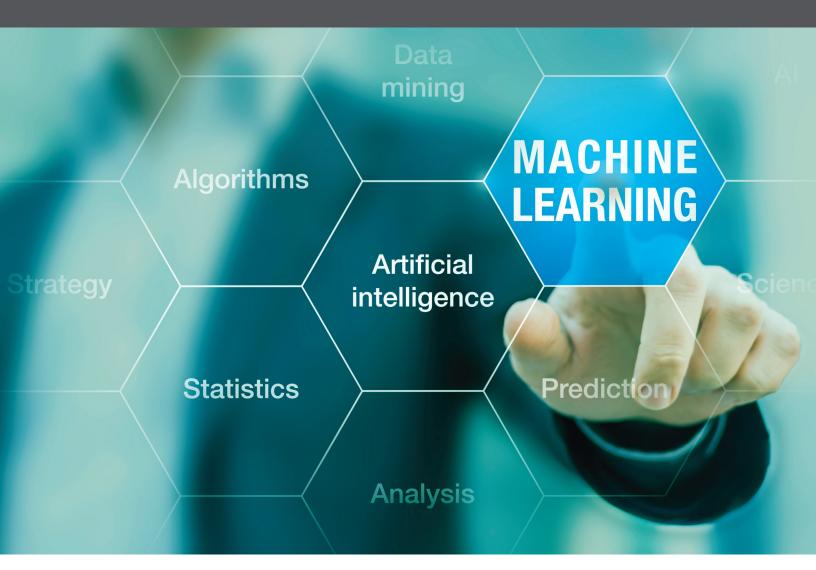# synchrony
FINANCIAL

Engage with us.

Machine Learning for Retailers

Driving Results with Artificial Intelligence Tools

July 2017

In the past decade, the field of data science has made significant progress in such areas as image and speech recognition that once seemed confined to research and academia. That progress is continuing today at a breakneck pace, with innovations like machine learning having the potential to transform entire portions of the economy.

Ever wonder how Netflix gives you recommendations for the next movie or how your smartphone knows that you will be driving to work Monday morning? Those are both examples of machine learning.
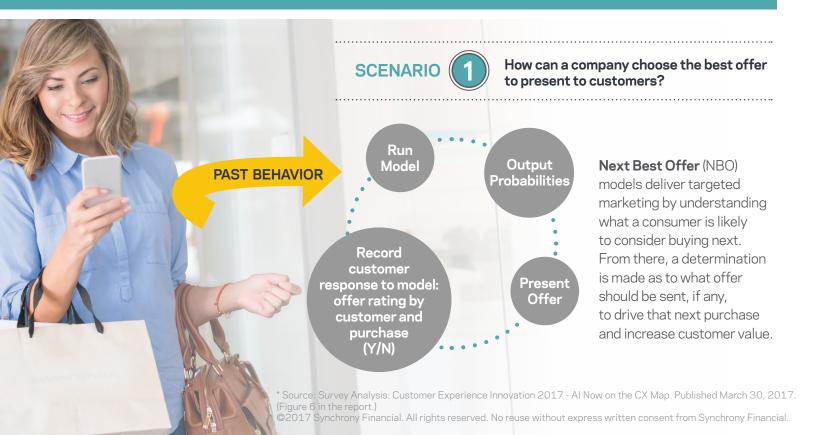
Machine learning is a subset of artificial intelligence. It creates computer-based algorithms designed to learn from data — and adapt to new data — without being explicitly programmed. In the past, using traditional methods such as regression analysis, an analyst had to define the objective and look for correlations between that objective and a defined set of data inputs. If new data came in, the analyst needed to rerun the analysis, create new correlations and develop a new algorithm. Machine learning basically alleviates the need for manual intervention with computing programs that automatically take new data inputs and "learn" from them.

Many companies are already exploring this technology. In their March 2017 "Customer Experience Innovation Survey — AI now on the CX Map" report, Gartner surveyed a panel of IT and business leaders. The data indicates that, **"more than half of the organizations in the 2017 study expect be using machine learning within the next three years,** 47% expect to be using virtual customer assistants or chatbots, and 40% are focused on virtual personal assistants for their customers." According to the Gartner report, 54% of businesses surveyed stated that they have either implemented machine learning or have plans to do so in the next 1 – 3 years.*

Artificial Intelligence: Simulation of human intelligence processes by computer systems, including learning, reasoning and self-correction.

THE FOLLOWING EXAMPLES SHOW HOW MACHINE LEARNING CAN HELP RETAILERS ANALYZE AND IMPROVE BUSINESS RESULTS

SCENARIO 1 How can a company choose the best offer to present to customers?

PAST BEHAVIOR

Run Model

Output Probabilities

Present Offer

Record customer response to model: offer rating by customer and purchase (Y/N)

Next Best Offer (NBO) models deliver targeted marketing by understanding what a consumer is likely to consider buying next. From there, a determination is made as to what offer should be sent, if any, to drive that next purchase and increase customer value.

A compelling, personalized offer can go a long way in influencing a consumer's shopping and buying habits. Keep in mind that contacting a consumer has a cost, both financially and possibly in reputation, because a poorly targeted offer can be annoying. Using machine learning, a company can decide which customer should be targeted with what offer, better addressing their needs and wants, in addition to eliminating wasteful and costly marketing.

In the retail environment, machine learning starts with SKU level data — the individual items purchased in each customer transaction. Data scientists can store this information on a massively parallel processing database, with multiple processors carrying out coordinated computations simultaneously. Using NBO models, they can more efficiently develop a list of probabilities that a consumer will shop in one of several predefined categories, depending on the retailer. For example, a model built for a mass merchandise retailer can predict whether a customer's next purchase will likely involve automotive goods, baby care items or housewares.

Inputs are provided by information, such as what the consumer buys next and/or how they rate the offer presented. These inputs allow the model to continually modify probabilities. This continuous process integrates new information, closing the learning loop so the customer can effectively "tell" the company what he or she wants based on past behaviors and present preferences.

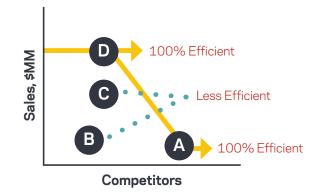**SCENARIO** (2) **How can a retailer determine the efficiency of each of its stores?**

Machine learning's data-driven intelligence **can identify gaps in performance efficiency by understanding how a location (e.g., store front, gas station) should perform.** A technique called Data Envelopment Analysis (DEA) can show a retailer why a store with the most sales isn't necessarily the most efficient one. How? Basically, **DEA is a method that can compare a store's various inputs using hundreds of characteristics — such as the number of customers, employees and nearby competitors — to determine its efficiency.** From there, the algorithm ranks each site based on the differences between the expectations and the actual results to come up with an efficiency ranking. Based on that number, a retailer can determine which stores need the most help — and the most appropriate type of help they need.

Comparing the efficiency of various locations can be challenging at face value. One location could be newer — with upgraded amenities and square footage — but located in a less trafficked location. In the past, it was more difficult to determine if this location should overperform or underperform a smaller, older location with fewer amenities but more foot traffic. By using machine learning, thousands of characteristics can be entered in numerous combinations to determine which store is performing above or below expectations.

STORE EFFICIENCY ANALYSIS

Example Input: Number of competitors in 10 minute radius
Example Output: Store Sales

Machine learning not only allows retailers to estimate what a given location should produce, but also lets retailers rank stores at a very granular level. In a market like Chicago, for instance, with numerous locations, a retailer can cluster their stores into neighborhoods and use machine learning to prioritize where they should spend their time and money.

K-Nearest Neighbor (KNN) is an unsupervised clustering algorithm that divides all locations in a market into smaller groups based on proximity.

Leveraging KNN and DEA enables retailers to use machine learning to provide area managers with locations that would benefit the most from an in-person visit. This also optimizes the order of site visits to minimize travel times.

Machine learning is proving to be a valuable tool retailers can use to maximize results and touch-points on multiple levels—whether it's improving their ability to measure store efficiencies or optimizing offer targeting. The technology is also being used successfully for fraud detection and mitigation. As wide-ranging applications are currently being developed, data scientists continue their work to expand machine learning's usage globally.

About Synchrony Connect

Synchrony Connect is a value-added program that lets Synchrony Financial partners tap into our expertise in non-credit areas. It offers knowledge and tools that can help you grow, lead and operate your business.

Grow
Marketing, analytics and research expertise to help you drive business growth
Lead
Tools for leading your organization and developing yourself as a leader
Operate
Best practices around business strategy and optimizing cost

Contact your Synchrony Financial representative or visit us at **SynchronyFinancial.com** or **SynchronyBusiness.com** to discover how we can help you grow your business.

Lukasz Filipek—Senior Manager, Analytics Insights
Lisa Firestone—Vice President, Marketing Innovation Insights
Andrew Lofgreen—Assistant Vice President, Analytics Insights
Ted Miller—Vice President, Loyalty Analytics
Sue Yasav—Vice President, Thought Leadership

synchrony FINANCIAL

Engage with us.