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Human–Machine Communication, Artificial Intelligence, and Issues of Data Colonialism

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Introduction: Colonialism and AI

This chapter addresses one primary concern: How have the fields of communication, human–computer interaction (HCI), and critical data/information studies addressed the issue of a "data colonialism" – the systematic exploitation of user data – in an epistemology of human–machine communication (HMC)? If the framing concept of HMC rests with the "creation of meaning between human and machine" (Guzman, 2018), then the issue colonialism raises is that of extractive and asymmetrical HMC in a global framework of advanced automation technologies that include artificial intelligence (AI) in the forms of machine learning and sensor-embedded "smart" technologies such as the Internet of Things. These technologies represent globally applied systems designed for the ubiquitous extraction and exploitation of data and held by a clustering of multinational IT giants, e.g., Google, Facebook, Tencent, and Baidu. In this framework, risk of algorithmic bias/societal harm particularly falls along the lines of precarity as historically marked by race, class, gender, and territory. Reducing people, things, and society to a series of data points or datafication presents an existential threat to the category of human subject in general. With that said, the given track record of datafication as applied to certain "test" populations, in the form of surveillance, policing, jurisprudence, economic and informational deprivation, demonstrates a direct threat to life.

As the technology continues to shift in its increasing ubiquity, advanced automation raises new challenges in technological affordance and social construction – the sociotechnological domain – in terms of datafication as an epistemic shift. The question of "communication" as the creation of meaning, and perhaps knowledge, as a function of human–machine relations is increasingly superseded by machine-to-machine (M2M) data exchange, leaving the human subject in the position of a data subject – effectively the information source. The affordances of big data, such as velocity, scale, temporality, enable the technology and culture of extractive and asymmetrical human–machine communication (Kitchin, 2014). In a sense, the data imaginary or ontology of advanced automation returns to the engineering origins of a theory of communication that does not

engage a (human) value of meaning but rather automates a machine-readable extraction of data (Shannon, 1948; Weaver, 1949). Yet in the shift to the M2M landscape, the damaging sociotechnological impact of such information systems is most readily traced across the locations, peoples, and legacy of imperial colonialism.

The chapter begins with an analysis of Couldry and Mejias' concept of data colonialism followed by references to case studies of AI/advanced automation technology global abuses (Couldry & Mejias, 2018). It then turns to a discussion of antecedents to the colonial critique of datafication (Dourish & Mainwaring, 2012; Arora, 2016; Milan and Treré, 2019). The critical frameworks of postcolonial and Indigenous science and technology studies (STS) and Black technoscience are discussed in their reformation of the issues of colonial legacy and "colonial" technologies (Tuck & Yang, 2012; Noble, 2018; Benjamin, 2019; Amrute, 2020). The final part of the chapter discusses the growing critical praxis of decolonial AI, as demonstrated by interdisciplinary collaboration that recognizes the global threat of a colonial AI/advanced automation (Mohamed, Png, & Isaac, 2020). Adjacent literatures on data justice, legal studies, and infrastructure studies all inform the constellation of arguments around the colonial and AI/advanced automation machines, as the issue is increasingly understood across disciplines and industry to be a sociotechnological one – demonstrating the complex intersections of power, politics, engineering, markets, social relations, and so on.

In the tradition of Fanon, Spivak, and other decolonial thinkers, fundamental to the colonial empire claim of territory is the eugenic ordering of value, visibility, and power, a biopolitics that enacts a science of ordering (Fanon, 1963/2004; Spivak, 1988). With the sciences of the artificial one finds a recapitulation of colonial practices that counts life or certain lives as a thing that must be organized and controlled. This had been a subject position, or scene of subjection, coded as an aspect of colonial regime for brown, black, and Asian "subalterns" as a condition of empire. Empire prefigures the epistemic logic of capitalism, wherein the colonial subject with their land, labor, and know-how, were – and continue to be – the raw goods as such. The colonial has come to emerge as a fulcrum point in the development of AI/advanced automation, as datafication – the rendering of human actions and behaviors at a societal scale into machine-readable data points – has profound implications. Among communication, HCI, and critical data scholars the fact of digital inequity is clearly established. The cross-disciplinary debate relates to critical framework and location of praxis: is the colonial critique of big data epistemology an extension of the historic colonial subject or is it a novel form of exploitation?

Data Colonialism: Datafication of Life Beyond Labor

The term data colonialism entered scholarly circulation with the 2019 publication of Couldry and Mejias' "Data Colonialism: rethinking big data's relation to the contemporary subject" (Couldry and Mejias, 2019). Coined by the scholars of critical data studies and sociology, the term "data colonialism" critiques the limits of a surveillance capitalism framework. As defined by Zuboff, surveillance capitalism addresses the data extractive design that dominates HCI technology from cell phones to search to social media (Zuboff, 2015; Srnicek, 2016; Cohen, 2018). Core to their analysis, Couldry and Mejias broaden the lens of surveillance capitalism to include issues of power, epistemological hierarchy, universalism, and empire – historical markers of coloniality. In marking the colonial method as the total subsumption of actors, environment, and contextual knowledge, they move beyond data as exploitation of labor to data as exploitation of *life*. To this effect, they write, "First, colonial history helps us see the emergence of digital platforms as more than business invention, or even new forms of economic control through multi-sided markets. Digital platforms are the technological means that produce a new type of 'social' for capital: that is, the social in a form that can be continuously tracked, captured, sorted and counted for value as 'data'" (2019). As they point out, social life as such is rendered into discrete data points, deracinating context and (human) communication toward machinic automation. In other words, from a perspective of HMC, data colonialism extracts but does not exchange; the position of the end-user of networked technologies transitions from the prosthesis model (media as the extension of "man") to that of the data point model ("man" as extension of data flows).

In the data appropriation of human life, they point to a shift of power and technology. In terms of power, the nexus of historical colonialism had been European nations claiming the lands of the Americas, Africa, and Asia, producing cartographies of conquest in mapping center-periphery. In the context of post-industrial global capital, Couldry and Mejias recognize the United States and China as the "colonial" powers of world dominance in design and application of advanced automation information technologies. As colonialism had served for early industrial capital, they argue for data colonialism as a precursor to whatever the next stage (or paradigm) of economy evolves from the given conditions. In terms of technology, the advent of big data is the key differential in advanced automation systems, such as the machine learning architecture that is the basis of the second generation of AI. The sociotechnological formulation of big data as an epistemic shift in the design and application of advanced automation has been a point of obsession for academics and industry alike from the turn of the twenty-first century. From the data colonialism framework, the most important attributes of data are its extractability (alienation from data subject) and autonomous market value (the data do not need to be

tethered to identity or individual to have value).

In the sociotechnological configuration of big data episteme, power and technology cannot be separated, as data is a valued resource. To Couldry and Mejias' point, it is a feedback loop that has been normalized by Silicon Valley and Beijing: "[W]e seek to explore the parallels with historic colonialism's function within the development of economies on a global scale, its normalization of resource appropriation, and its redefinition of social relations so that dispossession came to seem natural" (2019). The global IT companies that dominate the data-extractive platforms are also the ones that take up and apply the data, reconfiguring the positionality of end-user to that of data subject. From platforms to personal devices the data traces given off have been foundational to the development of big data repositories and predictive modeling that power technologies of advanced automation, such as AI. In a designed convergence of market value and technological development, advanced automation relies on data extraction as a right of domain. In effect, the practice of data extraction is the normative state of networked IT (Cohen, 2016). As with historical empire, the data colonial configuration of power and technology extends well beyond issues of labor. Counter to the Marxist Autonomist position, Couldry and Mejias make the argument that the state of big data and the technologies of advanced automation that are built upon it cannot be framed exclusively as an issue of political economy and labor exploitation (2019). They hail the ubiquitous, global phenomenon as the datafication of life itself. And it is in usurpation of "life itself" that they locate the imprint of legacy colonial regimes in which all of life – territory, peoples, knowledge, and resources – are subsumed by empire as an extension of power. Thus data colonialism describes a complex technological appropriation of everyday life that exceeds, but does not disrupt, capitalism.

Couldry and Mejias argue that "we" are universally victims of data exploitation, which is true. And yet, there is no universal "we" that occupies this subject position, as the status, impact, and violence of such dispossession of social relations is not equally distributed. They include a caveat, that the position of data subject varies from person to person. But the default of individualized positioning of a liberal subject ("what this means for one person may be very different from what it means for another") obscures the historic and located impact of what is demonstrably systemic, harmful bias in algorithmic applications (2019). The double binds of data colonialism – West/East and external/internal – reorders legacy colonial binaries – center/periphery and colonizer/colonized – but does not disrupt them. In other words, it is both the historical colonial subject and the historical normative subject who are taken up, exposed, and consumed by the data apparatus of advanced automation and ubiquitous computing. They mark a universal condition of appropriation/exploitation/alienation but with unequal distribution of harm.

Postcolonial Critique of Big Data Episteme

The colonial invention of species categories (famously, including racial categorization) as a function of datafication persists at the front-guard of data colonialism. In the framework of historical continuity, it is not by chance that the original sites of colonial exploitation continue to serve as test sites for data appropriation and advanced automation technologies. With the important exception of Cambridge Analytica, the Facebook data scandal of American voter manipulation, the dominant test sites for big data/algorithmic social experimentation have been on global South(s) population – subaltern, precarious, and disenfranchised.[1] The Indian state digital identity database, Aadhaar, creates a national tracking system that particularly infringes on the rights of the poor (Prakash, 2017). The Chinese machine vision data extraction and testing in Zimbabwe is a demonstration of data as a resource in the ongoing postcolonial engagement of empire and territories. As information studies scholar Noble points out, data colonial experimentation repeats a historically vicious cycle in which poor countries/peoples are sites of raw materials and data extraction, as well as global toxic dumping (Noble, 2018). Along similar lines, the long history of state violence and institutional racism in child welfare against Indigenous people has been rendered as predictive algorithm, automating a colonial paradigm (Vaithianathan et al., 2013; Gavighan et al., 2019). In parallel, data analytics groups such as Compass and Palantir act as third-party vendors procured by state authorities, such as courts and police, in applying experimental predictive functions with disproportionate impact on Black subjects (Bullington & Lane, 2018). The systemic colonial logic demonstrates what black technoscience scholar Ruha Benjamin describes as racism by design and not by chance (Benjamin, 2019). Racial discrimination is not a subset of data colonialism but a feature. These are systems designed for data command and control, sculpting the data subject of advanced automation.[2]

The logic of Couldry and Mejias' data colonialism correlates the universal with a state of inequality or subsumption – all are rendered data subjects – that contextually cannot be sustained. For over a quarter of a century postcolonial scholars from fields as varied as STS, Black studies, feminist and gender studies, Indigenous and global South positionalities have critiqued the biopolitical order of colonial hierarchies normalized and automated within a big data episteme. In this critical view, the existential threat of "data colonialism" has always already been manifest with historically colonized peoples and contexts from the inception of machines (or data) as the measure of "man." And yet, it is in the double bind of "data colonialism," its external/internal exploitation of populations that the historical weight of located geographic sites, peoples, and experiences are elided for a totalizing model. The tension with the Couldry and Mejias assessment does not rest with *how* ad-

vanced automation technologies behave but *for whom* it is a danger. In their account of the systematic danger in devaluing life as a form of data, the gap in their analysis rests with the universal application of a sociotechnological threat, without a clear articulation of the differential level of risk to particular peoples, places, and locations. Which is to say, their approach to the colonial does not attend to actual historical colonial legacy.

In their 2012 landmark essay, "Decolonization is Not a Metaphor," Indigenous STS scholars Tuck and Yang write, "Decolonization brings about the repatriation of Indigenous land and life; it is not a metaphor for other things we want to do to improve our societies and schools" (Tuck & Yang, 2012). They state that to decolonize is to enact reparations of the erasure of peoples, places, and their knowledge. Decolonization is emphatically not a metaphor for the improvement of the liberal subject but the reappearance and societal reconfiguration of the peoples and territories subordinated by settler colonialism (Tuck & Yang, 2012). The colonial, and by necessity the decolonial, must have a locus, a specificity of place, temporality, and phenomenon. The power of these concepts is contextually situated and not viable as epistemological universal (Suchman, 1987). The work of unsettling the legacy triad of "settler-native-slave" – three distinct positionalities – makes decolonial engagement complex and often praxis driven.

As early as 2012, Dourish and Mainwaring critiqued ubiquitous computing as colonial in structure or what they described as "ubicomp's colonial impulse," drawing parallels between the historic British colonial siege of place, peoples, resources, and knowledge, and ubicomp's indexical impulse (Dourish & Mainwaring, 2012). As an example of total subsumption of life, Dourish and Mainwaring point to the colonial research lab of Kew Garden, where exotic specimens collected from the extended sites of empire are cultivated, contained, and catalogued in a hot house (2012). In addition to the formal architecture of colonial capture, Dourish and Mainwaring include a valuable assessment of the colonial logic of counting. They argue that there are two forces at work in the universalizing logic of the colonial apparatus, one visible and the other implied: (a) *everything can be encoded* by machinic systems, i.e., data collection. Therefore, (b) if something is not encoded, it *ceases to exist* epistemologically. In short, the universal view of the imperial claim mandates what is relevant knowledge and obscures all else that is not. The system design is one of control through quantification, observing that "particularly mathematical models of the world have a habit of migrating towards centers of power which, operating through them, serve to reorganize the world in ways that make it compatible with the model" (2012). The issue of the world being made to conform to the system modeled is an ongoing aspect of biopolitics. Epistemically, in framing an order of things (and what things cannot be made visible in that order), the colonial logics are naturalized as states of organic hierarchy or manifest destiny. In either case, the same eugenically coded valuation persists.

Data from Global Souths: Beyond Universalism

In their critical data studies work, Milan and Treré develop a theory of datafication "of and in the Souths" that takes as its telos issues of reparation, justice, and subaltern ways of knowing through data (Milan & Treré, 2019). They articulate a baseline critique of datafication in keeping with a decolonial turn in big data that looks to decenter Western ontologies: "Datafication has put new weapons in the hands of institutions and corporations in the business of managing people. And it seems to hit harder where people, laws, and human rights are the most fragile" (2019). In recognizing the exacerbation of historical divides that informational capitalism performs, they see a global landscape in which the majority of the world's population resides outside the West, and yet the biopolitics of advanced automation continue to be framed by the ontology of empire (Broeders & Taylor, 2017). (It is in the special issue on "Big Data from the South(s)" that the Couldry and Mejias data colonialism article appears.)

Milan and Treré catalogue locational algorithmic aggression in the European and US use of biometric technologies on undocumented migrants or the deployment of drones and georeferential radar against Mapuche land defenders (Parra, 2016; Milan & Treré, 2019; Pelizza, 2019). Milan and Treré advocate for data South(s) as a complex plurality that is not geographically bound to old colonial mappings, moving beyond legacy binaries of center-periphery or colonizer-colonized. In the situation of data from global South(s), they recognize a data subject of agentic status, not simply oppressed. Their work contributes to decolonial framings of datafication in conversation with postcolonial/decolonial scholars, activists, and practitioners. "Big Data from the South(s)" emerges from foundational decolonial works such as Arora's "Bottom of the Data Pyramid" (Arora, 2016). As an information scholar with a focus on critical data, Arora critiques the neoliberal framework of global South development paradigms, outlining the structurally extractive design. She escalates the argument, advocating for local "disobedience," situating the radical act of reimagination with the legacy of decolonial resistance (Arora, 2019).

In concert with Arora's digital decolonial critique, information studies scholar and sociologist Amrute frames the concept of tech colonialism, in an effort to sustain critical and activist engagement. Her argument also serves as a direct corrective of Couldry and Mejias. Armute reorders the critical framework from "data colonialism" to that of "tech colonialism," which, among other differentiators, traces a more robust historical and ontological line between the legacy of colonial territories and the emergent state of global tech coloniality. To this effect, she writes, "As digital labour becomes more widespread across the uneven geographies of

race, gender, class and ability, and as histories of colonialism and inequality get drawn into these forms of labour, our imagination of what these worlds contain similarly needs to expand" (Amrute, 2019). As Amrute describes, "Tech Colonialism Today" carries on the original colonial mission of an "entire knowledge apparatus," designed to learn the total system of a people or place (Amrute, 2020). She traces the sociotechnological logics of taxonomy and hierarchy that Dourish and Manwaring reflect in the ubiquitous computing vision of total system knowledge. Amrute makes evident that the "over-reliance on the issue of data colonialism obscures the complicated welter of (post)colonial relationships" (2020). She concludes by citing Fanon on the necessity of rethinking everything after colonialism, seeing the tools for a decolonial tech emerging from the very sites of historical devaluation and deprivation.

Decolonial AI

In keeping with Amrute's critique of the erasure of colonial history in the assessment of datafication, decolonial AI emerges as a procedural dimension of advanced automation praxis. As a critical and procedural framework, decolonial AI recognizes the historic continuity of colonial epistemology in AI machine learning. As authors Mohamed, Png, and Isaac write of decolonial AI, "By embedding a decolonial critical approach within its technical practice, AI communities can develop foresight and tactics that can better align research and technology development with established ethical principles, centering vulnerable peoples who continue to bear the brunt of negative impacts of innovation and scientific progress" (Mohamed, Png, & Isaac, 2020). The authors summon a different AI ontology from the global North culture that spawned it. They call for intentional approaches to AI that "incorporate inclusive and well-adapted mechanisms of oversight and redress from the start" (2020). As such, one of the key recalibrations of decolonial AI is interdisciplinarity: implicit in the experimental framework is the seeding of research teams that include engineering, critical data, and critical race, among others. As a basis of decolonial AI praxis, they reference critical technical practice, a methodology that foregrounds issues of unequal power distribution and embedded values (Agre, 1997). In framing intersectional methodologies, such as CTP and critical data, they move beyond "good-conscience design" to engage the situated condition of AI, in its model of mind, design, and application (2020). In other words, they outline the steps of a decolonial AI in the layered movements of making legible context, constraints, and bias of existing system design followed by the intentional reconceptualization of system design that addresses "the ethical and social externalities of AI" (2020). As the authors highlight, emerging in the engineering field of AI/ML is a direct critique of the limits of an exclusively technological solution to the complexity of AI applications in the

world – a critique long established in disciplinary loci such as STS. They go as far as to express the potential of AI as a "decolonising tool." Implicit in the logic of decolonial AI are strategies derived from postcolonial theory: strategies such as role reversal – the metropole learning from the periphery – represent great potential toward a reconfiguration of how and by whom AI is made (Fanon, 1963/2004; Said, 1993).

Conclusion

It is possible with a decolonial framework that the issues of data colonialism might be reimagined and redesigned toward a HMC that moves away from the extractive to the communicative – a coproduction as such. But a great deal would have to change in the sociotechnological framework of AI/advanced automation for that to be the case. As a critique of the normative framework of AI/advanced automation, the term colonialism articulates the demonstrable extension of societal harm as built into its sociotechnological design. As a corollary, decolonial data as praxis is in an early stage with experimental work around diversity of AI teams, accountability of training data, etc. This is to say that the profound societal impact of harmful machine bias that results in societal injustice is a threshold issue for the design and application of AI/advanced automation technologies. The acknowledgement of such, at least in some quarters of the AI research and design domain, is testament to the recognition of the importance of the problem without providing an answer.

Notes

1 It should be noted that Cambridge Analytica tested its social media manipulation of voting groups on South Asian and Black youths in the Jamaica elections and have prior "third world" targets upon whom they have tested their skills.

2 This is not to imply that humans are currently removed from the AI/ML process. But their presence as system architects and engineering applications is often obscured by an AI model of mind that produces an autonomous computational "intelligence," as expressed by predictive modeling.

References

Agre, P. (1997). *Toward a critical technical practice: Lessons learned in trying to reform AI*. In Bowker, G., Star, S., Gasser, L., Turner, W. (Eds.) *Social science, technical systems and cooperative work: beyond the great divide. Psychology Press*. pp. 131–157.

Amrute, S. (2019). Of techno-ethics and techno-affects. *Feminist Review*, 123(1), 56–73. https://doi.org/10.1177/0141778919879744

Amrute, S. (2020). *Tech colonialism today*. *Keynote, EPIC2019 Feb. 25, 2020*. https://points.datasociety.net/tech-colonialism-today-9633a9cb00ad

Arora, P. (2016). Bottom of the data pyramid: Big data and the global south. *International Journal of Communication*, *10*, 19.

Arora, P. (2019). Decolonizing privacy studies. *Television & New Media*, *20*(4), 366–378.

Benjamin, R. (2019). *Race after technology: Abolitionist tools for the new Jim Code*. Polity Press.

Broeders, D. & Taylor, L. (2017). *Does great power come with great responsibility? The need to talk about corporate political responsibility*. In *The responsibilities of online service providers*. Springer. 315–323.

Bullington, J., & Lane, E. (2018). How a tech firm brought data and worry to New Orleans crime fighting. *The New Orleans Times-Picayune*. https://www.nola.com/news/crimepolice/article33b8bf05-722f-5163-9a0c-774aa69b6645.html.

Cohen, J. E. (2016). *The surveillance–innovation complex: The irony of the participatory turn*. In *Participatory condition*, edited by Darin Barney, Gabriella Coleman, Christine Ross, Jonathan Sterne, and Tamar Tembeck. University of Minnesota Press, 207–226.

Cohen, J. E. (2018). The biopolitical public domain: The legal construction of the surveillance economy. *Philosophy & Technology* 31 (2): 213–233. doi:

Couldry, N., & Mejias, U. A. (2019). Data colonialism: Rethinking big data's relation to the contemporary subject. *Television & New Media*, *20*(4), 336–349.

Dourish, P. & Mainwaring, S. (2012). *Ubicomp's colonial impulse*. *UbiComp' 12*, Sep. 5–Sep. 8, 2012, Pitts-

burgh.

Fanon, F. (1963/2004). *The wretched of the Earth*. Grove Press, 2004.

Gavighan, C., Knott, A., Maclaurin, J., Zerilli, J., & Liddicoat, J. (2019). *Government use of artificial intelligence in New Zealand*. New Zealand: Law Society.

Guzman, A. (2018). *What is human-machine communication, anyway?* In *Human-machine communication: Rethinking communication, technology, and ourselves*. Editor Andrea L. Guzman. Peter Lang.

Kitchin, R. (2014). Big Data, new epistemologies and paradigm shifts. *Big Data & Society*, 1(1), 2053951714528481.

Milan, S., & Treré, E. (2019). Big data from the South (s): Beyond data universalism. *Television & New Media*, *20*(4), 319–335.

Mohamed,S., Png, M., & Isaac, W. (2020). Decolonial AI: Decolonial theory as sociotechnical foresight in artificial intelligence. *Philosophy & Technology* 33:659–684. https://doi.org/10.1007/s13347-020-00405-8

Noble, S.U. (2018). *Algorithms of oppression: How search engines reinforce racism*. NYU Press.

Parra, F. (2016). *"Militarización En La Araucanía: Drones, Aviones No Tripulados y Más de Mil Policías Desplegados."* [*Militarization in La Araucanía: Drones, Unmanned Aircraft and More than a Thousand Policemen Deployed] El Desconcierto*, March 23. http://www.eldesconcierto.cl/2016/03/23/militarizacion-en-la-araucania-drones-aviones-no-tripulados-y-mas-de-mil-policias-desplegados/.

Pelizza, A. (2019). *Processing alterity, enacting Europe: Migrant registration and identification as co-construction of individuals and polities*. *Science, Technology & Human Values*. Published electronically February 6. doi:.

Prakash, P. (2017). Aadhaar Marks a Fundamental Shift in Citizen-State Relations: 'From We the People' to 'We the Government.'. *Hindustan Times*, 3.

Said, E.W. (1993). *Culture and imperialism*. Vintage.

Shannon, C. E. (1948). A mathematical theory of communication. *The Bell System Technical Journal*, *27*(3), 379–423.

Spivak, G.C. (1988.) *Can the subaltern speak?* In *Marxism and the interpretation of culture*. Ed. Nelson C and

Grossberg L. University of Illinois Press, 271–313.

Srnicek, N. 2016. *Platform capitalism*. Polity Press.

Suchman, L. A. (1987). *Plans and situated actions: The problem of human-machine communication*. Cambridge University Press.

Tuck, E. & Yang, K. W. (2012). Decolonization is not a metaphor. *Decolonization: Indigeneity, Education & Society 1* (*1*): 1–40.

Vaithianathan, R., Maloney, T., Putnam-Hornstein, E., & Jiang, N. (2013). Children in the public benefit system at risk of maltreatment: Identification via predictive modeling. *American Journal of Preventive Medicine*, *45*(3), 354–359.

Weaver, W. (1949). *Introductory note on the general setting of the analytical communication studies*. In C. E. Shannon & W. Weaver (Eds.), *The mathematical theory of communication* (12th Printing). University of Illinois Press.

Zuboff, S. 2015. Big other: Surveillance capitalism and the prospects of an information civilization. *Journal of Information Technology* 30 (1): 75–89.

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