



Seven Burning Retail Questions Machine Learning Can Answer



**Zebra
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In this eBook we will examine:

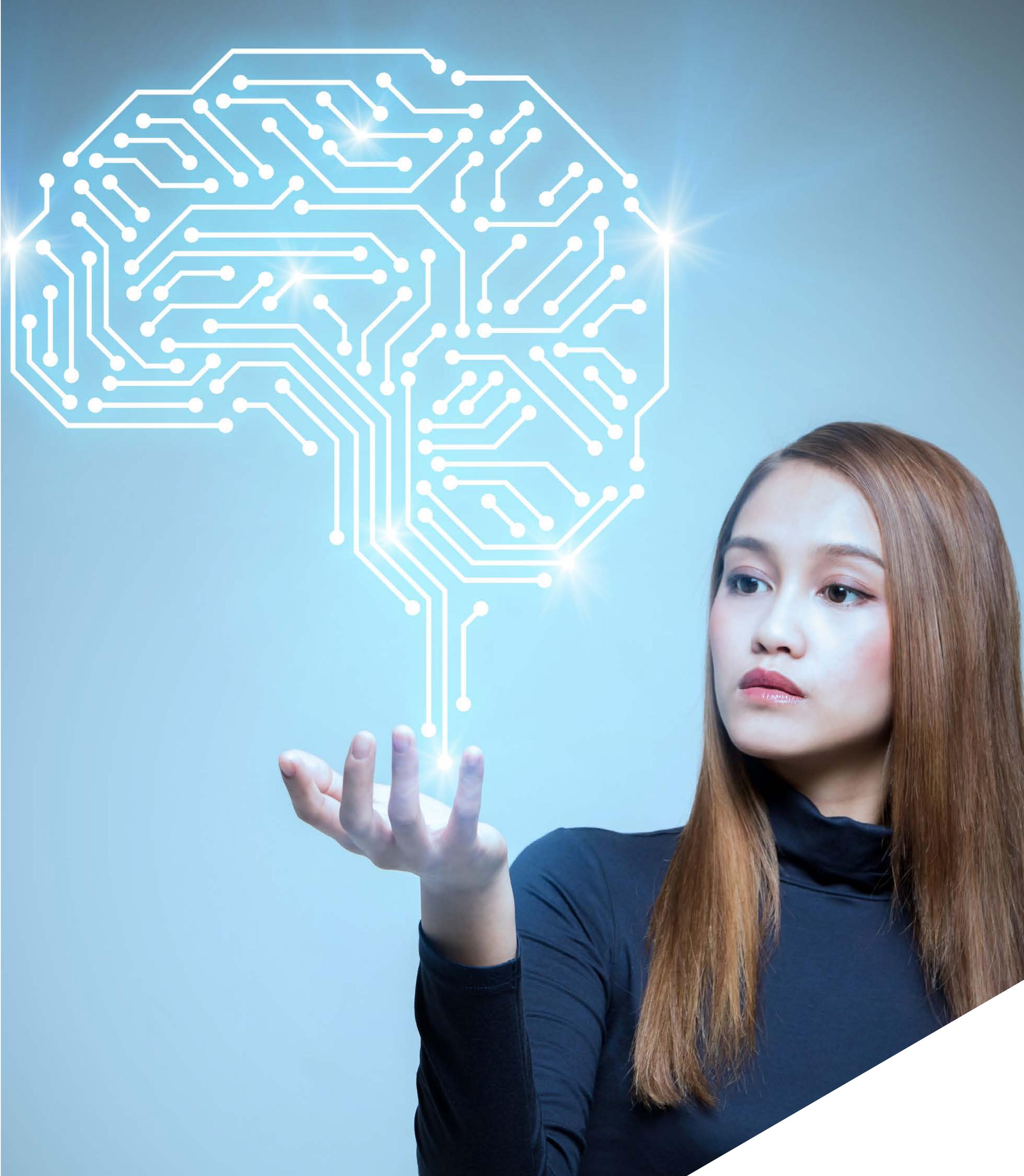
- Seven questions retailers must answer in order to succeed
- How machine learning can help find the answers
- How the answers result in increased profits and margins, among other benefits

Introduction

Today's retail environment is more competitive than ever, with margins and profits stretched thin by pricing wars and thrifty consumers expecting instant gratification.

As a retailer, the good news is that you have numerous tools at your disposal to improve revenue, reduce losses, and eliminate risks than ever before. One tool in particular that should be on your radar is machine learning -- the subset of artificial intelligence (AI) by which machines "learn" to recognize patterns, draw correlations, and learn and execute tasks within data without being programmed to do so. Machine learning, especially when used in conjunction with prescriptive analytics can form a pragmatic approach to AI that helps retailers find opportunities for improvement.

This piece will explore seven critical retail questions that machine learning can help you answer.



Seven questions machine learning can answer

1 What trends can be leveraged to increase sales?



2 How much are out of stocks actually costing me?



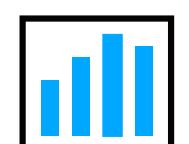
3 How can online reviews identify stores or products at risk of a public relations disaster?



4 What unusual behaviors are happening in my company that need to be addressed?



5 Can shrink and risk be forecasted and planned for?



6 Which of my cashiers are committing fraud or are non-compliant?



7 How can I mitigate risk around controlled-substance sales?



Mistake #1

What trends can be leveraged to increase sales?

Trends are a retailer's best friend in the battle to increase sales. For example, what are people buying the most in specific regions? What promotions or coupons encourage people to spend more? How do customer demographics influence buying patterns? Traditionally these questions could be answered by looking at historical trends. Unfortunately, especially today, historical data isn't especially reliable because it doesn't repeat exactly the same way twice (competitors adjust strategies, consumer tastes change, etc.). Thus, using history to predict the future is not recommended.

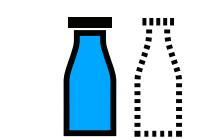
Luckily, there is a workaround. The most advanced machine learning models use a capability called "clustering" to help you understand and leverage positive trends like the above to maximize revenue. Clustering starts by grouping entities (e.g.

cashiers, stores, districts, vendors, etc.) into "clusters" based on similar sales behaviors rather than historical data. It then determines sales benchmark averages for each cluster. When sales exceed this benchmark, machine learning quickly assesses the root cause (e.g. wine selling better when placed near diapers) and alerts relevant employees to repeat it throughout the business, increasing revenue significantly.





Question #2



How much revenue do out-of-stocks actually cost me?

As a retailer, you're probably all too aware that sales are lost when items are out of stock. But just how much in sales are you losing?

The answer to this is called "hidden demand," and it isn't easy to calculate. A machine learning algorithm can handle it for you. It first processes data to determine true demand when a given item was in stock. It then uses the calculation as a benchmark to forecast demand during out-of-stocks, even when your supply chain system "believes" you are in-stock (phantom inventory). Finally, it translates the demand during the out-of-stock into a monetary figure to represent the total amount of lost revenue. This information can help you improve inventory accuracy, reduce shrink, and maximize sales through simple prioritization, specific tasking, and expedited product entry to fulfill hidden demand and satisfy consumer expectations.

Question #3



How can online reviews identify stores at risk of a public relations disaster?

Thousands of reviews are posted online every day, many of which are about your company. The information within them can point you to areas for improvement. But how do you harvest and leverage these reviews?

A machine learning algorithm can perform what is called “sentiment analysis” -- a data-mining methodology that combs through online content like reviews, comments, and ratings (“unstructured data”) looking for key insights into how customers perceive your business based on their true intent (i.e. positive or negative) when writing the reviews. It then uses its findings to alert you to specific stores that are at highest risk of a public relations (PR) disaster and order targeted retraining efforts to resolve any issues.

Sentiment analysis continually monitors these same locations post-correctional action to verify improvements. With this capability diagnosing customers’ feelings about your business, you have everything you need to help your organization avoid or weather a PR crisis.



Question #4

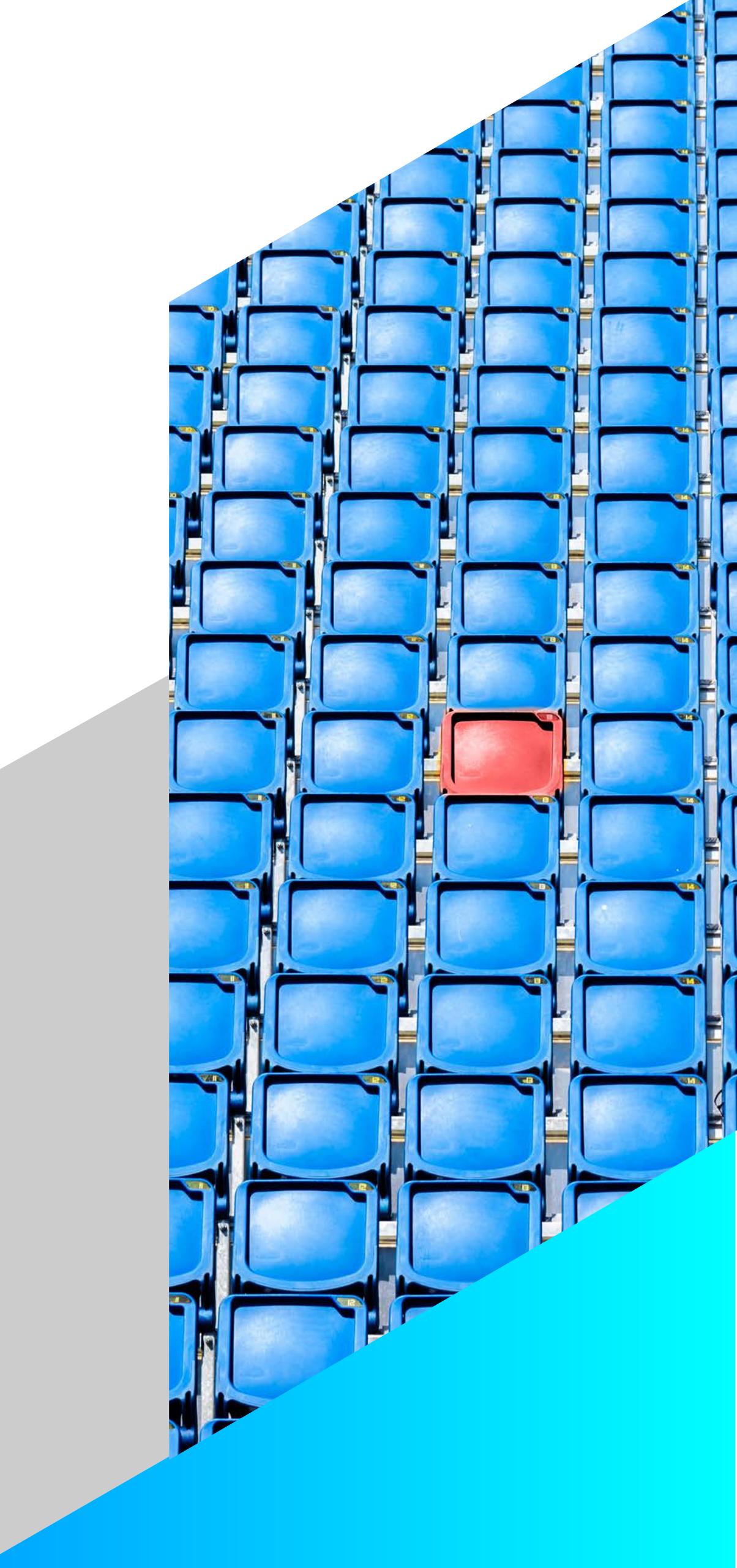


What unusual behaviors are happening in my company that need to be addressed?

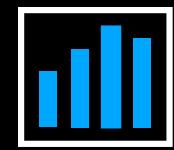
A surefire way to find areas for improvement is to look at anomalies. An anomaly occurs when real-time behaviors do not align with “typical” behaviors. Machine learning can continuously monitor data in the moment, verifying that your current trends are consistent with typical behaviors. Any instances that deviate from the norm are flagged as potential opportunities for improvement. Machine learning can detect both internal (e.g. your own employees, delivery activities, etc.) and external (e.g. direct-store-delivery vendors, drop ship, etc) anomalies.

Retailers use machine learning-enabled anomaly detection to identify numerous ways to

increase revenue and margin. The best solutions will flag anomalies with a high rate of true positive results. This will make your investigations more efficient and effective by optimizing labor and improve case-resolution rates.



Question #5



Can shrink and risk be forecasted and planned for?

In retail, shrink and risk are determined by unpredictable factors rather than an accepted timeline of events. This is somewhat logical, as many of their root causes are outside factors like organized retail crime, mis-shipments, operational losses, and other unanticipated events. Because of this, accurately predicting shrink and risk can seem impossible.

Machine learning algorithms analyze shrink rates at the time of your most recent cycle count, combine them with known shrink indicators such as theft, employee attrition, associate tenure, returns, receipts, traffic, new product introduction etc. and generate a forecast accordingly. Over

time, the machine learning algorithms “remember” the factors that most influence shrink to continuously improve results. Machine learning-powered shrink forecasting can offer you strategic visibility between physical inventories and targeted cycle-counts (also called “prescribed counting”) while identifying high-risk stores or specific product categories on which to focus corrective actions.



Question #6



Which of my cashiers are committing fraud or are non-compliant?

Two types of cashier fraud have retailers especially worried. “Sliding” occurs when a cashier passes an item over a register scanner while purposely obscuring the barcode. The customer, often an acquaintance of the cashier, is then free to bag the item and leave the store without paying for it. “Sweethearting” is a similar practice by which a cashier scans the barcode of a cheap item like gum or chapstick instead of a more expensive item. Confirming either activity as fraud (versus a simple mistake) can be tricky, whether in CCTV footage or even in person.

Machine learning algorithms can help. The best models can identify sliding by analyzing your cashiers’ per-minute or hourly scan rates and other behaviors to determine benchmark

averages, factoring in the type of transaction, date, and time. Any cashier whose scan rate differs from this benchmark average by three standard deviations is flagged as a potential slider. The theory is that a longer-than-average lapse between items indicates one or more were not scanned. Such a finding is considered particularly suspicious if it occurred during a “high-risk” time period (e.g. lunch hours, holiday shopping rushes, supervisor breaks or days off, etc.).



Question #7



How can I mitigate risk around controlled-substance sales?

Few issues expose retailers to more risk than non-compliance on controlled-substance sales. If a cashier sells to a minor tobacco or alcohol, the retailer faces financial penalties, lawsuits, and/or a negative media crisis causing a massive drop in sales due to negative public perception. With such severe consequences at hand, this risk of non-compliance needs to be mitigated.

Machine learning patterns can identify behaviors that indicate non-compliance around alcohol and tobacco sales. One option shown to be effective is to monitor customers' birthdays that the cashiers enter after checking an ID. Any cashier who enters the same date multiple times per shift is flagged as an opportunity for follow up by asset-protection

personnel. The theory is that the associate is not even looking at IDs and is instead simply entering the same birthday over and over to save time. Other suspicious activities around controlled-substance sales that machine learning can flag include multiple entries of an associate's own birthday, an unlikely date (like 11/11/11), or a combination of unusually low alcohol or tobacco sales alongside an increase in hand-keyed prices. Machine learning can identify these occurrences, allowing your asset protection team to follow up as appropriate.





Find the Answers

Today's retail environment is more competitive than ever and more often than not, the answers are hidden within a mass of data collected over the years. Luckily there are machine learning-powered analytics solutions like Zebra Prescriptive Analytics that can make short work of the required analysis. With its robust ability to find the answers to your toughest questions, machine learning is critical to success in today's market.



Zebra Prescriptive AnalyticsTM

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