The rise of the social algorithm

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Does content curation by Facebook introduce ideological bias?

Humanity is in the early stages of the rise of social algorithms: programs that size us up, evaluate what we want, and provide a customized experience. This quiet but epic paradigm shift is fraught with social and policy implications. The evolution of Google exemplifies this shift. It began as a simple deterministic ranking system based on the linkage structure among websites—the model of algorithmic Fordism, where any color was fine as long as it was black (*1*). The current Google is a very different product, personalizing results (*2*) on the basis of information about past searches and other contextual information, like location. In this week's *Science* Express, Bakshy *et al.* (*3*) explore whether such personalized curation on Facebook prevents users from accessing posts presenting conflicting political views.

The rise of the social algorithm is rather less transparent than the post–Model T choice in automobiles. Today's social algorithms are so complex that no single person can fully understand them. It is illustrative in this regard to consider that Bakshy *et al.* are Facebook researchers studying the impact of Facebook algorithms. You might imagine that they could just go into the next building and look directly at the code. However, looking at the algorithms will not yield much insight, because the interplay of social algorithms and behaviors yields patterns that are fundamentally emergent. These patterns cannot be gleaned from reading code.

Social algorithms are often quite helpful; when searching for pizza in Peoria, it helps not to get results about Famous Ray's in Manhattan. However, personalization might not be so benign in other contexts, raising questions about equity, justice, and democracy. Bakshy *et al.* focus on the last, asking whether the curation of news feeds by Facebook undermines the role that Facebook plays as a forum for public deliberation.

For the Facebook-uninitiated, much of the activity of Facebook is in the form of news that users post to their feed, which their friends have some access to and can like and comment on. When you open Facebook, you see a list of recent posts by friends; however, you typically will not see all posts, which are algorithmically sorted. The rationale for such curation is that in its absence, users would be deluged by uninteresting content from their friends. Facebook tries to pick out the gems from the detritus, anticipating what you will like and click on. But what are we missing? And are these computational choices troubling?

There are many facets to these questions, but one important one is how this curation affects Facebook as a deliberative sphere regarding public issues. Habermas (*4*) wrote of the role of the Parisian salons in the 19th century in offering a public space for such deliberations. The salons enabled intense conversation, with leakage across conversations creating a broader, systemic discussion. Facebook has many of these same qualities, and the issue is whether the curation process accentuates or undermines the quality of deliberation.

The specific deliberative issue that Bakshy *et al.* examine is whether Facebook's curation of news feeds prevents the intersection of conflicting points of view. That is, does a "filter bubble" emerge from this algorithmic curation process, so that individuals only see posts that they agree with (*5*)? Such an algorithmic sorting has the potential to be unhealthy for our democracy, fostering polarization and undermining the construction of a vision of the common good.

Their answer, after parsing the Facebook pages of ~10 million U.S. individuals with self-declared ideologies, is that the curation does ideologically filter what we see. However, this effect is modest relative to choices people make that filter information, including who their friends are and what they choose to read given the curation. The deliberative sky is not yet falling, but the skies are not completely clear either.

This is an important finding and one that requires continued vigilance. A small effect today might become a large effect tomorrow, depending on changes in the algorithms and human behavior. Ironically, these findings suggest that if Facebook incorporated ideology into the features that the algorithms pay attention to, it would improve engagement with content by removing dissonant ideological content. It is also notable, for example, that Facebook announced April 21st—well after the analysis conducted in this paper—three major changes to the curation of newsfeeds. These changes had benign objectives, such as ensuring that one sees updates from "the friends you care about" (*6*). It is plausible, however, that friends
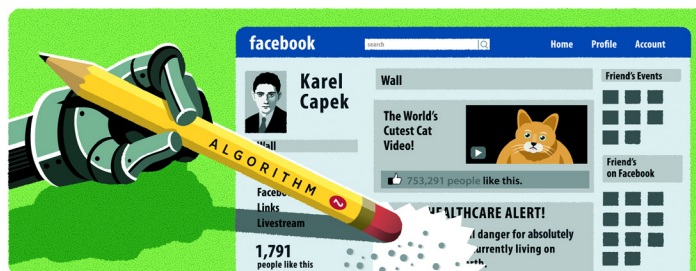
that Facebook infers you to care about also tend to be more ideologically aligned with you as well, accentuating the filtering effect. Furthermore, the impact of curation on other dimensions of deliberative quality on Facebook remains to be examined. Open questions include whether the curation privileges some voices over others, and whether certain types of subjects are highlighted by the curation in a way that systematically undermines discussions of the issues of the day (pets over politics).

The impacts of social algorithms are a subject with rich scientific possibilities, not least because of the enormous data streams captured by these socio-technical systems (*7*). It is not possible to determine definitively whether Facebook encourages or hinders political discussion across partisan divides relative to a pre-Facebook world, because we do not have nearly the same quality or quantity of data for the pre-Facebook world. The existence of Facebook, Twitter, etc., should be a boon to the study of political deliberation, because it is now possible to study these systems at a societal scale.

Important normative implications will follow from a clearer understanding of these systems. For example, a recent paper on price discrimination and steering that I coauthored (*8*) revealed that people sometimes get different prices and different products prioritized on e-commerce sites. This work has spurred substantial public discourse, as well as discussions with European Union regulators. Research such as that of Bakshy *et al.* has similar potential to inform a vigorous debate about the role that social media play in our society.

It is laudable that Facebook supported this research (*3*) and has invested in the public good of general scientific knowledge. Indeed, the information age hegemons should proactively support research on the ethical implications of the systems that they build. Facebook deserves great credit for building a talented research group and for conducting this research in a public way. But there is a broader need for scientists to study these systems in a manner that is independent of the Facebooks of the world. There will be a need at times to speak truth to power, for knowledgeable individuals with appropriate data and analytic skills to act as social critics of this new social order (*9*).

And although these systems are permeable and offer some entry points for study, this permeability is revocable and arguably decreasing. Facebook, for example, allows some access to user data via applications within the Facebook ecosystem. The relatively broad access creates the risk of third parties siphoning off large amounts of data from users, but has also allowed researchers to collect data to study Facebook.

The amount of data that can be collected via this route was sharply reduced on 30 April 2015 (*10*), with benefits to privacy, but undercutting independent research. This creates the risk that the only people who can study Facebook are researchers at Facebook—an unhealthy weighting of the dice of scientific exploration.

The fact that human lives are regulated by code is hardly a new phenomenon. Organizations run on their own algorithms, called standard operating procedures. And anyone who has been told that "it's a rule" knows that social rules can be as automatic and thoughtless as any algorithm. Our friends generally are a lot like us (*11*) and news media have always had to choose to pay attention to some stories and not others, in part based on financial and cultural imperatives (*12*, *13*). Social and organizational codes have always resulted in filter bubbles. However, every system of rules and every filtering process has potentially quite different dynamics and normative implications. Therein lies the most important lesson of Bakshy *et al.*'s report: the need to create a new field around the social algorithm, which examines the interplay of social and computational code.

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