Toward a Framework for Considering Echo Technologies: Faithfulness and Transparency in Reflecting User Data

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DOI: 10.18154/RWTH-CONV-245942

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Self-presentations through media technologies have both interpersonal (Subramanian, 2017) and intrapersonal effects (Velduis et al., 2020). The latter range from localized instances of self-persuasion to more global impacts on self-concept—collectively called self-effects (Valkenburg, 2017). While self-effects are generally considered in relation to expressions via social networks, this short essay reflects an initial attempt to situate them within a broader field of (media) technologies that I call here "echo technologies" (ETs)—those that capture, synthesize, and variably reflect user data. This notion is offered a first step toward a unifying framework for considering self-effects in relation to ETs by (a) briefly unpacking the concept, (b) articulating properties along which ETs vary, (c) situating existing technologies within that framework, and (d) posing research directions.

Characterizing Echo Technologies

In broadest terms, ETs are technologies that reflect user data. They are often media (e.g., selfies, social media profiles, livestreams) but also include other technological actors and systems (e.g., chatbots, predictive text, avatars). I draw here on the notion of *echoes*—sounds reflected with variable delay and distortion (McDonough et al., 2008)—as a functional metaphor, given ETs' procedural reflection and distortion of user-sourced information. ETs have (at least) three functional properties: they (1) afford interactivity, including elicitation and reception of user input (Banks & de Graaf, 2020), (2) process and reformulate input data such that they are to some degree authentically generative (Reiter & Dale, 2000), and (3) convey data reformulations back to users (cf. Rettberg, 2014). In other words, ETs capture (apprehend, encode, aggregate, store), synthesize (learn, organize, reformulate, generate), and reflect (communicate) traces of

user behavior. Exchanges among ETs and users result in user reception of information that is an echo of original expression(s): delayed, altered, and so variably recognizable (see Hamilton, 1942).

ETs as Variably Faithful and Transparent Reflectors

The manifestation of self-effects likely relies on the extent to which a user actually recognizes themselves in reflected data. Such self-recognition is afforded by at least two characteristics of the technology's re-presentations: faithfulness and transparency. *Faithfulness* is the degree to which the echo re-presents data as it was originally presented—without interpretation or manipulation (Lukoianova & Rubin, 2015). For instance, a TimeHop app re-presentation of intact video has high faithfulness but the same video would be far less faithful (i.e., reformulated) if it was reformulated by clipping it short, applying a filter, or even deepfaking a celebrity face. *Transparency* is the degree to which echoes are framed by the technology itself as grounded in user data (i.e., that the data user is also the subject or source of the data, cf. Bertino et al., 2019). Amazon may convey suggestions clearly based on our browsing history, while Facebook advertisements have historically been less transparent (i.e., opaque) in conveying ads based on browsing behaviors (Andreou et al., 2019).

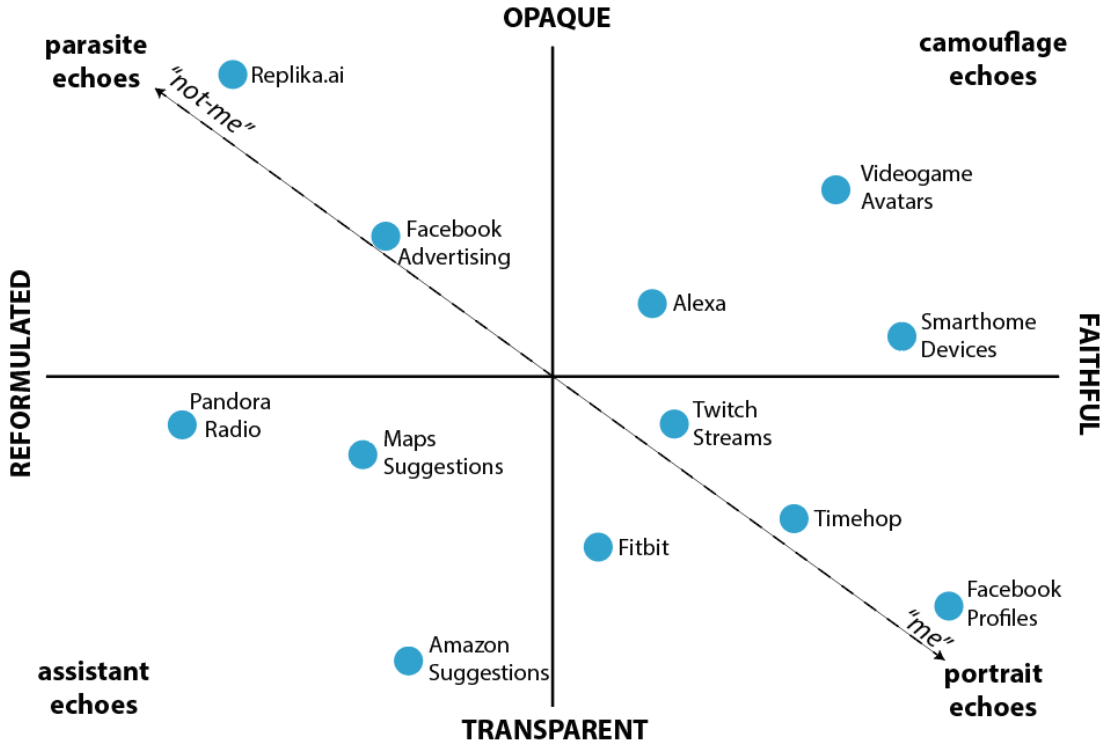
Faithfulness and transparency are discrete (Fig. 1) but arguably converge to afford degrees of re-presentative recognizability ranging from "me" (Deeb-Swihart et al., 2017) to "not-me" (cf. Nach & Lejeune, 2010). High faithfulness and high transparency combine for recognizable *portraits* of a user. Low degrees of both combine for *parasitic* re-presentations—those that draw on user data but dramatically reformulate and present them as the technology's "own"—thus, data's origins in user expression or behavior are not discernible. Faithful but

opaque ETs may be characterized as *camouflaged* reflections—they are faithful re-presentations but opaque in that the echo is functionally presented as emerging from the technology itself.

Inversely, ETs that more dramatically reformulated data and present the reformulations as originating in user behavior tend to function as functional *assistants*—conspicuously drawing on user preferences or tendencies to provide services.

Figure 1

Hypothetical Mapping of Select Echo Technologies for Faithfulness to and Transparency in Reflecting User Data



Although extant scholarship has long-addressed notions of data faithfulness and transparency in (media) technologies with higher user control (e.g., social media platforms), it is increasingly important to consider how (semi-)autonomous technologies reflect user data along these axes (see Papacharissi, 2018). For instance, the chatbot Replika features high opacity and

low faithfulness through framing as an "AI companion who cares" but draws from user language to develop a chat personality (Nima et al., 2017). In comparison, Amazon Alexa is somewhat more faithful in acknowledging data origination (e.g., in sometimes referring to users' past purchases) but camouflages that origin using a discernible voice, name, and device containers toward higher opacity. More transparent but similarly faithful ETs capture user behaviors and re-present them for visibility into our lives and expressions, as when Fitbit offers step counts as an activity-portrait (Cardell, 2018). In another permutation, apps like Google Maps track travels and autonomously offer suggestions based on the places we have been (Laforest, 2015), though it does so opaquely since there are often no indications that suggestions rely on travel histories. A middling scenario finds ETs that reflect user-inclusive contextual data but presents the scene as the user's own, as when the Twitch platform captures multi-actor on-screen activities (i.e., streamer's activities and audience members' text chat) and conveys them as belonging to the player's own, singular stream.

Operational, Theoretical, and Ethical Questions

Extant literature suggests that some ETs can move us to reflect on and sometimes adjust self-concepts, especially when engagement with them may be personalized (e.g., Carr, 2021; Schoenebeck et al., 2016). However, that literature largely addresses more transparent ETs like social media in which users create echoes specifically to represent them (such as profiles or streams). Yet unclear is how more opaque ETs—those that reflect our behaviors but claim them as their own—may impact our senses of self. This potential opens a range of operationally, theoretically, and ethically important questions across the full ET grid. (How) do self-concepts shift when we see ourselves reflected in technology (e.g., self-concept clarity, cf. Appel et al., 2018) versus encountering more opaque in reflections? Do we meaningfully recognize opaque

reflections as self-sourced? (How) does this change as a function of multi-user syntheses, as when Netflix's reformulations rely on the data from other users? Given that we may not always overtly recognize the echo, are there differences in consuming consciously and nonconsciously recognized echoes (cf. Nosek, 2007)? How do faithfulness and transparency function when users are not themselves fully faithful and transparent in expressions (e.g., editing selfies)? What changes about the nature of authenticity and authorship when echoes are generated in human-machine collaborations (see Banks, 2020)? What are the ethical implications of opaque reframings of person-generated content as machine-generated content? Most broadly, how may ETs contribute to (d)evolutions in ontological considerations around what it means to hold humanness as central to one's identity? The gravity of these questions calls for further investigation of the ways that ETs function in intrapersonal, interpersonal, group, and broader social spheres.

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