



The Machine Learning Revolution: How Retailers Are Turning Data Into Sales

A Roadmap to Taking the First Steps with Cognitive Computing

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Big data is disrupting the retail industry, ushering in a new era of hyper-targeting and hyper-personalization. Just as the Internet disrupted traditional retail storefronts 20 years ago, the era of big data is now upending conventional retail marketing models that relied on demographics. A wealth of structured and unstructured customer data creates the potential to understand customer intent in real time and target customers for instant sales. For many retailers, however, the true potential of this data remains untapped with no practical application. Retailers lack the capability and expertise to analyze this data fully and then translate findings into action. Machine learning – a subset of cognitive computing – is the missing link that puts this data to work for retailers.

Cognitive computing is a new computation paradigm that learns and builds knowledge from various structured and unstructured information sources. Machine learning algorithms use data mining, pattern recognition and natural language processing to teach the computer to mimic the way the human brain works. For retailers, machine learning creates three key opportunities – intent targeting, a shorter R&D cycle and hyper-personalization – that are driving the digital retail revolution.

In a recent IBM survey, [91%](#) of retail executives said that they believe cognitive computing will play a disruptive role in their industry and [83%](#) think it will have a critical impact on the future of their businesses. Even with the promise of machine learning, many retail companies are unsure how to adapt to the digital economy's complexities and leverage its opportunities. There's an urgency to do "something" but what this something actually entails – and how to even get started – remains unclear.

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This guide walks retailers through the current digital landscape with an actionable roadmap to identify quick-wins, address internal talent needs and position your organization to capitalize on the cognitive computing revolution.

The Challenge: A Perfect Storm of Changing Consumer Behaviors and Disruptive Technologies

Today's retailers face a perfect storm of challenges. Changing consumer expectations and behaviors, coupled with



disruptive technologies, are reshaping the retail landscape. Retailers are no longer selling products. They're selling the *experience* of buying these products— and this experience needs to surprise and delight customers at every turn. From smart beacons and personalized touchscreen displays to mobile alerts and floor sensors, retailers are scrambling to integrate [new technologies](#) into brick-and-mortar stores to maximize the value of consumer foot traffic. But resource shortages, including fierce competition for technology talent and limited bandwidth for internal change management, are making the implementation of these new technologies more difficult. Adding to the challenge is the declining value of demographic-based marketing and a rapidly evolving consumer decision-making journey that prioritizes contextual, in-the-moment information over mass advertising.

Declining value of demographic-based marketing.

For decades, marketers relied on demographics as a primary means for understanding and targeting potential customers. While demographics can be a useful tool for predicting broad behavior trends, it also reinforces biases and cannot shed light on individual customer intent. Consider this: [Google](#) reports that 40% of people who purchase baby products live in a household *without* children— and search engines are the number one way these purchasers research which product to buy. Demographic-based marketing is likely to miss this audience, leaving out a huge potential customer base.

Additionally, most demographic marketing interrupts the consumer while they're doing something else. A banner ad pops up while they're reading a news article online or an advertisement disrupts a television show. This marketing is a distraction to be ignored and avoided, not engaged. Retailers must consider the best method for delivering marketing messages to consumers at the time when they're most open to receiving them and taking immediate action.

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Shifting customer demands and a new decision-making journey.

Today's digital-savvy consumers expect personalized products and services that suit their specific needs. They also expect contextual and meaningful interactions. As [Google](#) reported in 2015, retail has entered a brave new age where intent and immediacy trump identity and brand loyalty— thanks in large part to our omnipresent smartphones.

Before committing to a purchase, consumers now turn to smartphones to research product information, check Yelp for product reviews, and do a quick price comparison. These mobile searches are happening at the exact moment consumers are in stores. They're holding the product in their hands asking, "Should I buy this right now?" and "What value does this bring to my life right now?" Retailers who fail to answer these questions may fail to make the sale.

The Opportunity: Intent Targeting, Shorter R&D and Hyper-Personalization

Machine learning is poised to profoundly disrupt traditional retail, shaking up operating practices, staffing methods



and business models. Practically speaking, what does the cognitive computing revolution actually mean for your organization? These are three areas to focus on:

1. Intent targeting.

Intent targeting delivers targeted information, like special product promos or offers, at the exact moment when a consumer is most open to receiving this information. Generally, this is when a consumer is in or near a point of sale and has signaled the intent to make a purchase. This precise, in-the-moment marketing reduces barriers to decision making and primes the consumer to take immediate action.

2. Shorter R&D cycles.

Digital technologies not only make it easier to gather data about customer intent and behavior, but these technologies can also shorten/tighten the customer feedback loop, getting valuable feedback directly to product developers. Product developers can then apply these insights to deliver higher performing products and services. By better understanding how customers use their products, developers can update features to better align with customer needs and expectations, giving retailers a key competitive edge with new points of differentiation.

3. Hyper-personalized marketing.

Analyzing big data can provide deep insight into individual consumer habits and behaviors, better positioning companies to understand individual needs and wants. Rather than flooding customers with an onslaught of poorly timed advertising, companies can better market their products to customers at the exact moment of need. For example, [CITO Research](#) reports that Coca-Cola gathered data from its vending machines and determined that beverage consumption spikes on college campuses at specific times correlated with specific TV shows. Coca-Cola could then use this data to offer targeted rewards through cross-promotion with the shows, increasing the likelihood of immediate action.

Quick Wins: Defining the Opportunity for Big Data and Machine Learning

Integrating big data and machine learning into your retail marketing strategy can feel like an enormous, daunting task. By focusing on quick wins, you can kick-start the digitization process for your organization and begin building internal stakeholder excitement around future opportunities.

Big Data

Why this matters: Data-driven marketing isn't new. Retailers have long been tracking customer purchases through loyalty programs, discount cards and CRM databases. The problem with this data, however, is that it's entirely historical. The data gives retailers insight into how a customer acted in the past, but its predictive powers for future behavior are limited as is the data's usefulness to understanding in-the-moment customer intent.

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businesses need to answer this simple question: what is a customer doing *right now* in my store? For example, is the customer pausing to look at a specific display or hold a specific item? This information – coupled with historical analysis of previous purchasing behavior – enables retailers to target and deliver relevant, engaging offers and promotions accurately. Big data promises to answer this question, but big data sets are also so complex that traditional data-process application software is inadequate to deal with it.

Implementation challenge: A wealth of “in-the-moment” data is now available, ranging from GPS data to a customer’s recent search history. GPS data, for example, provides precise location information so your company can know if a customer enters a store or is near a store location. Additionally, as [SAP](#) reports, “Apps can track every tap and swipe, giving retailers insight into which products a customer is viewing and how long a customer lingers on a specific product page. Smartphone sensors like accelerometers can identify if people are sitting, walking or driving, providing an added layer of insight into consumer behavior and purchasing intent.” The immediate data challenge is two-fold: which data is most relevant and how can this data be transformed into actionable intelligence?

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Quick win:

Start by assessing the extent to which your organization currently uses structured and unstructured data in relation to retail marketing objectives. Ask the following:

- What are the marketing or sales challenges facing my organization that can be solved by data?
- For each of these challenges, what data do we currently have that will be useful? What data are we missing for a full picture?
- For the missing data, can we leverage current technology to acquire this data? If not, what new technology implementation will be a cost-effective, easy lift to generate this data?

Machine Learning

Why this matters: Machine learning is a method of data analysis that automates analytical model building. Previously, to identify value in data, the information needed to be structured in spreadsheets and databases. Unstructured data from photos, videos, sensors and written text was considered too complicated and difficult to organize, so companies were unable to capitalize on this data’s full potential. Now, machine learning teaches computers to identify what unstructured data represents, spotting patterns faster and more accurately than a human.

With machine learning, retailers are able to uncover previously hidden relationships that are key to powering intent targeting, shrinking R&D cycles and hyper-personalizing marketing. Most importantly, by enabling computers to learn from experience, machine learning adoption is more than a one-time process and productivity improvement. It powers efficiency increases that continually improve over time.

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Implementation challenge: Machine learning is currently the best approach for making sense of customer data in real-time. Bringing this technology to your organization requires deft change management and an internal stakeholder consensus that may be difficult to achieve. Even though “machine learning” and “artificial intelligence” are two of today’s hottest buzzwords, not all executives are familiar with what these buzzwords actually mean. You’ll need to manage an internal learning curve and communicate benefits in tangible terms, which can be difficult given the “[black box nature](#)” of machine learning models. It can be difficult to explain with confidence how machine learning arrives at a specific result, potentially slowing adoption. Finally, you’ll need to consider the resources required to train the algorithm. Training a machine learning model can take weeks or longer due to the large volumes of data and sophisticated algorithms involved. Retailers may want to consider strategic partnerships with cloud computing GPUs, currently available from major providers like Amazon, Google, IBM and Microsoft.

Quick win:

Set yourself up for success by knowing the answer to these questions:

- What is the immediate benefit to our organization? How does machine learning fit into our existing business models?
- How do we gather data (if it is not already in-house) and then ensure the security of this sensitive data?
- How can we accelerate the training process? What infrastructure can support our adoption?

Building the Right Team: Recruiting Top Data Scientists and IoT Talent

Machine learning is poised to upend traditional business models, disrupt traditional retail marketing, and usher in an era of radical change. “The disruption over the next three to five years will be massive,” says Cliff Justice, a principal in KPMG’s Innovation and Enterprise Solutions team, as reported by [SAP](#). Justice predicts the gap between the haves and have-nots of machine learning will quickly become evident. Given this urgent mandate for change, retailers are all in direct competition for one scarce resource: talent.

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Adopting machine learning solutions requires data science professionals and IoT experts, two industries with a low talent supply and a very high demand. Adding to the challenge is the creation of new positions, like “Chief Internet of Things Officer” and “IoT Business Designer”, which retail organizations aren’t quite sure how to fill. Making the right first hire is critical and a “business as usual” approach to recruitment wouldn’t get the job done.

1. Educate internal stakeholders.

Before starting the search process, it may be helpful to conduct initial internal training to ensure key stakeholders are all operating from the same knowledge baseline. Consider the following:

- What is the cognitive computing IQ of your organization? How aware are stakeholders of cognitive computing benefits, including differences between AI and machine learning?
- What capabilities are required in order to support and manage cognitive computing services in your organization?



2. Define experience and skill requirements.

Your first IoT hire sets the tone for future program development. This hire will be not only responsible for managing day-to-day tasks but also for establishing company-wide best practices. Strong technical skills are just one piece of the puzzle. For retailers building programs from the ground up, leadership and change management excellence matters, too.

Aligning on requirements as a team before you start this search will streamline the process and prevent the perception that your organization “can’t make a decision” or “doesn’t know what it wants”—two red flags that can quickly alienate top talent.

3. Proactively address candidate concerns.

Like many retailers, your company is likely building its machine learning program from scratch and candidates may be unsure what to expect. Existing institutional barriers to change could make it difficult to build a new program and impact a candidate’s ability to succeed in this new role. Top talent can be reluctant to join organizations that lack a clear mandate for change. To land your dream candidate, you’ll need to address these concerns from day one.

Start by emphasizing your company’s commitment to providing candidates with the necessary resources and autonomy for success. Frame this position as a once-in-a-career opportunity to put a personal mark on a program by building it from the ground up.

4. Partner with a recruiter to connect with passive candidates.

Given the current talent market, posting a job opening to online career boards is unlikely to yield a high-quality candidate. These professionals are already gainfully employed and not actively looking for new opportunities. An experienced executive recruiter can tap into an extensive passive talent network, identifying candidates who might be open to changing positions should the right opportunity come along. The right recruiter will know the best way to present this option and get the candidate curious and eager to learn more.

As your organization narrows in on its top choice candidate, a recruiter can ask tough questions about compensation expectations and relocation willingness that a hiring manager can’t ask. We can discuss any deal breakers and work behind the scenes to ensure the candidate receives an offer he or she is excited to accept. Additionally, we can look beyond your company’s immediate hiring needs and consider next steps. For example, it’s not unusual to come across candidates who are not quite ready for the top spot but could play an important supporting role, giving your organization a leg up on future hiring.

5. Manage a candidate-friendly hiring process.

How your organization manages its hiring process can have a significant impact on the final hiring result. When organizations are fully aligned in advance on candidate requirements, the interview process will advance smoothly and on schedule. Communication is consistent and transparent; when you tell a candidate you’ll be following up with them next week, you follow up on schedule. If needs change, you promptly let the candidate know. As a result, candidates feel honored to be part of the process and feel like they’re a priority at your company. They’re excited to join the team, leading to more engaged and productive hires who act as employer ambassadors.



Making the jump to machine learning – and finally making sense of all the seemingly disparate data your organization has acquired – won't happen overnight. By educating stakeholders on machine learning opportunities and hiring the right technical and forward-thinking talent, your retail organization will lay the groundwork for long-term success.