

Cognitive Systems for Next-Gen Retail Store Operations: Moving from Insights to Transformation

Abstract

Store operations are undergoing a massive digital shift. Mobile devices and tablets are increasingly replacing handheld devices and point of sale registers. This shift is empowering store associates with relevant product availability and pricing information for enhanced in-store retail experience. And, this is just the beginning of store transformation journey for retailers. The next wave of retail transformation is already underway, driven by a powerful combination of analytics, artificial intelligence, and robotics.

In this paper, we explore how artificial intelligence (AI) will revolutionize retail store operations. We also discuss how retailers can ride the next wave of transformation using voice-based assistants and humanoids to automate store operations and pioneer next-gen retail store experiences.

Empowering Store Staff

Today, most retailers offer compelling prices and flexible buying options across channels such as buy online pick up in store, buy online return in store, and so on. Retailers are highly focused on leveraging analytics and AI to understand customer behavior and improve engagement experience. However, what is not so obvious is the growing complexity of store operations, and the way retailers can automate back-office activities such as receiving, stock taking, and quality check using AI and robotics. This in turn can enable store staff in fulfilling new functions and improving customer experience of in-store interactions, thereby building a powerful engagement differentiator.

Today, a store associate's job is no longer limited to receiving goods in the warehouse, stocking them on the shelves, conducting an inventory check, and processing the returns. It has evolved to include customer interfacing where they are expected to provide product information, recommend promotional offers, forecast demand, and ensure merchandising placements. It is imperative that retailers reimagine their engagement with store associates to motivate them to perform efficiently, reducing the overall operating cost of the stores and increasing the revenue.

Driving Next-Gen Store Operations with AI

Lowes and Starbucks are leveraging automated machines in their stores to slash labor costs as well as time to serve.¹ With global revenue from AI set to increase to \$36.8 billion by the year 2025, retailers shifting to AI for in-store assistance are poised to increase productivity and create happier customers.² However, retailers must understand that adopting AI and machine learning (ML) is a journey and not the end objective. Although the general apprehension is that AI might replace humans altogether, but the truth is very different – there is still some work to be done before robots can completely replace humans through experience-based self-learning that enables them to recognize shoppers and make personalized suggestions.

So, what can retailers do to reimagine their store operations today and be ready for the future? First of all, retailers must articulate a futuristic vision and define a roadmap. They must first select the in-store operational activities to be AI or ML enabled such as replenishment, stock taking, and check-out. They must also anticipate the challenges in delivering next-gen store operations and determine where AI can provide the most valuable business insights – for instance, using camera vision for shelf monitoring or smart carts for smart check-out.

Using video analytics, AI can help identify the items picked up by the customer from store shelves and tag them to the customer. It will require tagging the right item, in the right quantity to the right customer. When the customer reaches the checkout counter, the items can be automatically scanned and invoiced from the customer's smart cart. The customer then pays the amount automatically using mobile payment services such as Apple pay, credit card, or cash. The smart scanner can also identify any case of pilferage and sound an alarm.

Another use case for video analytics involves the stock taking process where the system analyzes and notifies the floor manager to restock shelves that are running low. The next level of AI enabled store operations could entail ambidextrous robots assessing product levels in the store and then picking up required items from the backroom and stocking them on the shelves according to predefined planograms. For example, Amazon³ uses robots in the company warehouses to locate items and help store associates quickly gather them.

As AI technologies become more sophisticated, the new system can be used to automate complex operations such as customer returns, eventually resulting in a fully human independent humanoid setup.

Deploying a Robust DataOps Platform

An AI-based transformation typically entails a three step process, which are: identifying the data that needs to be captured for the activity under consideration, setting up data streams from the source for getting the data, and designating the data destination where the data will reside before and after processing.

For example, to design an intelligent daily task scheduling application for store staff, data related to fulfillment of online orders, in-store customer traffic, customer preferences and demands, along with the skill and personality traits of store associates will serve as the starting point. What's more, the scheduling can be customized to the unique needs of the store. The outcome: reduced number of employees required in the store leading to lower operating costs, improved staff efficiency, and enhanced customer satisfaction.

After having established the data streams such as IoT sensors, drones, and cameras (see Figure 1), retailers need to manage and store the data ingested from internal and external sources in a data platform that could either be open-source or cloud-based. Using the DataOps (data plus operations) platform, businesses can derive real-time insights and deploy self-

learning automated systems and robots to deliver insights that is easily accessible to the business users for decision making.

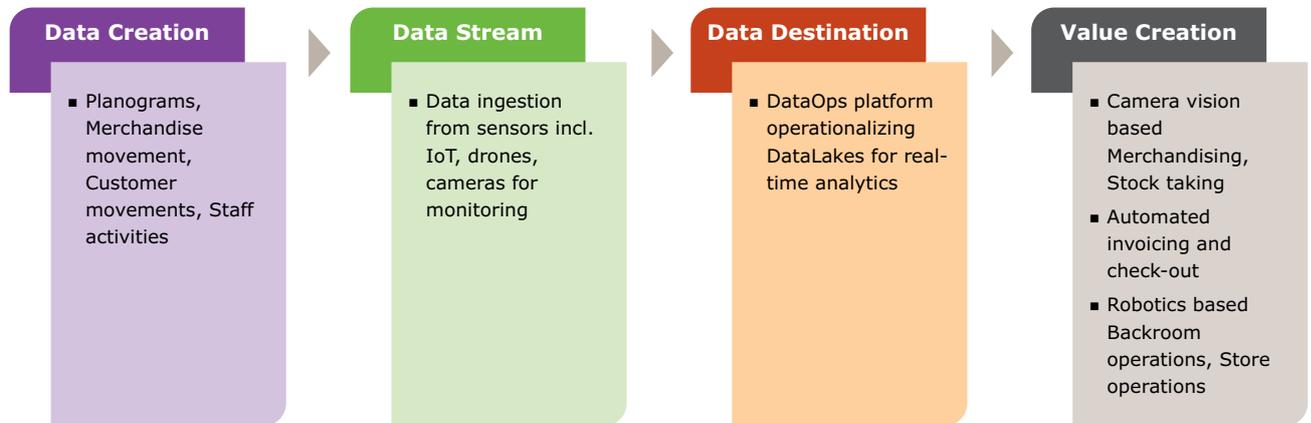


Figure 1: Transformation roadmap for setting up cognitive systems for retail store operations

Unmanned Retail Stores: The Next Frontier in Customer Experience

The day is not far when retail stores will be completely unmanned with end-to-end automated store operations. An AI based store operations platform that integrates all physical store functions such as stock taking, back room operations, merchandising, loss prevention, checkout, payment, and returns can revolutionize the way retailers operate, enabling them to offer a well-rounded and personalized customer experience.

Another trend to watch out for is voice-activated shopping. With the growing adoption of voice-based assistants such as Alexa and Siri, the time is ripe for retailers to use real-time store assistants to enhance customer experience and increase the efficiency of store associates and managers. Voice-based assistants can help customers check item availability, navigate through the store, create an in-store shopping list in sync with the items in their smart cart, and enjoy relevant promotional offers.

AI systems can offer insights into inventory, preempt shop lifting, identify incorrect item placements, and predict store staff requirements - based on real-time store traffic, weather conditions, and local news. Self-learning humanoids will not only improve shopper experience but also help retailers reduce in-store operational costs in remote locations and effectively reduce product shrinkage. Equipped with machine learning capabilities, humanoids can be designed to perform complex operations such as processing item returns, intelligently deciding on the condition of the returned item, and initiating

the refund after properly labeling the returns. While use cases abound, the success of AI-enabled store operations will depend largely on how well the data streams are managed and mined, which is why retailers must focus on deploying a sophisticated ML-based data analytics platform.

References

- 1] Business.com, How AI is changing the retail industry, February 2018, accessed June 2018, <https://www.business.com/articles/artificial-intelligence-changing-retail/>
- 2] Tractica, Artificial Intelligence Revenue to Reach \$36.8 Billion Worldwide by 2025, April 2016, accessed June 2018, <https://www.tractica.com/newsroom/press-releases/artificial-intelligence-revenue-to-reach-36-8-billion-worldwide-by-2025/>
- 3] Techmergence, Artificial Intelligence in eCommerce – Comparing the Top 5 Largest Firms, February 2018, accessed June 2018, <https://www.techmergence.com/artificial-intelligence-in-ecommerce-amazon-alibaba-jd-com/>
- 4] The Denever Post, Retail “smart stores” will feature robots, interactive shelves, January 2017, June 2018, <https://www.denverpost.com/2017/01/03/smart-stores-robots-interactive-shelves/>

About The Author**Shalem Tirkey**

Shalem Tirkey is a domain consultant with TCS' Retail business unit. He has over eight years of experience in the retail industry and has worked extensively in conceptualizing retail solutions to suit client requirements. Shalem has worked on efficiency improvements in store operations and implemented in-store digital merchandising systems for several of TCS' retail clients in the US. He holds an MBA degree from the Indian Institute of Management, Bangalore, India, and Bachelor's degree in Electronics and Communication Engineering from the Netaji Subhas Institute of Technology (NSIT), Delhi, India.

Contact

Visit the [Retail unit](#) page on www.tcs.com

Email: retail.solutions@tcs.com

Subscribe to TCS White Papers

TCS.com RSS: http://www.tcs.com/rss_feeds/Pages/feed.aspx?f=w

Feedburner: <http://feeds2.feedburner.com/tcswhitepapers>

About Tata Consultancy Services Ltd (TCS)

Tata Consultancy Services is an IT services, consulting and business solutions organization that delivers real results to global business, ensuring a level of certainty no other firm can match. TCS offers a consulting-led, integrated portfolio of IT and IT-enabled, infrastructure, engineering and assurance services. This is delivered through its unique Global Network Delivery Model™, recognized as the benchmark of excellence in software development. A part of the Tata Group, India's largest industrial conglomerate, TCS has a global footprint and is listed on the National Stock Exchange and Bombay Stock Exchange in India.

For more information, visit us at www.tcs.com