

Inspecting Algorithmic Flows

Ethics, Transparency, and Accountability for Digital Mass Communication Platforms

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ABSTRACT

With billions of users, algorithmic platforms like Facebook, Twitter, and TikTok are among the most influential communication technologies in the history of civilization. These platforms offer society a mixed bag of benefits and harms, but much remains ambiguous about their true dynamics, effects, and interworkings. As a step toward improved accountability, this document outlines a dissertation that inspects (i.e. audits) algorithmic platforms as mass communication flows. Broadly, I aim to characterize the temporal dynamics, content quality, and sustainability of four different platforms (Apple News, Google Ads, Twitter, and Facebook).

1 BACKGROUND

Mass communication technologies play significant roles in human history. Some scholars go back as far as Egyptian civilization, pointing out political disturbances that coincide with the introduction of ink and papyrus [5]. Similarly, the past few centuries have been significantly shaped by the printing press, and more recent decades have been shaped by radio, television, and the internet.

Today, algorithmic platforms like Facebook, Twitter, and TikTok shape human communication at unprecedented scale. They offer people new ways to find information, connection, and entertainment, but they also present new problems and challenges for civilization (for example, by infringing on personal privacy and spreading stereotypes that reinforce racism).

My dissertation inspects algorithmic platforms as mass communication flows, based on a framework of *algorithmic flows* (which extends “curated flows” [9]). The framework uses theoretical concepts from communication studies, and methods from a growing subfield of computer science known as *algorithm auditing* [6, 7]. Algorithm auditing offers empirical insights about algorithmic systems, often combining techniques from computer science, data science, and statistics. Much auditing work stems from the recognition that algorithms (and computer systems generally) embed subjective human values [4]. These values may be less relevant for algorithms that sort a list of numbers, but they are especially relevant for algorithms that rank news stories or messages from friends, for example (such algorithms have no single “correct” answer).

While algorithmic platforms shape communication for billions of people, their interworkings are almost entirely opaque and hidden from the public. By inspecting them as communication flows, my

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projects offer glimpses into how these platforms work, their effects on mass communication, and their implications for society.

2 CENTRAL QUESTIONS

My dissertation aims to address several high-level research questions about algorithmic communication platforms. In particular:

- **What are the *temporal dynamics* of algorithmic flows?** As Daniel Susser points out [8], existing research in computer ethics has mostly focused on the inputs and outputs of algorithmic/automated systems, while paying limited attention to important questions of temporality.
- **What are the *contents* of algorithmic flows?** This question overlaps with recent research into fake news and misinformation. I approach the subject through a broad lens of news quality and attempt to study the full spectrum, from low-quality junk news to high-quality journalistic reporting.
- **How *sustainable* are algorithmic flows?** This includes analyzing the diversity of sources contributing to platforms, how equitably those different sources receive visibility, and which sources are growing or dying.

3 PROJECTS

Thus far I have completed work on three projects inspecting algorithmic platforms as mass communication flows:

- (1) A case study audit of curation in Apple News [1]
- (2) A survey-based audit of geotargeted Google Ads [3]
- (3) A sock-puppet audit of curation in Twitter timelines [2]

As a final project, I will conduct a large-scale inspection of news exposure on Facebook. Unlike previous projects, this project will use real-world data to account for the impact of user choices.

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