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*Note from Editors*

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## Computational Advertising: Where Are We and Where Are We Going? Note from Editors

### Definition and scope of computational advertising

Over the past decade, computational advertising has emerged as a new paradigm of the field. In the early days, *computational advertising* referred to a type of automation that tries to “replicate what humans might do if they had the time to read Web pages to discern their content and find relevant ads among the millions available” (Essex 2009, 16), emphasizing its ability to match ads and relevant web content. Computational advertising has been further developed and is now recognized as more than just a new type of advertising. In this *Journal of Advertising* special issue on Advances in Computational Advertising, *computational advertising* is defined as “a broad, data[-]driven advertising approach relying on or facilitated by enhanced computing capabilities, mathematical models/algorithms, and the technology infrastructure to create and deliver messages and monitor/surveil an individual’s behaviors” (Huh and Malthouse 2020, 1).

Computational advertising has been embraced as the new paradigm of the field and praised for its ability to handle massive data in real time, quantify various consumer characteristics and their experiences, and use that information to personalize advertising messages and media content. Today’s algorithmically driven feeds offer targeted content that simplifies consumer decision-making, at the same time driving consumer attention to maximize the reach and frequency of their messages and eventually return-on-investment and lift.

Today, computational advertising is a rapidly growing field, involving interdisciplinary research such as advertising, marketing, computer science, linguistics, economics, and more. It requires a variety of computational systems, including information retrieval, behavioral analytics, and decision-making (Yang et al. 2017).

### Opportunities and challenges in the computational advertising landscape

There are many opportunities stemming from computational advertising. Computational advertising has the ability to solve some of the pressuring issues in advertising. It can also play a role as an influential force for society beyond just a marketing tool.

First, consumers are frustrated with the inundation of advertising across platforms that disrupts their user experience. In particular, millennials and Gen Zs find digital advertising irrelevant, useless, and not trustworthy, despite all the state-of-the-art digital ad targeting models in action (Lineup 2021). Because computational advertising is able to synthesize relevant messages based on information about consumers and/or surrounding context, it has the potential to overcome these negative perceptions. However, it needs to be careful not to infringe consumers’ privacy and autonomy in decision-making (see the discussion below).

Second, the general public considers marketers and advertisers as one of the sources responsible for spreading disinformation. According to a study on programmatic advertising by NewsGuard and Comscore, brands spend billions of dollars on advertising with misinformation publishers (Skibinski 2022). On the other hand, recommendation algorithms that aim to maximize

engagement become the culprit of amplifying misinformation (e.g., Eisenstat 2019). With its ability to identify inappropriate or incorrect content, computational advertising can stop the spread of disinformation and prevent brands from misplacing their ads next to reputation-harming content, thereby enhancing brand safety. Furthermore, we can use targeting techniques to detect and correct misinformation and disinformation and create public service announcements that promote media literacy, increasing consumers' awareness of consequences of data breaches, algorithmic biases, and mis/disinformation.

Third, computational methods come with a potential of developing innovative new research methods and measurements for key concepts of interest in advertising research and practice. By enabling researchers and advertisers to analyze online activities performed by hundreds of thousands of individuals in a natural setting, computational methods overcome such challenges as response bias and sampling errors. At the same time, as many constructs of interest to advertising researchers are rather abstract and not directly translatable into digital behavior, such methods create challenges related to linking or mapping between abstract concepts and appropriate indicators or proxies (Roy, Borbora, and Srivastava 2013).

Computational advertising that highly relies on processing of personal data (Huh and Malthouse 2020) of consumers brings new challenges to the landscape. Consumers are increasingly concerned about the violation of their privacy, lack of control over personal information, and biases built into algorithms (see Auxier et al. [2019] for general perception of privacy and use of personal data; see e.g., Hao [2019] and Kant [2021] for specific examples of biased targeted advertising). Not so long ago, advertising's societal role was broadly discussed during the Cambridge Analytica scandal when personalized advertising was criticized for its role in the 2016 U.S. presidential election as well as the "Brexit" referendum (e.g., Cadwalladr and Graham-Harrison 2018; Grassegger and Krogerus 2017). The fact that computational methods can be used to predict consumers' individual characteristics, such as personality, needs, political preferences, or current emotional states, has led to many discussions on advertising ethics, with some calling targeted advertising "one of the world's most destructive trends" (Mahdawi 2019). Now the question is: How can computational advertising create relevant messages without violating consumers' privacy and enhancing biases?

Finally, advertising struggles with establishing its worth. Attribution modeling is becoming increasingly difficult due to the number of privacy regulations and privacy settings being introduced but has always been challenged for its low accuracy. Some authors like Tim Hwang (2020) argue that digital advertising is ineffective, and we have limited ability to establish its effectiveness (e.g., Edelman 2020; see also Frederik and Martijn [2020] for an overview), whereas others point out that computational advertising can play a larger role in improving measurements throughout the process of creating, executing, and evaluating advertising programs and will continue to evolve (Yun et al. 2020).

This special issue of *Journal of Advertising* aims to recognize the potential issues that computational advertising is facing today and better understand the solutions that computational advertising can offer to these emerging issues.

### **This issue: The role of computational advertising**

In this special issue, we hoped to engage in a discussion on the role of computational advertising in advertising practice and society through a collection of five research articles. We invited contributions representing theoretical and applied work dealing with computational advertising. Our aim was to recognize and better understand the issues that advertising scholars and practitioners are facing today and find ways to use computational advertising ethically for the betterment of consumers, brands, and society. Notably, the authors contribute to research on computational advertising by exploring the spread of positive messages on sustainability on social media (Shin et al. 2024). They also explore privacy-preserving alternatives to data-driven advertising (Häglund and Björklund 2024); the role of credibility and trust in computational advertising (Kim, Jeon, and

Chung 2024); and how advertising can be meaningful and establish its worth in the age of artificial intelligence (Pearson 2024). Finally, they also provide a practical guide for researchers who want to collect data relevant to the replicable study of social media (Sussman, Looi, and Park 2024). These studies collectively encompass varied consumers from diverse regions, including Europe and North America. The authors represent both academia and industry. By using varied samples and mixed methods, the authors enhance the applicability of their findings to the global computational advertising landscape.

Shin et al. (2024) applied automated content analysis techniques to explore how sustainability issues are communicated on social media and what characteristics of the message drive user engagement. They focused on the impact of information quality and sentiment on information sharing of 59,181 tweets. The results showcase that certain characteristics of information quality drive shares, but positive sentiment results in decrease in sharing.

Häglund and Björklund (2024) explore alternatives for personalization without the use of personal data of consumers. The authors reviewed existing literature on contextual advertising, introducing three central factors: the applicability of the content and the ad, the affective tone of the content, and the involvement of the consumer. The article makes a unique contribution by showing how developments in artificial intelligence can be used to provide contextual advertising.

Kim, Jeon, and Chung (2024) applied the source credibility and attribution theory to the context of influencer marketing. In an online experiment, the authors explored what role follower size, trustworthiness, and influencers' motives played in the effectiveness of influencer marketing. They show that expertise and trustworthiness remain of importance in this novel marketing context.

Sussman, Looi, and Park (2024) focus on the impact of choices made by researchers in computational collection of brand-related content on Twitter. They reviewed literature that studied such content and explored reproducibility of data collection through queries. Subsequently, they identified different characteristics of a query that might impact the sample and hence results of the research. Their findings show substantial impact of researcher choices on the results: how a query was constructed affected measures of precision, engagement, sentiment, and recall.

Pearson (2024) provides a short overview of the history behind (computational) advertising, how advertising was established to build brands and help society achieve their goals, and how it may have lost its way by dividing its full attention to data and prediction. Pearson challenges both advertisers and advertising researchers to rethink how we do advertising and with what goals and provides directions on how to move forward.

## Conclusion and future direction

We hope that the readers will find the papers included in this issue valuable and inspiring. While reading these papers, we have identified a number of issues that we think require attention from future research.

First, collaboration across disciplines and with industry is vital for advancing computational advertising research because it brings together diverse expertise and practical insights that offer unique perspectives and allow investigation of novel issues. Interdisciplinary cooperation, involving fields such as computer science or marketing, allows for a more holistic understanding of the impact and consequences of computational advertising. Partnering with industry provides researchers with access to real-world data, latest technological developments, and externally valid challenges, ensuring that theoretical models and findings are grounded in practical relevance. The value of industry perspective is clearly demonstrated in Pearson (2024).

Second, several studies included in this special issue pose important questions related to advertising's worth and its impact on society. As Pearson (2024) rightly notices, Charles Sandage urged us to conceive of advertising as an institution for helping society to achieve socially desirable ends. Furthermore, advertising should go beyond building click-prediction models, focus on building

long-term brand engagement (Maslowska, Malthouse, and Hollebeek 2022). Alternative advertising models such as the artificial intelligence-driven personalization model presented by Häglund and Björklund (2024) can be an inspiration for limiting the negative impact of advertising on individuals and the society.

Finally, this special issue shows methodological challenges that come along with computational advertising and application of computational methods. Sussman, Looi, and Park (2024) highlight how methodological choices in the computational research pipeline impact our results and conclusions. The way we retrieve data, including our search strategy, may affect our results. As social sciences are struggling with replicability and we have been observing a push toward open science, we believe that future research needs to make sure to document and share all the steps taken not only to analyze but also to gather and clean data. Also, we should consider replicating valid studies as demonstrated by Sussman, Looi, and Park (2024) and pay more attention to them.

The field of computational advertising is changing rapidly creating opportunities for future research and theory development. We hope that this collection of articles and the issues we identified will inspire many new research projects. As the guest editors of this special issue, we would like to thank the authors for submitting their articles and undergoing multiple rounds of revisions to ensure quality. We would also like to extend our gratitude to the reviewers whose insightful comments and suggestions have allowed us to further improve the articles included in the issue as well as to the editor in chief for his support in the process.

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## References

- Auxier, B., L. Rainie, M. Anderson, A. Perrin, M. Kumar, and E. Turner. 2019. "Americans and Privacy: Concerned, Confused and Feeling Lack of Control over Their Personal Information." Pew Research Center. <https://www.pewresearch.org/internet/2019/11/15/americans-and-privacy-concerned-confused-and-feeling-lack-of-control-over-their-personal-information/>.
- Cadwalladr, C., and E. Graham-Harrison. 2018. "Revealed: 50 Million Facebook Profiles Harvested for Cambridge Analytica in Major Data Breach." [www.theguardian.com/news/2018/mar/17/cambridge-analytica-facebook-influence-us-election](http://www.theguardian.com/news/2018/mar/17/cambridge-analytica-facebook-influence-us-election).
- Edelman, G. 2020. "Ad Tech Could Be the Next Internet Bubble." <https://www.wired.com/story/ad-tech-could-be-the-next-internet-bubble/>.
- Eisenstat, Y. 2019. "I Worked on Political Ads at Facebook. They Profit by Manipulating Us." [www.washingtonpost.com/outlook/2019/11/04/i-worked-political-ads-facebook-they-profit-by-manipulating-us/](http://www.washingtonpost.com/outlook/2019/11/04/i-worked-political-ads-facebook-they-profit-by-manipulating-us/).
- Essex, D. 2009. "Matchmaker, Matchmaker." *Communications of the ACM* 52 (5): 16–17. <https://doi.org/10.1145/1506409.1506415>.
- Frederik, J., and M. Martijn. 2020. "The New Dot Com Bubble Is Here: It's Called Online Advertising." <https://the correspondent.com/100/the-new-dot-com-bubble-is-here-its-called-online-advertising>.
- Grassegger, H., and M. Krogerus. 2017. *The Data That Turned the World Upside Down*. Vice Motherboard.
- Häglund, E., and J. Björklund. 2024. "AI-Driven Contextual Advertising: Toward Relevant Messaging Without Personal Data." *Journal of Current Issues & Research in Advertising* 2024: 1–19. <https://doi.org/10.1080/10641734.2024.2334939>.
- Hao, K. 2019. "Facebook's Ad-Serving Algorithm Discriminates by Gender and Race Even If an Advertiser Is Well-Intentioned, the Algorithm Still Prefers Certain Groups of People over Others." [www.technologyreview.com/2019/04/05/1175/facebook-algorithm-discriminates-ai-bias/](http://www.technologyreview.com/2019/04/05/1175/facebook-algorithm-discriminates-ai-bias/).
- Huh, J., and E. Malthouse. 2020. "Advancing Computational Advertising: Conceptualization of the Field and Future Directions." *Journal of Advertising* 49 (4): 367–376. <https://doi.org/10.1080/00913367.2020.1795759>.
- Hwang, T. 2020. *Subprime Attention Crisis: Advertising and the Time Bomb at the Heart of the Internet*. New York: FSG Originals.
- Kant, T. 2021. "Identity, Advertising, and Algorithmic Targeting: Or How (Not) to Target Your "Ideal User"." <https://mit-serc.pubpub.org/pub/identity-advertising-and-algorithmic-targeting/release/2>.
- Kim, H., G. Jeon, and J. Chung. 2024. "Understanding the Role of Follower Size in Influencer Marketing: Examining the Perspective of Source Credibility and Attribution Theory." *Journal of Current Issues & Research in Advertising*. Advance online publication. <https://doi.org/10.1080/10641734.2024.2378349>.

- Lineup. 2021. "Overcoming the Ad Blindness of Millennials and Gen Z." <https://lineup.com/blog/overcoming-ad-blindness/>.
- Mahdawi, A. 2019. "Targeted Ads Are One of the World's Most Destructive Trends. Here's Why." [www.theguardian.com/world/2019/nov/05/targeted-ads-fake-news-clickbait-surveillance-capitalism-data-mining-democracy](http://www.theguardian.com/world/2019/nov/05/targeted-ads-fake-news-clickbait-surveillance-capitalism-data-mining-democracy).
- Maslowska, E., E. C. Malthouse, and L. D. Hollebeek. 2022. "The Role of Recommender Systems in Fostering Consumers' Long-Term Platform Engagement." *Journal of Service Management* 33 (4/5): 721–732. <https://doi.org/10.1108/JOSM-12-2021-0487>.
- Pearson, S. 2024. "Computational Advertising for Meaningful Brands, the Public Purpose, and a Sustainable Ecology: A Call for Research into Systems Approach and Modeling Applications of LLM's in Marketing and Advertising." *Journal of Current Issues in Advertising Research* 2024: 208. <https://doi.org/10.1080/10641734.2024.2382208>.
- Roy, A., Z. H. Borbora, and J. Srivastava. 2013, August. "Socialization and Trust Formation: A Mutual Reinforcement? An Exploratory Analysis in an Online Virtual Setting." In 2013 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM 2013), Niagara, Ontario, Canada, 653–660. IEEE.
- Shin, S., Z. Jiang, R. E. Lim, and J. Lyu. 2024. "Forecasting the Spread of Sustainability Movement: Computational Analysis on Social Media Messages Promoting Climate Actions." *Journal of Current Issues & Research in Advertising* 2024: 1–19. <https://doi.org/10.1080/10641734.2024.2366173>.
- Skibinski, M. 2022. "Top Brands Are Sending \$2.6 Billion to Misinformation Websites Each Year." [www.newsguardtech.com/special-reports/brands-send-billions-to-misinformation-websites-newsguard-comscore-report/](http://www.newsguardtech.com/special-reports/brands-send-billions-to-misinformation-websites-newsguard-comscore-report/).
- Sussman, K., J. Looi, and H. Park. 2024. "Examining Implications of Search Query Construction on Sentiment Analysis: The Case of Brandwatch." *Journal of Current Issues in Advertising Research* 2024: 695. <https://doi.org/10.1080/10641734.2024.2383695>.
- Yang, Y., Y. C. Yang, B. J. Jansen, and M. Lalmas. 2017. "Computational Advertising: A Paradigm Shift for Advertising and Marketing?" *IEEE Intelligent Systems* 32 (3): 3–6. <https://doi.org/10.1109/MIS.2017.58>.
- Yun, J. T., C. M. Segijn, S. Pearson, E. C. Malthouse, J. A. Konstan, and V. Shankar. 2020. "Challenges and Future Directions of Computational Advertising Measurement Systems." *Journal of Advertising* 49 (4): 446–458. <https://doi.org/10.1080/00913367.2020.1795757>.

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