

Boosting Audience Targeting Effectiveness in Digital Advertising Campaigns with Artificial Intelligence (AI): Review

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<https://doi.org/10.46649/fjiece.v4.1.24a.25.3.2025>

Abstract. *Improving the effectiveness of audience targeting in digital advertising campaigns is a key factor for companies' success in the digital age. With the rapid development of artificial intelligence technology, these campaigns have become more precise and engaging for the target audience. This paper reviews the importance of exploiting artificial intelligence tools to improve the effectiveness of digital advertising campaigns and e-marketing through improving personal targeting, big data analysis, and content personalization. The study includes a review of previous research on this topic and the various artificial intelligence tools used in this field, such as machine learning, big data analysis, and recommendation systems used in recommending products to users online while providing recommendations for improving digital targeting strategies.*

Keywords: *Artificial Intelligence (AI), Audience Targeting, Digital Advertising, Company, Recommendation system E-commerce, E-Marketing, Revenue, Customer Engagement.*

1. INTRODUCTION

Applications of Artificial Intelligence (AI) have grown quickly over the past few decades. Initially, AI was used to make recommendations in expert systems and knowledge-based systems. More recently, however, with advancements in big data, supercomputing, and machine learning, AI has advanced significantly and is now more adept at problem-solving, learning, manipulating objects, and navigating physical spaces [1][21]. More and more, data-driven strategies, advanced technology, and automation are used in modern marketing campaigns. The focused techniques of modern marketing have had a significant influence on the field's outcomes [15]. The significant shifts in marketing development brought about by ongoing technological breakthroughs demonstrate the mutually beneficial interaction between artificial intelligence (AI) and marketing. Cutting-edge AI-powered marketing solutions show flexibility in responding to changing company requirements and provide stakeholders with important and profitable communication and solution packages [1]. For example, recommendation systems can be used on websites to improve the user's experience, as these systems know what the user or customer prefers in general or what he likes to watch in the case of movie sites (Netflix / YouTube) or online purchase sites (such as Alibaba and Amazon),

as well as displaying ads that are appropriate for the user and according to his interests (for example, Facebook and YouTube). Artificial intelligence can also be used to analyze data, make forecasts and recommendations for customers, improve marketing operations, manage inventory, and enhance the logistics and shipping system [18][14].

2. LITERATURE REVIEW

Various studies have shown the impact of AI in improving customer experience and operational efficiency. For example:

1. [16] provided a study on how artificial intelligence might enhance the e-commerce industry's consumer experience. Enhancing personalization is one of the study's most significant conclusions, as artificial intelligence allows businesses to tailor offers and suggestions depending on client information. Additionally, enhancing operational efficiency has decreased running expenses and improved efficiency in applications like chatbots and product recommendation algorithms. Amazon and Alibaba are among the most significant businesses examined because they successfully apply artificial intelligence to enhance consumer experiences and boost revenue.
2. [19] The analytical examination of artificial intelligence's capabilities and uses in e-marketing is the focus of this article, "The Impact of Artificial Intelligence on E-Marketing." The four primary areas of artificial intelligence that were highlighted were autonomous robotics, kinetic navigation, expert systems, and natural language processing. The study found that artificial intelligence boosts competitiveness and improves the efficacy of marketing tactics through a questionnaire given to workers of marketing organizations in Iraq. The outcomes demonstrated these apps' strong beneficial effects on e-marketing. The fact that artificial intelligence efficiently helps to the improvement of e-marketing tactics is among the most significant findings. Artificial intelligence may also be used to enhance user experience and boost consumer contact.
3. [5] The function of chatbots in improving the customer experience in online marketing is examined in this research, "An Analysis of the Effectiveness of Chatbots in E-Marketing." This research examines the impact of chatbots on customer loyalty and purchase choices within the Jordanian telecoms industry. The study provides important insights into customer behavior and their opinions on the effectiveness of chatbots through focus groups and interviews. The study concludes with suggestions for using chatbots in e-marketing tactics and highlights the importance of cultural factors in their effectiveness.
4. [21] A case study methodology was used to analyze the technology use and resource management in Alibaba's smart warehouse. The artificial intelligence system was used to manage the fulfillment of orders in warehouses, increase the efficiency of warehouse and distribution operations, and reduce human errors. The study concluded that using artificial intelligence to fulfill orders helps increase the efficiency of resource management, reduce costs, and improve the customer experience in delivery and distribution operations.
5. [8] conducted a case study on this subject and data was collected by interviewing hundreds of online customers. The results showed that the main factors affecting the use of electronic recommender systems are: quality of information and content, trust, privacy, ease of use, social compatibility, and availability of results. This article suggests that studying these factors can help companies improve the use of e-recommender systems and derive the desired benefits from them. The results also showed that customers use online recommendation systems when facing purchasing decisions.
6. [22] analyzed role artificial intelligence in improving the performance of RS, as this highlights the importance of high Ai in developing the client experience in e-commerce and increasing sales and revenue generation through these systems. Some of the problems that these systems face when it comes to achieving maximum benefit in e-commerce include the unavailability of data used to train intelligence applications and the issue of protecting user privacy.

7. [13] They used the Movielens dataset to apply the hybrid system technique while building a site to development a recommendation system. Content-Based Filtering (CBF) uses genres associated with movies while CF uses Pearson's coefficient. The trial score was 0.9 as measured by MSE.

3.1. CHATBOTS

An increasingly common intelligent technology that businesses have been using recently is chatbots. Natural language processing is a tool that chatbots utilize to respond to clients' questions quickly and individually. It has been discovered that chatbots shorten client wait times and raise customer satisfaction levels.

3-2 AI-powered recommendation engines

Artificial Intelligence-powered recommender systems, or recommender engines (AR) are another type of intelligent technology that has been shown to improve consumer satisfaction. Recommendation engines utilize machine learning algorithms to evaluate customer data and provide customized recommendations for goods or services [2]. This may improve client loyalty and satisfaction. According to researchs, businesses utilizing recommendation engines saw revenues rise by 5–10% and customer satisfaction rise by 10 [22] [17]. Another example of a production company is Netflix. Furthermore, while delivering entertainment content over the Internet, machine learning algorithms are utilized to find tailored suggestions for viewers and improve the viewing experience, which has resulted in a rise in views [24]. How do recommendation systems work?

As illustrated in Figure 1, there are three different categories of recommender system techniques: content-based filtering (CBF), collaborative filtering (CF), and hybrid filtering [3].

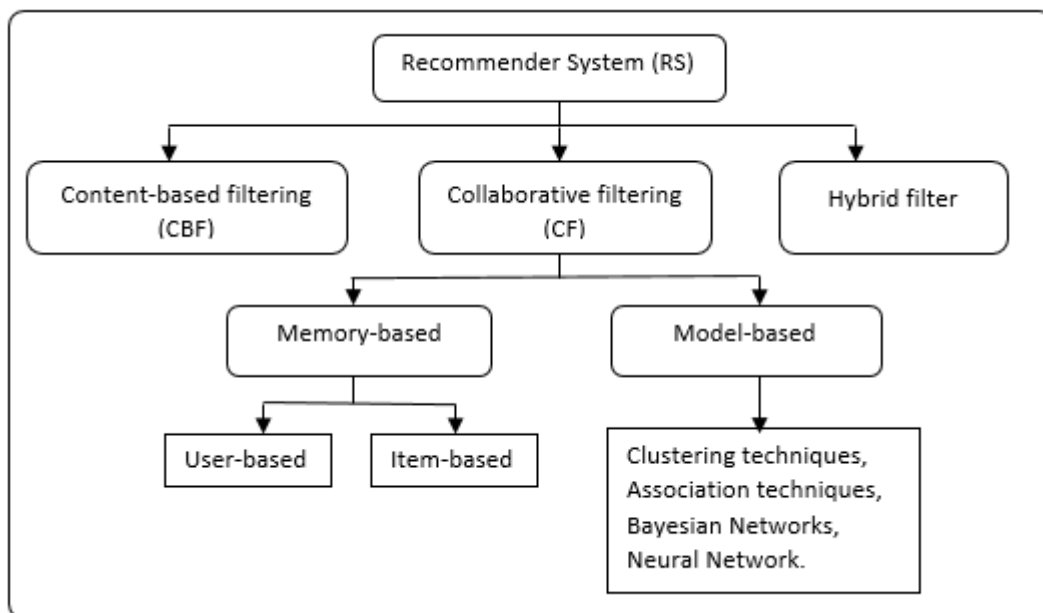


Figure 1: RS types (Isinkaye et al., 2015, Al-Fatlawi et al., 2022).

4 Recommendation System and Companies Sales

One of the top businesses in the field of electronic commerce and one of the pioneers of the recommendation system is Amazon [20]. Amazon's sales have increased by 60% due to its heavy reliance on suggestion algorithms, which are used on both its websites and email correspondence. [23], see Figure (2) Netflix, a company that specializes in streaming movies and TV series online, held a competition with a \$1 million reward pool to improve its algorithm by 10% based on the recommendation system. One of the competing teams won the cash prize at the end of the event, which ran from 2006 to 2009. [6], see Figure (3) to show the company revenues. Additionally, YouTube uses recommendation systems to show users relevant views [25]. Alibaba, a well-known online retailer of electronics, uses recommendation algorithms on its website to ensure that users are presented with the right product [9].

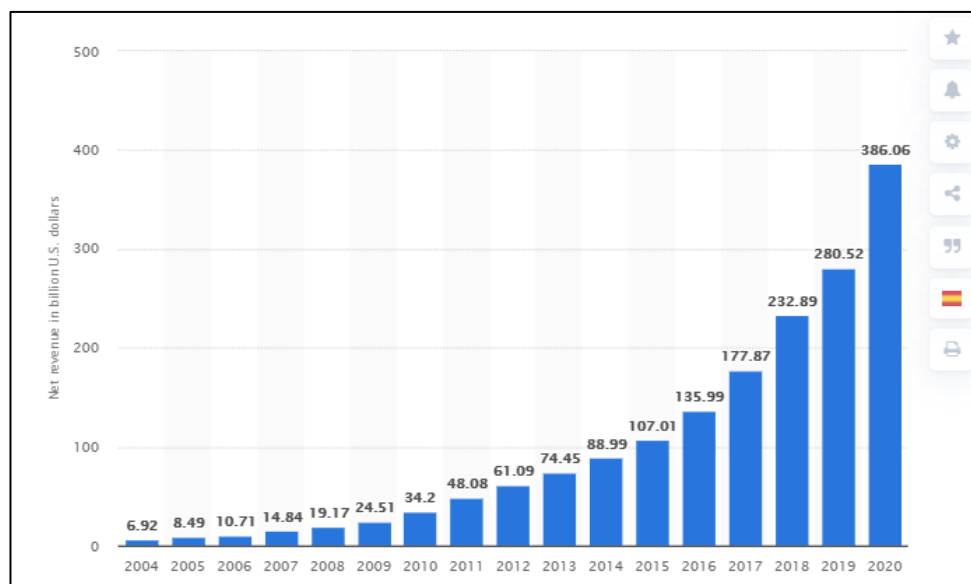


Figure 2: Amazon revenues 2004-2020 (<https://www.statista.com/>, 2022).

Amazon has seen significant growth in revenue and profits in recent years, reflecting the continued expansion of its e-commerce and cloud businesses. A major contributor to the company's growth has been Amazon Web Services (AWS) revenue growth as demand for cloud solutions has increased. Revenue has also increased as the company has invested in strengthening its position as a leading e-commerce platform, which has led to sales and revenue growth. The company has also invested heavily in improving its distribution channels and technology, which has helped improve efficiency and increase profitability. This continued

growth reflects its ability to adapt to market changes and effectively meet customer needs, strengthening its position as a market leader in many areas.

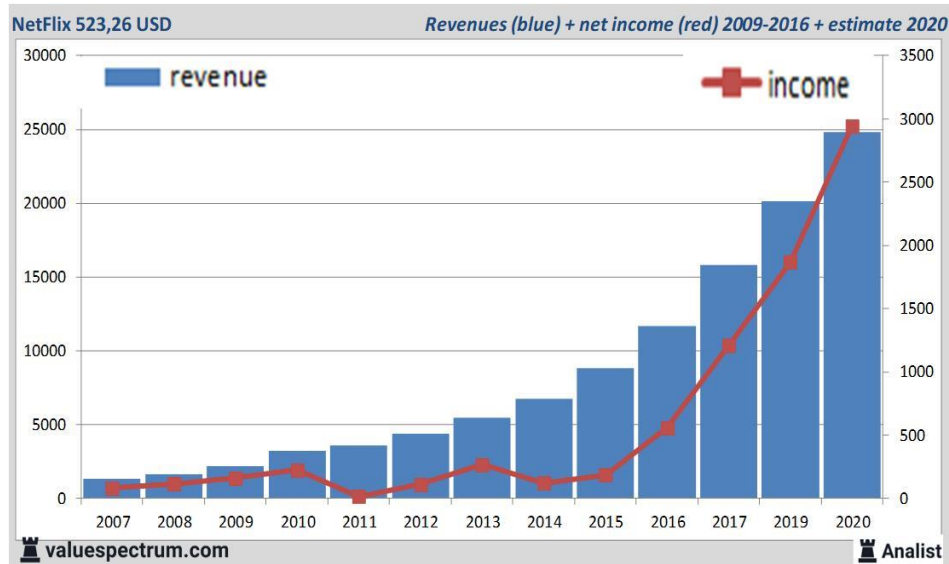


Figure 3: Netflix revenues 2007-2020 (<https://www.valuespectrum.com/>, 2020).

In 2018, Netflix saw significant growth in its revenue and profits, reflecting its continued expansion in the digital streaming market. This growth reflects Netflix's strategy of global expansion and increased investment in original content, which has contributed to strengthening its subscriber base and increasing revenue.

4.1 CHALLENGES

Privacy is a major issue in RS. To provide accurate recommendations to the user, RS needs to obtain the most relevant and detailed information about the user, such as (occupation, age, hobbies) and other data such as location that may violate the user's privacy, which requires taking this information and using it in other areas that may violate the user's privacy. There are also several other risks from companies using AI, the most important of which is cybersecurity: User data targeted by ads can be an attractive target for cyber-attacks. If AI systems are hacked, this may lead to the disclosure of sensitive information. As well as the collection and analysis of personal data, as AI algorithms rely on huge amounts of personal data, such as browsing history, geographic location, and preferences. If this data is not managed properly, it can lead to serious privacy violations.

5- CONCLUSION AND FUTURE WORK

5.1 CONCLUSION

Strong product marketing leads to strong sales, and the recommendation system does this by employing sophisticated algorithms to evaluate user behavior and then targeting certain users with sales offers and promotional activities. Effective audience targeting in digital advertising campaigns relies on the integration of ai technologies such as data analytics, intelligent personalization, and recommendation systems. These tools enable businesses to achieve more accurate and efficient marketing strategies, increasing engagement with their audience and achieving a greater return on investment. By reviewing the research, we found that most websites or applications use artificial intelligence through recommendation systems or other tools. We also found that the majority of businesses if not all of them had more marketing as a result of utilizing these technologies. Amazon is one such business that has had a notable 60% spike in revenue. Another illustration is Netflix, which was given a \$1 million grant to create its recommendation engine. As a follow-up, we suggested conducting a thorough analytical analysis of amazon, which was among the first businesses to use artificial intelligence in unique marketing strategies for its online stores.

5.2 Future Trends In AI For Digital Advertising

As artificial intelligence continues to evolve, several key trends will likely shape its application in digital advertising. The use of generative AI to create personalized content at scale, Integration with augmented reality (AR) and virtual reality (VR) for immersive ad experiences. Also, more transparent and ethical AI models can be developed to address privacy concerns. and expansion of AI tools tailored for small and medium-sized businesses.

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