

AI in Retail: Executive Cheat Sheet

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Emerj Artificial Intelligence Research

At Emerj Artificial Intelligence Research, we have a singular and powerful focus:

“Mapping what’s possible and what’s working in artificial intelligence in order to help leaders develop winning AI strategies.”

We create cutting-edge AI impact research, inform executive leadership, and make important contributions to important decisions around governance, innovation, and strategic planning. We’re called upon by many of the largest and most reputable organizations in the world:



Our research focuses on three critical aspects of AI capabilities:

- **Applications (“What’s Possible?”)** – Examining the landscape of AI applications, open-source tools, and use-cases that might solve organizational problems, or impact strategy.
- **Implications (“What’s Working?”)** – Determining the use-cases with a genuine track-record of ROI, and determining the integration costs and potential financial upside of AI applications.
- **Plans (“What to Do?”)** – Informing strategy by honing in on the AI trends or capabilities most likely to deliver the desired results or the organization.

Through our [Research Services](#) and [AI Business Strategy Process](#), we help clients win market share and make more profitable decisions – with a firm grounding in the current realities of the AI landscape.

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Table of Contents

- 1. AI in Retail and eCommerce Use-Cases**
 - Product Recommendations
 - Personalized Website Messaging and Email Campaigns
 - Fraud Detection
 - Customer Service
 - Inventory Management
 - Security
 - Merchandise Management
 - Store Management
 - Automated Checkout
- 2. AI in Retail and eCommerce Glossary**
- 3. AI in Retail and eCommerce Resources**
- 4. About Emerj**

1. AI in Retail and eCommerce Use-Cases

Product Recommendations

When one thinks about AI in retail and eCommerce, Amazon may be the first thing that comes to mind. One of Amazon's key differentiators is its AI-powered recommendation engine that suggests products customers may want to buy based on products they've previously purchased and their demographic information. Recommendation engines generally run on predictive analytics technology, which forecasts an outcome based on historical data. In the case of recommendation engines, the predictive analytics algorithm forecasts that a customer may like a product based on historical data, demographic data, time of day, internet search data, and more.

Personalized Website Messaging and Email Campaigns

Some vendors offer software that personalizes the website a site visitor views depending on the data a company has on that visitor. For example, eCommerce companies that sell furniture in many cases offer products for a variety of rooms. A site visitor might use the company's search function on its website to look for bedroom furniture: mattresses, nightstands, lamps, dressers, etc. Suppose the visitor did not end up purchasing anything after using the search function, but they returned to the website home page several days later. AI may allow the eCommerce company to display a separate version of its homepage to this particular visitor. In this case, the homepage might emphasize or show pictures of bedroom furniture, making it easier for the visitor to find something they are looking for.



Such a capability would run on predictive analytics algorithms, which would use data on the site visitor to “predict” which version of the website would have a higher chance of getting them to buy something. Right now, it would be extremely difficult to build an AI application that rearranges a company’s website in real-time, and so these website versions would likely have to be pre-built. All the algorithm would do is show the appropriate version based on the site visitor’s data.

Similarly, predictive analytics software could determine which email template to send to certain email subscribers based on data about their past opens and clicks, as well as demographic data the company may have on the customer through surveys and website activity. This could automate the process of manually creating email subscriber segments and manually scheduling different emails to be sent to them. Instead, the AI software could take care of this, sending the appropriate email template only to subscribers that meet certain data criteria.

Both of these use-cases are relatively nascent in comparison to recommendation engines, however.

Fraud Detection

Among the most proven use-cases of machine learning in business are fraud detection and anti-money laundering. Anomaly detection algorithms are good at picking up deviations from the norm, and they’ve been popular in industries like banking and retail since the early 2010s.

In order to use anomaly detection software for fraud prevention, a company would need to install the software and allow it to run in the background so that it generates an idea of normalcy within the company’s payment processor. Then, when a payment passes through a company’s payment processor, an anomaly detection software could flag that payment as potential fraud automatically if it deviates from the purchase behavior of the average customer or similar deviations from the norm.

For example, an office supplies store might flag a series of payments for bulk orders of printer ink if those payments all came from the same customer, took place within several seconds of each other, and are for large dollar amounts. This may not be typical of the average customer at that store, which may warrant flagging the payments for fraud. The actual algorithms are much more nuanced, but this is one example of a simplistic set of criteria for potential fraud.

Customer Service

Chatbots

AI could reduce customer service costs in the retail industry by way of natural language processing, a type of machine learning application that can discern the intent behind written text or spoken words. Chatbots are the most popular AI application for customer service, but most



of them can only handle very rudimentary questions right now. Site visitors can type their questions into a chat window, and the chatbot would respond with pre-written templates.

For example, a customer might ask a chatbot if they can return an item they bought. The chatbot might respond with information about refunds pulled from the company's FAQ site. It might then present a series of options to the customer; a sophisticated chatbot might be able to offer the customer a refund within the chat window, but most might present simpler options. It might ask the customer if they want to chat with a customer service representative or download a return label.

Search and Discovery

Natural language processing applications could also help call center representatives pull up the data that a company has on a customer faster. These applications, often called "search and discovery" or "enterprise search," scour the company's intranet or cloud storage for instances in which the customer interacted with the company.

For example, a call center representative might be able to pull up call center logs and email threads involving the customer, and the customer's account in the company's CRM at the same time. This could allow the call center representative to better assist the customer by referencing past conversations the customer had with the company, which may reduce the customer's frustration and provide them an all-around better experience.

Inventory Management

AI could also help retailers and eCommerce sites manage their inventory. A predictive analytics algorithm could forecast when a company should restock specific items before they run out of them, reducing out-of-stocks that come with large opportunity costs and risk upsetting customers.

For example, an AI software for inventory management may be able to alert a company based on predictions that it will run out of stock for certain kinds of shoes in the next few days. It might predict this based on historical sales data or those shoes and tie that data to time of year and other factors.

Security

Brick-and-mortar retailers could take advantage of computer vision, a type of machine learning that can analyze images and video. Some stores are using computer vision for security purposes, pointing cameras toward checkout lanes that can detect when store employees intentionally fail to scan items they're ringing up; usually, employees will do this for people they know. These AI-enabled cameras could also detect when customers fail to scan objects at self-checkout counters or when they take items from shelves and hide them on their person.



Merchandise Management

Other computer vision applications could help brick-and-mortar retailers with merchandise management. These include cameras that can detect when a shelf has empty space. The system would then alert employees in the back of the store to restock the shelves, which could potentially generate more sales.

Store Management

Computer vision algorithms can also analyze foot traffic in different areas of a store, providing store management insights into how it can rearrange its shelves and tables to increase sales.

Automated Checkout

AI could also make automated checkout possible, but it isn't easy. Automated checkout systems require that many cameras are placed throughout a store, and the computer vision algorithms behind these cameras would need to be trained to recognize all of the products in the store, as well as human faces.

Stores with automated checkout sometimes require customers to stand in front of a camera that scans their face, connecting them to an account the store has on file with the customer's credit card information. Then, the customer could pick up items in the store and walk out with them.

Other stores don't require customers to scan their face as they walk in, but all of these stores are very nascent. Amazon Go is perhaps the best example of them, but Go stores are not yet widespread.

2. AI in Retail and eCommerce Glossary

Predictive Analytics: Predictive analytics is a type of machine learning software that predicts an outcome based on historical data.

Computer Vision/Machine Vision: Computer vision, also known as machine vision, is a type of machine learning software that analyzes images and videos. Oftentimes computer vision systems are set up with cameras for analyzing video feeds in real-time.

Natural Language Processing: Natural language processing is a type of machine learning that can discern the intent or sentiment behind typed text.



Anomaly Detection: Anomaly detection is a type of machine learning software used for flagging deviations from an established norm within a digital ecosystem. It is most often used for fraud detection and anti-money laundering use-cases.

Recommendation Engine: Recommendation engines are an AI application often built on predictive analytics algorithms. Recommendation engines use data on a customer's demographics, the customer's past purchase behavior, and the customer's site behavior to recommend products the customer may want to buy.

Chatbot: A chatbot is an AI application built on natural language processing algorithms. Most chatbots allow users to ask questions by typing on their computers or smartphones, but some allow users to ask questions via voice (Alexa, Siri, etc.). Chatbots are most often deployed for customer service purposes, responding to customer inquiries about products, returns, refunds, and other processes. In the case that they can't, chatbots will sometimes route the customer's inquiries to a human operator either by emailing the customer support team or connecting them to a customer support agent within a chat window.

3. AI in Retail and eCommerce Resources

Below we highlight some of our best, free reports available on Emerj.com, including a few of the most relevant insights for retail leaders from each of them:

Artificial Intelligence in Retail – 10 Present and Future Use Cases

Link: <https://emerj.com/ai-sector-overviews/artificial-intelligence-retail/>

- **Sales and CRM Applications:** Chatbots and a robot that interacts with customers in-store and answers their questions.
- **Product Recommendations:** Conversational interfaces for recommending products to users, including IBM Watson Cognitive Computing.
- **Logistics:** Delivery drones from Amazon and delivery robots from Dominos.

Artificial Intelligence in eCommerce – Comparing the Top 5 Largest Firms

Link:

<https://emerj.com/ai-sector-overviews/artificial-intelligence-in-ecommerce-amazon-alibaba-jd-com/>

- **Chatbots/AI assistants:** Responding to customer inquiries, responding to voice commands for simple tasks and providing product recommendations through interactions using natural language.
- **Logistics:** Machine learning algorithms are being applied to data to help automate warehouse operations.



- **Recommendation engines:** Companies are analyzing customer behavior on their websites and using algorithms to predict what products may appeal to customers and provide recommendations.

Machine Learning in Big Box Retail – Walmart, Target, and Costco

Link: <https://emerj.com/ai-sector-overviews/machine-learning-big-box-retail/>

- **Walmart:** Walmart's Intelligent Research Lab is used to test the efficacy of machine learning, including computer vision, in its stores.
- **Target:** Target has a product recommendation application and a way for customers to try beauty products virtually.
- **Costco:** Costco is using predictive analytics for demand forecasting in its bakeries.

4. Emerj Artificial Intelligence Research

Emerj Artificial Intelligence Research is where executive leaders turn to understand how AI is impacting their organization or industry – and what to do about it. We're the industry source for authoritative market research and competitive intelligence for the business applications of artificial intelligence.

Our objective, jargon-free research and industry overviews are designed to give executives and decision-makers exactly what they need for competitive insight, informed AI technology procurement and strategic planning around AI.

With a finger on the pulse of academia, Fortune 500s, and the global artificial intelligence startup ecosystem, organizations call upon us for insight and research for their most important AI-related strategic decisions.





Through our [Research Services](#), [AI Capability Maps](#) and [AI Business Strategy Process](#), we help clients win market share and make more profitable decisions – with a firm grounding in the current realities of the AI landscape.

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