

A Survey on Digital Advertising Strategies in the Modern Internet Era with Artificial Intelligence Techniques

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ABSTRACT: Digital advertising is a vital element of online marketing, and businesses now have the means to create personalized, measurable advertising strategies with a data-driven approach. The digital advertising world has been reshaped by Artificial Intelligence (AI) with enhanced audience targeting, optimization of campaigns, real-time decision-making, content creation, and recommendation systems. This survey is a thorough overview of how digital advertising is used in the modern-day Internet and what strategies and methods are used in the context of AI. It also covers audience segmentation, personalization, programmatic advertising, metrics for measurement, and key advertising strategies, consumer perception, AI optimization techniques and generative and predictive AI. The survey also analyzes the current literature to uncover research trends, challenges and emerging topics, such as data privacy, algorithmic bias, explainability, ad fraud and scalability. It also identifies current research opportunities and explores the significance of ethical and trustworthy use of Artificial Intelligence (AI) in digital advertising. AI has the potential to revolutionize advertising efficiency, personalization, campaign performance, customer interaction and ROI, and a robust ethical and privacy-protective framework is needed to construct intelligent advertising systems of the future.

KEYWORDS: Digital Advertising, Artificial Intelligence, Machine Learning, Campaign Optimization, Consumer Behavior, Personalized Advertising, ROI, Ethical Challenges.

I. INTRODUCTION

Digital platforms have grown rapidly and are now an important part of digital advertising. The benefits of online advertising have spurred a move across all verticals towards online advertising as a means to target specific audiences, measure performance metrics and optimize campaigns as they go. With digital advertising on the rise, businesses are putting significant efforts into optimizing their ad placement to ensure ads are delivered to the right people at the right time, maximizing user engagement and ROI. Conventional ad placement approaches are mainly based on demographic targeting, heuristic rule-based models, and manual segmentation, in which affiliate marketers set certain rules to show ads according to their browsing history, location, gender, and age [1]. Advertising on Internet is a type of online advertising, and a source of income for a growing number of websites and companies. In modern times, regardless of whether a small business or a large multi-national company, online advertising is a necessary part of any business marketing plan [2]. Online ads are basically there at least two companies, the ad agency, the buyer or sponsor and the ad network, the publisher. Because technical innovation and online advertising go hand-in-hand, numerous companies specialize in both fields. The complexity of analytics data and cross-platform conversion attribution means that many organizations still require assistance when trying to measure the Return on Investment (ROI) of their digital advertising initiatives. These are some of the barriers that must be overcome and solutions that can be adopted in the future to make digital

advertising more effective and efficient. It is critical to comprehend and resolve these theoretical and practical concerns to guarantee the efficacy of digital advertising campaigns in light of the evolving technology and shifting consumer attitude [3]. What is called "intelligence" in the real world is really the capacity of computers and other electronic devices to mimic human intellect in areas like learning, problem-solving, and

decision-making. AI is quickly becoming a revolutionary force in several industries, including digital advertising [4][5]. The advent and growth of AI have laid the groundwork for intelligent operations in advertising across several domains [6][7][8]. Computational advertising (targeting, personalization, content creation, and ad optimization): these four areas of artificial intelligence in advertising have received a lot of attention and research from academics [9].

A. Structure of Paper

The rest of this paper is organized like this: An overview of digital advertising's origins is given in Section II.; Section III presents an overview of AI techniques and applications in digital advertising; Section IV examines the effectiveness of AI-based advertising and its benefits; and Section V discusses the challenges and limitations surrounding the adoption of AI in advertising. The paper ends with Section VI which summarizes the paper and offers directions for future research.

II. DIGITAL ADVERTISING STRATEGIES IN THE MODERN INTERNET ERA

Digital advertising strategies are now a fundamental element of Internet-based marketing, allowing companies to connect with the target audience via a variety of online channels. The integration of AI, data analytics, and automation has significantly improved audience targeting, campaign optimization, personalization, and overall advertising effectiveness. Fig. 1. presents the classification of major digital advertising strategies, including web display advertising, Amazon advertising, influencer marketing, PPC advertising, and geofencing advertising used in modern digital marketing [10].

- **Web Design Advertising:** A website is like a house online; a lot of people who might buy something go there to learn more about it. A company's website is the initial point of contact between the company and potential customers. Websites should be engaging enough to meet the expectations of users so that they stay longer and continue to be more immersed in the company's offerings, as the purpose of online advertising campaigns is to drive traffic to the website.

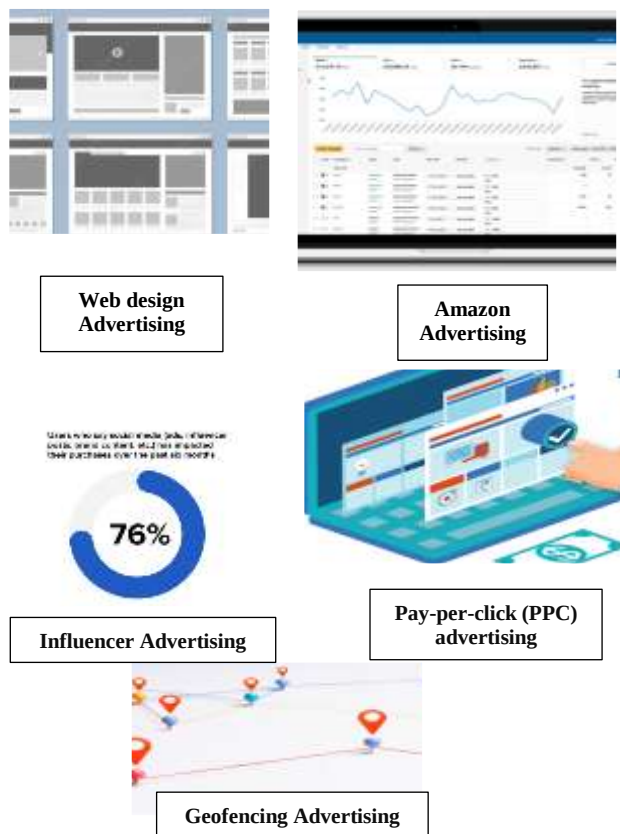


Fig. 1. Classification of Digital Advertising Strategies

- **Amazon:** Amazon is now among the most effective internet advertising platforms, ranking third in popularity, just behind Facebook and Google. The company may advertise its wares and name in many Amazon places, including search results, product pages, and more, through the use of Amazon Advertising.
- **Influencer:** Another kind of advertising that works is influencer marketing. Brand recognition, user trust [11], and revenue generation are all aided by influencer

marketing, which is employed by businesses of all sizes. One way to use influencers in advertising is to form a partnership with them and have them promote brands, products, or services on their exclusive channels.

- **Pay-per-click (PPC):** Pay-per-click (PPC) advertising is a method of promoting online products and services by having ads show up in response to user queries. Paid search allows to buy placement for chosen keywords, whereas search engine optimization focuses on winning ranks through optimization and content. With PPC, marketers compete with one another to have their adverts displayed in search results for certain keywords by using a bidding mechanism.
- **Geofencing Advertising:** One of the most effective forms of internet advertising for businesses seeking to reach rivals, top talent, expensive leads, and nearby consumers [12]. Using geofencing, a company may construct an electronic perimeter around an identifiable place, such as a university campus, a competitor's office, or a conference center. A retargeting audience is added once someone penetrates this barrier. After that, the firm may remarket to those users, which can increase their familiarity with the brand, direct their next shopping excursion, or even affect which vendors their company chooses for quarterly quotations and proposals [13].

A. Consumer Attitudes Toward Digital Advertising in the Modern Internet Era

The three attitude dimensions (forms) were named after the items with the highest factor correlation coefficients within their respective attitude forms. A three-dimensional advertising structure was created by applying the aforementioned processes to all four types of interactive digital advertising. The stability of this structure was then evaluated.

- **Informative:** Digital advertising serves as an important medium for delivering product-related information to consumers. Most users perceive interactive digital advertisements as effective in providing immediate access to product details, offering up-to-date and relevant information, highlighting new products, and communicating promotional offers and pricing information.
- **Entertaining:** Interactive digital advertising also enhances consumer engagement by delivering enjoyable and appealing content. It attracts users through entertaining experiences, reflects lifestyle preferences and personal identity, and helps consumers explore product trends, fashion, and purchasing choices while offering greater interest than many traditional media formats.
- **Irritating:** Consumer responses to digital advertising may also include negative perceptions when advertisements become intrusive or misleading. Many consumers view some advertisements as intrusive, and may find them intrusive during their online experience,

causing a decrease in the effectiveness of advertising campaigns [14].

B. Traditional Advertising vs Digital Advertising

The development of advertising has changed the marketing approach from traditional mass communication to a very focused and data-informed form. Digital advertising is significantly different from its analog predecessor due to a number of important distinctions. Real-time analytics, data-driven decision-making, personalized engagement provide the underpinning for effective and measurable marketing through digital advertising.

- Traditional advertising:** Traditional advertising is one of these forms of media advertising, which is the one that reaches a large audience, segmented in terms of their demographic and geographical characteristics [15]. Highly costly to produce and cannot be modified once it has been released, but is much more credible and recognized for the brand in question. The measurement

of ROI is also difficult because the most prevalent method used to measure performance is circulation count, television ratings or audience estimation.

- Digital advertising:** Digital advertising has its own set of tools including cutting-edge technology, artificial intelligence and data analysis that enable it to serve ads that fit people's preferences and behavior [16]. Businesses have the option to microtarget consumers on social media platforms, such as Instagram or Facebook, to boost engagement and conversion rates. Google Analytics and other analytics tools enable data-driven optimization and real-time performance monitoring, and PPC and CPA pricing models enable cost-effective campaign management [17]. Table I presents a comparative overview of traditional and digital advertising based on communication channels, targeting capabilities, personalization, cost, flexibility, and performance evaluation.

TABLE I. COMPARISON BETWEEN TRADITIONAL AND DIGITAL ADVERTISING

Aspect	Traditional Advertising	Digital Advertising
Advertising Channels	Television, radio, newspapers, magazines, and billboards	Websites, search engines, social media, mobile apps, and streaming platforms
Audience Targeting	Broad audience based on demographic or geographic characteristics	Precise targeting based on user behavior, interests, demographics, and online activities
Personalization	Limited personalization	Highly personalized advertisements using AI and data analytics
Communication	Primarily one-way communication	Interactive two-way communication with user engagement and feedback
Campaign Flexibility	Difficult to modify after deployment	Real-time updates and campaign optimization
Performance Measurement	Based on circulation, ratings, and audience estimates	Real-time analytics using CTR, CPC, CPA, ROI, impressions, and conversions
Cost Structure	High production and distribution costs	Flexible pricing models such as PPC and CPA with scalable budgets
Technology Support	Limited automation and analytics	AI, machine learning, big data analytics, and automation
Optimization	Manual campaign adjustments	AI-driven optimization and automated decision-making
Overall Effectiveness	Effective for mass brand awareness	Effective for targeted marketing, customer engagement, and measurable campaign performance

III. ARTIFICIAL INTELLIGENCE TECHNIQUES IN DIGITAL ADVERTISING

ML enables advertisers to enhance the efficacy of their advertising efforts by doing thorough analyses of customer behavior and preferences. AI technology does this optimization in four primary methods [18][19].

- Real-Time Bidding (RTB):** New platforms that use RTB are called ad exchanges. Auctions take place in real time whenever a user creates an ad impression. Using data on ad success and real-time customer behavior, AI systems automatically optimize advertising budget through bidding. The right audience helps to maximize ROI, by ensuring ads are shown to the right audience.



Fig. 2. AI-Based Advertising Optimization Techniques

The use of AI-driven advertising optimization techniques, as shown in Fig. 2, improves the effectiveness and accuracy of

advertising campaigns. These methods encompass RTB, A/B testing, programmatic advertising and ad placement optimization.

- **A/B Testing:** AI can speed up the A/B testing process, making it easier for advertisers to test different ad formats, messaging, and audiences. This can help establish an idea of the “content” or “format” that is more attractive on a site. AI can help with data retrieval, analysis, and presentation, enabling advertisers to create targeted marketing strategies in this testing.
- **Programmatic Advertising:** Advertisers may more accurately target certain demographics with the use of AI-powered automation in the ad purchasing and placement process. Use AI to fine-tune ad content, frequency, and timing by leveraging the performance metrics of ads and optimizing them for maximum engagement and conversions [20]. This can be useful in making the ads more profitable to advertise, as well as for improving the CTR of ad campaigns.
- **Ad Placement Optimization:** This functionality employs ML algorithms to gauge the performance of ads and identify which ads and placements are performing effectively, and then optimizes future ads and placements accordingly [21].

A. Types of AI in Digital Advertising

AI-driven digital advertising basically comes in two forms: generative and predictive. The two are instances of narrow AI, which is designed to carry out targeted activities with the goal of enhancing ad effectiveness, customization, and decision-making.

- **Generative AI:** It uses advanced DL models to generate personalized content like text, photos, videos, and audio. It has wide applications in digital advertising when it comes to making advertisements, promotional graphics, customized ads, and interaction with customers through chatbots [22].
- **Predictive AI:** Predictive AI uses past and current data to anticipate what users do, what they like and the results of campaigns. Utilized in digital advertising campaigns including audience segmentation, individualized recommendations, click-through rate prediction and campaign optimization. Netflix and Amazon are great illustrations of the power of predictive AI to provide personalized experiences. Furthermore, predictive insight can be utilized for data-driven decision-making, recommending the most effective approaches, budgeting and audience targeting to optimize the effectiveness of the advertising campaign.

IV. AI-DRIVEN ADVERTISING APPLICATIONS AND PERFORMANCE EVALUATION

AI has revolutionized digital advertising, allowing for intelligent audience targeting, personalized content delivery, automated campaign management, and data-driven performance

analysis. The section focuses on key AI advertising use cases and metrics to analyze ad campaigns.

A. AI-Based Audience Targeting and Customer Segmentation

AI can segment the audience using demographic, behavioral, and transactional data, and make user preference predictions [23]. The use of ML algorithms can also enable precise targeting of the customer, allowing for effective advertisements from a targeted group of people and significantly increasing the number of interactions, conversions, and in general the efficiency of the marketing process [24].

B. Personalized Advertising and Recommendation Systems:

AI recommendation systems can interpret customer data—such as their interactions, browsing history, and purchase patterns—to provide tailored advertising and product suggestions [25]. They work through learning from user feedback, making the recommendations more accurate, improving user satisfaction, and the effectiveness of the campaigns on digital platforms.

C. AI-Driven Advertising Content Generation

Generative AI and NLP generate advertising texts, images and videos automatically [26]. Furthermore, these tools allow for the optimization of contextually relevant ads towards targeted and contextually relevant ones, as well as optimization of contextually relevant ads towards dynamic ones, maximizing advertising effectiveness and user engagement [27].

D. Programmatic Advertising and Real-Time Optimization

AI can help with ad placement, targeting viewers, and optimizing bidding in programmatic advertising [28]. Real-time data analysis and Dynamic Creative Optimization (DCO) give advertisers the opportunity to optimize performance in real-time, allocate budgets more efficiently and maximize the impact of advertising [29].

E. Advertising Performance Evaluation

The campaign performance data that can be tracked include metrics like the Click-Through Rate (CTR), Conversion Rate (CVR), Cost Per Click (CPC), Return on Investment (ROI), and Return on Ad Spend (ROAS). These insights can be applied for continuous improvement and data-driven decisions to optimize ad performance [30].

1) Challenges of AI in Digital Advertising

AI is revolutionizing the effectiveness of digital ads, but there are technical and ethical issues regarding AI's application in digital advertising. However, there are some technical, ethical, and operational challenges associated with the widespread use of AI in digital advertising. These challenges must be resolved to ensure the availability of reliable, transparent, secure, and responsible AI-powered advertising systems.

F. Data Privacy and Security

A lot of data is used in AI-driven ads, which is essential for targeted and personalized ads. The threats of unauthorized access and privacy concerns are growing, and maintaining

privacy, secure management and compliance with law and user consent are becoming more challenging [31].

G. Algorithmic Bias And Fairness

AI models can be trained on biased or imbalanced data, which can result in unfair advertising decisions, such as targeting users inappropriately or discriminating against user segments. Equity and impartial AI algorithms are fundamental to responsible digital advertising.

H. Transparency and Explainability

AI models can be difficult to understand and are often referred to as “black boxes.” The lack of transparency is challenging for advertisers to trust the site, challenging to analyze campaigns, challenging to ensure campaign accountability and challenging to ensure regulatory compliance.

I. Ad Fraud and Invalid Traffic

As digital advertising platforms emerged, click fraud, bots, fake impressions, and fake interactions have become a big challenge. AI is essential to power fraud detection technology that can help uncover fraud and improve ad reliability.

J. Scalability and Real-Time Processing

The modern digital advertising environment creates a ton of real-time data from many platforms. This is a huge technical challenge to process the information efficiently with low latency, high accuracy, and scalable AI models.

V. LITERATURE REVIEW

This section provides an overview of the recent research on how digital advertising strategies use AI methodologies, main approaches, main findings, advantages, disadvantages, and gaps.

A. K. R. Seella (2026) proposes a model that leverages AI to predict a marketing campaign's success and estimate the ROI using data from the Marketing Campaign Performance Dataset (Kaggle). Boosting-based regression models (LightGBM and CatBoost) were evaluated by regression metrics and k-fold cross validation with the models. The results of the models were interpreted using SHAP, and here the top performer was CatBoost Regressor with 98.17% of the models and the lowest prediction error [32].

S. K. Aggarwal and J. Singh (2025) examine the impact of ad blockers on digital advertising and user concerns regarding

privacy. It discusses adaptive strategies like ethical advertising approaches and alternate revenue models, which help reconcile user desires with advertising effectiveness and encourage a sustainable digital advertising ecosystem [33].

S. O. Kediya et al. (2024) examine the ethical implications of AI in advertising and marketing, its current trends, regulations, and provide best practices. It provides practical insights from case studies and empirical research, highlighting the need for ethical AI usage, responsible implementation, and well-balanced AI regulations that enable innovation while ensuring consumer protection [34].

A. Leonardo P. C. S, and A. Ramadhan (2024) investigate the impact of digital advertising and trust on consumer purchase intention using data from 100 respondents with PLS-SEM. This study's findings—a positive and statistically significant correlation between digital advertising trust and purchase intention—point to the importance of trustworthy digital marketplaces and advertising tactics in influencing consumers' online purchasing behavior [35].

A. Samad et al. (2023) look at the practices of advertising in virtual worlds, gaps in the research, and the differences between traditional and metaverse advertising. It offers best practices in the creation of successful advertising campaigns and offers information to help make informed marketing decisions in metaverse environments [36].

Surjandy and C. Cassandra (2022) aim to analyze the impact of risk factors, trust, and information quality of advertisements on purchase intention and purchasing decisions by using SEM-PLS with Smart PLS modeling data, which was obtained using a snowball sampling technique with 200 samples. The results demonstrate that decisions and intentions to buy are affected by financial risk (19.8%) and performance risk (23.4%), whereas factors related to information quality (namely, accuracy (−23.4 %), integrity (50.5 %), timeliness (21.6 %), and validity (20.7%)) considerably impact these intentions, enabling the development of digital advertising campaigns to be more effective [37].The selected literature is summarized in Table. II, and the literature review is presented in a comparative way, pointing out the direction of future research.

TABLE II. SUMMARY OF RECENT STUDIES ON DIGITAL ADVERTISING STRATEGIES IN THE MODERN INTERNET ERA

Authors	Approach	Findings	Advantages	Challenges	Recommendations
A. K. R. Seella (2026)	AI-driven ROI prediction using boosting models and SHAP	CatBoost achieved the highest prediction performance (98.17%).	Accurate and interpretable campaign performance prediction.	Limited to campaign ROI prediction.	Integrate multiple AI techniques for comprehensive advertising optimization.
S. K. Aggarwal and J. Singh (2025)	Analysis of ad blockers and adaptive advertising strategies	Ethical advertising and alternative monetization improve user acceptance.	Addresses privacy concerns and sustainable advertising.	Ad blockers continue to reduce advertising effectiveness.	Develop privacy-aware and user-centric AI advertising solutions.

S. O. Kediya et al. (2024)	Review of AI ethics and regulatory frameworks	Responsible AI and ethical guidelines are essential.	Highlights ethical and regulatory considerations.	Lack of standardized AI governance frameworks.	Establish transparent and explainable AI advertising policies.
A. Leonardo et al. (2024)	PLS-SEM analysis of digital advertising and consumer trust	Digital advertising and trust positively influence purchase intention.	Demonstrates the importance of consumer trust.	Limited focus on AI-driven advertising methods.	Incorporate AI-based personalization and recommendation techniques.
A. Samad et al. (2023)	Review of advertising in virtual worlds and the metaverse	Identified best practices for metaverse advertising.	Explores emerging digital advertising environments.	Limited practical implementation and AI integration.	Investigate AI-enabled immersive advertising strategies.
Surjandy and C. Cassandra (2022)	SEM-PLS analysis of risk, trust, and information quality	Risk and information quality significantly influence purchase intention.	Provides insights into consumer decision-making.	Limited predictive intelligence and personalization.	Integrate AI models to improve personalization and advertising effectiveness.

Research Gap: Although considerable research has been conducted on digital advertising and AI-driven marketing, most studies focus on specific areas such as personalization, consumer behavior, trust, campaign optimization, or ROI prediction. The research is still in its early stages and does not yet provide a comprehensive picture of AI techniques, their applications, their performance assessment, or a common approach to implementation issues. Additionally, new concepts like Generative AI, explainable AI, data privacy, algorithmic bias, and ethical aspects of digital advertising have not been fully discussed or developed. Hence, there is a need to have a comprehensive survey that incorporates all these factors and highlights the potential avenues for future research on AI-powered digital advertising.

VI. CONCLUSION AND FUTURE WORK

Digital advertising is a key element of Internet-based marketing and is essential to providing organizations with personalized, data-driven and measurable advertising campaigns. This survey covered the latest trends in digital advertising strategies and the increasing influence of artificial intelligence on the shifting landscape of advertising, including its role in audience targeting, recommendation algorithms, programmatic advertising, real-time bidding, content creation and campaign optimization. Security of personal information, combating algorithmic bias, explainability, advertising fraud, and scalability were among the important issues discussed, as were the measures used to evaluate AI effectiveness. Also, the study has highlighted the expanding importance of trustworthy, ethical, and transparent AI in intelligent advertising, as well as the most recent advances in the field and any known research gaps. Ad efficacy, consumer engagement, decision-making, and ROI are all positively affected by AI, according to the results. AI also provides a good foundation for further study and the development of intelligent digital advertising systems for the future.

Implementing Generative AI, Explainable AI, large language models and multimodal learning into digital advertising platforms would benefit future studies. The creation of privacy-respecting, fair, transparent, and energy-efficient AI models, combined with effective fraud detection and cross-platform optimization strategies, will contribute to more reliable, ethical, and intelligent advertising environments.

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