

Forecasting Inventory Needs with Machine Learning and AI



Learn the importance of Machine Learning and AI when it comes to forecasting inventory.

Even if your business started with a single employee, you know the value of keeping track of inventory. For many businesses, conventional pen-and-paper methods or simple computer programs have sufficed to track their purchases, sales, stock, and reorders.

However, scaling your company in an increasingly competitive market requires progressively more accurate systems that can handle your business's growing needs, especially when managing inventory across multiple locations.

Over half of businesses with retail inventory management solutions reported needing improvement in those solutions in 2020. The main challenge they reported was a lack of accurate demand planning and forecasting compared to the speed of changing industry trends relative to their business's size.

In 2024, inventory management systems can utilize machine learning and AI to address these challenges by providing accurate, real-time forecasting that provides businesses with the data they need while being optimized to scale.

The importance of inventory forecasting

Inventory forecasting is how a business predicts the inventory it will need to fulfill its customer orders over a given period. All businesses forecast their inventory using different methods, with many relying on past sales data and planned promotions to predict seasonal changes and compare them against last year's inventory movement.

Forecasting is just one part of inventory management, which involves every process needed to fulfill orders. The key elements of a good inventory forecast may scale with a business's size, but they tend to be similar for all businesses. They include:

- ✓ Tracking current inventory levels accurately
- ✓ Tracking current purchase orders
- ✓ Comparing current purchase rates to historical data
- ✓ Predicting trends based on market changes and promotions
- ✓ Accounting for how seasonal changes influence demand
- ✓ Recording and using customer responses
- ✓ Correcting supply chain bottlenecks
- ✓ Avoiding understocks and overstocks
- ✓ Aligning the forecast with the business's goals for scalability

To accomplish these key points, businesses must utilize the right inventory forecasting tools, gather any data they can, and use state-of-the-art formulas to calculate stock reorders and sales predictions. As businesses grow and markets get more competitive, the accuracy of these forecasting methods becomes increasingly significant in determining which businesses stay afloat in their industries.

The role of machine learning

When businesses hear “machine learning,” they might think of automated customer service chatbots or auto-suggestions on streaming services. These processes use machine learning, which is the subfield of artificial intelligence that allows machines to solve problems on their own. Still, they do not represent the extent of its uses. When properly deployed, a program equipped with machine learning can adapt and learn how to do tasks without being directly programmed by people.

What this means for inventory management systems is that the software can solve the challenges of managing complex inventories by analyzing historical data to create strategies for improvement without a programmer’s input. A versatile management system can use predictive algorithms to generate high-level forecasts about where a market is headed based on past sales, trends, seasonality, and more.

Past systems were only as good at supply chain optimization as those who programmed and updated them, inventory management programs equipped with machine learning can make advanced predictions beyond the pay grade of conventional methods.

AI techniques for inventory management

The valid next question any business should ask is: how do programs equipped with AI and machine learning accomplish these results? In a general sense, these systems take the load off a business’s labor force by automatically tracking and updating

orders and assets. They can save businesses money on storage costs by optimizing their warehouses. They can also save businesses the cost of storing paper records by digitizing, storing, and tracking everything.

However, these factors are just as true of inventory management systems that have been programmed. Consider these unique advantages of a system equipped with machine learning and AI when shopping for an inventory management vendor.

Real-time visibility

AI systems can provide real-time visibility to your inventory in a way that conventional management systems cannot. In addition to keeping accurate stock, order, and out-of-stock numbers, machine learning allows these systems to maintain optimal stock levels for your storage facilities, even while managing multiple warehouses at once. This helps businesses avoid costly overstocks and stockouts, accounting for nearly \$2 trillion in lost revenue in 2023 alone, even when demand changes faster than manual decision-making can respond.

Demand forecasting

Demand forecasting means accounting for all the factors that change a business's predicted supply needs – including market changes, seasonality, historical sales data, promotions, consumer preferences, and more – and ordering stock accordingly. When done manually, demand forecasting requires detailed analyses of sales records and other statistical methods performed by trained personnel.

Advanced inventory management systems can anticipate stock requirements based on dozens of factors, far more than a human analyst could manage accurately, and improve the business's replenishment strategies accordingly. While conventional inventory tracking would have to stop and reassess the order schedule based on a market shift, machine learning allows the management program to correct supply as changes occur.

Not only can these systems predict market changes, but they can also analyze inventory workflows to point out areas that can be improved, identify complex trends, and propose possible solutions. Businesses equipped with this level of forecasting don't have to worry about whether their decisions are strategic. They can focus on devoting their manpower to implementing the changes efficiently.

External factors recognition

Accurate inventory reporting and demand forecasting rely on more than real-time updates and internal decision-making. Responding to external factors, or those that are beyond a business's control, is another key aspect of accurately changing inventory levels based on changes in demand.

External factors such as natural disasters, global supply chain changes, seasonal patterns, market trends, or pandemics can cause shifts in demand that are not predictable using normal analytics. Whereas conventional tracking methods require an adjustment period, management systems equipped with machine learning can respond quickly with order changes that reflect new forecasts for demand.

Businesses whose supply chains were disrupted by as much as 60% during the pandemic, such as those in the manufacturing sector, needed a faster response method to these external factors.

Predictive analytics, which is how inventory systems enabled with AI use past data to predict future trends, is a market projected to be worth over \$41 billion by 2028, due in large part to how businesses have adopted it as the most competitive method for demand forecasting.

How to effectively implement AI for inventory

Even knowing the significant potential gains of implementing AI management systems for inventory control, businesses still need to know how to choose the right system. With so many vendors

out there, matching the features of the software to a business's current needs and potential scalability requires breaking down what makes an inventory system viable in the first place.

Identify, collect, and prepare data

This is the main feature an AI-enabled inventory management system must have. Not only should it be able to collect and store historical sales data, but it should also be able to prepare the data for advanced uses with techniques such as a time series analysis. This technique, usually used in financing, analyzes trends, detects outliers, and predicts the movement of the data series to provide accurate forecasts.

Once the data has been collected, it should also be reportable to anyone with access to the inventory system. Your teams should be able to work with this data to create strategic outcomes for your inventory changes, regardless of the size of the business, the season, or any other factor.

Shop around for AI tools

AI and inventory management systems are tools, not magic wands. They can add to a business's infrastructure and increase its profitability, or they can weigh down its workflow with unneeded costs and extraneous features. Rather than aim for the one-size-fits-all solution to flaws in their demand forecasting, businesses should identify their unique pain points and shop for the system that solves their current problems while matching their goals for scalability.

Prioritize integration

Another factor to prioritize when shopping for AI tools is how well they will integrate into your business's existing software infrastructure. Most businesses now have some kind of global software setup, whether a POS system, inventory control software, warehouse management systems, PR hubs, HR systems, or a combination of them. New inventory management software should be able to integrate with existing systems when needed to keep your workflow going smoothly.

Start with pilot projects

To avoid derailing your workflow, use a pilot project to test whether the inventory management system is a viable addition to your company's demand forecasting strategy. Any new tool or innovation can have unforeseen consequences on a business's infrastructure, especially when accounting for numerous employees and multiple storage locations. A small-scale test will help your team assess how viable the management system is for completing your objectives.

Assess, optimize, and scale

Your business's objectives for the future come first when choosing inventory management software. The program you choose should be able to scale with your business and optimize not only your current workflow but also the additions you have planned. It can do this through regular performance monitoring and assessments, which the software provider should help you optimize.

Inventory management systems equipped with AI provide businesses with a competitive edge in a post-pandemic market where predictability is key. The ability to collate historical data, analyze market trends, and account for both internal and external factors when strategizing the new workflow gives these management systems an edge over other methods of demand forecasting.

Scaling a business in an unpredictable market is risky. This is why so many businesses are investing in AI and machine learning to get ahead. Remember that not every management system is right for every business. Assess your objectives and compare the system to your future plans when choosing which vendor's software is the right fit for your business.