Three Ways Machine Learning Can Support Smarter Replenishment for Fresh Food

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Fresh food, a crowded arena in grocery retail, is becoming more competitive in a fast moving, consumer-driven grocery marketplace. With the on-demand economy, companies like Amazon, Uber Eats and Blue Apron have fundamentally changed the way consumers think about convenience, organic options, unlimited assortments, low prices and fast delivery, grocers must respond. Together with Amazon's purchase of Whole Foods and increasing competition from discounters and convenience store chains, fresh food retailers are facing unprecedented pressure to satisfy changing consumer preferences.

How can fresh retailers remain competitive and relevant? In McKinsey's article, "The secret to smarter fresh-food replenishment? Machine learning.", Christoph Glatzel, Matt Hopkins, Tim Lange and Uwe Weiss estimate that fresh, and more recently "Ultra-fresh," foods account for 40% of grocers' revenue and a third of their costs. This category has been least well served by traditional replenishment planning systems.

Fresh's biggest replenishment challenges?

For grocers, the fresh food category represents the biggest challenges on both ends of the replenishment spectrum. On one end, both demand and supply are highly variable and difficult to predict traditionally with limited bandwidth and resources. No grocer plans for a romaine lettuce contamination scare or the resulting plummet in demand.

On the opposite end of the spectrum, fresh foods are highly perishable, with shelf-lives measured in days. Stock too much and waste can quickly eat into already thin margins. Stock too little and risk not only lost sales, but also lost customer loyalty and repeat visits. In fact, the "2019 Retail C-Suite Viewpoint Survey" conducted by Incisiv in collaboration with Microsoft and Blue Yonder found that 75% of C-suite executives rank in-stock/ on-shelf availability as the most important factor for customer engagement. So, getting the too much/too little balance just right is mission critical.

The replenishment planning problem?

Traditional replenishment planning systems use a fixed, rules-based approach to calculate replenishment requirements. They use historical sales and delivery data to predict future needs. This approach supports stable products with constant demand, think hand soap or laundry detergent. This method is also like driving a car while only looking in your rearview mirror. In the fast-changing, bumpy and frequent curves for fresh foods it can mean a massive hit to customer satisfaction and your bottom line.

It isn't just the lack of forward vision that plagues traditional replenishment planning systems, either. Due to the variability of local demand based on changing tastes, day of the week, events or other local trends, as well as local price changes and promotions, planners rarely rely on systems and more often rely on tribal knowledge to manually input data into replenishment systems. The constant substitution and cannibalization across and within categories can also be challenging. This process is time-consuming, error prone and relies heavily on the planner's experience.

So, what's moving fresh replenishment forward?

Clearly, more advanced replenishment planning solutions are needed to help fresh food grocers successfully compete in the digital age. Unfortunately, the Incisiv study found that grocers lag other retail segments in their digital maturity.

Three steps fresh food grocers can use to catch up and gain a competitive advantage

1 Automate

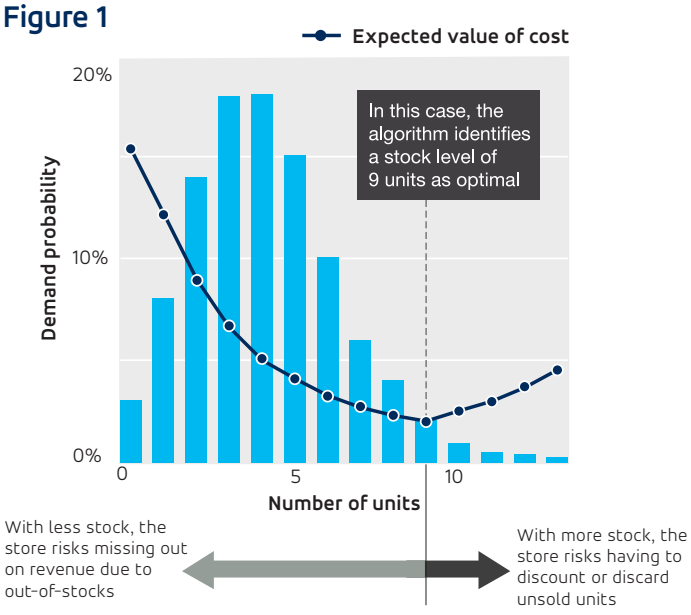
The first step is to replace the planners' enormous amount of manual inputs for each store with machine learning (ML) technology and instantly collect data from scores of internal and external sources. This includes data from internal sources such as advertising campaigns and store opening times and from external sources including suppliers, partners, customers and other third parties, as well as from social, news, events and weather (SNEW) sources. It could also include data captured from temperature and humidity sensors in storage areas and store shelves. By automating this wider collection of data, retailers can improve replenishment planning decisions while freeing planners for more proactive activities. With up to 99% automation, planners can focus on product availability, vendor collaboration and establishing higher quality data, the foundation for data-driven solutions.

2 Look forward

Instead of relying solely on historical data to predict future needs, ML and artificial intelligence (AI) use many internal and external sources of data to create a daily probabilistic demand forecast that enables a more robust determination of future replenishment requirements. This can include sophisticated cost/benefit analysis that takes into account the asymmetric nature of inventory balancing. That is, the cost of waste from too much inventory versus the risk of lost sales from too little inventory when customers shop. The calculations can also take into account supply chain constraints such as supplier delivery windows and store receiving hours.

Let's look at a simple example, as shown in figure 1. The graphic shows demand probabilities for a single fresh food item such as apples and bananas on a given day in one store. Using the traditional replenishment approach, an appropriate inventory level to meet expected demand would be four or five units. But what if a sixth or seventh customer wants to buy a cumquat that day? The store would lose that potential revenue and may also lose customer loyalty and subsequently, future revenue. Factoring in a broader set of inputs, the ML-driven demand probability curve shown on the graph indicates that the best inventory level on a cost/benefit basis would actually be nine units.

Figure 1



Source: McKinsey&Company

3 Trust the multiplier effect

The use of ML and AI technology to improve replenishment planning offers more than replacement of outdated planning systems and manual effort. Yes, replacing the manual planning input requirements across hundreds or thousands of stores will have a significant cost benefit. And yes, replacing older planning systems with ML-based planning will generate more effective replenishment plans. But there are other benefits for deploying ML and AI technology, what we call, the Multiplier Effect.

The Multiplier Effect refers to the ability for ML and AI to easily integrate with other systems and capabilities to produce broader benefits than those derived from normal replenishment planning. For example, ML algorithms can consider corporate goals and key performance indicators so that replenishment plans reflect corporate strategies in addition to individual store requirements.

AI can also simultaneously optimize pricing with replenishment to simulate how pricing decisions impact demand, and thus, replenishment needs. If a small reduction in price results in significant demand increases, for example, replenishment order quantities would be increased accordingly.

If, however, demand is fairly inelastic to price, quantities and pricing may be held steady. Because demand-price elasticity can change frequently, the ability for ML to continually evaluate pricing and replenishment data provides great potential to improve profitability. It evaluates seasonality and takes into account start-of-season and end-of-season costs. For example, the algorithms can factor in seasonal changes for berry pricing, expensive at the season start, cheap in high season and losing demand towards end of season when new fruits are coming into play. This happens simultaneously while accessing potential markdowns to reduce waste and increase margins.

ML data can also be used with assortment planning to optimize categories and subcategory levels by store, driving localized assortments based on true consumer attribution and preference. This can improve store profitability and can be a valuable input to merchandising teams and suppliers.

These are just a few examples of how machine learning automates and significantly improves the ability to analyze a tremendous amount of internal and external data in real-time, and as a result can have a multiplier effect on effectiveness and profitability across many areas of a grocery retailer's business.

The future is on the Cloud.

One final consideration for the adoption of advanced digital technology including ML and AI, these systems are typically Cloud native. They can be overlaid onto existing supply chain and retail systems in a relatively short period of time to enhance the efficiency of those systems as well. So, it is no surprise that the C-suite respondents to the Incisiv survey expressed that ML and AI would have more than twice the impact of any other technology on their business agility. Additionally, 55% of grocers in the survey see ML and AI having the greatest impact on optimizing inventory levels.

The future is now. Are you ready?

According to Retail Dive's article "Retail spending on AI to reach $7.3B by 2022," retailers globally are committed to investing in AI and ML. The fresh food category is too vital to grocer success to wait, and the competition is only getting tougher.

Discover what's possible for your fresh food replenishment and every other aspect of your grocery retail environment. Visit BlueYonder.com to learn how Blue Yonder's Luminate family of Retail solutions, using AI and ML, can position you for a brighter future.

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