Research and Implementation of E-commerce Advertising Content Optimization Based on Artificial Intelligence

Mengdan Xia

Henan Vocational College of Agriculture, Zhengzhou, Henan, 451450, China

18203655651@163.com

Abstract. In the last decade, e-commerce has developed rapidly and created convenience for consumers. In order to increase operational efficiency and improve service quality, many e-commerce companies are constantly looking for new trends and seeking to meet consumer demand. Research and study various SP display formats and effectively analyze their work; It can clearly reflect users' language preferences and can be implemented in a multitasking learning model. The multitask learning model uses CTR prediction function to improve SP prediction. The emergence of artificial intelligence has opened up new ideas and models for the development of e-commerce, and the value of e-commerce will be everything.

Keywords: artificial intelligence; E-commerce advertising; Content optimization

1 Introduction

With the development of information technology, the era of Big data and artificial intelligence has become a wave sweeping the world, and has entered many fields of human society with rapid development. The characteristics of massive data volume, fast processing speed, multiple types, high timeliness requirements, high value, and high accuracy have brought new challenges and opportunities to the marketing of the e-commerce market. In addition, with the acceleration of planning and construction, the demand for standardized, large-scale, and market-oriented supply from consumers is becoming increasingly strong. How to make use of the advantages accumulated in Big data and artificial intelligence to further build a global cross-border e-commerce center is a great challenge and opportunity for the development of e-commerce market[1].Artificial intelligence belongs to a technical discipline that simulates, extends, and expands human intelligence to achieve automated operations of mental labor. Artificial intelligence technology is centered around intelligent technology, and on this basis, intelligent machines similar to human mental labor have been developed, such as robots, speech worlds, image recognition, etc., which can respond instantly after receiving control commands. Artificial intelligence technology has strong professionalism and is

R. Appleby et al. (eds.), *Proceedings of the 2nd International Conference on Intelligent Design and Innovative Technology (ICIDIT 2023)*, Atlantis Highlights in Intelligent Systems 10,
https://doi.org/10.2991/978-94-6463-266-8_43

closely related to disciplines such as computer science, psychology, biology, linguistics, and medicine. With the continuous improvement of modern social science and technology, the fields involved in artificial intelligence are also broader, and the mechanical products produced also have a high level of intelligence, with the function of executing human control commands. There is a close connection between the development of artificial intelligence technology and computer technology, which affects each other and advances together.

E-commerce is equivalent to an economic and technological revolution, using the Internet as a platform and supported by computer network technology to achieve close integration of business technology, information technology, and management technology. It is a product of economic, scientific, and cultural development, with strong comprehensive characteristics. The development of e-commerce has made significant contributions to global economic progress. Early e-commerce was carried out through electronic technology, and with the continuous progress of science and technology, with the support of the Internet, commercial activities such as electronic transactions, electronic settlements, and electronic banking were carried out through computers, truly realizing e-commerce[2]. Compared with traditional commercial activities, the market exchange venues of e-commerce have virtual characteristics, and the development of commercial activities can be free from time and space constraints. Through e-commerce platforms, the diverse needs of manufacturers, enterprises, and users can be met, and information acquisition is more timely and convenient. The understanding of the market is also more comprehensive, providing excellent conditions for the development of commercial activities compared to e-commerce, E-commerce is a special concept that not only refers to enterprises establishing e-commerce platforms and conducting commodity transactions based on the Internet, but also not simply representing the working form of e-commerce. It emphasizes the modernization level of the entire business operation system with the support of information technology, optimizing business processes, integrating resources, promoting the optimization and upgrading of business operations, and refining to design, production, sales In various aspects such as logistics and management, comprehensive control is used to promote the efficient development of business activities. Moreover, e-commerce requires the assistance of supporting systems, including internet information systems, intermediaries, and trading environments, to ensure mutual promotion and promote the smooth development of e-commerce activities[3-4].

2 Scene mining based on artificial intelligence data

The scene insight of e-commerce advertising is based on accurate user profiles. The application of user profiles has made the dissemination process of e-commerce advertising efficient and orderly, and advertisers and brand owners can accurately understand users' needs, pain points, and product demands through user profiles. In the traditional advertising era, the means to understand user needs and find target consumer groups were single, usually through questionnaires and interviews. Then, the basic attributes, interests, purchasing habits, and other information of users were manually organized,

ultimately gaining insight into consumer needs and conducting advertising creativity. This model is not only small, time-consuming and laborious, but also the survey data is often not accurate and comprehensive. John Wanamaker, the advertising master, once put forward a famous problem: "I know that half of my advertising expenses are wasted, but the problem is that I don't know which half is". In the mobile The Internet Age, user scene insight has become scientific and efficient. Through the user's authorization protocol in the intelligent terminal, users' daily network behavior data is obtained and users' profiles are depicted[5]. On this basis, analyze users based on their basic attributes, short-term behavior, and long-term interests, and extract user interest labels. Take today's headline as an example. According to public sources, the daily information flow displayed in the Toutiao App today exceeds 10 billion articles and videos, with a daily processing volume of over 78 PB of data. The Toutiao series products generate 6 billion server requests per day. At the same time, Toutiao AI Laboratory continuously accumulates a large number of training samples and data based on a rich and diverse application scenario and a large number of users, trains algorithm models, and establishes a unified data warehouse to continuously train and improve artificial intelligence. When users use the Headline App, the algorithm center begins to interpret the content they are browsing, forming a preliminary user profile in a few seconds. As the data generated by reading behavior increases, the user profile continues to be optimized. In this process, the headline labels the user's interests and sets the primary, secondary, and underlying interest labels to optimize the placement selection of recommendation content and information flow advertisements[6].

At present, the integration of today's headline advertising and news has achieved an optimal balance point. Headline adheres to the operational philosophy of "advertising is news, news is advertising" and provides a profound insight into consumer needs. On its advertising placement website, it bluntly states that "no one likes advertising. People read what they want to read, and sometimes these contents happen to be advertisements". Therefore, Toutiao has introduced three advertising placement methods, namely application startup full screen advertising, information flow large image advertising, and information flow small image advertising, as shown in Table 1.

Table 1. Form and characteristics of Toutiao advertising

	Characteristic	**Scope of application**
Full screen advertising	The large user base, per per At least 10 million people in day You'll see ads	Suitable for enhanced brand exhibition show: Can be put by the province
Information flow large picture advertising	In the news-information stream Show ads, AD pictures Film are larger than news pictures size: Get your attention, and be used Household first attention	Get high attention; Targeted advertising investment release; Can be according to the city district and county \ xing Fun on
Information flow of small picture advertising	With the news picture font Consistent size style, In the news and information stream Show advertising; Reduce users to ads The exclusion of psychology	Get high attention; Precise and targeted advertising investment release; Can be according to the city district and county \ xing Fun on

Smart Algorithms have brought many benefits to Headline Ads. According to Headline statistics, as of October 2022, Headline has been installed by 800 million people, and at least 1.5 billion people use it every day, and those who use it spend half of 100 minutes every day. Those. Based on advanced hardware and technology, Headline calculates user interests and intelligently recommends news based on interests, which can be done within 5 seconds. At the same time, based on big data mining, we can achieve a variety of advertising goals such as gender, age, interest, mobile phone, time and location. Based on real-time data reports, advertisers can check the data at any time, click on the user's image in the ad, and create an original advertising plan instantly. Past history. Random sampling cannot be used because the total amount of header traffic cannot be known. Therefore, in this paper, the "recommendations" section of HeadlineApp is applied to the published data stream with simple measurements, and the published articles are classified and recorded as shown in Table 2.

Table 2. Information flow advertising records in the recommended section of Toutiao APP

Order number	Advertising title	Advertising form	Advertising sources
1	A city household registration quota development	Information flow map	Location
2	Medical advertising	Information flow map	Pay attention to the label
3	Hot old songs APP download	Information flow map	Random
4	Wework Office space	Information flow map	Age
5	Book shopping guide advertising	Information flow map	Random
6	Baby bazaar	Information flow map	Time is close to the Children's Day
7	Lighter advertising	Information flow map	Sex
8	Huawei New ads on it	Information flow map	Mobile phone brand
9	Kindergarten decoration	Information flow map	Age
10	Men's shopping guide	Information flow map	Sex

The head algorithm pushes information related to advertising traffic in case of bursts based on user's reading interest, reading history and other information, and on the other hand pushes information based on user's geographic information. Based on a collection of user data, an AI algorithm can update the user profile in real time and capture user reading information, which may lead to ad updates[7-8].

3 Deep exploration of personalized advertising optimization under artificial intelligence

This paper presents a series of large-scale online A/B tests. As shown in Figure 1. This paper analyzes data and puts forward ideas according to online A/B test results, and deeply discusses how to optimize the display content of SS return results through selling point keywords (SPs) in the e-commerce platform sponsored search (SS) scenario, revealing the effectiveness of this intelligent optimization form for users' attraction.

This paper uses the page from Headline to display traffic data for online experiments and surveys related users, so as to explore profound insights from users, businesses and e-commerce platforms[9-11].

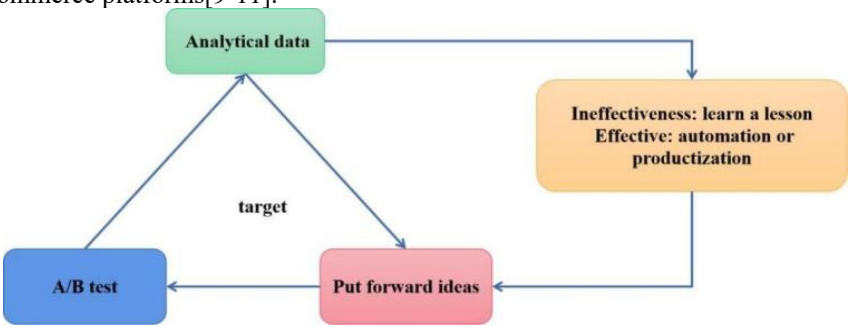

Fig. 1. Online A / B test Fig

Specifically, this paper re-optimizes the results returned by SS by automatically adding personalized SPs (that is, the content of advertising products returned in the search list), thus improving its appeal to users. As shown in the figure, in sponsored search, merchants bid for keywords; When the user sends out a query request, it will trigger the bidding mechanism[12]. The winning advertising product will be added with SPs before its title through the model in this paper, and then it will be displayed in the user's search list, thus being presented to the query user. This chapter designs experiments to test different SPs display schemes. All the experiments and analysis in this chapter are to answer the following questions:

(1) Can the attractiveness of 1)SS return results to users be improved by intelligently optimizing what they show?

(2) Is personalization a key component to enhance the attractiveness of SS return results to users?

(3) Intelligent optimization of the results returned by SS, such as the display style of added SPs and the display number of SPs. How and to what extent do these different factors affect its appeal to users?

Exploring the answers to these questions is very necessary for building the model later[13]. On the one hand, the answers to these questions are closely related to the basic assumptions about the intelligent optimization framework of advertising content for multi-task deep learning proposed in this paper, and the design and implementation of the algorithm should not be studied directly before verifying these assumptions; On the other hand, the exploration and investigation of these problems provide great insights and insights on how to design a more attractive model and a more intuitive SS system for e-commerce platforms. In order to solve the above problems, this paper accesses a certain proportion of real traffic to conduct online A/B testing and user research, and collects real user feedback[14-17].

4 Conclusion

Based on studies of e-commerce advertising and phenomenological theory, this paper examines the communication strategy of e-commerce advertising as a foundation through artificial intelligence. Meaning the development process of e-commerce and its relationship with intelligent technology. This paper analyzes and explores the depiction of intelligent communication in e-commerce advertising, summarizes the technical process depiction of the communication field, the role and influence of the information platform, and the structural meaning of the communication field. customer image support for e-commerce advertising phenomenon communication. This article will focus on our concept of e-commerce advertising communication and explore in depth the principles and applications of site features and content optimization strategies, eight and community projects. Finally, here are some tech-savvy tips for e-commerce ad communications. This article will discuss how to develop e-commerce advertising skills, how to communicate in e-commerce advertising, and communication strategies.

References

1. Guo, A. , & Yuan, C. . (2021). Network intelligent control and traffic optimization based on sdn and artificial intelligence. Electronics, 10(6), 700.
2. Xia, Y. . (2021). Research and realization of artificial intelligence-based salary system optimization. Journal of Physics Conference Series, 1915(2), 022056.
3. Yufeng, Z. , & Wan, S. . (2021). Research on logistics distribution in e-commerce environment based on particle swarm optimization algorithm. Journal of Physics: Conference Series, 1881(4), 042059-.
4. Cong, C. . (2021). An ai based research on optimization of university sports information service. Journal of intelligent & fuzzy systems: Applications in Engineering and Technology, 40(2),0216365.
5. Li, K. , & Gao, G. . (2021). Research on reactive power optimization of power system based on improved particle swarm algorith. Journal of Physics: Conference Series, 2136(1), 012045-.
6. Zhang, Y. , Ji, Y. , & Qian, H. . (2021). Progress in thermodynamic simulation and system optimization of pyrolysis and gasification of biomass. Green Chemical Engineering, 2(3), 266-283.
7. Wang, Q. , & Yu, Y. . (2021). Evaluation of solar energy potential based on artificial intelligence and optimization of college english courses in coastal areas. Arabian Journal of Geosciences, 14(11,423.
8. Hu, J. , & Xie, C. . (2021). Research and implementation of e-commerce intelligent recommendation system based on fuzzy clustering algorithm. Journal of Intelligent and Fuzzy Systems(3), 1-10.
9. Li, S. , Li, W. , Wang, Z. , & An, D. . (2022). Research and implementation of parallel artificial fish swarm algorithm based on ternary optical computer. Mobile Networks and Applications, 3(6),1-11.
10. Wang, S. , & Zhang, J. . (2021). Research and implementation of real-time render optimization algorithm based on gpu. Journal of Physics: Conference Series, 2136(1), 012059-.
11. Huaping, L. . (2021). Analysis of coastal rainfall pattern based on artificial intelligence and global cultural communication. Arabian Journal of Geosciences, 14(17),0258763.

12. Yang, Y. , & Sha, Z. . (2021). Research on innovation of design education based on artificial intelligence technology. Journal of Physics: Conference Series, 2136(1), 012055-.
13. Bu, S. . (2021). Logistics engineering optimization based on machine learning and artificial intelligence technology. Journal of intelligent & fuzzy systems: Applications in Engineering and Technology, 40(2),014878.
14. Li, H. . (2021). Stability rating of mine rock slope based on artificial intelligence. Advances in Civil Engineering, 2021(3), 1-12.
15. Zhang, Y. , Li, R. , & Zhang, J. . (2021). Optimization scheme of wind energy prediction based on artificial intelligence. Environmental Science and Pollution Research,3(5),03615
16. Burnaev, E. V. , Bernstein, A. V. , Vanovskiy, V. V. , Zaytsev, A. A. , Bulkin, A. M. , & Ignatiev, V. Y. , et al. (2023). Fundamental research and developments in the field of applied artificial intelligence. Doklady Mathematics, 106(Suppl 1), S14-S22.
17. Khan, M. , Chuenchart, W. , Surendra, K. C. , & Khanal, S. K. . (2023). Applications of artificial intelligence in anaerobic co-digestion: recent advances and prospects. Bioresource technology, 370(6), 128501.