

Applications of Artificial Intelligence in Advertising and Marketing

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Abstract. Nowadays, the advertising industry is developing apace, especially the online advertisement, which has caught customer's attention. In era of information explosion, how to accurately capture the needs consumers in a large number of complex information, is the problem faced by enterprises in marketing. The main research problem of this paper is the application of artificial intelligence in the field of advertising and marketing. In the digital age, AI has become a key driver of advertising and marketing. It can not only help enterprises to accurately target the target consumer group to deliver information, but also help enterprises to convey information and improve the effect of marketing activities and advertising. With the vertical deepening of artificial intelligence technology, AI endorsement, interactive advertising and immersive interactive advertising will be the mainstream advertising forms that occupy the market in the future. Therefore, using the AI technology in the fields of advertising and marketing can lead to wealth upgrading.

Keywords: artificial intelligence, advertising, advertising effectiveness, marketing strategy

1. Introduction

Many analysts call 2023 “the first year of generative artificial intelligence (AI)”, and 2024 is “two years of AI”, but also “the first year of large-scale AI applications”, and AI applications around the world have exploded and begun to penetrate into all aspects of our daily lives. Sora video large model, the launch of ChatGPT4.0, the large-scale use of self-driving cars and AI medical robots. AI leaps from single-task intelligence to multi-modal, multi-task intelligence, showing unprecedented capabilities and providing effective solutions in different fields. However, in the field of AI there are research advancements and industry gaps. First of all it is the adoption of Multi-ID measurement and privacy concern problems. But it still has many advantages. Most importantly is the generative AI and automation. Generative AI has emerged as a critical trend in advertising and marketing, surpassing even Connected TV (CTV) in terms of importance. In addition, it can create personalized content for individuals. Artificial intelligence is powered by machine learning. Machine learning is responsible for training computers to perform specific tasks automatically. Usually these tasks are too large for humans to effectively complete, but the machine can efficiently output through human input instructions, in the process of allowing the machine to recognize the relationship between input and output, so as to build learning models to cope with different situations. In particular, in the field of advertising and sales, the article mainly analyzes the role of AI in programmatic buying and consumer insight, analyzes the impact on the marketing field, and discusses the future development trend. Finally, the problems that may occur in AI marketing will be discussed and solutions will be proposed.

2. Introduction and Development of Artificial Intelligence

Back in the middle of the 20th century, people were already working on artificial intelligence. And the concept of artificial intelligence originated from the Dartmouth conference in 1956, which was hailed as the symbol of the birth of artificial intelligence. Since then, artificial intelligence has gradually entered the public's vision and become an independent discipline. In the 1960s, great progress was made in artificial intelligence. Frank Rosenblatt proposed the perceptron model, which laid the foundation for subsequent research on neural networks and deep learning. At the same time, Herbert A. Simon and Allen Newell developed the General Problem Solver, GPS is the world's first knowledge representation system. In the 1970s, AI research was influenced by expert systems, an intelligent decision-making system based on knowledge bases and reasoning mechanisms designed to simulate the knowledge and experience of human experts. Stanford University's MYCIN system was one of the early expert systems to

make a huge contribution to medical diagnosis. The MYCIN system is one of the early expert systems that has made great contributions to the theory and practice of expert systems. Now many expert systems refer to the design idea and logical reasoning method of the MYCIN system [1]. However, from the 1980s to the 1990s, the field of artificial intelligence seems to be stagnating and much research has been delayed. Change begins at the beginning of the 21st century. The development of GPUs has increased computing power, which can greatly improve artificial intelligence algorithms. In summary, throughout the development process, AI has experienced the rise to the trough, and the acceleration the process of development. Nowadays, AI has come into our daily lives and connected to the society in many different areas, which is a new scientific and technical revolution. At the same time, the development of artificial intelligence has also caused some controversies and concerns, including unemployment, privacy problem, and so on. In the future, artificial intelligence will make unlimited progress and become an important pillar of human civilization.

3. Application of Artificial Intelligence in the Field of Advertising

3.1. Factors Affecting Traditional Manual Advertising

3.1.1. Locate the Target Customer

Traditional advertising media mainly include television, posters, leaflets and magazines, etc. These media advertisements are usually transmitted to the audience through media purchases and advertisement spots in the form of graphic display. This mode of communication has the advantage of large release volume, but also has shortcomings, such as not accurately positioning the target consumers, so that the audience feels the information is miscellaneous, which greatly reduces the marketing function of advertising.

3.1.2. Interactivity and Engagement

Traditional forms of advertising are usually one-way, and the audience has no direct interaction and participation in the advertising content. The audience can contact the advertiser by phone, letter or other means, or purchase the product in the corresponding store according to the introduction on the promotional poster, so the form is relatively simple and the audience participation is low [2].

3.1.3. Effect tracking and Data Analysis

Traditional advertising relies on professionals to conduct market research, such as sales and number of customers to obtain data, which is not necessarily accurate and difficult to analyze in large quantities, leading to error-prone results. It has no way to know the preferences of every customer, and can only judge by the public preference, which leads to the decline of the audience's love for advertising.

3.1.4. Cost and Efficiency

Traditional advertising is usually transmitted through TV, posters, magazines and other media. The range of traditional advertising is relatively wide, but the cost of delivery is relatively high, and the positioning of specific audiences is relatively difficult. And this approach is one-way and cannot be improved by feedback from customers or viewers.

3.2. AI Target Customers

Imagine, in the forest of information, we are like explorers, looking for goals in the intricate trees. In this forest, advertisements are like different kinds of animals and plants that attract our attention. In this rapidly changing era, artificial intelligence has quietly changed our lives, and massive amounts of information are flooding in. AI technology is gradually integrated into the advertising industry, re-exploring and sorting out this traditional industry.

3.2.1. Intelligent Delivery

For example, in the field of service research, Jiang Zhibin and Ma Xin believe that artificial intelligence technology has expanded to all aspects of advertising operation. The traditional advertising operation is generally manifested as advertising research and market analysis, advertising strategy advertising creative production, advertising delivery, effectiveness testing and other links; the advertising operation under the reconstruction of artificial intelligence is mainly reflected in four aspects: consumer intelligent insight, advertising intelligent creation, advertising intelligent delivery and advertising intelligent response [3]. Through these four aspects, it has been shown that artificial intelligence can replace human beings in advertising operations and formulate personalized advertising programs by collecting personalized data from customers. For example, record how long customers browse a certain page, the frequency of retrieving a certain keyword, or compare data in other apps, and infer user preferences through AI analysis.

Then, AI will target consumers and push different ads or products according to different users who like them, and then intelligently create new ads to be delivered again to attract users' interest.

3.2.2. Behavior Analysis and Feature Engineering

First is the construction of a user value system based on the Recency, Frequency, Monetary (RFM) model. The RFM model consists of three indicators: (1) Recency (R) refers to the distance between a customer's last purchase and a particular purchase. The lower the R-value, the more active the user is and the higher the stickiness to the platform. Therefore, there is a negative correlation between R-value and customer value, which needs to be negated when calculating RFM scores. (2) Frequency (F) refers to the number of times customers purchase products in a period of time. The higher the purchase frequency, the higher the customer loyalty. (3) Monetary (M) refers to the total consumption of customers in a period of time. The greater the consumption, the stronger the willingness to consume, which also means the possibility of buying again [4]. It can be inferred from the RFM model that the user stays in the hot zone on the page, the shopping cart gives up the time point, and the price comparison path become one of the ways for AI to lock the target consumers. In addition, it is also possible to extract the drivers of consumption decision from the comments of users under the video ads or customer service conversations, so as to mine the psychological characteristics of the target customers.

3.3. AI enables Advertisement (AD) Placement and Programmatic Buying

Brahe used to say that hope is the star hidden behind the mountains, and exploration is the persistent traveler on life's path. In the exploration of advertising, AI is the star behind the mountain, is the hope of the advertising field, and guides people to continue to explore. In the field of advertising, AI technology has long been the right hand of advertisers. AI can adjust the advertising strategy according to user preferences, so that the AD is just right in front of the target customer. For example, Google's search engine, AI technology can help advertisers analyze users' search habits, extract keywords, and then push corresponding ads, so that ads have a favorable position in search results.

Programmatic buying is an advertising delivery mode that automatically executes AD purchases after matching the needs of advertisers with the data of the trading platform. It involves DSP demand-side platform, SSP media resource supplier platform, DMP data management platform, etc., and completes transactions in the advertising trading platform through real-time bidding and non-real-time bidding. AD Network is the traffic provider in the link, unifying large, medium and small traffic access. ADX and SSP, as traffic service providers in programmatic advertising, are both advertising trading platforms with basically the same functions; DSP is a demand-side platform that serves advertisers directly. The DMP platform is responsible for the establishment of data labels and is the data management and analysis side of the link [5]. AI plays a monitoring role in this, monitoring the advertising effect in real time and automatically optimizing the advertising content and advertising strategy according to the data feedback, which greatly improves the ROI of advertising. Meanwhile, AI has high productivity and a strong ability to generate ads, and can quickly generate creative and interactive ads to enhance the user's sense of experience. For example, Mercado Libre is using AI technology to improve the product recommendation and search experience of the e-commerce platform to help users find the goods they need more accurately.

3.4. Advertisement Development Proposal

Firstly, rich advertising forms, people's "curiosity" psychology, and novel advertising forms can let more people remember advertisers, in addition to the traditional video, audio, and flat... In addition to advertising forms, it can also innovate advertising forms, such as the combination of quadratic and reality-breaking barriers, advertising participatory experience under new technologies, etc., to improve the initiative and involvement of advertising audiences through novel forms. It is necessary to subdivide user behavior, track user behavior and judge user demand trends. Second, through accurate prediction of user behavior, real-time and scenario-based advertising for users, achieving point-to-point user demand matching, and improving the interaction of audience participation in advertising in all aspects of communication [6].

4. The Role of AI in Marketing

With the advent of more and more AIs, such as ChatGPT and DeepSeek, AI text and image processing technology is widely used in marketing. With the help of AI, business processes are more automated, so machines can perform tasks, such as transmitting data, updating files, reading documents, extracting keywords, and so on, with greater precision and with less interference. The use of AI in marketing can better predict customer choices and thus deploy digital marketing strategies [7].

4.1. Localization Marketing Strategy Analysis

From the user's point of view: thousands of on-demand precision marketing based on big data technology. Ni Ning and Jin Shao pointed out, "Massive data collection and data mining is the basis for Internet advertising to achieve precision marketing; with the

help of big data, it can achieve the accurate positioning of target consumers, accurate mining of consumer demand, accurate control of advertising delivery and accurate evaluation of advertising effect". The core feature of big data is that "everything is quantifiable", and of course, marketing activities are no exception [8]. The combination of big data and artificial intelligence (AI) through the data analysis, the semi-finished products become creative, and then through big data matching to the corresponding Ren to achieve automated marketing.

From the perspective of advertisers: online and offline integrated smart marketing based on AI technology. In January 2018, the high-tech enterprise Youbi launched a commercial service robot Kruze (Cruzr), and 2,150 robots Cruzr were placed in the hundreds of cities and thousands of stores of the actual home. Perform large-volume service work, such as greeting, flexible promotion, intelligent shopping guide, accurate introduction, one-click multi-control, easy viewing of stores, and data analysis. Cruzr can be written and spoken, sound, vision, movement, environment capture and other ways to interact with customers, to achieve a wide range of artificial intelligence technology to enable the wisdom of offline stores smart marketing practices [9]. From this case, it can be seen that online intelligent marketing relying on the Internet alone has been insufficient for the development of advertisers, and only by combining intelligent identification and voice interaction technology can online and offline integrated marketing maintain the competitiveness of marketing. It reconstructs the structural relationship of the three elements of "people, goods and things" in the retail system, and profoundly changes people's consumption concept, consumption pattern and consumption experience through scene experience and diversified and personalized services that meet emotional needs [10]. The satisfaction and interaction of this service will stimulate people's enthusiasm for consumption.

4.2. Artificial Intelligence-driven Marketing Innovation Strategy

4.2.1. Develop Personalized Product and Service Push Systems

AI will use the user's data network to try to learn the user's interests by machine learning algorithms; every song clicks and even every "like" is a clue that the AI algorithm interprets the user's preferences, and every choice of the user will be recorded by the system like a detective.

4.2.2. Intelligent Transformation of CRM

With the help of AI, today's intelligent CRM is like a magic wand, giving enterprises the ability to accurately and deeply interpret customer needs. In the new era, intelligent CRM innovates the behavior of enterprises collecting customer information through powerful data processing and analysis functions. Instead of passively filling in tables of information, AI can disaggregate customers' core desires and potential preferences from a vast array of complex Internet behavior data, consumption records, feedback, and even from social media users' comments. Such real-time and comprehensive information makes it possible for enterprises to understand the unique dynamic information of users at each interactive node, making customer service more appropriate and timelier. Through deep learning, it can capture small changes in user behavior, giving advanced insight into the needs and problems that may arise. This means that companies can provide preventive or proactive services before problems arise, rather than waiting for complaints to occur [11].

4.2.3. Automated Generation and Dissemination

Automated generation technology is ubiquitous in the digital media arena, and the dynamic updates of media, news reports or those ever-changing advertising copy are quickly and accurately generated by AI, which allows enterprises to market at the most appropriate time, reducing a lot of time and energy.

4.3. Problems with AI Marketing

First of all, the brand search engine function of generative artificial intelligence may lead to the risk of invisible malicious bidding ranking in the advertising field, and AI providers may become new bidding ranking service providers, resulting in the risk of malicious bidding ranking. Second, the content generation capability of AI may lead to the risk of disguised advertorials, making users mistakenly think that the copy is written by real people. Third, big data is killing, and online shopping platforms, as AI providers, have the risk of promoting expensive products to users who accept the characteristics of "high prices" based on commercial interests or even directly tampering with product prices [12]. Although the application of artificial intelligence in the field of advertising marketing has broad prospects, it still faces many problems in the process of technical realization. In order to effectively develop, it is necessary to strengthen business management.

5. Conclusion

This research systematically discusses the wide application of artificial intelligence in the field of advertising and sales and the changes it brings. The study found that artificial intelligence technology significantly improves advertising effectiveness and sales

conversion rates through accurate data analysis, personalized advertising and intelligent customer interaction, which can improve the revenue of enterprises. For example, the AI model can automatically learn the user's preferences according to the user's usage and watching videos and browsing time, and then deliver different advertising products according to different preferences, thereby improving the click-through rate and conversion rate of the advertisement; AI models can also improve the company's sales model, using online and offline models while targeting target customers, forming a more intelligent marketing model. Although artificial intelligence shows great potential in the field of advertising and sales, it also faces some challenges, which are not mentioned in the current paper, so we can conduct in-depth research in the following aspects in the future. First of all, data privacy and ethical issues remain difficult issues for AI applications, and how enterprises can use data while protecting the personal privacy of users. Secondly, the rapid development of AI technology also puts forward higher requirements for the technical ability and talent reserve of enterprises. How to improve the management strategy of enterprises to improve the marketing efficiency is also worth studying. In a word, the emergence of AI is not to replace people's jobs, but to make them more efficient and promote the development of society.

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