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REVIEW ARTICLE

Production Dilemmas of Computational Advertising and a Path Towards Regulation

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Abstract

With the continuous development of new technologies and the ceaseless transfer of demands among multiple parties, computational advertising has emerged as an entirely new form of online advertising. Its excessive dependence on data and technology has produced a series of defects in practice, and these defects bear directly or indirectly on the production of advertising: they are not only detrimental to the advertising industry but also exert a negative influence on the state, on society and on individuals. How to avoid the production dilemmas of computational advertising, give full play to its technical advantages and bring about sound development is therefore an urgent question. Starting from the current state of practice, this article reflects critically on the dilemmas that computational advertising faces in production, analyses their causes and identifies a corresponding path towards regulation. Production faces three dilemmas: the 'data island', the infringement of privacy and crude push delivery. The causes lie in the monopolisation of data and information, the absence of industry self-regulation and external regulation, and a deficit of media literacy. On this basis the article proposes a corresponding approach. First, the advertising subjects — producers, communicators and gatekeepers alike — should collaborate to build an open, shared big-data environment. Second, the exploration of 'data desensitisation' should be actively pursued so that diversified advertising activity can proceed on the premise of user privacy. Third, industry self-regulation and external regulation should both be strengthened so as to secure the conditions for producing high-quality computational advertising. The production dilemmas of computational advertising cannot be resolved overnight; they require coordination and joint effort from many quarters before computational advertising can promote what is beneficial in production and eliminate what is harmful, and the advertising industry can develop soundly.

Keywords: computational advertising, production dilemmas, big data

1 Technological 'Disenablement': The Production Dilemmas of Computational Advertising

As computing technology and computing power continue to develop and improve, the core characteristics of computational advertising are shifting towards digitalisation, precision and intelligence, yet the algorithmic logic operating behind them has also brought a series of problems — the 'data island', the infringement of privacy, crude push delivery — which harm the sound development of the news industry and obstruct advertising production.

1.1 Data Monopoly: The 'Data Island' Lowers the Efficiency of Data Use

Data monopoly refers to the conduct of a small number of companies that possess and control vast quantities of data and, by monopolising data resources, attain a dominant market position [1]. The three giants that hold vast quantities of Chinese user data — Baidu, Alibaba Group and Tencent — process that data through an algorithmic black box for profit [2]. The practice of big-data 'price discrimination against regular customers' is one example: at the same place, at the same time, on the same platform, members pay more than non-members; booking a hotel on one platform can cost twice the actual room rate. All of this obtains profit through the algorithmic black box, and at the same time it lowers overall efficiency of use. This shows itself, first, in the refusal of large internet companies to share data, which obstructs the unified allocation of resources. Second, different internet companies collect user data along different dimensions. Third, the 'data island' may lead large internet companies to abuse user data [3]. Because awareness of data sharing is absent and interests constrain the parties, data is difficult to transfer between internet enterprises and administrative departments, and there is still a long way to go before big-data sharing is achieved.

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1.2 Privacy Infringement: Privacy and Security Give Rise to a Crisis of User Information

The collection and use of user data is a necessary condition for the operation of algorithms, but it also raises the problem of privacy infringement. When a user, for instance, completes real-name verification on a platform, the user's personal identity information and data may be exposed to disclosure risk from the moment they are generated to the moment of use.

In a technological society, data is existence [4]. Computational advertising can readily track and locate users, and in pursuing precision marketing it brings with it the disclosure of consumer privacy. The operation of computational advertising depends on big-data technology, yet the protection of data places certain constraints on users' learning and on the analysis of algorithms. How to strike a balance between technical operation and the security of user privacy is a question that the production of computational advertising urgently needs to answer.

1.3 Crude Push Delivery: The Hidden Cage Woven by Algorithms

The crude push delivery that algorithmic technology produces is an infringement of users' space and time and an intelligent deception brought about by personalised advertising delivery [5]. When an advertiser has a new requirement, the algorithm determines the target users from that requirement; only users who satisfy the advertiser's delivery specifications and whose tags meet the audience characteristics' threshold will receive the advertising the algorithm has carefully selected.

To retain users, the major social platforms and operating systems all employ guidance to reduce users' permissions and induce them to accept the platform's advertising push. Cookies, WeChat IDs and mobile numbers serve as people's avatars online, recording personal information, habits and network behaviour behind these digital IDs. Guided by user-tracking technology, personalised advertisements follow at every turn, and a moment's carelessness drops the user into the algorithm's trap. Lengthy advertising copy wastes users' time and forces them to scatter their limited attention. When users can no longer bear the constant appearance of advertising, a condition of information overload arises and they gradually ignore content that has no meaning. The practice of pushing advertising information at users continuously, without regard to their needs and their distaste, is called crude push delivery. Users are confined by the advertising algorithm within an 'information cocoon' without knowing it, and are plundered by the algorithm unnoticed. At the same time, the various advertisements the algorithm drives use technology to conceal their invasion of users' living space.

2 Technological Resistance: Why Computational Advertising Falls into Production Dilemmas

Because computational advertising is subject to a variety of constraints, producing an advertisement encounters multiple obstacles. These obstacles arise from the monopolisation of data and information by large internet companies, and from the fact that the industry has not yet established a sound mechanism of self-regulation and external regulation. In addition, the difference in professional competence between advertisers and the media brings considerable difficulty to advertising production. Given that supervision and management are inadequate, these problems cannot be thoroughly resolved.

2.1 The Monopolisation of Data and Information

The operation and development of computational advertising depend on internet platforms. As information infrastructure, platforms are of crucial importance to computational advertising. Not only that: they also possess a capacity for social mobilisation and for shaping social order beyond that of traditional multinational corporations [6]. The disclosure or abuse of data and information may threaten national security and the public interest. At the same time, users frequently face a serious imbalance of size and of information in relation to platforms [7].

With the rapid development of the internet, the mainstream status of traditional media has gradually been eroded, and the major platforms are all attempting to become the leader in their field. The big-data competition case that HiQ Labs v. LinkedIn recently brought before the courts in the United States is a typical example. LinkedIn refused to provide workplace data to HiQ, yet that data is the core foundation of HiQ's business. Being barred from using it could deal a devastating blow. At present the United States District Court for the Northern District of California has issued a preliminary injunction requiring LinkedIn not to prohibit third-party enterprises from obtaining the public data on its website. What should alert the public is that monopolisation of information of this kind may drive computational advertising into a 'data island' and obstruct advertising production.

2.2 The Absence of Industry Self-Regulation and External Regulation

Advertising industry self-regulation is the code of ethics by which the industry constrains itself, and it can curb misconduct in production. Its mechanisms include corporate self-management, association self-restraint and self-management by dedicated bodies, and they aim to establish an effective system of management. Everywhere, the industry generally works through a combination of self-regulation and external regulation. In China, no dedicated self-regulatory body has yet been

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established, and the self-regulatory function of membership associations is not yet complete [8].

Beyond weak advertising self-regulation, the lack of strict supervision of the advertising industry is an important reason for the unchecked disorder of online advertising. As an emerging industry, online advertising is highly specialised and technical, and its entertaining and diversified character calls for particular means of supervision. Strengthening that supervision requires joint action by several legal departments and regular, rigorous oversight. At present, no clear and specific legal provisions cover computational advertising, information-flow advertising and other such forms within the management of online advertising. The Measures for the Administration of Internet Information Services and the Advertising Law of the People's Republic of China can be consulted in handling suspected violations, but the definition of offences in the online advertising field, computational advertising included, is not adequate. Specialised legal provisions are therefore urgently needed to close the gaps in supervision.

2.3 The Deficit of Media Literacy

Computational advertising suffers from excessive information and from the disclosure of user privacy. The causes vary: one is the drive of external interests, another is the low media literacy of advertisers. To adapt to the age of intelligent media, artificial intelligence and machine learning should incorporate media literacy into their algorithms as a new means of content generation. Yet the creativity and depth of AI advertising fall far short of human designers; the advantage of intelligent programmatic creativity lies in its efficiency, and its output is not a simple pastiche. Artificial intelligence can generate advertising work in quantity, but it cannot capture deep human feeling, for it lacks complete media literacy.

Moreover, whether advertiser or advertising practitioner, operating an intelligent creative platform requires both media-use literacy and information-consumption literacy. If users cannot distinguish useful information and filter the mass of information, they will find it hard to judge the quality of advertising information, and they will be unable to ensure the accuracy and scientific character of the advertising information a platform provides.

The field of advertising operations involves the professional knowledge of advertisers, producers, communicators and reviewers, and every link requires a deep understanding of the media together with practical experience of, and analytical capacity in, media design, production, dissemination and analysis. For the advertiser, a lack of media literacy makes difficulties in the course of advertising production unavoidable. These difficulties include but are not limited to the infringement of user privacy and crude salesmanship, and they tend in some measure to limit the advertiser's development. The advertiser must therefore not only understand the production process of advertising material in depth but also raise its media literacy, so as to ensure the quality and efficiency of its advertising.

3 Technological Disenchantment: A Path Through the Production Dilemmas

In response to the present production dilemmas of computational advertising, data must first be diversified in order to oppose the 'data island'. Second, 'data desensitisation' should be used to protect users' data privacy. At the same time, the double gatekeeping of self-regulation and external regulation must be properly performed.

3.1 Sharing Diversified Data to Oppose the 'Island Dilemma'

To make data sources more plural and their provenance more varied, internet enterprises need to strengthen collaboration among their different departments continuously, so as to reinforce the links between data and at the same time reduce redundant information within it. In addition, data management and application standards should be established within the industry, so as to avoid the 'island problem' that arises when enterprises and departments apply different standards.

Beyond this, the relevant state departments should strengthen supervision of data-monopoly conduct by large internet companies, warn or penalise data-monopoly conduct such as platform 'price discrimination against regular customers' that violates the Anti-Monopoly Law of the People's Republic of China, resolutely oppose monopoly and unfair competition, and actively issue policies to constrain them.

3.2 Protecting User Privacy Through 'Data Desensitisation'

With the formal entry into force of the Data Security Law of the People's Republic of China and the Personal Information Protection Law of the People's Republic of China, every sector has paid closer attention to data security. For the overall construction of data security, 'data desensitisation' is an indispensable link. To protect sensitive information, 'data desensitisation' technology can be adopted on the premise that the accuracy of data analysis is unaffected. 'Data desensitisation' means processing the sensitive fields in raw data so as to lower the data's sensitivity and thereby reduce the risk of disclosing personal privacy.

In digital marketing, data and algorithms play an important role, and sensitive information must be handled with care. Protecting user privacy is particularly important in the intelligent production of advertising, and 'data desensitisation'

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therefore becomes an indispensable requirement. A balance should be struck between data collection and the protection of user privacy, so as to advance the development of computational and intelligent advertising. To this end, different 'data desensitisation' strategies should be formulated for different data requirements, and user data should be handled appropriately, so as to ensure both advertising effect and the security of user privacy.

With the development of blockchain technology, introducing a privacy risk assessment mechanism helps to protect user privacy by adjusting data-anonymisation strategies in good time, while also safeguarding the effectiveness of data transfer. Such a mechanism can enhance the security of sensitive data.

3.3 Performing the Double Gatekeeping of Self-Regulation and External Regulation

Data platforms and media platforms bear a certain responsibility for computational advertising falling into production dilemmas. For the publication of content on social media platforms, the industry must establish a self-regulatory mechanism. Platforms must assume a duty of review in advertising delivery. Douyin is an example: as users browse Douyin, they intermittently scroll past pushed advertisements. The quality of this advertising content varies greatly, and not a little of it draws dissatisfied comment, yet the platform will keep pushing fresh low-quality content to offset the effect of users losing interest. Moreover, with the arrival of the self-media age, every social media user has the opportunity to place advertising, and the lowering of the entry threshold has made the spread of poor-quality advertising more rampant. Platforms should therefore start at the source, tightening review of outgoing advertising so as to control the appearance of low-quality advertising. While attracting advertisers, platforms should vet advertisers' operating qualifications.

On 1 May 2023 the Measures for the Administration of Internet Advertising came into force. The regulation specifies the responsibilities of the business entities involved in online advertising and strengthens supervisory measures, but it also bears on the production and dissemination of computational advertising. As the regulatory system improves, obtaining user data becomes more difficult, a dilemma for the future of the industry. Only when data security is assured can mechanisms for openness and sharing of data minimise the negative effects of data-security protection on computational advertising.

It follows that only by recognising the strict demands of both the internal and the external environment, and by conducting review at every level both within and without, can the production of low-quality advertising and the abuse of data and information be effectively prevented.

4 Conclusion

Computational advertising has injected new momentum into the development of the advertising industry, but at the same time the problems it brings — data monopoly, crude push delivery, the infringement of privacy — must be faced squarely. These can be addressed by providing technical support, improving laws and regulations, and strengthening industry self-regulation and external regulation, so as to form a sound situation of multi-party governance. In future, computational advertising will reach a new equilibrium, combine with emerging technologies, and form a thriving and vigorous sector.

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