not technological determinists (Dafoe, 2015; Wyatt, 2008), and they are attentive to history, symbols and language. Such scholars come from a variety of theoretical backgrounds, and the field is conceptually and methodologically pluralistic. Some shared commitments can be identified, including the attention to content and reception (from media and cultural studies), attention to structures of ownership and control (from political economy), attention to the normative implications (from ethics and philosophy), and attention to the physical materiality and sociotechnical configurations of infrastructure and access devices (from STS). These commitments add to the analysis of metaphors used to describe the Internet and digital media by reminding us that metaphors are not only evocative and political but that they also suggest something about how the actors who use them understand the economic and physical
materiality of new media. In this concluding essay, I go further and suggest that not only is it important for critical scholars of the Internet and digital media to analyse the metaphors of other social actors, we also need to be reflexive about our own use of language so that we do not unwittingly reinforce power structures that serve to exclude groups, organisations or regions, by promoting the inevitability of particular socio-technical configurations, for example.

In the next section, I revisit some of the metaphors that have been deployed over the past 25 years, to highlight how metaphors can be used to serve particular political, technical or economic interests. I then turn to some metaphors that have gained currency more recently, especially those nature-related metaphors such as clouds and oil that are used to describe remote computing and big data. The conclusion focuses on our responsibilities as scholars to move beyond deconstructing the metaphors of others in order to contribute new metaphors, new ways of describing and thinking about the future. One of the basic lessons of technology studies is that technologies ‘might have been otherwise’ (Bijker and Law, 1992: 3). In this essay, I argue that the words we use to describe technologies could also be otherwise.

Looking back: highways and frontiers, libraries and archives

As the opening paragraph suggests, many metaphors were circulating in those early Internet years, and they all captured some important aspect of what the Internet offered. The Internet is potentially a medium for democratic interaction as suggested by the town hall and village square metaphors. That innocence is fading as people become more aware of the ways in which autocratic regimes can deploy digital media to suppress democracy, and of how the ‘Dark Net’ offers facilities to both organised crime and those legitimately seeking to evade state or commercial surveillance.

Stefik (1996) groups those early metaphors into four archetypes: library/keeper of knowledge, mail/communicator, markets/trader, and digital worlds/adventurer, which together make up the highway infrastructure (itself a metaphor). This focus on archetypes resonates with what McNeil et al. (2017) conclude about why STS (and I would add also critical studies of the Internet and digital media) should be more open to psychoanalysis and science fiction as theoretical resources. In this brief, concluding essay, I do not have space to examine all four of Stefik’s groups, but I do discuss the library metaphor and the overarching highway metaphor.

One of the crucial battles in the mid-1990s was between the libertarian metaphor of ‘frontier’ (adventurer archetype) and the engineering or technocratic metaphor of ‘highway’. The highway metaphor represented the view that the Internet was a suitable object for state intervention, in terms of investment and to regulate ‘the safety of those who pass on it’ (Blavin and Cohen, 2002: 270). This resonated especially in the United States, then and now home to the companies largely responsible for the production of the technical infrastructure, access devices, services and applications that make up the Internet used in much but not all of the world. Wired magazine attacked the highway metaphor used by Al Gore when he was Vice-President of the United States (1993–2001), as it offended the libertarian sensibilities of its editors and core readers by granting too great a role to the state. Postrel (1998), a regular contributor to Wired in
those years, argued that such engineering metaphors ‘represent technocracy, the rule of experts’ (p. 52).

The frontier and highway metaphors still capture the ongoing battles around regulation. The frontier mentality is reflected in statements such as ‘move fast and break things’, the Facebook motto until 2014 and the principle guiding many of the activities of many Internet entrepreneurs and platforms (Taplin, 2017). The corollary that it is easier to apologise after laws have been broken and/or norms transgressed reflects the cavalier attitude of many engaged in high-tech industries to the rule of law. In the European Union, the GDPR (General Data Protection Regulation, 2018) is an attempt to regulate and control the activities of the major companies, an attempt which is systematically resisted by Facebook and Google among others. But, as Blavin and Cohen argue, metaphors may lose their value as the materiality of the Internet has changed. ‘[T]he information superhighway metaphor is “literally incongruent,” as it no longer fits either the architecture of the Internet or the legal decisions that have developed thereunder. This does not mean that the metaphor is erased, rather it is localized’ (Blavin and Cohen, 2002: 285).

The recurring metaphors of world brain, library and archive reflect the notion of the Internet as a repository of data, information and knowledge (Stefik’s archetype of ‘keeper of knowledge’), sometimes to the dismay of librarians, archivists and curators. The Israeli launch of a lunar probe in February 2019 contained a ‘Lunar Library’ and attracted media headlines such as, ‘A 30-million page library is heading to the moon to help preserve human civilization. The massive archive is aboard Israel’s Beresheet spacecraft’ (Powell, 2019). Leaving aside the important differences between libraries and archives, no such thing has been sent. A metal disc drive is on board, unlikely to reveal much about human civilisation to future generations or aliens, given the massive infrastructure required to access that disc drive is not included on the spacecraft.

Similarly, in March 2018, the Chief Executive Officer of YouTube claimed at the SXSW® festival that, ‘We’re really more like a library in many ways, because of the sheer amount of video that we have, and the ability for people to learn and to look up any kind of information’ (Thompson, 2018). This claim provoked the wrath of archivists and librarians. They rightly pointed out that YouTube has no system of curation and, more importantly, that the relationships between librarians and those who visit libraries is very different from the relationship YouTube has with its users. This is particularly stark in the United States where librarians have been in the vanguard of resisting anti-terrorist legislation such as the 2001 Patriot Act that wanted to allow police and security agencies to be able to monitor people’s library behaviours, and to require libraries to provide data without informing those who visit libraries. Librarians exercise great care when collecting data in order to protect the privacy of readers.

As these examples illustrate, metaphors are not simply descriptive. They often also have a normative dimension. Lakoff and Johnson (1980) express this clearly when they write that metaphors ‘have the power to define reality. . . . [W]hether in national politics or everyday interaction, people in power get to impose their metaphors’ (p. 157). By paying attention to the historical role of libraries and to the material dimensions of infrastructure, scholars are able to provide an even more extensive critique of those popular metaphors.
Looking forward: clouds and water, mining and oil

Metaphors are available to all, are much more flexible and dynamic than sociotechnical imaginaries (see Note 3), and can capture fears as well as hopes and promises. As mentioned in the previous section, some of the early metaphors persist, such as ‘library’, while others have emerged or been adapted. In this section, I examine the nature-based metaphors used to describe large, connected systems of data storage devices and computing power and the ‘big data’\(^5\) they store.

The first example is ‘cloud computing’, now pervasive in policy and industry. The European Commission is investing substantially in the European Open Science Cloud (EOSC, 2019) in order to promote and share data, research and innovation. Amazon earns more from its cloud services than from selling books, and those cloud-based services are what allow users to make use of data centres without substantial infrastructural investment of their own. But clouds have been used to describe and represent the Internet since its early days (Dodge and Kitchin, 2001), and the English-language entry on Wikipedia (often the first point of reference for both students and more senior scholars) recognises the metaphorical nature of describing connected computers as clouds (Wikipedia Contributors, 2019). In a fascinating article about classification, including atmospheric clouds, Mattern describes cloud computing as follows:

> Today we are engaged in a similar cloud-rendering enterprise, although we look not to the skies but to the fog of data, the algorithmic atmosphere, the hazy geography of digital intelligence. This is our Cloud...[it] absorbs weird ‘geopolitical designs’ and forms of sovereignty and governance; energy flows and rare earth minerals; cables, data centers, and supply chains; and operational tracking through gross profusions of data. Whether we understand these technologies or not is almost beside the point. (Mattern, 2016: 2)

The first two sentences are a powerful evocation of the political and technical complexity of cloud computing, but the final sentence could be read as naïve. Critical scholars of the Internet and digital media need to understand the materiality of cloud computing and how it works, if only to point out to those promoting it that they are really talking about other people’s computers, with the political and material consequences that such a potential loss of control may risk. It is cloud computing that makes it possible for the US intelligence agencies and private companies to examine, process and sell data generated by people outside the boundaries of the United States.

Amoore (2018) offers an exemplary demonstration of how to use metaphors in critical analysis. She provides a fascinating analysis of cloud computing, drawing an analogy with the cloud chamber of particle physics. She pursues the cloud metaphor in order to highlight the geopolitics of cloud computing and distinguishes between the spatial location of data centres and the experimental algorithmic techniques that are part of cloud analytics. She suggests that ‘the geography of the cloud is not merely supplying the spatial location of large volumes of data, but the means to map and make perceptible the geography of our world in particular ways’ (Amoore, 2018: 6).

There are also many metaphors used to describe ‘big data’, including the much used references to data as the new oil or gold. Van Dijck (2014) points to the ‘gold rush’ metaphor beloved of big data entrepreneurs and recognises the ‘peculiar rationale’ that
presents data as raw material to be exploited for profit (p. 201). Rieder (2018) traces the use of ‘big data’ in the official documents of the European Commission. While he uses the notion of ‘sociotechnical imaginary’ (see Note 3) to highlight the tension between the free market and democratic principles, he also draws attention to the metaphorical language used in those documents and in speeches by Commission officials, such as ‘oil’, ‘goldmine’ and even some ‘magic material’ (p. 93). Both industry and policy makers draw on these resource-based metaphors to emphasise the importance of exploiting the economic potential of data for private or public gain. In some sense, these metaphors could be criticised for not going far enough with the resource-based parallel. Finding and extracting oil and gold are highly skilled and capital-intensive activities. Similarly, huge amounts of work and theoretically driven enquiry are needed to make sense of large volumes of data (Leonelli, 2016; Noorman et al., 2018). With the benefit of hindsight, the negative consequences of oil-based economies are now visible. At the very least, this should alert both scholars and policy makers to consider what might go wrong with pursuing data as a resource to be exploited for financial gain. Puschmann and Burgess (2014) highlight how these nature metaphors serve to render technology and data as natural and beyond political control. Metaphors of ‘big data’ as an exploitable resource are related to the earlier ‘frontier’ and ‘new world’ metaphors of the 1990s, reflecting Stefik’s (1996) adventurer archetype.

Water-related metaphors are also often used to capture ‘big data’, such as ‘data flood’, ‘data deluge’ and ‘data flows’. These can suggest that the movement of data is fluid and unproblematic. Although flood and deluge can be threatening, they certainly capture the powerful movement of data (and of water). As Leonelli (2016) suggests in her discussion of scientific data,

Not only do data not ‘flow’ toward discovery, but it is the lack of smoothness and predefined direction that makes their travel epistemologically interesting and useful. Furthermore, the idea that data flow seems to suggest that data travel as a cohesive ensemble... In shifting from laboratory to publication, publication to database, and database to new research environment, data can be lost, acquired, misrepresented, transformed and integrated – and the metaphor of a journey seems to better capture those features of mass movement than the notion of flow. (p. 41)

Leonelli recognises the work required to make scientific data of epistemic value and goes beyond critique to propose ‘journey’ as an alternative metaphor that better reflects the actual work required. This is an important reminder to all of us interested in ‘big data’ and other aspects of digitalisation not only to analyse and critique but also to consider our own words and the work they may do to imagine and create different futures.

**Conclusion: metaphorical imagination**

Metaphors describe one thing in terms of another, because they help to describe something novel or for poetic and rhetorical effect. As speech acts, they are both performative and constative (Sismondo, 1996) (see Note 7). Metaphors are not only the preserve of poets but also of scientists, engineers, designers, policy makers and politicians. And, as I have argued above, metaphors are available to all. It is important for
scholars of critical Internet and digital media studies to remember McCloskey’s (1986) warning that ‘unexamined metaphor is a substitute for thinking – which is a recommendation to examine the metaphors, not to attempt the impossible by banishing them’ (p. 81). We need to understand the genealogy of metaphors (as McNeil et al., 2017 do) and call out misleading metaphors wherever they are found. We need to go further and consider the power of our own words and metaphors.

In the previous section, I referred to works by Amoore and Leonelli, both of whom move beyond critique to enrich existing metaphors and provide alternatives. We can all dream of ‘sentence[s] of balance, care, rigor, and integrity’ (Smith, 2019), but we do not always succeed in producing them. Furthermore, it would be rash to deny that very poor sentences make their way into academic literature. Steedman (2015), a British feminist historian, reflects with admirable candour on the pressures shaping some of her own early writing:

I produced an awful lot of dross in the 1980s. I responded far too readily to invitations to write... something or other; I regret the clumsy imagery, the pretentious sentence structure, and the unthought-through transitions. I did things too fast; I wrote too much. (p. 219)

Those pressures to publish have only intensified over the past decades. Even if we try to write with care and elegance, we do not remain in control of what later readers understand and do with our words. Recall the cyborg (Haraway, 1987), one of the hugely successful metaphors of the 1980s. This spawned much critical reflection on the human–machine relationship and on the relationship between feminism and technoscience, much of it excellent, but not all of it (Henwood et al., 2001). Van der Ploeg and Wingerden expressed their anxiety about what they describe as the ‘intellectual laziness’ of those who describe the objects of their research as cyborgs but make ‘no effort to think through what it adds to call something a cyborg, what such a description might enable us to see, in contrast to other description; in short, what difference it makes’ (Van Der Ploeg and Wingerden, 1995: 399). Squires is even more direct in her critique of how the political potential of cyborg imagery was ‘largely submerged beneath a sea of technophoric cyberdrool’ (Squires, 1996: 195).

Social science and humanities scholars concerned with emerging digital societies and communities can contribute to debates about the regulation of the Internet and about the role of digital technologies more broadly. One way to contribute is to insist on dispensing with metaphor and be firmly literal. For example, returning to some of the examples mentioned earlier, a hunk of metal in space is not a library, and a huge, privately owned technical system is not a fluffy cloud. From STS we have learned to pay attention not only to the political dimensions of metaphors but also to the material dimensions. In addition to analysis and critique, we can also attempt to contribute to public discourse about our shared digital future by paying more attention to the imaginations and possibilities conjured by our own words and metaphors, not only those invoked by designers, engineers, industrialists and policy makers. The online dossier about metaphors hosted by the Humboldt Institute for Internet and Society (Katzenbach and Larsson, 2017) does both, offering reflections on long-standing metaphors and attempts to introduce new ones.
Analysis of metaphors enables exploration of the underlying ambivalence that pervades all things digital. Of course, new technoscientific developments grow from representations and projections of what is possible in the future. They draw upon and nourish public imaginations which can be expressed in many forms and affect how the future may be realised. The process of doing research (in all domains) is a creative act, and certainly communicating the results of research to others (peers, students, wider publics) requires a great deal of imagination. Despite the pitfalls, some of which are described in this essay, it is worth experimenting with our language. Metaphors, science fiction, speculation and imaginaries can reveal new thoughts or feelings to ourselves and to others and may open up new lines of theoretical enquiry, empirical investigation, technological design and political action.

Acknowledgements
First and foremost, I thank Christian Katzenbach and Astrid Mager for two things: the invitation to speak at the workshop, ‘We are on a mission’, Exploring the role of future imaginaries in the making and governing of digital technology, held in Berlin in April 2018 and thereafter for their patience and excellent advice during the preparation of this article. I am also grateful to all of the workshop participants for their interesting questions and feedback, both on the day and in later interactions. The reviewers were not always impressed by my writing (e.g. see Note 1), but they did provide some useful references and stimulated me to try to do better, for which I am grateful.

Funding
The author(s) received no financial support for the research, authorship and/or publication of this article.

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Notes
1. One reviewer, careful to point out my infelicitous language use, said that my use of ‘amazing’ here sounded ‘somewhat puerile or ironic without being ironic’. Neither puerility nor irony was intended. Digital technologies are impressive human achievements. In our concern to point out their shortcomings, dangers and risks, critical scholars of the Internet and digital media sometimes forget this.
2. According to World Bank figures (https://data.worldbank.org/indicator/IT.NET.USER.ZS; accessed 27 September 2018), in 2016, 46% of the world’s population had used the Internet at some point in the preceding 3 months. But access remains highly uneven. Just under 20% of the African population had access, whereas almost 80% of those living in Europe did.
3. Science and Technology Studies (STS), feminist technology studies, history and philosophy of science have developed many concepts to capture the unknown, uncertain and contested futures offered by those promoting new and emerging technoscience, not only digital technologies. These include thought experiments beloved of philosophers and scenarios deployed by futurists, and also the following: expectations (Van Lente, 1993), figurations (Haraway, 1987), guiding visions (leitbilder) (Borup et al., 2006), imaginaire (Flichy, 2007 [2001]), productive speculation (Currie and Sterelny, 2017), imaginaries (Taylor, 2004),
sociotechnical imaginaries (Jasanoff and Kim, 2009) and one-world imaginaries (Felt, 2014). See McNeil et al. (2017) for a comprehensive overview and genealogy of their plural and disparate use in STS. The concept of sociotechnical imaginary is well represented elsewhere in this special issue. In this concluding essay I focus on metaphors, which can be local, language dependent, of short or long duration, positive or negative.

4. Town hall, village square and other public sphere type metaphors were very common in the 1990s. For example, Bill Clinton held an online Presidential Town Hall Meeting in November 1999. For critique, see Dahlberg (2001), Graham and Marvin (1996) and Pimlott (2000).

5. Note that I am not analysing big data as a metaphor. In literary theory terms, in what follows ‘big data’ is the tenor, and clouds and oil are the vehicle.

6. Rieder (2018) deployed some digital methods in his analysis, but relied on careful reading. Dewandre and Gulyás (2018) demonstrate how new methods can be used in metaphor analysis (and they enjoyed fuller access to EU documents). They analysed thousands of EU policy documents for the period 1985–2014, focusing on the metaphors contained therein. The regulation of the Internet and of the companies that produce it have been objects of political governance for decades. Policy makers and politicians deploy language in sophisticated ways in their attempts to secure their political and economic interests. One of the many interesting results was what they call ‘sensitive inversion’. This means that EU policy has presented economic agents, such as firms and markets, as sensitive, animate creatures to be helped to achieve their desires. Human beings, however, are rendered as functional parts in the modernist project and are discussed in purely instrumental terms.

7. Sismondo (1996) points to the ways in which metaphors can work both ways. ‘To say that the world is a machine is not just to shape our conception of the world, but also, eventually, to reshape our conceptions of machines; we make the world appear a little more machinelike and machines a little more worldlike’ (p. 144).

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