Artificial Intelligence-Driven Marketing Strategy Optimization: Innovative Convergence of Big Data and Personalized Marketing

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Keywords: Artificial Intelligence, Marketing, Big Data Analysis, Personalized Marketing.

Abstract: Personalised marketing has become one of the core strategies of modern marketing. The core question of this study focuses on how to take advantage of artificial intelligence and big data to improve the efficiency of personalised marketing while maintaining data privacy and security. The specific application of artificial intelligence in personalised marketing is analysed in detail through the literature analysis method. Through big data analysis, consumer needs can be understood more effectively, and more targeted marketing strategies can be developed, thus improving marketing effectiveness and customer satisfaction. However, the application in personalised marketing also faces some issues. Among them, data security and privacy are among the most critical issues. To develop AI systems, a large amount of personal data needs to be collected and analysed, which raises concerns about the privacy and security of user information. Aiming at these problems, this paper puts forward a series of suggestions. Firstly, enterprises should establish a perfect data management system to ensure the quality and security of data. Secondly, enterprises need to build a 'balance model between data privacy protection and personalised marketing' to jointly develop marketing strategies and continuously optimise personalised marketing algorithm models.

1 INTRODUCTION

Artificial intelligence technology began in the 1950s and has now become a global hotspot for scientific and technological research and application. With the rapid development of new technologies such as big data, cloud computing, and the Internet of Things, the application scenarios of AI technology have been greatly expanded. With the arrival of the Internet era, the field of marketing has experienced radical changes, the traditional advertising channels can no longer meet the needs of enterprises for marketing effectiveness. Enterprises need to leverage AI technology and rely on big data analysis to gain a deeper understanding of users' behavioral patterns and consumption habits and discover potential market opportunities.

This study is useful to guarantee the scientificity, rigor, and accuracy of personalized marketing strategies, to improve the efficiency of personalized marketing, and to ensure that personalized marketing is better put into the market to form productivity. It is very meaningful to make greater use of the role of big data as a driver of its development, to reduce the input of ineffective costs, and to promote the rational and efficient functioning of society.

While the application of artificial intelligence and big data on the Internet has brought convenience to people's lives, it has also given rise to many problems that need to be solved. Such problems can have a great impact on people's lives and social stability. This study focuses on three specific aspects: data security, privacy protection, and personalized marketing efficiency. Literature analysis was used to find and read relevant information and literature, and the advantage of this method is that it can well analyze how to improve the efficiency of personalized marketing by taking advantage of artificial intelligence and big data while maintaining data privacy and security.

2 LITERATURE REVIEW

Zhang Weiyu in the *Artificial Intelligence Background of Modern Enterprise Marketing Strategy Thinking.* This article studies the use of artificial intelligence machine learning algorithms to optimize the marketing strategy for modern enterprise marketing to provide thinking, in the optimization of artificial intelligence marketing aspects of the contribution to this study. Still, in the data collection

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and analysis of the content involved in the content of the little, this paper will start from the aspect of data collection and analysis, explore the data collection methods, and from which perspective to analyse the data to supplement the existing research gaps. collection methods and from which perspectives to analyse the data to supplement the existing research gaps (Zhang, 2024).

Guan Fuzhong, in his article *New Marketing Engine for Operators under the Wave of Artificial Intelligence*, researched the need for operators to make use of big data models to make data more accurate and reliable, as well as the risks and challenges foreseen by artificial intelligence, and contributed to this research in building a collaborative and efficient big data model. However, not much has been done in the area of personalised recommendation, and this paper will start from the aspect of personalised recommendation, focusing on the question 'How to improve the effect of personalised recommendation from more aspects?'. to supplement the existing research gaps (Guan, 2024).

Zhang Shuo studied the use of big data analysis to enhance personalised influence and the use of advanced technology to improve marketing efficiency in the article *Research on the Innovation Path of Enterprise Marketing Strategies in the Era of Digital Economy*. It contributes to this research in terms of innovative marketing strategies, but the content of natural language processing is not comprehensively researched, and this paper will start from the natural language processing aspect to carry out research to supplement the existing research gaps (Zhang, 2024).

The researcher explores the specific application scenarios and effects of big data and artificial intelligence in personalised marketing through case studies and empirical research. The focus is on how big data analytics can be used to develop more accurate marketing strategies and the decision-making role of AI in assisting marketing decisions. This shows that the application of AI in marketing focuses on data collection and analysis, personalised recommendations, natural language processing, and predictive analytics.

Firstly AI technology helps companies in data collection and analysis to collect and analyse customer data more effectively, including multi-channel data such as social media, mobile apps, online shopping, search engines, etc., to better understand customer needs and behaviours.At the same time, personalised recommendations are based on customers' historical behaviours and interests, dividing them into different sub-groups, which can provide personalised product and service recommendations and improve customer satisfaction and purchase conversion rates. Secondly, natural language processing helps companies to better understand and process customer feedback and improve customer service quality through techniques such as sentiment analysis and intent recognition. Finally, prediction models based on big data and AI can predict future consumer behaviour and market trends, providing a basis for corporate marketing decisions.

Despite the remarkable success of AI and big data in marketing, it still faces risks in terms of data privacy and security, technology integration, and talent development. The convergence of AI-driven marketing optimisation strategies and big data personalised marketing provides companies with unprecedented marketing opportunities. By deeply analysing customer data, companies can meet customer needs more accurately and increase customer satisfaction and loyalty. At the same time, personalised marketing can also significantly improve marketing efficiency and reduce marketing costs. With the continuous development and improvement of AI and big data technology, personalised marketing will show its great potential and value in more industries and fields.

3 ALIBABA'S PERSONALISED MARKETING STRATEGY AND THE APPLICATION OF AI TECHNOLOGY

3.1 Alibaba's Personalised Recommendation Mechanism

Alibaba has accumulated a large amount of user data through its e-commerce platform, firstly using user browsing, purchasing, searching, and other behavioural data to build an accurate user profile. By establishing a user profile, companies can more accurately understand the user's needs, interests, preferences, and other information, so that they can more accurately locate the user group. In this way, when personalised marketing is carried out, companies can better target specific user groups to develop marketing strategies and improve the accuracy and effectiveness of marketing (Letter, 2024).

Secondly, sophisticated algorithms, including collaborative filtering and content recommendation,

are employed in conjunction with machine learning to conduct comprehensive data mining and analysis, thereby facilitating the generation of precise recommendations. And real-time analysis of the user's latest behavioural data, and timely update of the recommended content to ensure the timeliness and accuracy of the recommendation.

Finally, when collecting and using user data, Ali strictly abides by its privacy policy to ensure the security and compliance of user data and enhance users' trust in the recommendation system. It will also continue to optimise and improve its recommendation algorithms and improve the accuracy of recommendations and user satisfaction by introducing new technologies and methods.

3.2 Data Security and Privacy Protection Measures

Due to the diversity and complexity of data sources, the quality and reliability of data vary, and there may be problems such as missing data, errors, and duplication. These problems will affect the accuracy and credibility of the data, which will bring some difficulties to the marketing decisions of enterprises (Guo et al., 2024). Alibaba in response to the data privacy and security issues in big data analysis, the first to take the data encryption and desensitisation processing, data encryption using the key and encryption function to complete the replacement and alteration of computer storage information, the purpose is to make the data information to change the basic changes, to enhance the security and integrity of the information transmission, use, the receiver only needs to master the key and decryption function can be the data information All restored (Wang and Ma, 2024). For data that needs to be used for analysis, testing, and other non-production environments, Alibaba will also perform desensitisation to reduce the sensitivity of sensitive information.

Secondly, strict data access control has been adopted in the management. This refers to the fact that only authorised users have access to specific datasets and that each user can only access data within his/her privileges. It will record all the behaviours of data access and operation, including access time, access user, operation type, etc. so that it can be traced and investigated in the event of a security incident.

Most importantly, Alibaba has formulated a comprehensive data security management policy, which specifies the security requirements for all aspects of data collection, use, storage, and destruction. Alibaba regularly conducts data security training for its employees to raise their awareness of and attention to data security and ensure that they strictly comply with data security regulations in their work.

4 SYNERGIES BETWEEN BIG DATA AND AI IN MARKETING

4.1 Big Data Analytics to Enhance the Effectiveness of Precision Marketing

Businesses can better understand their target markets and consumer needs by collecting and analysing large amounts of data, including consumer behaviour, purchase history, social media interactions, and more. This data-driven approach helps organisations make more accurate and effective marketing decisions (Jiang, 2024). This data constitutes the three-dimensional dimension of the user profile, which reflects the immediate needs of the user and also predicts his or her potential purchase intention. And through personalised recommendation algorithms, it recommends products or content to users that best meet their needs. For example, when a user browses a certain type of product on Taobao or Tmall, the system will analyse the data based on the user's historical behaviour and the behaviour of similar users to recommend other products that the user may be interested in. At the same time, AI technology can integrate and analyse data across platforms and channels. By analysing users ‘behaviour and interests on social media, as well as their purchase history and preferences on e-commerce platforms, Alibaba can gain a deeper understanding of users’ needs and consumption habits, to provide users with more personalised services and recommendations.

4.2 Personalised Recommendations and Customer Stickiness Improvement

Brands should fully explore customer full lifecycle data, including browsing, searching, purchasing, evaluation, after-sales, and other aspects of the data, through data integration, depicting the customer journey map, identifying the key touchpoints, and optimising the key aspects of the experience. Using personalised recommendation engine, technology intelligent customer service, and other technical means, insight into the personalised needs of customers, to provide tailor-made products, content, and services, so that customers can feel the ‘exclusive

customised' experience (Wang et al., 2024). At the same time, personalised recommendation not only allows users to see the products they like, but also reduces the time they spend searching and screening products, making shopping more convenient and efficient. What's more, the personalised recommendation system can also adjust the recommendation strategy in real-time according to the user's behavioural changes. For example, when a user shows strong interest in a certain product, the system will recommend similar products or collocation promptly. This kind of cross-selling helps to increase the purchase volume of the user and improve the unit price and sales. This ability to adjust dynamically makes the personalised recommendation system more flexible and intelligent, as well as better able to meet the diverse needs of users, resulting in a higher return rate and better user reputation.

4.3 The Challenge of Balancing Data Privacy and AI

Alibaba has adopted a series of strict security measures to protect user information. For example, they take the help of cryptographic knowledge and related techniques to encrypt a section of data information of the computer to ensure the security of user data during transmission and storage (Wang and Ma, 2024). It also prevents data from being accessed or leaked by unauthorised personnel through mechanisms such as access rights control and data backup. Ali has established a comprehensive data security management system in response to data leakage and privacy issues, including the formulation of data security policies, training employees in data security awareness, and conducting regular security audits and risk assessments. These measures not only raise employees' attention to data security but also ensure the continuity and effectiveness of data security management.

In addition, Alibaba has a strong focus on transparency and security when it comes to personalised marketing. Users are informed of the purpose and scope of the data at the time of use, and their consent is obtained before personalised recommendations are made. Technical means are also used to ensure the fairness and accuracy of the recommendation process and to avoid users being treated unfairly or misled.

4.4 Big Data and AI for Personalised Shopping Surprises

Alibaba through big data and AI technology can accurately analyse customer behaviour and preferences, such as Taobao's 'guess you like' and history will recommend products that meet the interests of the customer, so that customers have a 'just what they want' feeling, bringing surprises. At the same time, the system can be based on the customer's historical data to explore potential needs, recommending products that they may not be aware of but need, such as recommending related accessories after the customer purchases photographic equipment, to stimulate the desire to buy and add shopping surprises.

The variety of goods recommended through the personalised recommendation system is rich, covering niche and novelty products, such as personalised and innovative products on Taobao, and cultural and creative products, which open the door to a new world for customers to access different goods with artificial intelligence as the guide and big data as the basis. The discovery of products that meet the user's needs will be recommended to customers promptly to the newly listed products, so that it is the first time to understand and buy, to meet the freshness of the psychological, such as the launch of a brand of new electronic products and customers concerned about the brand's promotional activities will be recommended to the relevant interest in the customer.

5 AI-DRIVEN PERSONALISED MARKETING EFFECT MODEL

5.1 Data Insight Driven Personalised Recommendation Enhancement Mechanisms

The construction of consumer behaviour models based on big data is a core aspect of consumer behaviour analysis. Through in-depth mining and analysis of consumer data, enterprises can construct models that reflect the laws and characteristics of consumer behaviour, and then provide a scientific basis for the formulation of marketing strategies (Zhang and Chen, 2024).

By analysing the recommended content in more detail, including textual content, images, videos, etc., more features such as semantics, sentiment, and themes are extracted for a more accurate understanding of the meaning of the content. Match

the user's behaviour and content characteristics to recommend more personalised content for the user. And with the continuous accumulation of user data and the continuous generation of new content, it is constantly optimised and adjusted to improve the accuracy and diversity of recommendations.

5.2 Data Privacy Protection and Personalised Marketing Balance Model

To balance personalised marketing and privacy protection, the government and enterprises must work together to ensure its effective implementation, through the government's enactment of laws to regulate the protection of data privacy, and the establishment of a sound data security management system by enterprises. Systematising mechanisms for balancing data privacy protection and personalised marketing. A model is proposed that contains data encryption, user consent, transparency, and decentralised storage approach to protect user data using data encryption and desensitisation process (Wang and Ma, 2024). Demonstrate how to improve marketing effectiveness while ensuring privacy. Personalised marketing efficiency while maintaining user rights and ensuring consumer trust in the business.

How introducing affective computing in personalised recommendations can enhance the user experience. For example, AI identifies the real-time emotional changes of users through sentiment analysis, so as to adjust the recommended content and further personalise it to meet the needs of users, making the research more cutting-edge and richer. However, it also makes personalised marketing easy to fall into the predicament of 'pseudo-personalisation', over-reliance on algorithmic recommendations, neglecting emotional interaction, and the user experience being superficial and programmed (Wang et al., 2024).

In the data privacy section, add the ethical and legal challenges of AI and big data applications of affective computing. It is possible to discuss how companies can comply under different legal frameworks, such as the EU's GDPR rules, and explore how to deal with compliance issues while innovating in technology, adding depth and practical application to the article.

5.3 Intelligent Interactive Trends in Personalised Marketing

Add a look at future trends in personalised marketing, such as incorporating emerging technologies such as AI voice assistants, virtual reality (VR), and augmented reality (AR), and predict how these technologies will make personalised marketing more interactive and enhance the immersive customer experience. Combined with the recent emergence of the 'meta-universe', the company will be able to ask questions about the future development of human trends, grasp the future trend of personalised marketing, and achieve more efficient big data analysis and prediction, to better understand user needs, improve user experience, and increase market share and brand value. At the same time, enterprises should pay constant attention to the development trend of emerging technologies and continuously carry out product innovation and technology upgrading, which can make use of technologies such as virtual reality and augmented reality to provide an immersive shopping experience and attract consumers. In daily operations, enterprises should actively explore the application of 5G, IoT and other technologies in marketing to improve marketing efficiency and user experience (Qi, 2024).

Second, collecting and analysing consumer data is the cornerstone of personalised marketing. Enterprises collect data such as consumers' purchase records, search records, social media activities, etc., and use advanced analytical tools and algorithms to dig deeper into these data. This analysis not only reveals consumers' explicit needs but also uncovers underlying consumer trends and preferences. For example, by analysing consumers' online behaviour, companies can learn which products or services are more popular and which marketing messages resonate better with consumers (Mingqi, 2024). It can also be based on several classical deep learning models, e.g., BiLSTM - TabNet model, to accurately identify and classify customers to implement more refined marketing strategies and introduce Whale Optimisation Algorithm (WOA) to further enhance the model performance to improve the classification accuracy and practicality. Understanding customers from data, to carry out personalised recommendations and improve customer stickiness (Li et al., 2024).

6 CONCLUSION

AI and big data technologies offer great potential for personalised marketing to improve, especially in

terms of increasing accuracy and user experience. The findings of this study are that AI provides companies with accurate user profiling, market trend prediction, and marketing effectiveness evaluation by intelligently analysing massive amounts of data. Not only does it help companies develop more effective marketing strategies, but it also significantly improves the accuracy and efficiency of marketing decisions. From this, it further concludes that its research is based on big data, companies are also able to provide customised product recommendations and marketing messages to their customers, which greatly satisfies consumer demand for personalised and customised services.

However, the application of AI and big data in personalised marketing also faces certain challenges, with data security and privacy protection issues becoming increasingly prominent. By strengthening data privacy protection, companies can further enhance users' trust in the platform and ensure the stability of their personalised marketing.

In the future, with the continuous progress and cost reduction of AI and big data technologies, personalised marketing will usher in a broader development prospect. Enterprises should aim to actively embrace these new technologies and continuously explore new marketing theories and practical directions for in-depth inquiry. In order to adapt to the increasing level of digitalisation and the diversification of consumer needs.

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