



A Study of Ethical Risk Issues in Computational Advertising Based on Data Algorithms

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Abstract: Algorithmic advertising independently matches and distributes advertisements, media, and users on the basis of algorithmic data, which improves the efficiency of advertising and branding, and meets the potential personalized needs of the majority of users. However, as the development of algorithmic advertising relies on the comprehensive mastery and analysis of user big data, the problem of algorithmic surveillance is becoming more and more prominent, and the hidden "bias" and "discrimination" behind the algorithm is also gradually emerging. This paper points out the problems of algorithmic neglect, bias and discrimination in computational advertising, and puts forward corresponding countermeasures to the problems arising from computational advertising, it's hoped that computational advertising can also realize benign and orderly development.

Keywords: computational advertising, big data, algorithmic surveillance

1. Introduction

With the rapid development of internet technology, data algorithms are widely used in the field of computational advertising. Meanwhile, they also bring a range of risks and ethical concerns. This article aims to analyze the risks and ethical issues of computational advertising in the era of data algorithms, providing valuable insights for relevant businesses and policymakers. By conducting an in-depth analysis of the risks and ethics of computational advertising, it can expose the current problems in the field and provide directions for improvement to businesses and policymakers. Additionally, this research can contribute to the academic community by enriching the theoretical framework surrounding computational advertising risks and ethics.

2. Markets and Technologies for Internet Business Realization

From traditional contract ads, bidding ads to online ads, extensive collection, identification, targeting, and computation of user information based on big data has continuously driven the development of advertising product forms[1]. After big data has been widely noticed and widely used by global Internet companies, the research on computational advertising has gradually emerged and developed rapidly. As a kind of data-oriented advertising form constructed based on algorithms and arithmetic power, computational advertising enables the three parties, namely ads, media and users, to realize the best match with the support of algorithms, which profoundly affects the internal logic of advertising technology and product realization. When Yahoo Research's André Broder first proposed the concept of computational advertising in 2008, he only explored it as a specific advertising business[2]. Nowadays, the advertising business process and operation mechanism are undergoing a reshuffle under the impact of technology, and computational advertising has realized the precision of placement and measurable effect by virtue of its "thousands of people, thousands of faces" technological iteration, so that the effect of advertisement can be seen on the paper[3].

The generation of computational advertising is based on the needs of multiple subjects, but due to the singularity and unpredictability of the technology, computational advertising has also exposed a series of problems such as privacy invasion, traffic cheating, and market trust crisis in the process of practice, and the original theory of advertising has been difficult to cope with these new problems, coupled with the fact that the theory and relevant laws and regulations lag behind the practice of technological development, these problems have caused extensive moral and ethical controversies within the society, affecting the commercial practice of advertising and the life of advertising practitioners in a subtle but prominent way. It is not conducive to the healthy development of the advertising industry. Therefore, the data privacy and security issues arising from data-based computational advertising have been gradually understood and even resisted by users, and the increase in users' awareness of self-data security has also triggered the discussion of "algorithmic bias" and "algorithmic discrimination" and other related issues.

3. Data Surveillance - The Personalization and Privacy Paradox

Computational advertising consists of two core elements: data and algorithms, and through a large amount of data to "calculate" user profiles, it can accurately grasp the behavioral habits of users, explore their deep-seated needs, and achieve precise point-to-point interaction and continuous tracking of advertising effects.[4] As a typical personalized system, advertisements need to use a lot of user' behavioral data for audience targeting, which results in a large number of active privacy disclosures and passive privacy concessions.

3.1 App Tracking and Privacy Invasion

In the operational logic of computational advertising, the acquisition of user privacy is only the first step, and the mishandling of private user data can also raise consumers' concerns about its potential ethical risks. Computational advertising is a publicized commercial cash flow tool that pushes advertisements based on users' interests in order to improve the efficiency of advertisement delivery. At this level, the display of advertisements is, to a certain extent, a mapping of users' interests and preferences. In many scenarios, users do not want to make them public, but computational advertisements handle users' privacy and preferences, so that users' interests are displayed in front of others through the medium[5].

3.2 Website Interactive Behavior Labels

In the field of big data, the system will label and classify the user's behavioral data, through the data labels on the user has a more intuitive and comprehensive portrayal, at the same time, the computer can also be in-depth understanding of the user's behavioral habits, etc., and then use the user's interactive behavioral information for personalized recommendation of relevant content and the accurate placement of online advertising and other fields.

Algorithms are based on data, and the "consumption footprints" that users leave behind in the online world become the primary focus of advertising algorithms.[6] The collection of user behavioral data by both technology and advertisers is aimed at further speculating on the future consumption trends of users and formulating effective follow-up advertising plans accordingly. In the era of big data, consumers are "digitized" and "data-enabled"[7] . Algorithms are monitoring users all the time, making them fearful[8] .

3.3 Advertising Cocoon

Due to the excessive attention to the click rate and purchase rate of computing advertising technology, as well as the immaturity of advertising recommendation technology, consumers often encounter the trouble of over-recommendation by machines. For example, the "guessing your favorite" column in the home page of Taobao often appears "advertising cocoon" over-recommendation phenomenon, in order to "hairdryer" as a keyword search click on the home page will be found in a few days almost all of these products are recommended, even if it has happened. In a few days are almost all kinds of such goods recommended, even if the purchase behavior has occurred. Behind the over-recommendation exposed the shortcomings of the algorithmic recommendation, too much attention to the click rate of a single search, the conversion rate, but ignored the actual situation and the real needs of consumers.

4. Algorithmic Discrimination - Subtle Discrimination and Prejudice

In addition to algorithmic data monitoring that has tended to be open and transparent, algorithmic bias in computational advertising is also subtly penetrating our daily behavior. Algorithmic bias refers to algorithmic programs losing their objective and neutral stance in the process of information production and distribution, affecting the public's objective and comprehensive perception of information. Some studies have shown that Google's advertising system is already engaging in subtle gender discrimination, with women's chances of being recommended for "high-paying" jobs being only one-sixth that of male workers. Algorithms have hypothesized that users of Apple phones may pay more for a taxi than users of other brands, thus engaging in some sense of price discrimination. Algorithms also stereotype and rank differentiate user behavior based on the similarity of their daily website behavior, and even unknowingly instill gender bias or rank discrimination. It can be said that algorithmic bias and discrimination "exists in every aspect of algorithm design and data operation"[9] .

Algorithms are not objective and accurate in portraying users' behavioral labels, and may even generate certain "bias" and "discrimination" based on users' algorithmic data, and such potential "bias" and "discrimination" are also unknowingly affecting users' advertising behaviors. This potential "bias" and "discrimination" also affects the advertising behavior of users unknowingly . In the migration from human to machine, prejudice acquires a certain "invisibility" and "legitimacy", and is constantly practiced and amplified. Technology is a mirror of society and the human heart. In a way, algorithmic bias is like a re-representation of the truth in the gray corners of what we consider to be a progressive and beautiful moment and a wake-up call. So when it comes to dealing with algorithmic bias, part of the effort is to get back to people. Fortunately, even

technological attempts at self-regulation and governance can go a long way toward reducing the level of bias and preventing it from expanding significantly.

5. Breaking the Ice under Prejudice

The limited nature of data sample collection and the persistence of human social bias doom algorithmic bias and discrimination to a certain degree of inevitability, for the negative benefits generated by the algorithm, not only need to protect the sensitive characteristics of the individual information, but also be vigilant about the possibility of the expansion of algorithmic discrimination brought about by neutral data information.

For ordinary Internet users, the most direct and effective way to avoid algorithmic surveillance and algorithmic discrimination is to download software from regular channels; if there are problems with the software download channels, then there is no way to talk about the protection of personal information. Secondly, when the platform draws up the authorization consent form, it should not only state that the authorized operator needs to collect the user's personal data, but also make it clear whether the consumer agrees to the algorithmic personalized recommendation of the consumer.

Again, the writers of the algorithms should strictly follow the industry guidelines in designing the algorithms, maintain a neutral and unbiased attitude and professional ethics, conduct regular studies and assessment tests related to professional ethics, and accept the supervision and review by the industry organizations composed of professionals.

Finally, multi-party regulation should be realized. The government, the media and all sectors of society should work together to regulate[10] from macro-control, media positively guiding the value orientation, and the public actively reporting several levels of synergistic governance.

Problems such as unstandardized use of data in computational advertising cannot be solved overnight, which not only requires guidance and rectification of the external social and legal environment and relevant policies, but also requires us, as users, to continuously improve our own media contact, recognition and use of literacy, and to rationally and dialectically look at computational advertisements.

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