REPORT REPRINT

Retailers stock up on the benefits of machine learning

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Machine learning can help retailers meet the expectations of modern customers, but first it's important for decision-makers to understand the capabilities of present-day ML technology that can be applied to retail business use cases.

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The aura of anticipation and uncertainty that permeates discussions around AI and machine learning tends to overshadow the near-term and practical use cases of the technology. One space already showing the promise of machine learning is retail. Today more than ever, the customer is king as shoppers expect on-demand, seamless and personalized buying experiences. Machine learning can aid in getting retailers to meet these expectations, but first it's important for decision-makers to look beyond 'AI washing' and understand the current capabilities of machine learning that can be applied to retail business use cases. This report will cover the primary functions of machine learning in retail segments that 451 Research has designated.
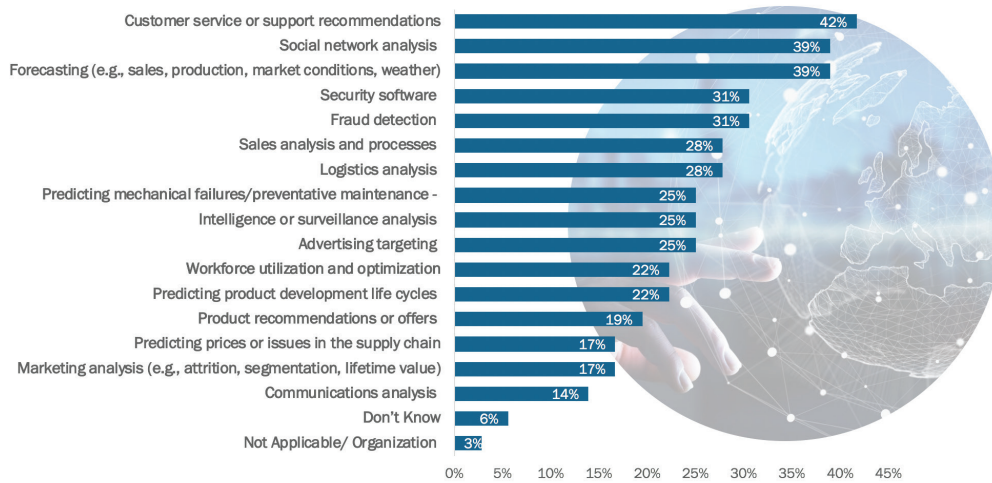
THE 451 TAKE

Each segment of retail is now experimenting with how machine learning can be applied successfully, and with this will come changes to the market. ML is increasing automation in many areas of retail, particularly manufacturing and checkout processes, which could result in the gradual reduction of factory and retail shop employees. Retailers will have to reevaluate how they capture the attention of their audience as more precise and faster online shopping functions cut the time buyers spend on retail sites. Retailers won't be the only ones needing to adapt to the disruption of machine learning – customers will also face changes in how they view and experience shopping. Customers will need to be comfortable with increased data sharing if they want to benefit from personalized shopping experiences via machine learning, and there will be those who will struggle with weighing out the benefits of convenience for potentially increased privacy risks. Like with most emerging technologies, currently unknown security risks could be an obstacle for both customers and retail decision-makers. As ML in retail matures, the risks and benefits will be made clearer, and those players who are already experimenting with it successfully will have the opportunity to define the space for themselves and build brand cachet.

CONTEXT

Our Voice of the Connected User Landscape's 2H 2017 Digital Transformation Survey shows that retailers are most interested in exploring advancements in machine learning and AI as potential retail game-changers over the next 24 months. Our survey indicates that retailers are highly interested in use cases that prioritize operational efficiency and customer engagement.

FIGURE 1: ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING OPPORTUNITIES IN RETAIL

Source: 451 Research, LLC

Category	Percentage
Customer service or support recommendations	42%
Social network analysis	39%
Forecasting (e.g., sales, production, market conditions, weather)	39%
Security software	31%
Fraud detection	31%
Sales analysis and processes	28%
Logistics analysis	28%
Predicting mechanical failures/preventative maintenance -	25%
Intelligence or surveillance analysis	25%
Advertising targeting	25%
Workforce utilization and optimization	22%
Predicting product development life cycles	22%
Product recommendations or offers	19%
Predicting prices or issues in the supply chain	17%
Marketing analysis (e.g., attrition, segmentation, lifetime value)	17%
Communications analysis	14%
Don't Know	6%
Not Applicable/ Organization	3%

Which of the following are the main reasons you may consider using machine learning at your organization?

Source: 451 Research's 2H 2017 Voice of the Connected User Landscape: Corporate Mobility and Digital Transformation Survey, (n= >500 ~30% IT and 70% line-of-business decision-makers)

AI IN RETAIL SEGMENTS: BACK-END OPTIMIZATION

The area of retail that encompasses supply chain management and the manufacturing operations typically performed at the warehouse level falls under the back-end optimization segment, and includes logistics and quality assurance. Optimizing the supply chain has a direct impact on front-end customer-experience issues such as automated store replacement and reducing 'out of stocks.' JDA's acquisition of Blue Yonder is an example of using AI and machine learning to automate complex supply chain decisions that impact the entire value chain.

Companies like GE (Brilliant Manufacturing) and robotics company Fanuc are using machine learning to improve the manufacturing process. In 2016, Fanuc joined its Gakushu Learning Software with NVIDIA's GPUs to enable robots to learn tasks via a sensor that collects and stores data. According to Fanuc, after about 18 cycles of training, the sensor is removed and the robots can perform tasks autonomously and adjust motions to real-time environmental conditions. Tesla is said to have employed Fanuc robots in the company's Fremont factory.

Logistical operations are implementing machine learning to train autonomous modes of delivery. In partnership with the UK government, Amazon (Prime Air) began testing the deployment of unmanned drones in 2016. Although the technology is functional, there are several regulatory hurdles around safety that Amazon must tackle to ensure that the drone parcel-delivery service will become a reality in the near term.

Quality assurance is another area of back-end optimization that is using machine learning to achieve efficiency. China-based Malong Technologies (ProductAI) uses visual representation learning algorithms to recognize products, using computer vision as an alternative to barcodes for use cases including quality assurance and merchandizing.

IN-STORE OPERATIONS

There is a wealth of opportunity to improve in-store operations. Efficiency of the operating model is everything in retail. The ability to pick up on small drivers of change at the very earliest stage and then finesse operations in response to those changes is what makes for a well-oiled retail machine. We know that a small modification such as the placement of a product can provide competitive advantage. The slightest rerouting of a pick list to speed delivery can reduce shipping costs. The improvement in payment processes, streamlining checkout experiences and overall improvement of in-store efficiency is categorized under the in-store operations segment.

A trend in this space is the use of machine learning for automation of checkout experiences. Adyen's RevenueAccelerate offering utilizes machine learning to increase transaction approval rates for payment processing. Companies like AVA retail.ai, DeepMagic and Wheely's use machine learning to enable staff-less shopping. Additionally, there are other players in this space that focus on enhancing specific aspects of stores, like pricing (Darwin Geo-Pricing) or design (Symphony Retail). Symphony Retail offers floor-planning technology to help retailers improve physical layouts by using customer insight and planogram data to identify high-performing configurations that increase value.

Bigger players are also turning to machine learning to optimize in-store operations, including Target, Walmart and more recently H&M. International fast-fashion retailer H&M is investing in machine learning to improve its ability to predict more successful product sales cycles that will make inventory leaner, thus avoiding large amounts of discounted items down the line.

MARKETING

The implementation of machine learning software to attract, retain and grow customer relationships is classified under the marketing and service segment. The impact of the digital and physical worlds colliding is felt most acutely in retail. It's virtually impossible to plan for all potential customer journeys – each is essentially a nonlinear, self-directed interaction, or 'micro moment,' across a customer's channel of choice. Furthermore, the growth in customer data coupled with the maturation of machine learning and AI ensures that retail is well-placed to benefit from new disruptive technologies that boost efficiency and improve customer engagement.

Retailers are looking to move beyond segment-based rules analysis toward algorithmic decision-making that enables personalization at scale that factors in individual affinity along with overall intent, resulting in greater relevancy and effectiveness. Self-learning algorithms allow marketers to adjust or adapt based on any combination of factors, such as individual customer or visitor behavior, geolocation, inventory levels and manufacturer incentives. There are several vendors – such as Adobe, Salesforce, Evergage, Persado, Reflektion, Emarsys, RichRelevance, Ometria, Optimove, Zeta.ai and Bloomreach – that offer retail-focused machine learning for personalized, cross-channel marketing and modern digital experiences.

There are also brand new categories rising to the occasion. Companies such as Appier for cross-device insight, Bold Metrics for intelligence for body shape and size personalization, Commerce.ai for modern merchandising, Sentient Technologies for self-learning visitor conversion, GrowthIntel for B2B target-market analysis, and Albert Technologies for audience targeting and media-buying are just a few entering the market with new approaches to enable retailers to create more intelligent interactions, which demand automated insight on unstructured data with embedded analytics.

CUSTOMER ENGAGEMENT

The customer-engagement segment involves the use of machine-learning-supported technologies that improve the overall buyer experience, whether online, mobile or in-store. This category uses AI and machine to create a truly unique, immersive experience for customers. A trend in this segment is in-store augmented shopping experiences. Japan's SoftBank has deployed its Pepper Robot in over 140 stores, where customers are greeted and assisted by a humanoid robot that is capable of recognizing faces and changes in human tone. Other examples of augmented in-store experiences are focused on personalization. For instance, Sephora stores have begun using a device called the ColorIQ camera to capture an image of a customer's skin and assign the customer an 'IQ' number that will be used to create a customer color profile of makeup and skincare that best matches or suites their specific number. Other customer-facing machine-learning-enabled experiences include chatbot stylists like Vue.ai and mode.ai, and virtual dressing rooms such as Modiface.

Wide-Eye Technologies, Fashwell, ViSense (for visual search) and Twiggle provide a more modern approach that improves the precision of the search experience to reduce customer friction points. Visual search makes images shoppable and uses a camera to recommend similar products. It can reduce visitor abandonment and ease the checkout process, avoiding shopping cart abandonment.

There are also ways to improve customer service through improved self-service capabilities via a conversational experience that provides automated, personalized selling or VIP support experiences. Customers can get help with products, and track shipping status and product returns – all within the confines of an automated digital conversation. If escalated to a customer service representative, recommended responses help expedite resolutions to improve engagement and lower operational costs. Companies Narvar, Solvyy and Xpresso.ai are a few new entrants that are turning conversations into conversions using concierge-like digital experiences.

ANTI-FRAUD AND COUNTERFEITING

The retail industry depends on secure transactions and transparency in the supply chain – two areas machine learning is playing a role in. Currently, one of the primary uses of ML is reducing manual reviews of suspicious transactions (e.g., billing/shipping address mismatch, cross-border purchases) by taking humans out of the process and making better-informed decisions based on previous transactions across numerous different merchants. Behavioral biometrics is another use case for machine learning, which compares a user's behavior to previous interactions with other shoppers (or bots) that have resulted in fraud. A few companies that specialize in using ML for reducing manual reviews and device identification are Sift Science, Stripe (Radar), Biocatch and Feedzai.

Counterfeit identification and product authentication is another area relying on machine learning to accurately detect bad-faith commerce. Entrupy, an anti-counterfeit company, uses advanced computer vision for luxury shoe and bag authentication. An example of an e-commerce company that uses ML for this purpose is Goat, an online and mobile reseller that specializes in rare collectable footwear, which the company vets via its proprietary authentication machine learning technology.

OUTLOOK

Widespread use of machine learning in retail is in its early stages, although in pockets the sector has been using the technology for many years. The market will likely go through several changes as the technology matures. The companies already experimenting with ML in retail will have to reevaluate how they capture the attention of their audience as more precise online shopping functions cut the time buyers spend on sites. Customers will also face changes in how they view and experience shopping, and will need to be comfortable with increased data sharing if they want to benefit from personalized shopping experiences via machine learning. Like with most emerging technologies, unknown security risks could be an obstacle for both customers and retail decision-makers.