On Automation in Media Industries: Integrating Algorithmic Media Production into Media Industries Scholarship

Philip M. Napoli¹

Rutgers University

phil.napoli [AT] rutgers.edu

Abstract:

Media industries scholarship has devoted a substantial amount of attention to understanding the decision-making dynamics surrounding the production of media content. This work has addressed factors such as organizational norms and structures, environmental cognitions, and audience information systems. Today, an increasingly important layer over all of these established factors is the role that algorithmically-driven decision-making tools play in the process of producing media content. This essay will argue for the importance of media industries scholarship effectively accounting for this algorithmic turn and its implications for media production. It will illustrate a number of current examples in which algorithms are playing an increasingly influential role in media production, and how these examples connect with media industries scholarship. The essay concludes by proposing some lines of inquiry for future research.

Keywords: Digitalization, Internet, Production, Technology

Introduction

As recent efforts to define the contours of media industries scholarship illustrate, one of the core objectives of the field is to develop deeper understandings of the processes via which media content is produced, consumed, and interpreted by media audiences.² Such a focus inevitably requires exploring the decision-making dynamics that take place at the individual, organizational, and supra-organizational levels. Decision making in this context should be understood broadly to encompass aspects such as: the constructions of the environmental cognitions of decision makers; the inputs that inform these decisions; and the institutional and organizational structures that guide and constrain them.

For these lines of inquiry to respond effectively and adapt to the rapidly changing technological conditions under which contemporary media industries operate, a key point of focus going forward should be on the role of algorithmically-driven automation and how it is affecting the dynamics of media production and consumption. Due to space constraints, the focus here will

be on the production dimension.³ In addressing this issue, this essay provides an overview of the roles and functions that algorithms are serving in the dynamics of media production, and how these roles and functions connect with core areas of media industries scholarship. Drawing from this analysis, this essay then proposes directions for future research.

The Algorithmic Turn in Media Production

Perhaps one of the most visible and potentially significant transformations currently affecting media industries is the increasingly prominent role that algorithms play in the production of media content.⁴ As the media environment grows more complex, with audiences increasingly fragmented and empowered, and with a growing array of technologies and platforms at their disposal, media organizations are increasingly turning to “big data” and algorithms to help them effectively navigate this complex environment.⁵ The two primary functions that algorithms currently perform in the media production realm are: a) serving as a demand predictor; and b) serving as a content creator.

The Algorithm as Demand Predictor

A common point of focus in media industries scholarship has been examining and critiquing the mechanisms via which media organizations navigate the inherently unpredictable marketplace demand for various forms of media content.⁶ A key pattern that has been illuminated by this line of research has been a steady although contentious process of “rationalization,” in which impressionistic modes of decision-making are replaced by more data-driven, analytical approaches.⁷ In this big-data era, media organizations have an ever-expanding supply of data on audiences’ media consumption patterns and preferences to draw upon,⁸ and algorithms play a central role in extracting actionable insights and producing decision outcomes from these data stores. These are the fundamental elements of the most recent—and perhaps most dramatic—step forward in this long-running process of rationalization.

The motion picture industry, for instance, has begun to rely on predictive software packages such as [Epagogix](#), which employs algorithms to predict the success of prospective film projects based upon the plot elements contained within the individual film scripts, linking these content characteristics with historical data on box office grosses.⁹ Similarly, [Netflix](#) has been developing its slate of original programming by feeding its enormous trove of audience behavior and ratings data into a predictive algorithm that then identifies the type of original programming most likely to succeed.¹⁰ The inputs in the Netflix case are obviously very different from the inputs being utilized by a system such as Epagogix, but the outcome is essentially the same: algorithmically-derived performance forecasts that are increasingly dictating production decisions.

Perhaps the most controversial application of such algorithmically-driven demand predictors has been in the realm of journalism. In some cases (such as [Patch](#), AOL’s hyper-local news venture), algorithms that analyze demographic, social, and political variables related to specific geographic communities and their anticipated demand for local news have been used to determine where local news outlets are established.¹¹ Thus, the very existence of local news operations is, to some extent, being algorithmically dictated. In other cases (but also including Patch), news organizations are increasingly relying on analyses of various forms of user behavior and feedback data to more precisely calibrate their newsgathering and reporting activities. Many newsrooms now operate with comprehensive and immediate feedback related

to various aspects of online news consumption, ranging from page views to time spent on a site/story, to ratings, to volume and valence of comments.¹²

Consider also the case of “content farms.” Content farms mine search-engine data to estimate demand for content on various topics, and then produce that content rapidly and cheaply in order to meet that demand.¹³ Once again, the process is algorithmically-driven. Leading content farm [Demand Media](#) for instance, feeds its algorithm three types of data: a) popular search terms from search engines; b) the ad market for keywords (i.e., which keywords are currently being sought and how much is being paid for them); and c) the competitive environment (in terms of content that’s already available online).¹⁴ The output then represents a prediction of the type of content for which there is the highest unmet audience and advertiser demand, and Demand Media produces that content accordingly.¹⁵

The Algorithm as Content Creator

The algorithmic turn in media production is, in some instances, being enhanced in ways that go beyond demand prediction and extend into the realm of content creation. This is not to say that the human element is being eliminated from content creation. Algorithms are human creations. Rather, the point here is that the human role in content creation is migrating from a direct to an indirect role.

Algorithms already have been developed and employed to perform comparably to human content creators in areas such as poetry and music composition.¹⁶ They are also playing an increasingly prominent role in areas of online content creation such as tweets, where a large number of tweets are automatically generated by algorithmically-driven bots.¹⁷ This model is at the core of [Narrative Science](#), a start-up based around a software package that can generate complete news stories once it is fed the core data on which the stories will be based (e.g., sporting event scores and statistics, company financial reports, housing data, survey data).¹⁸

Discussion

As should be clear, the production of media content is now, in many instances, being conducted in ways that increasingly delegate important analytical and decision-making authority to sophisticated algorithms. The long traditions of media industries scholarship that have sought to comprehend how media industries seek to understand their audiences, anticipate demand for content, and generate content must now consider how these processes are being reconfigured by this algorithmic turn in decision-making processes. Algorithms may even need to be considered a distinct media institution in their own right within the context of the production of content.¹⁹ Understanding algorithms from this broader institutional perspective means examining not only how algorithms are being used and the outputs that result, but also the inputs—the ways in which algorithms are being constructed, and the assumptions, priorities, and inputs that underlie their construction. As much as media industries research has enhanced our understanding of the ways in which films, television programs, and music are produced, the field must similarly begin to investigate the still-opaque processes of algorithm construction.

Conclusion

Developing a deeper understanding of algorithms, their construction, and the role they play in the dynamics of media production should be a focal point of media industries scholarship. Such a focus is a natural extension of a well-established line of media industries scholarship that has

sought to illuminate the decision-making dynamics that surround media industries' efforts to understand their audiences and produce the content that most effectively meets their audiences' interests.

Future research should delve into the organizational dynamics of algorithmic development, deployment, and calibration. For example, we know little at this point about the organizational dynamics surrounding the adoption and usage of algorithmic tools in the media sector. Are there intra-organizational tensions, and if so, how are they being resolved? How are established professional norms, identities, and practices adapting? How are algorithmic tools becoming legitimized in organizational processes? How are the criteria that are utilized in the construction of media industry-specific algorithms developed? How and why are they adjusted and recalibrated over time? And perhaps most importantly, how exactly are algorithms affecting the nature of the content that is produced? Are they having their intended effects in terms of improving the success rates of various forms of media content? Are there any unintended effects (either positive or negative) that have yet to be realized? Exploring questions such as these will help to ensure that media industries scholarship fully reflects the contemporary dynamics surrounding the production of media content.

-
- 1 Philip M. Napoli (Ph.D., Northwestern University) is Professor of Journalism and Media Studies in the School of Communication and Information at Rutgers University and a Media Policy Fellow with the New America Foundation. His books include *Audience Economics: Media Institutions and the Audience Marketplace* (Columbia University Press, 2003) and *Audience Evolution: New Technologies and the Transformation of Media Audiences* (Columbia University Press, 2011).
 - 2 John T. Caldwell, "Para-Industry: Research Hollywood's Blackwaters," *Cinema Journal* 52, no. 3 (2013): 157-165; Nitin Govil, "Recognizing 'Industry'," *Cinema Journal* 52, no. 3 (2013): 172-176.
 - 3 Philip M. Napoli, "The Algorithm as Institution" (paper presented at the Media in Transition Conference, Cambridge, Massachusetts, May 2013).
 - 4 Tarleton Gillespie, "The Relevance of Algorithms," in *Media Technologies*, eds. Tarleton Gillespie, Pablo Boczkowski, and Kirsten Foot (Cambridge: MIT Press, 2014); Napoli, "The Algorithm as Institution."
 - 5 Thomas Davenport and Jean Harris, "What People Want to Know (and How to Predict It)," *MIT Sloan Management Review* 50, no. 2 (2009): 23-31.
 - 6 Todd Gitlin, *Inside Prime Time* (Berkeley: University of California Press, 2000).
 - 7 Jarl A. Ahlqvist, "Programming Philosophies and the Rationalization of Music Radio," *Media, Culture & Society* 23, no. 3 (2001): 339-358; Philip M. Napoli, *Audience Evolution: New Technologies and the Transformation of Media Audiences* (New York: Columbia University Press, 2011).
 - 8 Napoli, *Audience Evolution*.
 - 9 Davenport and Harris, "[What People Want to Know](#)," 23-31; Malcolm Gladwell, "The Formula: What If You Built a Machine to Predict Hit Movies?" *The New Yorker*, October 16, 2006.
 - 10 David Carr, "[Giving Viewers What They Want](#)," *The New York Times*, February 24, 2013; Andrew Leonard, "[How Netflix is Turning Viewers into Puppets](#)," *Salon*, February 1, 2013.

-
- 11 Joseph Tartakoff, [“AOL’s Patch Aims to Quintuple Size by Year-End,”](#) *paidContent*, August 17, 2010.
 - 12 C.W. Anderson, “Between Creative and Quantified Audiences: Web Metrics and Changing Patterns of Newswork in Local U.S. Newsrooms,” *Journalism: Theory, Practice, Criticism* 12, no. 5 (2011b): 550-566.
 - 13 Piet Bakker, “Aggregation, Content Farms, and Huffinization: The Rise of Low-Pay and No-Pay Journalism,” *Journalism Practice* 6, no. 5-6 (2012): 627-637.
 - 14 Daniel Roth, [“The Answer Factory: Demand Media and the Fast, Disposable, and Profitable as Hell Media Model,”](#) *Wired*, November 2009.
 - 15 Christopher W. Anderson, “Deliberative, Agonistic, and Algorithmic Audiences: Journalism’s Vision of its Public in an Age of Audience Transparency,” *International Journal of Communication* 5 (2011a): 529-547.
 - 16 Christopher Steiner, *Automate This: How Algorithms Came to Rule Our World* (New York: Portfolio, 2012).
 - 17 Zi Chu, Steven Gianvecchio, Haining Wang, and Sushil Jajodia, “Who Is Tweeting on Twitter: Human, Bot, or Cyborg?” (paper presented at the ACSAC Conference, Austin, Texas, December 6-10, 2010).
 - 18 Steve Lohr, [“In Case You Wondered, A Real Human Wrote This,”](#) *The New York Times*, September 10, 2011.
 - 19 Napoli, “The Algorithm as Institution.”

Bibliography

- Ahlkvist, Jarl A. “Programming Philosophies and the Rationalization of Music Radio.” *Media, Culture & Society* 23, no. 3 (2001): 339-358.
- Anderson, C.W. “Deliberative, Agonistic, and Algorithmic Audiences: Journalism’s Vision of Its Public in an Age of Audience Transparency.” *International Journal of Communication* 5 (2011a): 529-547.
- Anderson, C.W. “Between Creative and Quantified Audiences: Web Metrics and Changing Patterns of Newswork in Local U.S. Newsrooms.” *Journalism: Theory, Practice, Criticism* 12, no. 5 (2011b): 550-566.
- Bakker, Piet. “Aggregation, Content Farms, and Huffinization: The Rise of Low-Pay and No-Pay Journalism.” *Journalism Practice* 6, no. 5-6 (2012): 627-637.
- Caldwell, John T. “Para-Industry: Research Hollywood’s Blackwaters.” *Cinema Journal* 52, no. 3 (2013): 157-165.
- Carr, David. [“Giving Viewers What They Want.”](#) *The New York Times*, February 24, 2013.
- Chu, Zi, Steven Gianvecchio, Haining Wang, and Sushil Jajodia. “Who is Tweeting on Twitter: Human, Bot, or Cyborg?” Paper presented at the ACSAC Conference, Austin, Texas, December 6-10, 2010.
- Davenport, Thomas and Jean Harris. “What People Want to Know (and How to Predict It).” *MIT Sloan Management Review* 50, no. 2 (2009): 23-31.

- Gillespie, Tarleton. "The Relevance of Algorithms." In *Media Technologies*, Tarleton Gillespie, Pablo Boczkowski, and Kristen Foot, eds. Cambridge: MIT Press, 2014.
- Gitlin, Todd. *Inside Prime Time*. Berkeley: University of California Press, 2000.
- Gladwell, Malcolm. ["The Formula: What If You Built a Machine to Predict Hit Movies?"](#) *The New Yorker*, October 16, 2006.
- Govil, Nitin. "Recognizing 'Industry'." *Cinema Journal*, 52, no. 3 (2013): 172-176.
- Leonard, Andrew. ["How Netflix is Turning Viewers into Puppets."](#) *Salon*, February 1, 2013.
- Lohr, Steve. "In Case You Wondered, A Real Human Wrote This." *The New York Times*, September 10, 2011.
- Napoli, Philip M. *Audience Evolution: New Technologies and the Transformation of Media Audiences*. New York: Columbia University Press, 2011.
- Napoli, Philip M. ["The Algorithm as Institution."](#) Paper presented at the Media in Transition Conference, Cambridge, Massachusetts, May 2013.
- Roth, Daniel. ["The Answer Factory: Demand Media and the Fast, Disposable, and Profitable as Hell Media Model."](#) *Wired*, November 2009.
- Steiner, Christopher. *Automate This: How Algorithms Came to Rule Our World*. New York: Portfolio, 2012.
- Tartakoff, Joseph. ["AOL's Patch Aims to Quintuple Size by Year-End."](#) *paidContent*, August 17, 2010.