The False Promises of Bid Shading

How Intelligent Bidding can **save advertisers $6.6 billion in US ad spend.**

COGNITIV™
The brain behind the brands

alter agents

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Executive Summary

Programmatic advertising has revolutionized the traditional approach to online media buying. In the past, advertisers would directly purchase ads from websites at fixed prices, with no control over the ad's audience. However, programmatic advertising provided advertisers control down to the individual advertising impression and promised unparalleled ability to target the right people, in the right place, at the right time. It also solved a big problem for publishers - low yield from direct sales. Once the infrastructure was in place for advertisers to easily make bids, they quickly saw results, and programmatic advertising grew rapidly. This year, programmatic advertising is expected to represent 91 percent of total digital display ad spending in the US (Mitchell, 2023)[1] and the IAB sized 2022 non-search programmatic spend in the US at $109.4 billion, up 10.5 percent from the prior year (IAB, 2023)[2].

Publishers have greatly benefited from programmatic advertising by leveraging the ability to auction off advertising inventory that would otherwise remain unsold. Today, the primary method for programmatic advertising involves a first-price auction. Advertisers place bids, and if their bid is the highest, they pay exactly what they bid. In order to avoid overbidding, many buyers employ bid shading, an algorithm that utilizes historical winning bid prices for a given advertising placement, suggesting an optimal bid for advertisers.

However, first-price auctions and bid shading have not always been the industry standard. Just five years ago, the majority of programmatic advertising relied on second-price auctions, where the highest bidder pays only one cent more than the second highest bid. The introduction of first-price auctions and bid shading aimed to rebalance the power dynamics between advertisers and publishers and bring greater transparency to the bidding process. Unfortunately, these practices now cost advertisers at least $6.6 billion annually due to suboptimal decisioning processes and pricing of inventory.

Bid shading should have been a temporary fix to purportedly help advertisers learn how to effectively bid in a first-price auction environment and not overpay. However, it is still here today and many buyers do not even know it exists.

The best way for advertisers to effectively evaluate, bid, and take advantage of the $6.6 billion opportunity in a first-price auction environment is to break the mold and use Intelligent Bidding. This paper will delve into existing practices in the programmatic advertising industry and critically examine what new solutions will better serve advertisers in the publisher-first world we live in.

> ❝
> *I don't think the buyers, especially the people who are 'hands on keyboard,' have any idea that there's bid shading even going on.*❞
>
> Heather Carver, Principal Tech Business Development at Amazon Ads

1 Mitchell, E. (2023, February 24). Us Programmatic Digital Display Ad Spending, 2018-2024. insiderintelligence.com. Insider Intelligence | eMarketer. Retrieved April 26, 2023, from https://www.insiderintelligence.com/content/programmatic-ad-spending-forecast-q1-2023.
2 Interactive Advertising Bureau. (2023, April 12). Despite Headwinds, Digital Advertising Delivered Double-Digit Growth in 2022 According to the IAB Internet Advertising Revenue Report. iab.com. Retrieved May 8, 2023, from https://www.iab.com/news/despite-headwinds-digital-advertising-delivered-double-digit-growth-in-2022-according-to-the-iab-internet-advertising-revenue-report/

About the Study

To better understand the state of programmatic advertising, Cognitiv sought to rigorously explore the complexity of today's bidding environment and how current solutions are performing for advertisers. Cognitiv, in partnership with independent research agency Alter Agents, conducted a mixed-mode quantitative and qualitative research study, including three in-depth interviews with industry experts, as well as a quantitative survey fielded amongst 251 Digital Media Buyers.

The Rise of Header Bidding: A Growing Desire for More Transparency

Programmatic advertising was constructed to connect advertisers directly with their target audiences in a highly efficient manner. It successfully upended the traditional digital advertising methods - where historically all ads were bought directly from a website at a predetermined price, with little to no advertiser control over who would see the ad, to instead paying individually, via a bid, for an ad to reach a specific audience when they decide to visit a website. Prior to 2019, most real-time bidding would take place in a second-price auction, where the advertiser who placed the winning bid would generally pay one cent above the second highest bid.

Messaging a target audience without any waste was not only efficient, but also highly performant, which is what attracted many advertisers.

Over time, however, publishers became frustrated with a lack of transparency in the system. Waterfall auctions in place at the time disadvantaged publishers in two ways. First, publishers missed out on seeing potentially higher bids from DSPs lower in the waterfall. Second, the exchanges were not in competition with each other, allowing them to extract hidden fees with minimal consequences. Such frustrations prompted the swift rise of header bidding in the mid-2010s (Bilton, 2015)[3]. Unlike the waterfall bidding system, header bidding allowed publishers to receive bids from multiple exchanges concurrently, thus effectively addressing both of these issues.

The adoption of header bidding, however, led others in the programmatic adtech chain to desire transparency. In particular, advertisers became frustrated with a lack of transparency in header bidding, a process which over a quarter of Digital Media Buyers in our study say has impacted their company negatively. Advertisers lost the ability to track which inventory they were bidding on across the various DSPs they used, and they struggled to differentiate one bid opportunity in one exchange from another similar opportunity in another exchange. This provided the potential that advertisers could be bidding against themselves, ultimately driving up their end-price. Over time, auctions became less efficient than they once were and broke the model that once attracted advertisers to programmatic advertising. As Jana Jakovljevic, SVP of Partnerships at Cognitiv describes it, "Header bidding meant publishers could work with multiple SSPs… so now a publisher is sending out a bid request for the same impression multiple times, and in the past [the DSP] had no way of knowing if they were bidding on the exact same impression, and possibly outbidding themselves."

Header bidding also created a desire for transparency on behalf of the exchanges. Prior to header bidding, exchanges could safely pass the second-highest bid price (plus a fraction of a cent) along to the publisher, but with header bidding doing so risked unnecessarily losing the auction to another exchange in the header. Header bidding meant exchanges had far less visibility into the dynamics of each auction.

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[3] Bilton, R. (2015, October 15). WTF is header bidding? digiday.com. Retrieved April 26, 2023, from https://digiday.com/media/wtf-header-bidding/

The False Promise of First-Price Auctions: The Lure of Greater Transparency

The industry's increased desire for transparency, from multiple parties, but particularly the exchanges, created an appetite for change that facilitated the transition to first-price auctions. Publishers were particularly receptive to news of this transition out of a desire for greater profits, and also less complexity. Advertisers were informed that the transition to a first-price auction environment would support their desire for greater transparency as well. The promise of greater transparency in a first-price world is evident from the messaging of key blogs and articles during this transition:

> **In a first-price auction, a buyer with a winning $7 CPM bid pays $7 minus fees – a simple, transparent approach. Buyers can use bid shading algorithms to ensure they don't overpay.**
>
> (Sluis, 2019)[7]

> **After we've [Google] completed the transition to first-price auctions, we'll be able to provide additional auction transparency to both publishers and advertisers.**
>
> (Bigler, 2019)[5]

[4] Bigler, J. (2019, September 5). Rolling out first price auctions to Google AD Manager partners. blog.google. Retrieved April 26, 2023, from https://blog.google/products/admanager/rolling-out-first-price-auctions-google-ad-manager-partners/

[5] Sluis, S. (2019, March 6). Google Switches to First-Price Auction. adexchanger.com. Retrieved April 26, 2023, from https://www.adexchanger.com/online-advertising/google-switches-to-first-price-auction/

[6] Anekola. (2017, October 5). Programmatic advertising is preparing for the first-price auction era. Digiday. Retrieved April 26, 2023, from https://digiday.com/marketing/programmatic-advertising-readying-first-price-auction-era/

> **"**
> *Auction dynamics implemented by supply-side platforms often confuse ad buyers. In order to provide more transparency, exchanges like OpenX, Index Exchange and Rubicon Project all started experimenting with first-price auctions, where the highest bidder determines how much an impression gets sold for.* **"**
>
> (Anekola, 2017)[6]

This focus on transparent pricing provided by first-price auctions was, in reality, an **illusion**. What was less clear to the advertising community was that first-price auctions would ultimately raise costs and make programmatic advertising less efficient and less transparent than it had ever been before. Unfortunately, first-price auctions shifted the balance of power too far towards the publishers. Publishers were incentivized to shift their inventory into first-price auctions because it enabled them to receive a higher price for their inventory. As Spencer Brown, Independent Ad Tech Consultant, puts it, "Generally programmatic buyers… [are not] very connected to the buy or the process or even understand what programmatic buying is, and there's not a ton of transparency. I think that's why they were able to get away with the shift [to first-price auctions] initially because there weren't enough people asking questions, which can be the case for a lot of things with programmatic advertising."

Although first-price auctions led to an increase in cost of media for advertisers, media buyers grew to accept first-price auctions for several reasons. Not only did they hope that first-price auctions would bring about greater transparency to their buys, they believed that publishers would be more willing to offer more premium inventory, such as premium video, in the auctions if the pricing was more closely aligned with what publishers would receive by selling it directly. Our survey of Digital Media Buyers illustrates the dissonance that occurs when they are queried about this shift from second-price to first-price auctions. Although 83 percent of Digital Media Buyers say the switch to first-price auctions has increased their trust in the process, 75 percent also say the switch to first-price auctions has ultimately served publishers more than advertisers, and 64 percent of Digital Media Buyers say first-price auctions have caused CPMs to increase.

Digital Media Buyers Agree…

83% The switch to first-price auctions has increased their trust in the process

72% There is a lot more transparency as a result of first-price auctions

66% That they prefer first-price auctions

75% The switch to first-price auctions has ultimately served publishers more than advertisers

68% The transition to first-price auctions was a result of greedy ad exchanges

64% First-price auctions have caused CPMs to increase

Although Digital Media Buyers say they prefer first-price auctions, an overwhelming amount believe it has benefited publishers more and that costs have increased as a result of first-price auctions. These cost increases have been widely recognized across the industry and led to the next attempted solution to the programmatic advertising conundrum.

More than a quarter of Digital Media Buyers indicated that the transition to first-price auctions in programmatic media buying impacted their company negatively.

Bid Shading:
The Blunt and Unsophisticated Tool

As CPMs rose, a stop-gap solution was introduced by publishers to placate advertisers' growing discontent with the increasing costs of buying in a first-price auction environment. The solution sought to help advertisers bid efficiently enough to keep them happy and bidding on ad inventory. That solution, called bid shading, is still utilized today. Bid shading helps advertisers ensure they are not overpaying for a piece of inventory based on historical bid data, but it cannot replace the cost-savings that second-price auctions initially offered. It serves as a middle ground between second-price and first-price auctions, helping to ensure that advertisers still feel like they are getting a better deal on inventory while also preserving the first-price environment which ultimately benefits publishers.

Most industry experts agree that bid shading is a blunt tool. Bid shading solutions are based on aggregate inventory statistics, not specific campaigns or advertisers. Bid shaders attempt to maximize the value of an individual auction, but they fail to maximize the value across an entire campaign. Campaigns typically have multi-objectives (pacing and several KPIs), bid shaders cannot trade-off bid price and win-rate in accordance with risk-tolerances associated with each objective. Bid shading is not free either - its price is often built into the fees for a DSP or an SSP.

With bid shading, it is even less clear what bid is placed in the auction, which further erodes any perception of transparency that first-price auctions were meant to produce. Bid shading has a measurable transparency issue. Many Digital Media Buyers do not know what it is, and they also do not know how much they pay for it.

> 66
>
> *There was a lot of communication to the buy side: 'We're going to move to first-price, here's why, we're going to give you time, and in order to help you through this transition with our exchange, we're going to do something called 'bid shading'... it was always meant to be some sort of training program but I don't think the buyers, especially the people who are 'hands on keyboard,' have any idea that there's bid shading even going on.* 99
>
> Heather Carver, Principal Tech Business Development at Amazon Ads

Our study found that a third of Digital Media Buyers do not even know that bid shading exists, with **only 35 percent of Digital Media Buyers "extremely confident" in their understanding of how a bid shading algorithm works** and that they could explain it to others. Yet, **70 percent are paying an extra fee for this tool** that they do not fully understand, blindly trusting that it is saving them money.

> **66**
> *The SSPs monetized that product [the bid shaders]. They did a revenue share with the DSPs on the savings... so it started contributing to that middleman ad tech tax once again.* **99**
>
> Heather Carver, Principal Tech Business Development at Amazon Ads

Digital Media Buyers Cannot Agree on What Bid Shading Does:

33%	32%	22%	12%
say it is a tool to adjust their bids for a first-price auction	say it is an algorithm that optimizes their win-rate and CPM	say it is a tool that manipulates their bid so they pay less	say it just adds another fee to their bid

Advertisers are Disadvantaged

It's now been over four years since first-price auctions and bid shading became standard practice for the majority of programmatic media buys. The same challenges related to transparency continue to plague the industry and if anything, they are heightened. Advertisers do not trust the process and question the validity of their buys or they remain unclear as to how the auction system works. With this status quo, it is unclear whether programmatic advertising can continue to be efficient or if it can provide transparency to advertisers. The decision makers we interviewed are doubtful:

> *I am not really sure if the digital media I buy are actually reaching the people they purport to be. An ad on a screen means nothing if nobody reads it. Measurement is weak and calculating ROI is impossible. They want you to think it is but it isn't.*

Owner and CEO

> *The weakest aspect of the digital media buying landscape is the lack of transparency and control buyers have over their campaigns. With the rise of programmatic advertising, buyers are often unable to track the effectiveness of their campaigns and the impact of their ad spend.*

Digital Media Buying Director

> ## 66
> *Digital media buying allows for the collection of massive amounts of data and there can be a lack of transparency with unclear pricing structures.* 99
>
> Director of Marketing

More than 3-in-4 Digital Media Buyers we surveyed indicate that in the future they would like to see either "greater transparency into how bids are altered as they pass from the DSP to the SSP to the header" or "auction transparency (i.e., reporting of the highest bid for auction losses and the second-highest bid for wins)".

According to Aaron Andalman, Co-Founder and Chief Science Officer at Cognitiv, "The solution that has been pitched to everyone is that all they need to know when it comes to the transition to first-price auctions is, 'You just need to turn on bid shading,' but we know that is a suboptimal solution. With [bid shading] you are leaving either performance or money on the table at the end of the day."

Either way, bid shading is a generic tool across all campaigns that does not take into account an advertiser's category, specific campaign goals, or that specific individual being reached by the ad, but instead treats each campaign the same. **This approach led the team at Cognitiv to ask - if every campaign is different, why do advertisers rely on tools that treat them all the same? How could this be efficient or performant?**

> ## 66
> *The solution that has been pitched to everyone is that all they need to know when it comes to the transition to first-price auctions is, 'You just need to turn on bid shading,' but we know that is a suboptimal solution. With [bid shading] you are leaving either performance or money on the table at the end of the day.* 99
>
> Aaron Andalman, Co-Founder and Chief Science Officer at Cognitiv

A Need for Intelligent Tools

Advertisers need a permanent solution, one that is designed for advertisers by media buyers, not a solution that publishers offered as a stop-gap solution to keep advertisers placated. A better, more intelligent solution will help shift the balance of power towards the center. For an industry that had innovated so quickly early on, the past few years have brought few new solutions, and advertisers are eager for what is next. In fact, Digital Media Buyers surveyed in our study report "innovations around AI and deep learning in real-time bidding" as the most anticipated future trend in programmatic advertising.

Advertisers need a permanent solution, one that is designed for advertisers by media buyers.

Of those Digital Media Buyers Surveyed, When Developing their Bidding Strategy for a Campaign:

ONLY
46%
consider the targeting strategy

ONLY
45%
consider the duration of the campaign

ONLY
37%
consider the need to place their ad in contextually relevant contexts

ONLY
36%
consider the inventory that will be available during the campaign

The reality is, current bidding solutions do not make it easy to factor in key parameters like these when developing a bidding strategy, so how could one fault advertisers for largely ignoring them? The industry needs new innovations that better determine the exact price that an ad placement is worth to reach that specific individual at that moment in time.

The $6.6 Billion Solution: Intelligent Bidding

Enter Intelligent Bidding from Cognitiv. Intelligent Bidding is a patent-pending approach for optimizing bid prices to maximize a campaign's KPI. The approach improves on bid shading in several critical ways:

Bid shading only considers first-price auction dynamics in the final step of the bidding process – after the decision of whether-or-not to bid has been made. Intelligent Bidding, on the other hand, considers first-price auction dynamics throughout the decisioning process so that inventory can be selected more optimally.

Intelligent Bidding is based on new technology we call Inventory Forecasting that allows it to consider what inventory will be available over the course of the campaign. This peek into the future allows Intelligent Bidding to pass on simply good inventory because it knows better inventory lies ahead.

A bid shader lowers bid prices according to a rule (for example Surplus Maximization) that is generally unaware of the client's specific needs and risk tolerances with respect to budget, frequency caps, pacing, different KPIs, etc. Using its Inventory Forecast, Intelligent Bidding leverages combinatorial optimization methods to consider all of these factors when determining a bid price. **This results in a bidding strategy that is customized to a client's specific needs.**

As a result, Intelligent Bidding prices inventory strategically before it even gets to the point that a bid shader would be applied (typically as a last step in an auction environment). Aaron Andalman, Co-Founder and Chief Science Officer at Cognitiv, says Intelligent Bidding is based on performance and not just reactionary bidding: "Bid shading is helpful - in that it will save you some money - but it leaves a lot on the table. To drive the lowest KPI, first-price auction dynamics must be considered much earlier in the decision making process. Once you are using a bid shader, it is too late."

Advertisers are leaving at **least $6.6B** in savings on the table by relying on bid shaders.

Cognitiv has shown that Intelligent Bidding can save advertisers between 6.1% and 36.9% depending on the specifics of the campaign (see **Intelligent Bidding Background and Methodology** for details).

Considering that last year advertisers spent $109.4 billion (IAB, 2023)[7] on programmatic advertising (excluding search), those savings suggest **advertisers are overall leaving at least $6.6B in savings on the table by relying on bid shaders**.

> *Cognitiv is bringing intelligence to advertising with AI. We are predicting consumer behavior in ways that were not possible before the deep learning revolution.*
>
> Jana Jakovljevic, SVP of Partnerships at Cognitiv

With Intelligent Bidding, Cognitiv is leading the way when it comes to providing client-customized bidding solutions that consider the complex game theory of first-price auctions. Intelligent Bidding is a component of Cognitiv's broader system for building custom algorithms that deliver advertising performance by leveraging deep learning technology – the technology that powers self-driving cars and generative AI like ChatGPT and DALL-E. Large Language Models and Transformers allow Cognitiv to understand contextual and behavioral signals in ways not previously possible. This understanding is connected to first-party data to train custom models for our clients that are used, in real-time, to predict the ability of each potential impression to drive an advertiser's KPIs.

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[7] Interactive Advertising Bureau. (2023, April 12). Despite Headwinds, Digital Advertising Delivered Double-Digit Growth in 2022 According to the IAB Internet Advertising Revenue Report. iab.com. Retrieved May 8, 2023, from https://www.iab.com/news/despite-headwinds-digital-advertising-delivered-double-digit-growth-in-2022-according-to-the-iab-internet-advertising-revenue-report/

Intelligent Bidding Background and Methodology

Cognitiv's Intelligent Bidding solution is a patent-pending system for strategically bidding in repeated online first-price auctions. A key advantage of Intelligent Bidding is its capacity to strategically select bid prices to achieve and balance risk tolerances for multiple objectives across all bids, which is not possible with bid shading solutions (since such solutions operate solely at the level of a single bid request). In order to optimize jointly over all bids, Intelligent Bidding constructs a forecast of the set of bid requests that will be available over the duration of the campaign to the tactic being optimized. This Inventory Forecast is used to search for a parameterized bidding strategy that maximizes the objectives using a combination of black-box and combinatorial optimization techniques. Critically, this search is customized to meet the needs of each client by considering client risk tolerances around spend, pacing, and different KPIs.

The Inventory Forecast relies on two neural networks to capture key information about each bid request. The first network, the Win-Rate Model, is trained on historical auction outcomes using survival-based techniques to capture information about what other advertisers are likely to bid in the auction – all bid shaders rely on similar, though potentially less sophisticated, models. The Win-Rate Model predicts the auction win probability as a function of bid price as a parametrized probability distribution. The second network, the Value Model, is a client-specific model, generally trained on first-party data, that estimates the value of a bid request to each of the client's KPIs. Together, these models enable the Inventory Forecast to be used to search for an optimal bidding strategy.

To demonstrate that Intelligent Bidding is superior to bid shading approaches, Cognitiv has conducted a number of investigations related to the efficiency and performance gains it offers in scenarios involving repeated bidding into first- and second-price auctions (as in programmatic advertising). To estimate the savings that Intelligent Bidding can provide advertisers, as stated in the section above, Cognitiv isolated the effect of selecting bid prices using Intelligent Bidding compared to bid shading using the following methodology:

The performance of the two bidding strategies was compared on multiple datasets. Each dataset represented a specific tactic for an advertiser and consisted of a historical 1-month sample of auction data used to build the requisite Win-Rate Model, Value Model, and Inventory Forecast; and a separate 1-week sample of tactic-eligible bid-requests used for performance evaluation. For each dataset, the subset of bid-requests to bid on within the evaluation set, and the associated bid prices, were determined using two approaches: (1) Cognitiv Intelligent Bidding (as described above) and (2) bid shading using Surplus Optimization (for example, see Zhou, 2021)[8]. For the latter, the same Value Model as used with Intelligent Bidding was used to value bid requests (and determine the pre-shaded price), and the same Win-Rate Model as used with Intelligent Bidding was used to maximize the surplus, thereby ensuring measured performance differences were the result of more efficient bidding, and not potential differences in inventory assessment.

For each dataset, both approaches were used to design a bidding strategy with the objective of minimizing spend under that constraint of achieving a target number of attributed actions in expectation. A range of attributed action targets was used for each dataset. For bid shading, bid requests were selected greedily based on value, meaning only inventory above a minimum Value Model prediction (i.e. probability of attributed conversion) was selected. This minimum threshold was selected such that it was sufficient to achieve the requisite action count ensuring the bid shading approach had the advantage of only bidding on the best inventory, thus providing a fair and conservative comparison. The resulting bidding strategies were then applied to the 1-week evaluation dataset, and a Monte Carlo simulation approach, based on the Win-Rate and Value Models, was used to estimate resulting spend and performance of the selected bids. This method ensured that auction dynamics were well controlled across bidding approaches. The difference in spend between the two bidding approaches was then used to measure the percent savings that Intelligent Bidding offers compared to bid shading using Surplus Optimization. Across the different datasets and target actions counts, Intelligent Bidding resulted in between 6.1% and 36.9% savings (5th and 95th percentile, respectively). The reported industry-wide savings of $6.6 billion is conservatively based on the 5th percentile of estimated savings.

[8] Zhou, T. (2021, July 15). An Efficient Deep Distribution Network for Bid Shading in First-Price Auctions. Retrieved June 12, 2023 from https://arxiv.org/pdf/2107.06650.pdf

Research Study Background and Methodology

This research project sought to better understand the state of the programmatic media buying industry and the role and perceptions of the most widely used bidding solution in today's environment: bid shading. Cognitiv aimed to start conversations and generate awareness about the complexity of today's bidding environment and how current solutions are perceived and perform for advertisers.

Cognitiv, in partnership with independent research agency Alter Agents, conducted a mixed-mode quantitative and qualitative research study, including three in depth interviews with industry experts, as well as a quantitative survey fielded amongst 251 Digital Media Buyers. In this study, industry experts are defined as those who have extensive experience working on the DSP or SSP side and can speak to the historical context of second-price auctions, first-price auctions, the advent of bid shading, and how media buyers currently utilize and understand these tools. Digital Media Buyers are defined as individuals who have more than five years of experience in their current industry, hold a position of director level or above, are regularly involved in media buying, media planning, or other programmatic advertising tasks and have decision making influence over these tasks, and are at least somewhat familiar with the concept of bid shading.

The methodology, interviews, questionnaire, and analysis were conducted by Alter Agents, based out of the United States. All survey participant answers and quotes are kept anonymous for respondent privacy. Experts quoted have given their full consent to the publication and use of their names in this report.

The In-Depth Interviews:

- 35 minute conversation conducted by an Alter Agents moderator
- N=3 respondents
- Conducted from March 8 - March 23, 2023
- Respondents included:
  - Heather Carver, Principal Tech Business Development at Amazon Ads
  - Dustin McQuary, Lead Principal, Technical Account Management at The Trade Desk
  - Spencer Brown, Independent Ad Tech Consultant

The Survey:

- A 15-minute online quantitative survey
- N=251 respondents
- Surveyed March 29 - April 8, 2023

The Respondents:

- Do not work in market research
- Age 25-65
- 5+ years of experience in current industry
- Director level or above
- Their role includes at least some decision-making responsibilities in digital media planning, digital media buying, and/or programmatic advertising
- At least somewhat familiar with bid shading when given a definition

Glossary of Key Terms

Ad Exchange: A digital marketplace where advertisers can go to buy advertising inventory from publishers by bidding into real-time auctions

Ad Inventory: Any space in a digital environment where it is possible to place an advertisement (e.g., digital banner, pre-roll ads that stream with online video, social media ads, etc.)

Algorithm: A process or set of rules to be followed in calculations or other problem-solving operations, especially by a computer

Artificial Intelligence (AI): The theory and development of computer systems able to perform tasks that normally require human intelligence, such as visual perception, speech recognition, decision-making, and reading and writing

Bid: The amount of money an advertiser indicates they are willing to spend on a single piece of ad inventory

Bid Shading: A tool offered by DSPs and Ad Exchanges to help advertisers mitigate the risks of overpaying in first price auctions. A bid shader algorithmically lowers the bid price after it is selected by the advertiser using historical auction outcome data to inform the bid-price/win-rate trade-off

Cost per Thousand Impressions (CPM): The total cost for every thousand impressions on a web page. Formula: CPM = (Ad Spend / Impressions) x 1000

Deep Learning: The use of multi-layer artificial neural networks for machine learning. Unlike prior machine learning techniques, deep learning has proved most capable of learning to understanding human content like photos, text, speech, and video

Demand Side Platform (DSP): Programmatic advertising platform that allows advertisers and media buying agencies to bid automatically on display, video, mobile and search ad inventory from a wider array of publishers and exchanges

First-Price Auction: A type of programmatic media buying auction in which the winner pays the exact amount they bid, regardless of how much the second highest bidder's bid was (e.g., The winner bid $10 and the second highest bidder bid $5, so the winner pays $10 for the item)

Frequency Cap: A technique that sets a maximum amount of times an individual person will be served a specific piece of creative or advertising over a specified length of time

Header Bidding: A process in which publishers place the same piece of inventory up for auction across multiple ad exchanges, increasing the chance that the inventory will sell at a higher price than if it were only being sold in one ad exchange

Intelligent Bidding: A patent-pending system for optimizing bid prices in first price auctions developed by Cognitiv Corp. Unlike bid shaders, which only use information about what competitors will likely bid in the final step of the bidding process, Intelligent Bidding uses this information earlier in the process to design more efficient and performant bidding strategies

Key Performance Indicator (KPI): A quantifiable measure of performance over time for a specific objective

Machine Learning: The use of computer programs that learn and adapt without following explicit instructions, by using algorithms to analyze and make inferences from patterns in data. In the context of programmatic advertising, an example could be a program that takes in information regarding a user (e.g., gender, age, behavioral cues) and contextual clues (e.g., website, time of day, type of content being watched) to predict how likely the individual would be to take a specific action if served an ad (e.g., click on a link, make a purchase, watch a video, etc.)

Monte Carlo: A mathematical technique that predicts possible outcomes of an uncertain event. Computer programs use this method to analyze past data and predict a range of future outcomes based on a choice of action

Programmatic Media: Digital media space that is sold via an auction at the individual viewer level; Typically inventory is sold based on targetable indicators that align with the target audience that an advertiser is seeking to reach (e.g., women, individuals aged 18-34, dog owners, etc.)

Publisher: An individual or entity that owns a website or other medium in which ad inventory is made available and sold

Real-time Bidding (RTB): A programmatic media buying technique that refers to the practice of buying and selling ads in real-time on a per-impression basis

Return on Investment (ROI): A performance measure used to evaluate the amount of return on a particular investment, relative to the investment's cost. Formula: ROI = (Net Profit / Net Spend) x 100

Second-Price Auction: A type of programmatic media buying auction in which the winner pays an amount slightly higher than the second highest bidder's bid, rather than the actual amount bid (e.g., The winner bid $10 and the second highest bidder bid $5, so the winner pays $5.01 for the item)

Supply Side Platform (SSP): Software that allows digital publishers to sell ad inventory within the programmatic space

Surplus Maximization: A commonly used algorithm for bid shading in which the bid price is lowered such that expected surplus is maximized based on a prediction of the auction win-rate at different bid-prices. The surplus is defined as the difference between the value of the impression and the bid-price if the auction is won, otherwise the surplus is zero

Waterfall Auction: A process in which publishers place a piece of inventory up for auction in one exchange at a time. If a piece of inventory does not sell in the exchange at the top of the waterfall, it is passed to the next exchange, and so on…

About Cognitiv

Cognitiv is a performance advertising partner using custom algorithms unique to each advertiser. We can activate as a managed service DSP or a Dynamic Deal run through the DSP of your choice.

We innovate to solve key advertising challenges by leveraging cutting-edge AI technology and rigorous science to shape the future of marketing and predict consumer behavior. While our business is grounded in deep learning and scientific experimentation to avoid human bias, our ability to think and create differently is powering the evolution of marketing.

Partnership is key to the success of every business. Our team of experts deliver a unique client experience focused on proactively educating and empowering our partners to accelerate their performance across outcomes. To learn more about this research or how you can utilize Intelligent Bidding in your processes, please contact:

cognitiv.ai
sales@cognitiv.ai

About Alter Agents

Alter Agents is a full-service strategic market research consultancy reimagining research in the age of shifting decision making. Alter Agents curates leading edge research technologies and current methodologies to deliver insightfully designed research projects geared towards challenging issues.

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