Artificial Intelligence Set to Transform Digital Commerce Marketing

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Digital Commerce is expanding and evolving faster than ever. Marketers can now create unique ads and personalized messages for each individual customer in real-time. This involves using artificial intelligence and machine learning technologies to analyze individual behaviors to figure out which creative elements will entice a shopper to return and make a purchase.

Criteo is pleased to share with you the Gartner research report “How to Apply Artificial Intelligence to Digital Commerce”. The report provides actionable insights and recommendations on how AI and machine learning technologies should be used to improve digital commerce performance.

According to this Gartner study:

- By 2020, 30% of digital commerce revenue growth will be attributable to artificial intelligence technologies.
- By 2020, artificial intelligence will be used by at least 60% of organizations for digital commerce.
Artificial intelligence and machine learning technologies make it possible to capture, process and infer data on a massive scale, and far more effectively than any human being could ever do. For example, Criteo’s creative technology “Kinetic Design” can apply insights from 1.2bn monthly impressions to select and optimize individual branded ad components according to each shopper’s preference and intent. This ensures more granular personalization and visually inspiring on-brand ads, resulting in up to 12% more sales for our advertiser clients.

Advertisers can now engage and inspire shoppers on a more personal level, rendering custom ads in real-time for every impression. Not only that, Kinetic Design continues to learn from each design’s success to make ads more and more effective over time.

Furthermore, brands are increasingly using paid search on retail sites to draw attention to their products on the crowded online shelf. Google Shopping is a key growth area as more users are engaging with shopping ads across the globe. Google Shopping has become essential to retailers’ marketing strategies but is a difficult channel to master. Here’s a report worth reading The Smart Marketer’s Guide to Google Shopping

Criteo Predictive Search is a new solution built for Google Shopping to drive greater ROI and sales for advertisers. It is a fully automated solution that continuously optimizes every aspect of Google Shopping campaigns and delivers proven, programmatic technology to campaign structure, bidding, and remarketing.

Criteo’s vision is to build the highest performing commerce marketing ecosystem that connects shoppers to the things they need or love. Through this ecosystem, our clients and partners can seamlessly engage shoppers with relevant experiences that maximize sales and ROI, and at the same time, harness the power of brand partners to generate revenue. This ecosystem creates a powerful network effect and brings value to all.

We welcome you to join us on this journey and explore with us.

Source: Criteo
Case Study: Monoprice

About Monoprice
Founded in 2002, Monoprice is a B2B and B2C electronics retailer that focuses on offering high-quality, affordable electronics and accessories to professionals and consumers around the world. They manufacture many of their products themselves, which eliminates the ‘middle men’ and layers of markup in the supply chain in an effort to keep costs down for their end customers.

The Challenge
Prior switching its Google Shopping campaigns to Criteo Predictive Search, Monoprice relied on a vendor for feed management, a bid automation tool for bidding, and in-house resources for campaign management decisions and analytics.

Google Shopping was driving strong results for Monoprice, but the lean in-house team suspected that they could get more out of the channel if they had a technology driven solution that comprehensively optimized the entire program.

They sought out a solution that would not only create efficiencies for their team, but would also drive even more growth.

Criteo Predictive Search offered just that.
“We didn’t want just a bid management tool, we wanted a partner. Criteo’s solution took over the heavy lifting from our team and more importantly, it made everything about our Google Shopping program more efficient – with more revenue and a higher ROI than we ever expected”.

Diana Toldoya, Director of Marketing

The Solution

Monoprice enlisted Criteo Predictive Search to optimize all aspects of Google Shopping through machine-learned, end-to-end technology. The technology transformed the program by bidding precisely on both products and users. This was done by creating SKU level bids, transforming remarketing lists so that every returning user is bid on granularly, and machine-learned algorithms to set optimal bids. With Criteo, Monoprice quickly realized workflow efficiencies, and even greater performance gains.

How It Works

Predictive Bidding Increases Merchandising: In bidding on each product, Criteo’s machine-learned models look at signals on each specific SKU, and on SKUs with similar attributes. For Monoprice, this was key as they regularly have new inventory. Criteo predicted accurate bids for all of Monoprice’s SKUs, driving more sales from a broad set of products.

Granular Remarketing Drives Growth: Monoprice’s remarketing lists (RLSA) on Shopping campaigns prior to Criteo were based on static rules. Criteo transformed the remarketing program to value each user individually and set a bid to match their likelihood to purchase. Monoprice saw a 743% increase in sales driven by returning users, while still seeing significant growth from new users.

Comprehensive Optimization Enhances Campaigns: Criteo’s solution automatically adapts the feed, settings, budgets and structures to ensure that Monoprice’s account is always configured to allow for the most optimal, precise bid decisions.

The Results

With Criteo’s machine-learned solution, Monoprice saw a 75% increase in revenue at a 64% higher ROAS (Return On Advertising Spend) within 90 days.

Source: Criteo
Artificial intelligence and machine learning can improve digital commerce performance, but are not a solution to all problems. Application leaders for digital commerce technologies should be aware of the benefits and limitations of AI and use a pragmatic approach to deliver tangible results.

**Key Challenges**

- Application leaders are often misled by vendors into believing that artificial intelligence (AI) and machine-learning technologies can dramatically improve digital commerce performance, and together are a panacea for all problems.

- Application leaders can see opportunities to apply AI and machine learning to digital commerce, but don’t know where to start to make the most impact on the business.

- Organizations hoping to replace human employees with AI will be disappointed, because AI delivers more value when working alongside employees with domain expertise and when mapped against business strategies.

**Recommendations**

Application leaders for digital commerce technologies should:

- Identify clearly defined digital commerce use cases that fall into the categories of pattern recognition/classification, prediction and
natural-language processing (NLP). Identify the top three to five use cases that will have an immediate impact on your digital commerce performance.

- Use the output from AI to identify key influencing factors, and use traditional technologies such as rule engines, weights and scoring to fine-tune your decision model to ensure close alignment with business strategies and objectives.

- Equip employees with AI and machine-learning tools to help them make better decisions.

- Pilot AI point solutions for one to two use cases that have clearly defined objectives and can be put into production within 90 days. Take pre-emptive measures and fail fast.

**Strategic Planning Assumptions**

By 2020, artificial intelligence will be used by at least 60% of organizations for digital commerce.

By 2020, 30% of digital commerce revenue growth will be attributable to artificial intelligence technologies.

By 2020, smart machines will be a top five investment priority for more than 30% of CIOs.

By 2022, early adopters will have, on average, four virtual personal assistants that they turn to for advice.

**Introduction**

Digital commerce technologies have existed for a long time and have well-served businesses of all sizes and types. It is not that these technologies are suddenly out of date due to the rise of AI and machine-learning technologies; on the contrary, many will keep working very well and are likely to work hand-in-hand with AI to get the most out of both sets of technologies.

The benefits of using AI in digital commerce include:

- **Improved efficiency** in discovering the underlying relationships between disparate datasets over traditional methods, which require complex modeling and coding.

- **Improved accuracy** for clearly defined processes that otherwise involve a lot of manual processing.

- **Ability to deal with a large amount of data with many attributes.** Examples include customer behavior data, multichannel and multidevice data, complex product data and fraud detection.

- **More granularity in analysis and orchestration** such as customer segmentation, sentiment analysis and personalization.

- **Frequent algorithm refreshes**, such as several times a day, to capture the transient changes in customer and market behavior.

There is, however, a lot of hype around AI, in particular that driven by vendors claiming their solutions are AI-ready and can deliver dramatic improvements over existing technologies. Application leaders for digital commerce can be misled into believing that AI can solve all their problems, which is not true for an in-depth discussion of the AI and machine-learning technologies).
AI is not the ideal solution in the following cases:

- The need to make decisions based on business strategies and objectives; employees close to the business are best-positioned to control such decisions

- Analysis involving few attributes and clean datasets that can be well served by existing technologies such as regressions, decision trees and rule engines

- Analysis involving too many attributes, too little data or poor data quality, which are common reasons for AI project failures (see section on "Pilot to Fail Fast").

Gartner has witnessed an increasing amount of interest in client inquiries about digital commerce that refer to AI and the related technologies; these inquiries increased by 350% from 2015 to 2016, and are on course to increase significantly again from 2016 to 2017. In addition, in Gartner’s annual enterprise survey (see Note 1 for methodology), 63% of the 923 respondents who are involved in their organization’s decisions related to IT services and sourcing report that they plan to invest in AI technologies by the end of 2017 (see Figure 1).

AI and machine-learning technologies are very new and can be applied in multiple areas in digital commerce, but application leaders are not always clear about which use cases will be most beneficial. In addition, there is often a misperception that AI can replace human decision making completely – by automating processes. This can happen in a highly predictable environment, and especially for internally facing processes; however, it is not the

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**Figure 1. Artificial Intelligence/Machine Learning Adoption Status**

<table>
<thead>
<tr>
<th>Status</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have adopted/in use today</td>
<td>18%</td>
</tr>
<tr>
<td>Implementing</td>
<td>26%</td>
</tr>
<tr>
<td>Piloting</td>
<td>20%</td>
</tr>
<tr>
<td>Active plans to deploy within 12 months</td>
<td>12%</td>
</tr>
<tr>
<td>No plans to adopt within 12 months</td>
<td>24%</td>
</tr>
</tbody>
</table>

*Base: Number of respondents = 923 involved in decisions for IT services and sourcing; excluding “Don’t Know.”
Q. “Please indicate your organization’s adoption status regarding the following IT initiatives.”
Source: Gartner (May 2017)
case in digital commerce where activities tend to be dynamic – involving lots of customer interactions, and requiring people with strong domain expertise to make decisions based on business strategies. Organizations hoping to replace humans with AI in digital commerce will, in most cases, be disappointed.

**Analysis**

**Identify Use Cases Suited for AI**

AI and machine-learning technologies, as they currently stand, are best-suited to three categories of use cases in digital commerce: pattern recognition/classification, prediction, and natural-language processing (NLP; see Figure 2). While we identify use cases for each category, this is not an exhaustive list, and organizations can find other opportunities depending on their type of business and industry.

**Pattern Recognition/Classification**

AI performs pattern recognition and classification by identifying relationships among attributes of various objects, and classifying objects into clusters or categories. It can be used for the following digital commerce use cases:

- **Personalization** – Businesses can personalize their interactions with visitors/customers by presenting the right content and format to achieve objectives such as increasing conversion and/or average order value (AOV), or improving the customer experience. The challenge is to find out how different types of customers respond to different content, and the impact that has on business objectives.

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**Figure 2. Artificial Intelligence Use Cases in Digital Commerce**

Source: Gartner (May 2017)
Successful personalization involves analyzing a huge amount of data from various sources and in different structures, coupled with multiple types of analytics where both the customer profile and the customer experience are updated in real time. Traditional personalization solutions use rule engines; these have scoring methods that are highly manual, can get extremely complex when dealing with such large amounts of data, and are infrequently updated.

With AI, personalization engines can quickly discover the correlation between customer attributes and observed activities. The engines can display different content with more granularity and include data points from a larger number of sources, moving close to individual personalization. This will improve the effects of personalization.

There are three typical use cases of personalization where AI can have a significant impact:

- **Product recommendation.** AI can frequently test and update the recommendation model to best match the customer interest – with higher accuracy and more granularity – by including more customer attributes such as behavior, demographics and preferences, and product interest such as purchases, browsing history and searches.

- **Product search.** AI can incorporate multiple data sources to identify customer behavior, interest and intent, and is more sophisticated than the existing search framework using collaborative- or content-based filtering. AI can also open doors for new types of functionality such as image and natural-language search. Solid Signal, for example, used AI-enabled search to better understand its customer needs and personalize the result; its conversion rate doubled to 6% and the exit rate from the search results page decreased by 33.5%.

- **Landing page design.** Matching landing pages to customer interest is critical, especially for first-time visitors. AI can gather information from a wide range of partners and sources to continuously improve its understanding of visitor intent, thus increasing the accuracy of the intent matching of the landing page content and reducing bounce rate.

- **Customer Segmentation** – This is often a labor-intensive task, where many customer attributes are manually tagged, and tends to be more broad-brush approach. AI can increase the granularity of attributes and the accuracy of assigning those to customers, and make the process more automated. Additionally, AI can suggest clusters of attributes, thereby creating new segments that would probably not be readily apparent to humans reviewing the same customer data.

- **Product Categorization** – AI can automatically categorize products based on attributes and/or natural-language description, and can include images and video. This improves the efficiency and accuracy of the task and makes highly granular image/video categorization possible; thus, content search is easier for business users and product search is easier for customers.

- **Customer Journey Path Identification** – This is the part of a customer journey analytics application where the technology needs to identify the customer’s path as they go through
the purchase process. AI helps to identify the visitor by correlating their activities and attributes across channels and devices – considering data such as device ID, media access control (MAC) address, browsing, call logs, app usage, check-ins, locations, social media, coupons collected/used, reviews, transactions, and so on. The path is then formulated by tracking the same visitor as they move through their journey.

- **Fraud Detection** – AI can learn the transaction attributes and activity patterns associated with fraud in a much shorter time than rule engines, and also identifies high-risk factors and combinations. Such insight helps fraud managers to quickly configure effective fraud detection and prevention models that are relevant for their business.

**Prediction**

AI provides probabilistic predictions for events by learning the relationship between the input attributes and the target outcome. It can be used in the following digital commerce use cases:

- **Propensity Model** – Predicts customer behavior such as how likely it is that a visitor will register, open an email, purchase a product, or churn. By analyzing data from disparate sources, AI can build the propensity model in order to identify customers/visitors that will be more responsive to an organization’s marketing and loyalty programs.

- **Dynamic/Optimized Pricing** – Businesses set prices to achieve business goals, such as maximizing product or market share, by considering a wide range of factors including cost, inventory, margin, customer segment, time of day, season, location, competition, and so on. AI can provide valuable inputs to the pricing model by identifying factors that mostly impact the targeted business results.

- **Demand Forecasting** – Forecast customer demand to improve efficiency for supply chain, manufacturing and operations. Traditionally, this is done with the use of statistical models and judgment by experts who know the business inside out. With AI, the system can analyze a much larger amount of data that could not possibly be managed by a human – and with better accuracy (see Otto under the Case Study section).

- **Order/Inventory Management** – Order management helps businesses to deal with complex orders or multichannel fulfillment options. AI can suggest the best fulfillment location and delivery routes/options by considering factors such as stock availability, distance to the customer, time/cost/modality of shipping and customer preferences, and be able to promise delivery time for normal and back orders. When applied to inventory management, AI helps businesses minimize inventory costs without impacting product availability.

**Natural-Language Processing**

AI handles NLP better than traditional methods when the domain is huge, general or complex, or when the input is noisy; for example, bad spelling or voice to text with background noise. Traditional NLP is better when the lexicon is well defined and understood. Today, natural-language understanding (NLU) is still at a primitive stage and the words are often passed to traditional NLP for understanding. NLP has a lot of potential in digital commerce, because it improves customer experience in a number of use cases:
Virtual Personal Assistant (VPA) – This is a key battleground for the technology giants; typical examples include Amazon’s Alexa, Google Assistant, Apple’s Siri, Microsoft’s Cortana and Facebook Messenger. The VPA interacts with consumers via conversation to handle daily requests that range from playing music to setting alarms, to making purchases and travel bookings. Alexa, Google Assistant (with Google Home) and Messenger allow people to make purchases, and other VPAs are likely to follow suit. Businesses, rather than building their own VPAs, usually integrate with market-leading VPA platforms to maximize the reach and shorten their time to market. Studies have shown that close to 60% of the millennials (typically, those born from the early 1980s to the early 2000s) in the U.S. have used chatbots.³

Virtual Customer Assistant (VCA) – Robots field inquiries from customers (from online or in the call center); they can automatically respond to customer inquiries, if there is a known answer, or intelligently route inquiries to human agents, knowing their strengths in handling different types of inquiries. VCAs are gaining popularity in the enterprise space and are welcomed by millennials. VCAs can be trained to gain knowledge of the specific business using their own vocabulary; some use-case-specific VCAs can be trained with as little as fewer than 100 sentences. A number of vendors offer VCA solutions.

Sentiment Analysis – This allows businesses to detect customer sentiment for purposes such as customer service, testing product concepts or marketing campaigns, suggesting products, or monitoring user reviews and social media. AI helps to determine the context of phrases and classify words.

Organizations should identify the top three to five use cases that have an immediate impact on their digital commerce performance. Start by looking at broken processes or the biggest headaches – such as low conversion rates, or high customer churn or bounce rates. Then, break them down into smaller problems and see which ones are most-suited to AI. The more accurately you can define your problem and goal, the easier it will be to find AI vendors or tools that can help.

Augment Employees With AI for Better Decision Making

While AI can bring benefits to digital commerce, today’s AI technologies often work as a black box – where the model cannot be documented, the mechanisms by which algorithms work are unclear, and the model evolves over time. As the model goes through multiple iterations, the output is not always predictable, leading to systems generating unexpected results. It is important to separate the AI output from business logic that is controlled by humans and configured using traditional technologies such as statistical models, decision trees and rule engines. In this way, any AI irrationality – such as poor predictions and false positives – will not break the business logic and negatively impact digital commerce business.

Businesses get the most value by augmenting their employees with insight generated from AI to help them make better decisions. AI is great at finding relationships between data but it doesn’t understand your business, nor can it make business decisions. Your employees do, however – they know how to provide the right set of data, and how to apply the output to achieve business objectives. For example, when making product recommendations: a higher weight can be given to products on promotions at the expense of relevance, if the objective is to drive higher volume; or to products carrying higher
margins, if the objective is to generate more profits. Also, when making pricing decisions, higher weighting can be given to competitors’ pricing (in the decision model) if businesses want to grow their market share.

In short, AI and machine-learning technologies should be used to understand the underlying relationships between datasets, and to augment your employees with that insight for their decision making.

Pilot to Fail Fast
AI is complicated and project failures are common. Be aware of common problems associated with AI projects and take pre-emptive measures (see Table 1).

Run pilots with clearly defined problems, objectives and measurement (applying the pre-emptive measures in Table 1). Look for point solutions for

<table>
<thead>
<tr>
<th>Problems</th>
<th>Preemptive Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projects are too complicated or too ambitious</td>
<td>■ Start small by breaking down big problems into smaller pieces, then attack those one by one</td>
</tr>
<tr>
<td></td>
<td>■ Start with the types of use cases that are most-suited to AI</td>
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<tr>
<td></td>
<td>■ Start with the types of use cases that are most-suited to AI</td>
</tr>
<tr>
<td></td>
<td>■ Keep the project team small and agile</td>
</tr>
<tr>
<td>Too little data or poor data quality</td>
<td>■ Look for specialized machine-learning engines that require less training data</td>
</tr>
<tr>
<td></td>
<td>■ Clean your data</td>
</tr>
<tr>
<td></td>
<td>■ Test and learn to discover the ideal dataset</td>
</tr>
<tr>
<td>Overfitting*</td>
<td>■ Reduce the number of attributes in the training data</td>
</tr>
<tr>
<td></td>
<td>■ Use additional techniques, such as cross-validation, regularization and pruning, to improve generalization</td>
</tr>
<tr>
<td>No strong in-house data skills</td>
<td>■ Hire data scientists that have experience with AI/machine learning.</td>
</tr>
<tr>
<td></td>
<td>■ Link the new hires to business analysts that understand the connections between the business and the data</td>
</tr>
</tbody>
</table>

* Overfitting: the model closely fits the training data, even the outliers, but doesn’t genuinely reflect the underlying relationship so performs poorly in production.

Source: Gartner (May 2017)
your identified use cases, and vendors that can get
the system into production within 90 days. Control
the project scope, timeline and budget, and iterate
fast. Even if you fail after doing all of the above, fail
fast and learn from the experience. It is common
that several attempts are needed before businesses
find the right approach to get real benefits from AI.

Case Study
Otto, a leading online marketplace in Germany,
found that it can reduce merchandise returns and
increase customer retention if it can deliver goods
within two days of purchase and in a single package.
As Otto sells merchandise from other brands that
it doesn’t always stock, it used to rely on human
analysts to forecast what customers would buy and
to order the goods ahead of time. Now, it is using
a machine-learning solution that analyzes three
billion historic transactions and 200 variables (such
as sales, searches and weather). The system now
predicts, with 90% accuracy, what customers would
buy within a month; then automatically purchases
200,000 items from third-party merchants each
month with no human intervention. As a result, Otto
has cut its surplus inventory by 20% and its product
returns by two million items per year. It is currently quite uncommon for a company to
give so much control to AI that it even allows it to
procure goods with no human intervention. However,
as the technology matures and businesses gain more
trust in the decisions made by their machines, they
will rely more on AI and machine learning. What’s
interesting is that Otto actually hired more people
after implementing its AI solution, because its
business grew. The purpose of using AI is therefore
not to replace humans, but rather to manage a
level of work that cannot possibly be managed by
human beings. Employees can therefore be freed up
to deal with more sophisticated tasks such as goal
alignment, strategy setting and partner engagement.

Evidence
This analysis is based on client inquiries,
discussions among analyst communities and with
leading technology vendors, as well as results from
Gartner’s Annual Enterprise Survey (see Note 1 for
more details).

Acronym Key and Glossary Terms

AI artificial intelligence
NLP natural-language processing
NLU natural-language understanding
VCA virtual customer assistant
VPA virtual personal assistant
"Solid Signal: Giving Consumers a Clear Connection to Products They Want," Bloom Reach (PDF).

"Survey: Nearly 60% of Millennials Have Used Chatbots," Retale.

“How Germany’s Otto Uses Artificial Intelligence,” The Economist.

Note 1

Gartner’s Annual Enterprise Survey, 2016

Gartner conducted its Annual Enterprise survey in five countries between 23 September and 2 December 2016, to explore organizations’ use of IT products and services across geographies and to help Gartner build its forecasts. The research was conducted online among 2,557 respondents in five countries, as follows: the U.S. (n = 420), Brazil (n = 422), France (n = 420), the U.K. (n = 417), China (n = 424) and India (n = 454).

Qualifying organizations had to have at least 20 employees. Participants were screened to gain a general understanding of their organization’s IT department and/or its policies and procedures. Furthermore, each of the six technology-focused sections of the questionnaire required the respondents to be involved in decisions related to at least one phase of the IT buying cycle: determine and set the strategy; evaluate or select vendor or service provider; plan investment or set the budget; implement or manage the technology or services.

Interviews were conducted online and in a native language and averaged 24 minutes. The sample universe was drawn from external panels of IT and business professionals. The survey was developed collaboratively by a team of Gartner analysts who follow these IT markets, and was reviewed, tested and administered by Gartner’s Research Data Analytics team.

Source: Gartner Research, G00300290, Sandy Shen, Jason Daigler, 16 May 2017
About Criteo

Criteo (NASDAQ: CRTO) delivers personalized performance marketing at an extensive scale. Measuring return on post-click sales, Criteo makes ROI transparent and easy to measure. Criteo has over 2,500 employees in more than 30 offices across the Americas, Europe and Asia-Pacific, serving over 15,000 advertisers worldwide, with direct relationships with thousands of publishers.

Contact us

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