Time Travel Store Checks

Combining crowdsourcing and AI to win at retail

Executive summary

The post-pandemic retail world presents a challenging chessboard for the Consumer Packaged Goods (CPG) industry, with pieces constantly in flux. New product innovation, escalating inflation, seasonal promotional activity, and persistent supply chain disruptions continually add layers of complexity to this ever-changing, high-stakes game. At the forefront of these challenges are Category Managers, tasked with making the strategic moves that ensure retail execution remains precise and profitable.

Research has repeatedly shown that 60-90% of buying decisions are made at the physical shelf. It's no surprise that according to a recent study by McKinsey, companies that focus on retail execution outperform their peers by an average of 10% in sales growth and 30% in earnings growth. Category Managers need to know how their products look and compete on the shelf.

But finding the time to do store checks can be difficult. Too often, you end up visiting the same few stores around the corner from the office. Moreover, these visits only give a snapshot of a single location and moment in time, often missing the bigger picture. The real challenge is understanding retail execution over time and across a wide range of stores.

That's why we wrote this whitepaper. We're interested in exploring a novel approach to the time-honored store check by introducing the concept of 'Time Travel Store Checks.' The idea is that you could take an already powerful workflow known for producing incredible insights and supercharge it. Imagine flying across your national retail network from your laptop. Imagine scrolling back in time to understand the nuanced evolution of the shelf. Imagine having your whole team's eyes 'in-store', bolstered by an AI assistant helping you along the way.

Marrying the irreplaceable insights of physical store checks with the scalability of crowdsourcing and the precision of AI can unlock these capabilities, and more. It's like having a high-powered retail telescope that lets you see further, clearer, and faster.

In this report, we're going to delve into the practicalities of consistently capturing in-store photographs over time, then leveraging advanced AI algorithms to extract metadata. We'll look at how this approach can track planogram compliance, keep tabs on the competition, and enable companies to spot market trends before they're trends. We'll explore the short-term benefits of accessing actionable retail insights without the typical lag that comes with more conventional data sources. We'll also examine the longer-term benefits of institutionalizing this knowledge into the corporate memory.

With all the recent and rapid advancements in AI, the virtual store tour is poised to be a game-changing capability for any Category Manager looking to get closer to the retail floor than ever before. The potential for this new technology is immense, and as an industry, we're just beginning to scratch the surface of what's possible. It seems that when it comes to the emerging capability of time-travel store checks, the journey has just begun.

Contents

What are time-travel store checks?

The explosion of the digital age has led to an unprecedented influx of data for businesses. Today, companies have access to a wide array of data points, generated every moment, from a multitude of sources such as customer transactions, social media interactions, web analytics, IoT devices, and more.

This immense data flow can result in analysts experiencing "data obesity," where the sheer volume of information becomes more of a hindrance than a help. The challenge for industry leaders is no longer about data availability, but about extracting meaningful insights amidst the sea of information found in data lakes.

It's within this context that the qualitative insights produced from store checks emerge as an important counterpoint to numeric data. Understanding the real-world conditions that produce sales data is the fastest and most effective way to determine the causal drivers of business performance.

The concept of "time-travel store checks" is where companies can virtually "go back in time" to review the state of a store at any given moment. While this might sound like a concept from science fiction, it's quickly become a commonplace capability for CPG leaders thanks to the integration of crowdsourcing and advanced AI.

Through continuous photo capture, companies can record visual data over time with each image serving as a snapshot of a specific moment. Once the photos are indexed, it becomes possible to conduct chronological comparisons and long-term trend analysis. Armed with these insights, companies can improve their retail execution, streamline reporting, and bolster strategic planning capabilities. Furthermore, combining this retail execution data with traditional sales and inventory data can provide a rich, multi-dimensional view of store conditions over time.

Key benefits

- Find out what the numbers aren't telling you

- Uncover the 'why' behind 'what' happened in-store

- Enrich any analysis with robust visual observations

A picture is worth 1,000 data points

A recent study by the Category Management Association found that optimized product assortments could lead to a 10% to 15% increase in profitability through improved promotional effectiveness[1].

So what exactly is category management and why are time-travel store checks relevant?

Well, category management - it's kind of like being the coach of a sports team, but your players are the products you're selling. Each product, or player, has a specific role to play in your team. Some are your star players, bringing in the most sales. Others are your reliable defenders, not always in the limelight, but steady and important.

As a Category Manager, or coach, your job is to understand the strengths and weaknesses of each player. You need to know who's performing well, who needs a bit of a boost, and who might need to be benched. You also need to consider how your players work together - do some products sell better when they're placed next to each other? Do some products perform better at certain times of the year?

1. Category Management Association, "The ROI of Category Management," 2014.
However, The Promotion Optimization Institute in their 2020 report indicated that only 32% of companies felt that they were highly effective at category management[2], suggesting a significant opportunity for improvement.

2. Promotion Optimization Institute, "Retail Execution and Monitoring Report," 2020.

Just as a sports team would review film of past games to understand what worked and what didn't, a business analyst can rewind the tapes to see how past planograms, displays, and promotional activity impacted sales performance.

You also need to keep a keen eye on the competition. What are other teams doing? What strategies are they using? How can your team adapt and stay competitive?

A coach might find that their team's offense is more successful when they run certain plays or formations. Similarly, a Category Manager might notice that another retailer has made a sudden change in shelf placement or promotional timing.

For seasonal categories, such as sun care, ice cream, or gardening, the ability to time-travel can be especially valuable. By analyzing past planograms and display activity from different seasons and years, Category Managers can identify which products performed well during specific seasons or events, and adjust the planogram accordingly to optimize sales.

The most straightforward incarnation of a time-travel store check capability is simply a scrollable feed of photos. By contrasting a feed of images from your best performing stores with your worst ones, you can easily spot patterns and contemplate what might be driving or inhibiting sales. For example, you might notice that something as simple as display placement or shelf availability can make a huge difference in sales. And by tracking these factors and correlating them with business performance, you can build a strong case for making changes to improve sales. This approach can help you make smarter decisions about resourcing and support during the season.

With the advancement of AI and machine learning, these images can then be analyzed to extract valuable metadata. For instance, in a single image of a store shelf, AI can identify each product, count the number of each product, determine the arrangement of the products, and identify if some products are missing or are out of place.

Over time, AI systems can "learn" to recognize patterns or changes, and provide insights such as the effect of product placement changes, promotional display effectiveness, or shelf stock levels.

2021

2022

2023

Why now? How AI is changing the game

Recent advancements in AI, particularly in computer vision and machine learning, have created unprecedented opportunities for manufacturers to extract valuable metadata from field photos that produce new insights. Let's break down how five different AI technologies are working together to revolutionize this space.
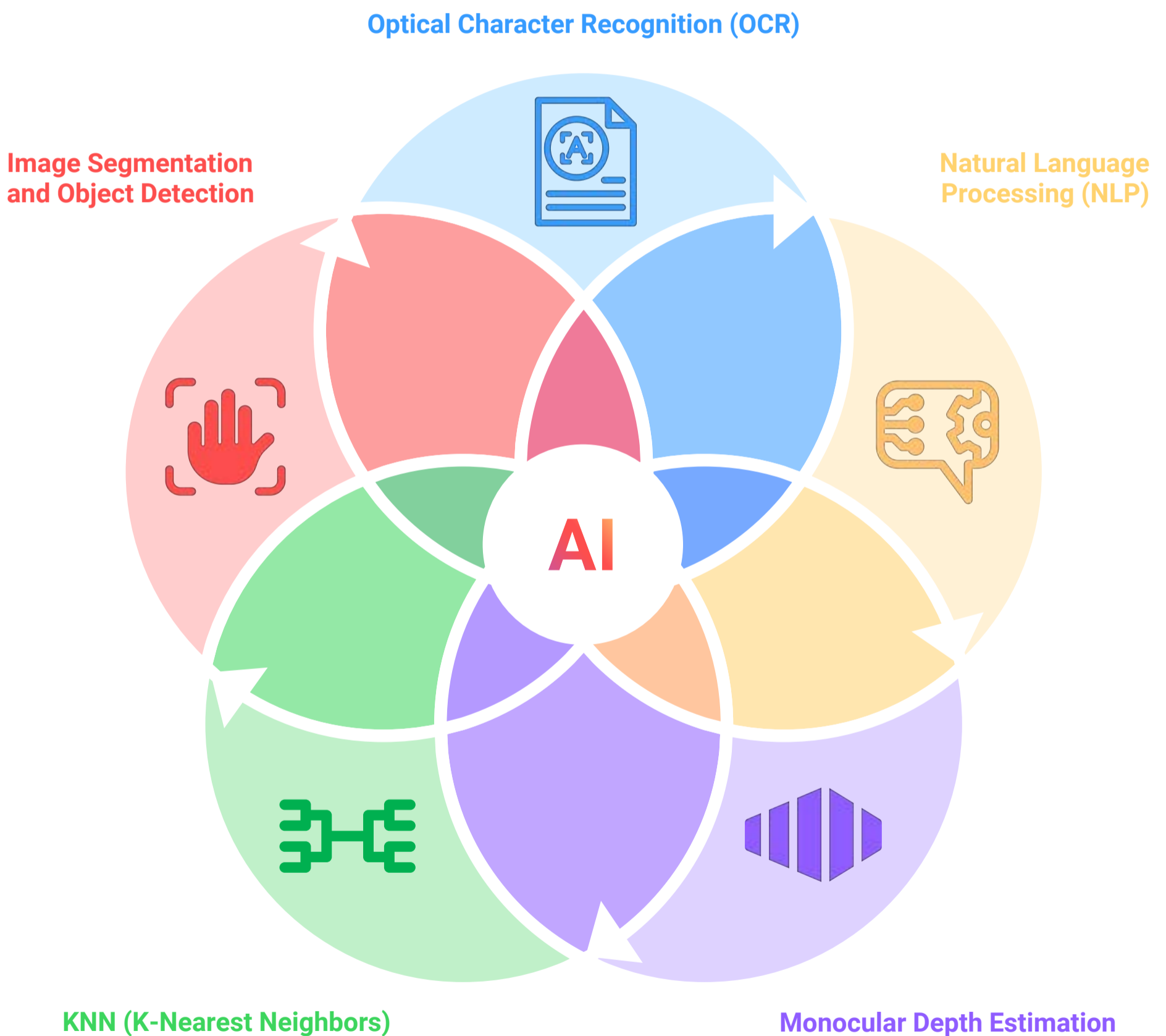
Optical Character Recognition (OCR)

Image Segmentation and Object Detection

Natural Language Processing (NLP)

AI

KNN (K-Nearest Neighbors)

Monocular Depth Estimation

Image Segmentation and Object Detection are two AI techniques often used together to identify and delineate specific objects within an image. In the context of retail, image segmentation could be used to identify individual products, understand their placement, and measure the space they occupy (i.e., share of shelf). Object detection could further classify these products into specific categories or brands. Over time, this allows for the tracking of changes in product placement, stock levels, and shelf space allocation.

Optical Character Recognition (OCR) is a technology used to convert different types of documents, including photographed images, into searchable text. OCR could be used to read product labels, price tags, promotional materials, and anything else that shoppers are reading.

Natural Language Processing (NLP) is traditionally used to understand and generate human language. However, this technology could also be used to analyze textual data derived from retail photos. For example, it could identify keywords or marketing claims found on promotional materials or detect the presence of new products or packaging changes.

Monocular Depth Estimation refers to the task of estimating the depth or distance information from a single 2D image or photograph. Depth information derived from retail photos can contribute to understanding the overall scene or environment. It enables the identification of relative distances between objects, the estimation of object sizes, and the recognition of spatial relationships. This knowledge can be useful for inventory management, store layout optimization, or focusing an analysis on free-standing displays while ignoring background noise.

KNN (K-Nearest Neighbors) is an AI algorithm commonly used for pattern recognition tasks. When applied to a catalog of product images, KNN can be applied to identify UPC's found in the image. It works by extracting a feature vector that represents relevant attributes like color, shape, or size and then calculating the distance similarity to other known SKUs in a master data library.

When these technologies are combined, the resulting system can be far more powerful than each individual component. This is because each AI technique often specializes in interpreting a specific perspective. By integrating them into a higher-level abstraction, a more complete understanding emerges in the system which leads to deeper insights, more accurate predictions, and a greater overall robustness across a wider range of situations.

Perhaps the greatest opportunity is to run machine learning on the system outputs with the goal of tracking changes and identifying trends over time. This could provide Category Managers with a wealth of new insights, such as:

• How changes in product placement affect sales.
• Which products often run out of stock and when.
• How changes in pricing or promotions impact demand.
• How shelf space allocation changes over time and what drives those changes.
• How competitor products are positioned and priced.

Such a system would provide a level of detail and precision that is hard to achieve with manual store checks, while also eliminating the data lag associated with syndicated data services. This could lead to more informed decisions, more effective strategies, and ultimately, improved business performance.

Unlocking the causal drivers of business performance

Companies grow when they do more of what's working and fix whatever's not. When it comes to the complex and ever-changing retail landscape, determining the true causality of business performance is notoriously hard to isolate. For example, a change in sales could be caused by a new advertising campaign, a price change, a competitor's actions, shifts in consumer preferences, seasonal variations, or a combination of these and other factors.

This is why almost all manufacturers have implemented a monthly reporting process that seeks to understand the key drivers and inhibitors of sales growth. It is also common practice to invest quite a bit of analytical rigor into an annual business planning process with the goal of strategically aligning on where to invest based on market conditions.

The foundation of both workflows is a retrospective analysis based on a synthesis of data sources including shipment data, POS data, promotional activity, and more.

However, these data sources are expensive, open to interpretation, and struggle with data lag. Point of sale data needs to be cleaned, integrated, and analyzed. Only once these steps are completed can it be presented in a report or dashboard. This whole process can take weeks, or in some cases, even months. Even for businesses that can afford these services, they might be basing strategic decisions on stale data.

These quantitative sources work harmoniously to tell you "what" happened but beyond finding correlation, it's often a stretch to say "why" it happened. One common issue is that true causality is often masked by the tyranny of averages. For example, a brand might show flat overall growth at a retailer despite winning big in that retailer's large size planogram while losing ground in the smaller format. Alternatively, a brand might experience a strong sales lift in the first week of a hot promotional ad but experience subsequent declines in the two following weeks due to poor on-shelf availability, leading to flat performance over a 4 week period.

Store checks provide a powerful antidote to these problems by contributing real-time ground truth data that's often unattainable through other means. Maybe sales went down because of a new competitive claim in the category, a new assortment strategy, or a previously unseen execution compliance issue. Whatever the reason, store checks give you immediate insight.

While store checks offer significant advantages, they can be resource-intensive, requiring personnel, time, and effort. Most people are limited to the same few neighboring stores that they can physically get to. They also only offer a snapshot of a specific location at a specific time, so they may not be representative of wider trends. Unfortunately, unless you had the luck or foresight to visit the right stores, by the time you get your sales results, it's too late to do a store check.

The key is to set up a regular cadence of store checks across your retail network. That way, you can dig your well before you're thirsty and irrespective of where the numbers lead you, you'll always be able to jump into the time machine and virtually visit the right retail locations. Once you can see what your shoppers were seeing, it just takes a bit of pattern recognition and business context to figure out what your top (or bottom) performing stores have in common.

Plus, since you're working backwards from sales impact, you can quantify the impact that retail execution has. For example, you might conclude that stores where your brand appears adjacent to another brand on a specific shelf and at a specific price, sales go up by 6.7%. Conversely, when another competitor has an extra facing or one of your key SKUs is out of stock, sales go down by 7.2%. From there, you can align the organization around a business plan that optimizes for these outcomes with the confidence that the right investments in merchandising, sales support, and supply chain, will yield a specific revenue outcome.
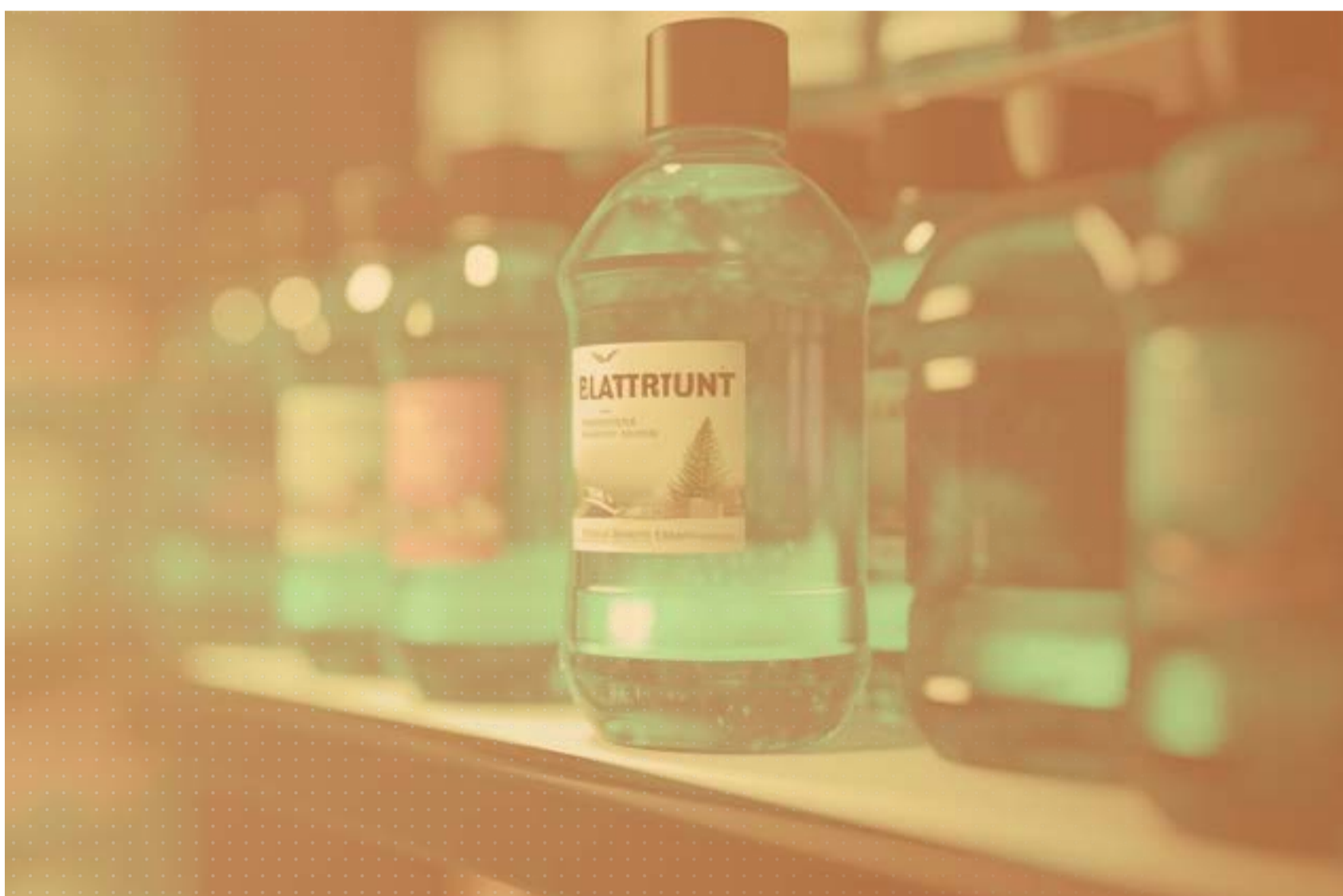
Store checks reveal all sorts of qualitative factors that impact sales performance. For example, there's been a trend of retailers testing and implementing anti-theft strategies like locking products behind a case or attaching electronic sensors to products. While these can be effective at deterring theft, they can also be effective at deterring regular shoppers.

A distinct benefit of time-travel store checks is the ability to monitor the same-store sales impact of anti-theft measures by knowing when the shopper experience changed. Armed with this information, it's possible to make a compelling business case to retailers, demonstrating the trade-off between loss prevention and sales losses? Moreover, by comparing the different strategies across multiple store locations, manufacturers can recommend best practices for optimizing theft reduction and sales.
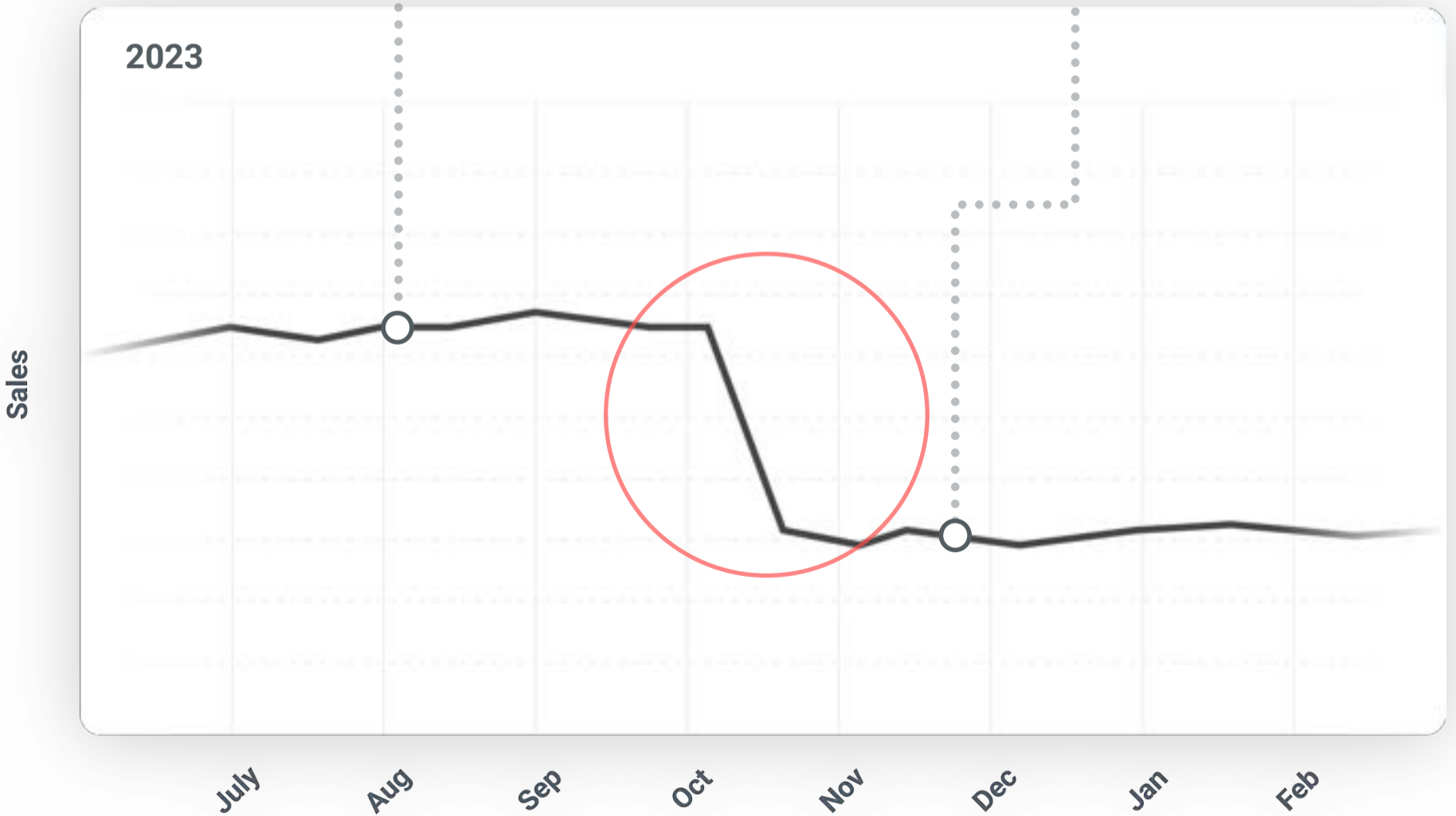
Turning non-compliance into competitive advantage

According to Nielsen, products that have optimal shelf placement and are easier for shoppers to find can experience sales lifts of up to 28%[3]. However, a recent report from the The Promotion Optimization Institute indicated that only 55% of promotional displays were executed as planned, highlighting a significant gap in adherence to store implementation standards[4].

Retail execution compliance is a major industry problem, but also a unique opportunity for insight generation. In evolutionary biology, mutations are random changes in an organism's genetic code that can either be beneficial, harmful, or neutral. Most mutations are harmful and do not provide any survival advantage, but a few are beneficial, and over time, this process can lead to the development of new species and the

evolution of complex, resilient biological systems. The same principles can be applied to planogram non-compliance and the role of category management in providing guidance and oversight. Every day, retail execution experiences non-compliance from random events that either hurt or help sales.

Execution compliance issues are the byproduct of a number of interdependent events such as products going out-of-stock, products being misplaced within the store, or critical operational decisions - often made in good faith - by store personnel. The result is that no two stores ever look exactly the same.

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3. The Power of Placement: How Shelf Placement Impacts Shopper Marketing Success.

4. Promotion Optimization Institute, "Retail Execution and Monitoring Report," 2020.

A happy accident

Planogram non-compliance is a major issue because most of the time it's harmful. Inconsistencies in product availability, shelf layout and pricing can lead to customer confusion or dissatisfaction. However, some non-compliant modulars will by chance be more successful than their original and intended design. In fact, a Nielsen study found that 60% of assortment decisions are suboptimal, suggesting that there is significant room for improvement through better planogram design[5].

For example, let's suppose a budget-friendly product that's experienced persistent low levels of stock gets replaced by a more premium product. Perhaps the additional facings introduced on the higher-end product generate more shopper discovery through a stronger brand-block. Ultimately, this leads category sales and profitability to increase. Later on, the former product might have remedied any supply issues but the Category Manager seized the opportunity to simplify the shelf, rationalize an underperforming SKU, and carry more inventory of fewer products to improve overall shelf availability.
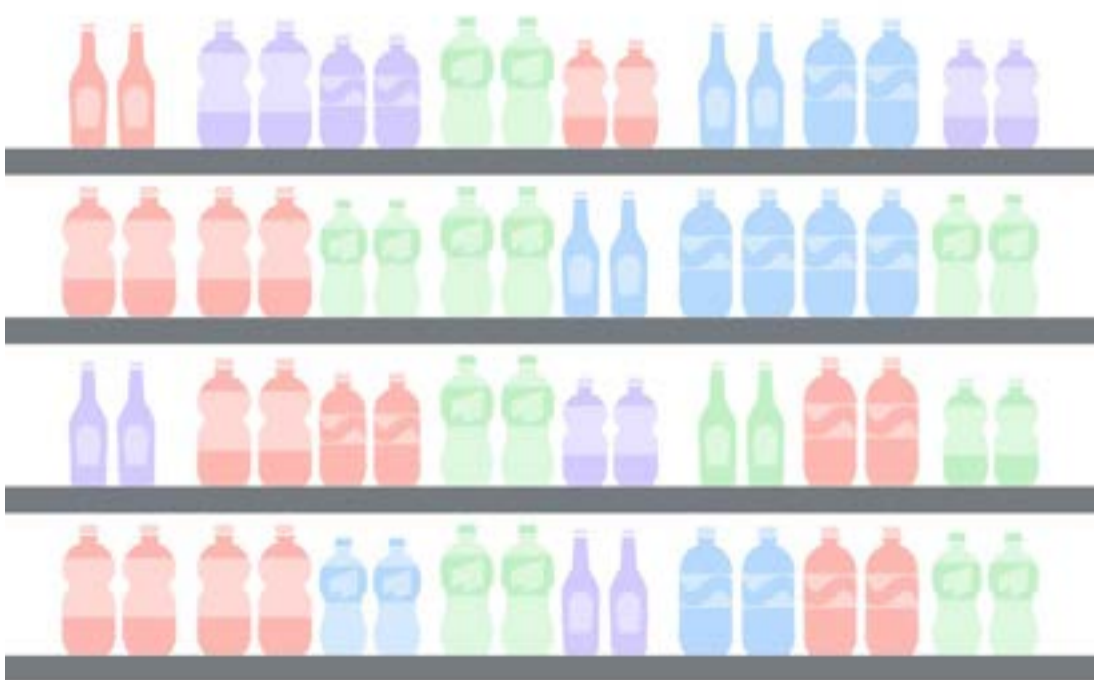
Adaptability

A planogram spec is virtually a category's DNA in brick-and-mortar stores. The random mutations in retail execution will come and go, but there is an opportunity to select for the favourable characteristics along the way. When fortunate deviations occur, Category Managers can actively select new ideas and embrace the adaptations that foster growth and profitability. However, it can be a challenge to identify these pivotal moments and precisely measure their financial impact.

This is where having an ongoing, AI-driven, shelf monitoring solution can deliver considerable value. After all, you can't measure what you're not monitoring. If you want to capitalize on the quiet chaos of planogram experimentation, you need to unlock the power of time-travel store checks.

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5. Nielsen, "Assortment: The True Loser of The Long Tail," 2015.
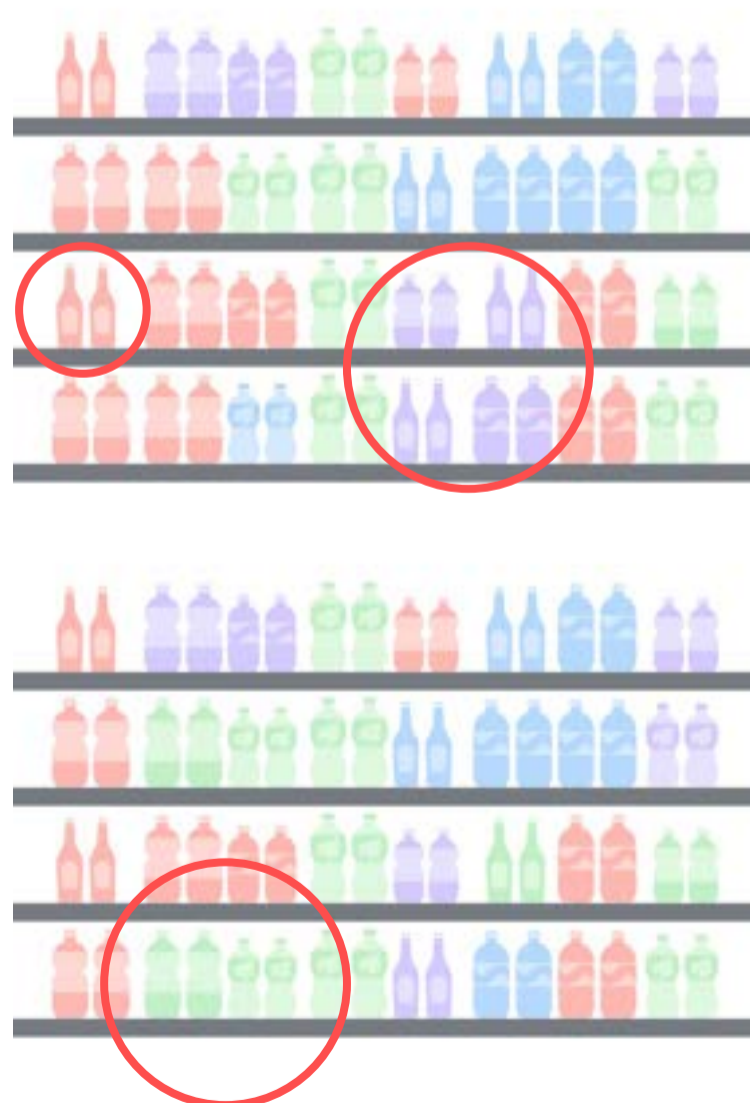
Institutionalizing retail execution into your corporate memory

The value of these insights extends beyond just improving the bottom line. By institutionalizing retail execution insights into the corporate memory, companies can build a wealth of knowledge and experience that can be leveraged to improve performance in the future.

Onboarding new colleagues

By capturing insights and trends over time, time-travel store checks can help new colleagues quickly get up to speed on a category. This can be particularly valuable in the case of high employee turnover or rapid growth.

Monitoring long-term trends

Many CPG products have short lifecycles due to rapid innovation and competition. This makes it difficult to establish and monitor long-term trends. With a longitudinal view of retail execution, managers can identify trends and patterns that might otherwise go unnoticed. This can be particularly valuable for identifying long-term shifts in consumer behavior or changes in the competitive landscape.

Understanding what top or bottom performing stores have in common

By analyzing retail execution across top and bottom performing stores over time, managers can identify commonalities that might be driving success or failure. This can be particularly valuable for developing best practices or identifying areas for improvement.

Pattern recognition tasks

Time-travel store checks can be used for a wide range of pattern recognition tasks, such as identifying changes in product placement, pricing, and promotion. By tracking these changes over time, managers can gain insights into which tactics are most effective in driving sales and adjust their strategies accordingly.

Best practices for implementing longitudinal retail execution monitoring

Implementing time-travel store checks can be a complex process that requires careful planning and execution. To ensure the success of this approach, Category Managers should consider the following 3 best practices:

Leverage crowdsourcing to scale data collection and remove bias

In the dynamic world of retail execution, field team representatives play an indispensable role, by fixing the shelves, building displays, and flagging issues to the head office.

However, for the same reason that people tend not to post ugly pictures of themselves on social media, field teams usually "groom" or "condition" the shelf before snapping a photo. This practice involves fixing holes, straightening product facings, removing irrelevant items, and generally ensuring that the shelf looks neat and tidy. While it can help create more aesthetically pleasing photos, it may not best represent what shoppers are actually seeing. This introduced bias can skew the true picture of retail execution and hamper strategic decision-making processes.

In response to this challenge, an increasing number of companies are turning to crowdsourcing to get a more comprehensive and unvarnished view of their retail execution. Crowdsourced photo capture provides a raw visual snapshot of the retail environment from the shopper's actual perspective. Sometimes, this ground truth data diverges from the manicured and idealized images posted by field teams looking to showcase their great execution. With crowdsourcing, the shoppers don't even know why they're taking the photos so you get to see the good, the bad, and the ugly without overlooking minor issues.

According to the Grocery Manufacturers Association (GMA), a massive 70% of promotional activity does not break even, underlining the importance of effectively monitoring retail execution to ensure promotions are implemented and managed correctly[6].

However, the advantages of crowdsourcing go beyond just reducing bias. This method of photo capture is fast, cost effective, and much more scalable, allowing companies to consolidate diverse perspectives in a way that traditional data collection methods often fail to deliver. With crowdsourcing, you can conduct store checks in rural areas that are hard to reach or may not make sense to send a merchandiser to.

6. Grocery Manufacturers Association, "Shopper Marketing 5.0: Creating Shopper Intimacy in the New Digital World," 2010

To ensure that time-travel store checks are conducted consistently and accurately, it's essential to have clear instructions, provide appropriate incentives, and implement quality control systems to ensure the accuracy of the data collected.

Develop a coverage model that follows a representative sampling methodology

In developing a representative sampling methodology for longitudinal retail execution monitoring, there are three primary components to consider.

First, decide which stores to monitor. You want to ensure your selection represents the overall characteristics of your store network. This could involve a balance of high and low-performing stores, different store sizes, varied geographic locations, and distinct customer demographic profiles.

Second, determine the frequency of data collection. Consistent, regular data collection is crucial for longitudinal analysis. This could be daily, weekly, or monthly depending on your business requirements and operational realities. Keep in mind that frequent data collection may provide a more granular view of retail operations, but it also requires more resources.

Designing a sophisticated quota system for your retail execution monitoring takes careful consideration. It's all about ensuring your chosen stores accurately represent the broader characteristics and conditions of your entire network.
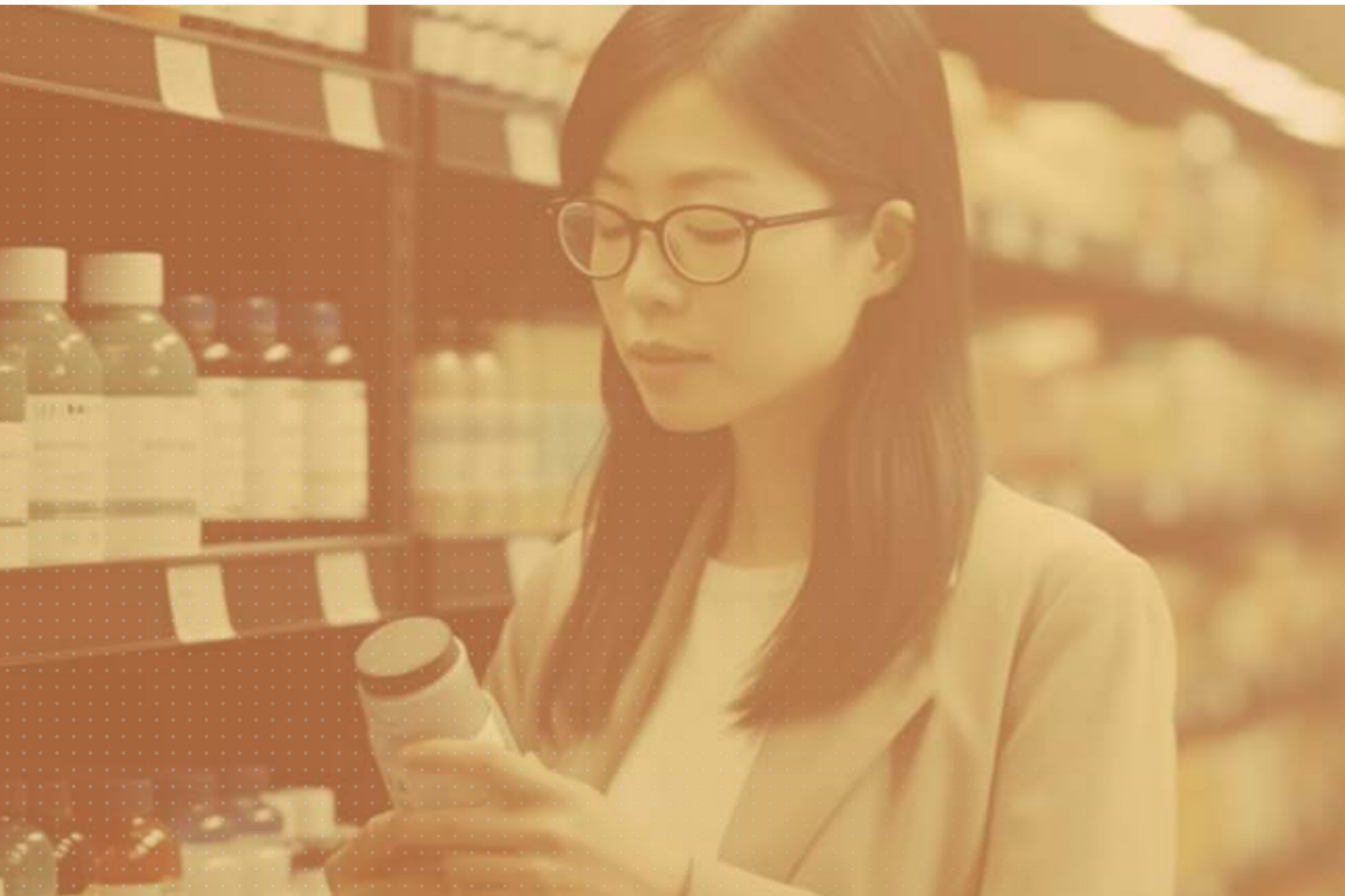
For example, the level of urbanization has a significant influence on store performance. A store in a bustling city center is likely to face different challenges and opportunities compared to one in a rural or suburban area. Monitoring these locations at varied rates, in tune with their significance to your overall business, can help identify location-specific best practices and challenges.

Store banner is another layer to consider. If your retail business operates under different banners or formats—say, hypermarkets, supermarkets, convenience stores, or online platforms—each of these will have unique operational norms. Adjusting your quota system to proportionally represent these various banners would ensure you're capturing the full breadth of your business operations.

Frequency of audit can be adjusted based on the importance and volatility of each store's performance. Stores that have significant influence on your overall retail execution, or those showing fluctuating results, might warrant more frequent audits.

Finally, geography beyond urbanization plays a role too. Stores in different regions or countries may operate under different cultural norms, economic conditions, or regulatory environments. Hence, establishing quotas based on these geographic divisions can help you capture and understand these differences in your retail execution.

Remember, a sophisticated quota system is not set in stone. It should be reviewed and updated periodically to keep up with changes in your retail network, business objectives, and external factors such as market trends or socio-economic shifts.

Leverage technology to provide company-wide access

Having many eyes on retail execution encourages a culture of collaboration, accountability, and continuous learning. Each person brings a unique perspective based on their role, expertise, and experience. For instance, a store manager might focus on product availability and layout optimization, while a sales representative might emphasize promotional compliance or competitive activity. Simultaneously, a data analyst might be more concerned with broader market trends and performance metrics. Combining these various perspectives can create a holistic understanding of the category's performance and potential opportunities.

This approach also promotes a common understanding of the category across different roles and hierarchies. This shared understanding is a valuable asset when planning and implementing future strategies, as everyone involved has a firm grasp of the category's current state and potential growth areas.

When choosing technologies to enable this capability, avoid ones that place a limit on the number of user seats. This is a huge bottleneck, particularly for larger organizations where sharing information can significantly enhance decision-making and retail strategy implementation.

Beyond just decision-making, the sharing and transparency of data can also foster a culture of collaboration and mutual accountability, driving everyone towards common business goals. If access is restricted due to a limited number of user seats, it might lead to information silos, where some people are left out of the loop, hampering overall organizational coordination and efficiency.

Also, as businesses grow and evolve, so too does the need for more employees to access such platforms. A cap on the number of user seats can stifle this growth, leading to additional costs in expanding licenses or even forcing a migration to a new platform.

Shelfgram

shelfgram.com ↗

Shelfgram is a retail insights platform that supercharges the store check. We offer a suite of AI-powered tools that empower businesses to understand a more holistic picture of their retail execution.
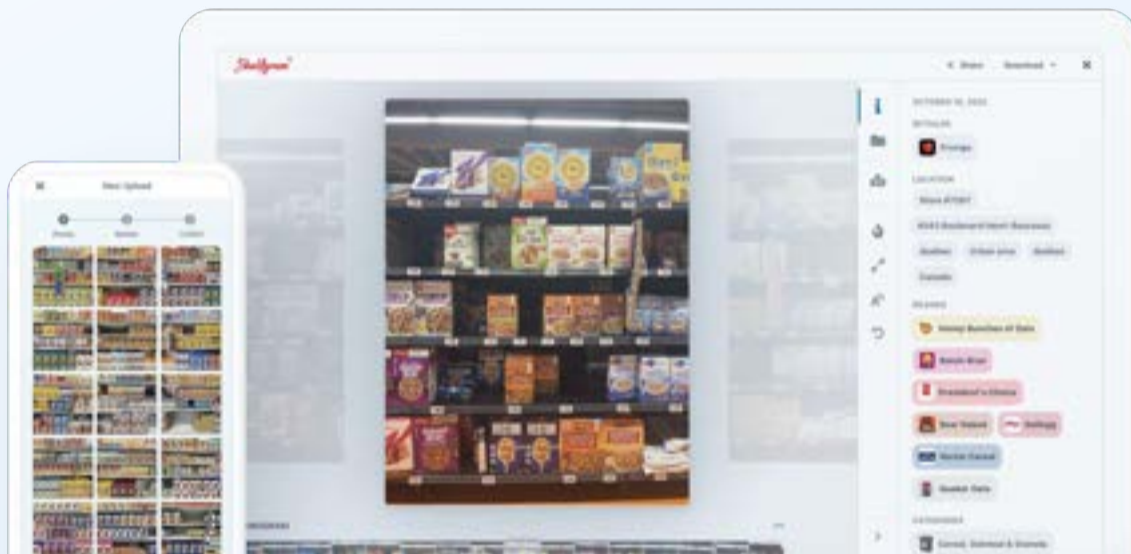
FiELD AGENT

fieldagent.net ↗

Field Agent connects businesses that need work done with on-demand workers looking to make a little extra money. We work to equip brands, retailers, and other businesses with fast, accurate retail information, shopper insights, and digital product demos.