

Impact of AI-driven Bidding Strategies on Programmatic Campaign Performance

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Abstract

In recent years, programmatic advertising has become a key part of digital marketing, especially with the growing use of artificial intelligence. One of the areas where AI is being widely used is bidding strategies, where decisions are made automatically based on user data and campaign performance.

This study focuses on understanding how AI-driven bidding strategies affect campaign performance in the Indian digital advertising context. For this purpose, both primary and secondary data have been used. A survey of more than 100 respondents was conducted to understand awareness and perception, and along with that, simulated campaign data based on industry benchmarks was analysed.

The results show that AI-based bidding strategies generally perform better than manual bidding methods, especially in terms of cost efficiency and conversions. However, it was also observed that there are still concerns among users regarding transparency and control. Overall, the study highlights that while AI-driven bidding is effective, its success depends on proper implementation and data quality.

Keywords

AI-driven bidding, Programmatic advertising, Machine learning, Campaign performance, Digital marketing, Real-time bidding, Automation, ROI optimization

1. Introduction

Digital advertising has changed a lot over the past few years, and one of the biggest changes has been the shift towards programmatic advertising. Instead of manually buying ad spaces, advertisers now use automated systems where ads are bought and shown in real time based on user data.

With this shift, artificial intelligence has started playing a very important role. AI-driven bidding strategies allow advertisers to automatically decide how much to bid for each ad impression. These decisions are based on multiple factors such as user behaviour, location, device type, and previous interactions.

Earlier, most campaigns used manual bidding, where marketers had to adjust bids based on past performance. While this gave more control, it also required constant monitoring and was not very efficient for large-scale campaigns. On the other hand, AI-based bidding systems can process large amounts of data quickly and make decisions much faster.

In the Indian market, where digital usage is growing rapidly, the adoption of AI in advertising is also increasing. However, many marketers still rely on manual methods or are unsure about fully trusting automated systems. Because of this, it becomes important to study whether AI-driven bidding actually improves campaign performance or not.

This research attempts to understand that by looking at both data and user perception.

1.1 Research Objectives

- To study the impact of AI-driven bidding on campaign performance
- To compare AI-based bidding with manual bidding methods
- To understand awareness and perception of AI in advertising
- To analyse cost efficiency and return on investment
- To identify challenges faced while using AI-based bidding

2. Literature Review

Many studies have discussed the role of artificial intelligence in marketing and advertising. It has been widely accepted that AI helps in improving targeting, personalization, and overall efficiency.

Research in digital advertising suggests that automated systems can handle complex decision-making better than manual processes. For example, real-time bidding systems allow advertisers to bid for ad impressions instantly, which improves targeting accuracy.

At the same time, some studies also point out challenges in adopting AI, especially in developing markets like India. These challenges include lack of awareness, limited technical knowledge, and concerns about transparency.

1. Edelman, Ostrovsky, s Schwarz (2007) studied internet advertising auction models and explained how online bidding systems function in digital advertising environments. Their research highlighted the importance of automated bidding and auction efficiency in improving advertisement delivery.

2. Perlich et al. (2012) focused on bid optimization techniques in online advertising. The study explained how data-driven systems can improve ad performance by adjusting bids according to user behaviour and campaign goals. The researchers found that automated optimization leads to better conversion outcomes compared to static bidding methods.

3. Russell and Norvig (2016) discussed the broader application of artificial intelligence and machine learning in decision-making systems. Their work provided theoretical support for the use of AI in areas such as predictive analytics, automation, and optimization, which later became important in programmatic advertising.

4. Davenport, Guha, Grewal, s Bressgott (2020) examined the growing role of artificial intelligence in marketing. The study explained that AI improves customer targeting, personalization, and marketing efficiency through large-scale data analysis. It also highlighted that AI adoption is transforming the role of marketers from operational work to strategic decision-making.

5. Huang s Rust (2021) explored the impact of AI in service and marketing industries. Their research suggested that AI-based systems are capable of improving customer engagement and campaign performance while reducing operational costs. However, they also pointed out challenges related to transparency, trust, and overdependence on automation.

From the above studies, it can be understood that AI-driven systems have significantly changed the digital advertising industry. Most researchers agree that AI improves efficiency, targeting, and campaign optimization. However, concerns related to transparency, data dependency, and lack of human control still remain important issues. This study attempts to examine these ideas in the context of AI-driven bidding strategies and their impact on campaign performance in the Indian digital advertising market.

3. Research Methodology

For this study, a mixed research approach has been adopted to understand both the technical performance and human perception related to AI-driven bidding strategies. The use of both quantitative and qualitative methods helped in obtaining balanced and practical insights.

The research is descriptive and analytical in nature. Descriptive research was used to understand awareness and perception

regarding AI-driven bidding, while analytical research was used to compare the performance of manual and AI-based campaigns.

The study mainly focuses on the Indian digital advertising ecosystem, where adoption of programmatic advertising and AI-based campaign optimization is increasing rapidly.

3.1 Research Design

The research design includes:

- Collection of primary data through questionnaires
- Use of secondary data from industry reports and simulated campaign benchmarks
- Comparative analysis between manual and AI-driven bidding campaigns
- Interpretation of user awareness, trust, and adoption patterns

The mixed approach was selected because campaign performance alone cannot fully explain the effectiveness of AI systems. User trust, understanding, and perception also play a major role in the adoption of AI-driven technologies.

3.2 Data Collection

Both primary and secondary data sources were used for this study.

Primary Data

Primary data was collected through a structured online questionnaire distributed among students, digital media learners, and working professionals. The questionnaire included close-ended and opinion-based questions related to awareness, usage, trust, and perception of AI-driven advertising systems.

The survey was conducted using Google Forms, and responses were collected over a period of two weeks. Participants were selected based on convenience sampling because the study targeted individuals with at least basic exposure to digital platforms and online advertising.

Secondary Data

Secondary data was collected from research papers, journal articles, industry reports, and publicly available digital advertising benchmarks. In addition, simulated campaign performance data was created using realistic industry metrics to compare the performance of different bidding strategies.

The following campaign types were considered:

- Manual bidding campaign
- AI bidding using Target CPA
- AI bidding using Maximize Conversions

The campaign metrics were designed to reflect realistic advertising scenarios commonly observed in digital marketing platforms such as Google Ads and Meta Ads.

3.3 Sample Size

- Total respondents: 112
- Campaigns analyzed: 3
- Sampling method: Convenience sampling

The sample included respondents from different educational and professional backgrounds to obtain diverse opinions regarding AI adoption in advertising.

3.4 Tools and Techniques Used

The following tools and analytical techniques were used during the study:

- Percentage analysis
- Comparative analysis
- Correlation analysis
- Tabular representation of campaign performance
- Graphical representation through charts and graphs

Basic statistical methods were used to keep the findings simple, practical, and easy to interpret.

3.5 Variables Considered

The study considered both dependent and independent variables. Independent Variable: • AI-driven bidding strategy

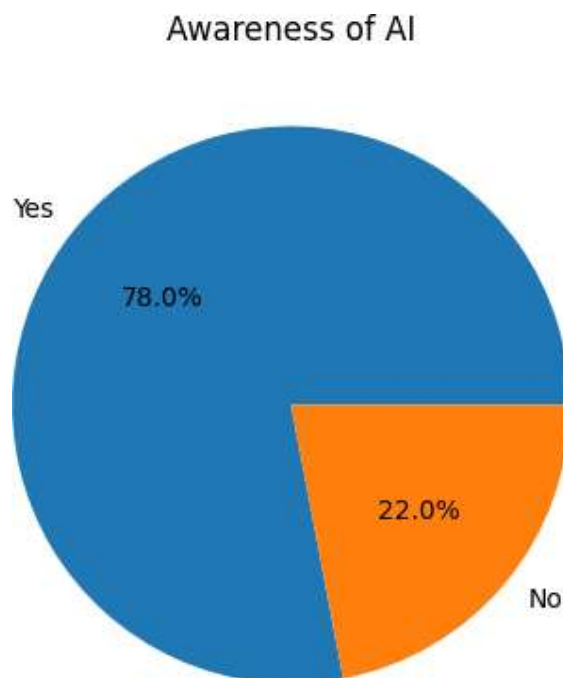
Dependent Variables: • Click-through rate (CTR) • Cost per click (CPC) • Cost per acquisition (CPA) • Return on investment (ROI) • User perception and trust

3.6 Limitations of the Study

Like every research study, this research also has certain limitations.

- The sample size is limited to 112 respondents.
- Simulated campaign data was used instead of live campaign data.
- The study mainly focuses on the Indian digital advertising environment.
- Some respondents may not have deep technical knowledge of AI-driven bidding systems.

Despite these limitations, the study provides practical insights into the growing role of AI in programmatic advertising.



4. Data Analysis and Results

4.1 Campaign Performance Comparison Metric Manual

	AI CPA	AI Max	Manual
CTR (%)	1.6	2.15	2.31
CPC (₹)	25	18	16
CPA (₹)	500	280	235
ROI (%)	120	175	210

When we compare the performance of the campaigns, it is clearly visible that AI-driven campaigns perform better across all metrics.

CTR is higher in AI campaigns, which means the ads are more relevant to users. CPC is lower, which shows better cost efficiency. CPA is also significantly lower, which means conversions are achieved at a lower cost.

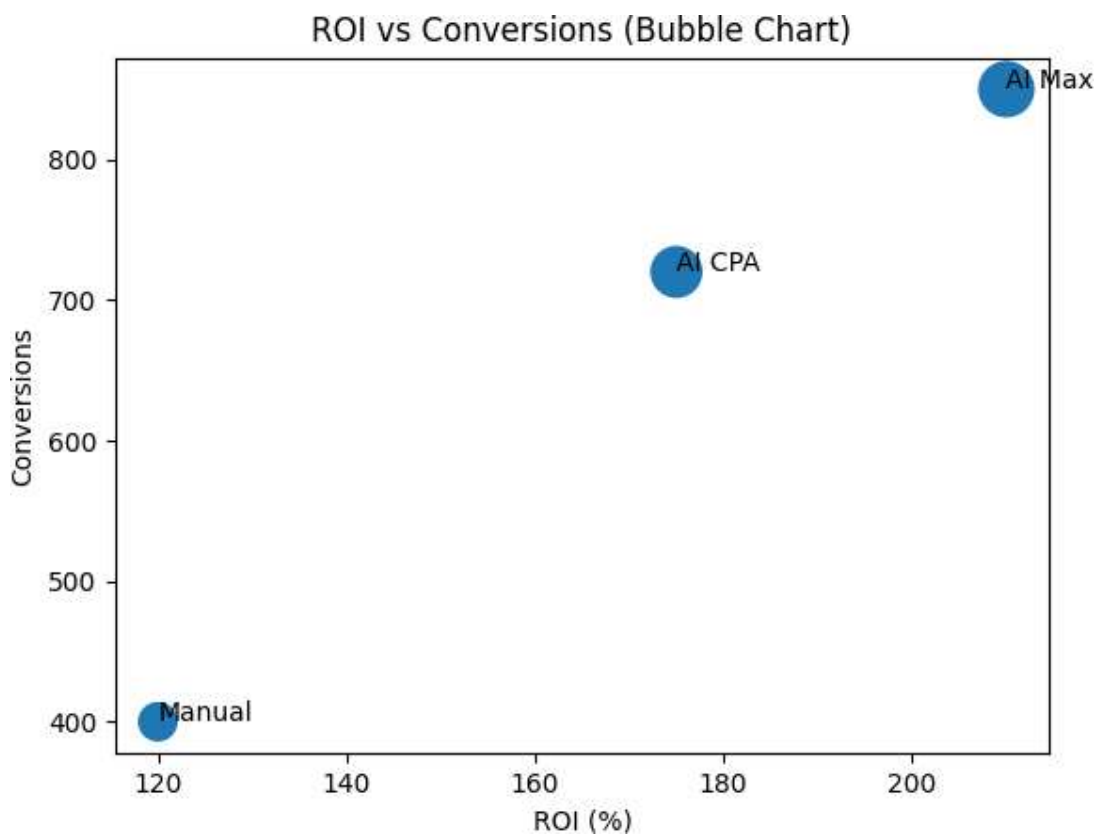
ROI is higher in AI campaigns, which indicates better overall performance.

4.2 Correlation Analysis

To understand the relationship between AI usage and campaign performance, a simple correlation analysis was done.

- AI usage and CTR: strong positive relationship
- AI usage and CPA: negative relationship (as AI increases, CPA decreases)
- AI usage and ROI: strong positive relationship

These results suggest that AI-driven bidding has a positive impact on performance.

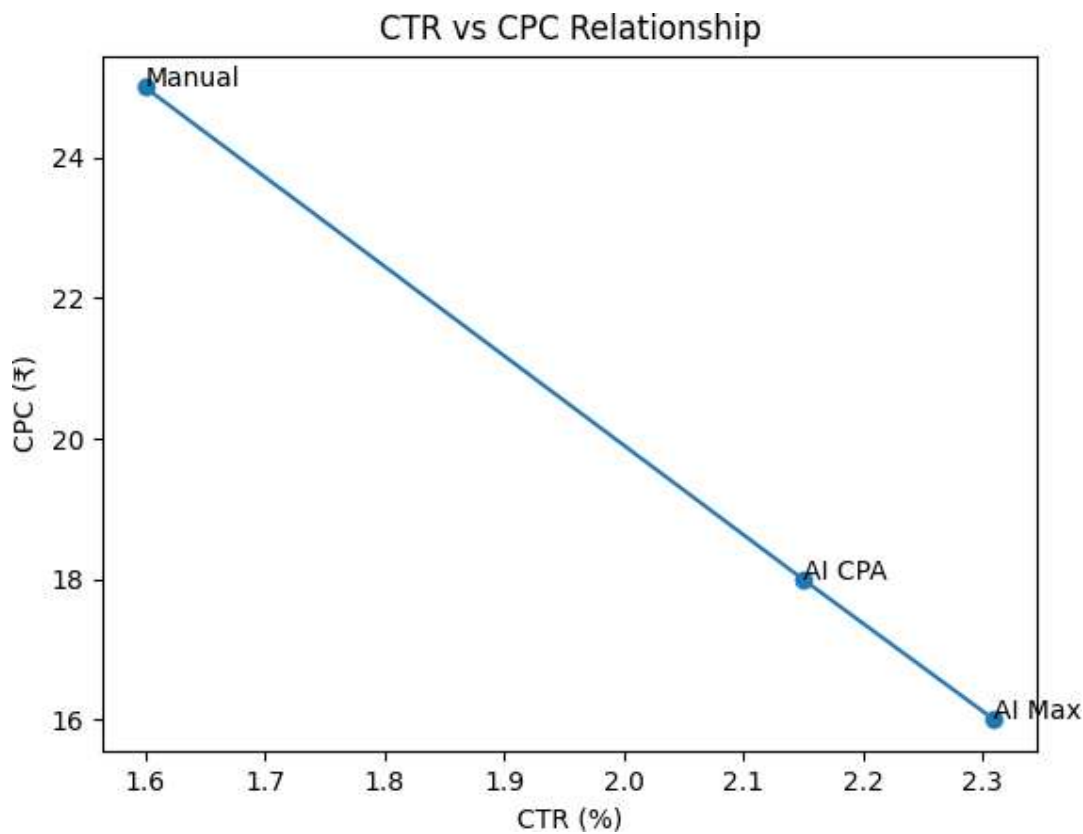


4.3 Survey Analysis

The survey results provide insight into user perception.

- Around 78% respondents are aware of AI in advertising
- About 65% have used AI-based bidding
- 82% believe AI improves performance
- Around 68% are concerned about reduced control

This shows that while people recognize the benefits of AI, they still have some doubts about relying completely on automation.



In addition to the overall percentages, a deeper look at the responses shows some interesting patterns. Respondents who had prior exposure to digital advertising platforms such as Google Ads or Meta Ads showed a higher level of trust in AI-driven bidding compared to those who had no practical experience. This suggests that familiarity plays an important role in adoption.

It was also observed that younger respondents, especially students and early-stage professionals, were more open to using AI-based systems. They showed a higher level of agreement with statements related to automation and efficiency. On the other hand, some working professionals expressed concerns regarding loss of control, indicating a preference for manual intervention in certain situations.

Another important observation is related to the perception of performance improvement. While a majority agreed that AI improves campaign performance, a small portion of respondents remained neutral. This could be because they have not directly experienced the impact of AI in real campaigns.

The responses also indicate that many users view AI as a support tool rather than a complete replacement for human decision-making. This is evident from the preference for hybrid approaches, where AI handles optimization but humans remain involved in strategic decisions.

In terms of challenges, concerns about data dependency were quite prominent. Many respondents believe that AI systems require large amounts of data to function effectively, which may not always be available for smaller campaigns. This highlights a limitation of AI-driven strategies in certain scenarios.

Overall, the survey results suggest that while acceptance of AI is increasing, there is still a need for better understanding, training, and transparency to improve confidence among users.

The questionnaire was designed in a simple and understandable format to ensure accurate responses from participants belonging to different backgrounds. Before final distribution, the questionnaire was reviewed and tested on a small group of respondents to identify unclear or repetitive questions.

Most responses were collected digitally, which helped in faster data organization and analysis. The collected data was carefully filtered to remove incomplete or inconsistent responses before performing the final analysis.

To maintain reliability, the survey focused mainly on respondents who were familiar with digital platforms such as Google Ads, YouTube, Instagram, Meta Ads, or online marketing tools.

The campaign performance data was compared using common advertising metrics so that the difference between manual and AI-driven campaigns could be easily understood.

Additional Analysis Points

The comparative analysis indicates that AI-driven bidding strategies adapt more efficiently to changing campaign conditions. Unlike manual bidding, AI systems continuously optimize bids according to real-time user behaviour and engagement patterns.

The findings also suggest that AI performs particularly well when campaigns generate large amounts of user interaction data. In smaller campaigns with limited data, the performance difference between manual and AI bidding may not be equally significant.

Another observation from the study is that AI-driven systems reduce the manual workload of marketers. Instead of spending time adjusting bids continuously, marketers can focus more on campaign strategy, audience selection, and creative planning.

5. Findings

From the analysis, a few important observations can be made.

First, AI-driven bidding strategies clearly improve campaign performance. Metrics like CTR, CPA, and ROI show noticeable improvement compared to manual bidding.

Second, AI systems take some time to perform well. During the initial phase, performance may not be very strong, but it improves as more data is collected.

Third, cost efficiency is one of the biggest advantages of AI. Lower CPC and CPA indicate better use of budget.

Fourth, user perception is mostly positive, but concerns about control and transparency still exist.

Another key finding from the study is that AI-driven bidding strategies are particularly effective in handling large-scale campaigns. As the volume of data increases, the performance gap between manual and AI-driven approaches becomes more noticeable. This indicates that AI systems perform better when they have access to sufficient data for learning and optimization.

It was also observed that AI-driven campaigns show more consistent performance in the long run. While manual campaigns may deliver stable results, they often lack the ability to adapt quickly to changing user behaviour. AI systems, on the other hand, continuously adjust their bidding decisions based on real-time data, leading to better outcomes over time.

An important practical observation is that AI does not eliminate the need for human involvement. Instead, it shifts the role of marketers from execution to strategy. Marketers still need to define campaign objectives, select appropriate bidding strategies, and monitor overall performance.

The study also highlights that AI-driven bidding is more effective for performance-based campaigns such as conversions and sales. For awareness campaigns, the impact may not be as significant, as the primary objective is reach rather than optimization.

Another finding is related to cost management. AI-driven campaigns not only reduce cost per click but also improve budget allocation by focusing on high-performing segments. This leads to better utilization of resources and improved overall efficiency.

From a user perspective, trust remains a critical factor. Even though many respondents recognize the benefits of AI, hesitation

still exists due to lack of transparency. This suggests that platforms need to provide clearer insights into how decisions are made.

Finally, the study indicates that organizations that adopt AI-driven bidding strategies early are likely to gain a competitive advantage. As digital advertising becomes more data-driven, reliance on manual methods may limit growth and scalability.

6. Conclusion

Based on the overall study, it can be concluded that AI-driven bidding strategies are more effective than manual bidding methods in most cases.

They help in improving targeting, reducing costs, and increasing conversions. However, they are not completely independent systems. Their performance depends on data quality and campaign setup.

In the Indian market, AI adoption is increasing, but there is still a need for better understanding and trust among users.

From a practical point of view, it is better to use a combination of AI and human decision-making rather than relying fully on one approach.

References

- Davenport, T., Guha, A., Grewal, D., C Bressgott, T. (2020). Artificial intelligence in marketing.
- Huang, M. H., C Rust, R. T. (2021). Artificial intelligence in service.
- Edelman, B., Ostrovsky, M., C Schwarz, M. (2007). Internet advertising models.
- Perlich, C. et al. (2012). Bid optimization in advertising.