

THE IMPORTANCE OF FORECASTING IN E-COMMERCE

Sales forecasting in e-commerce is essential as it allows businesses to optimize their resources and quickly adapt to dynamic market changes. Today's e-commerce business faces intense competition and frequent changes in consumer preferences, which creates the need for forecasting. Studying sales data and customer behaviour helps to avoid risks, such as shortages or overstocks, and ensures sustainable business growth through more efficient inventory management.

Inventory management is one of the most challenging tasks for large online retailers, as improper planning can lead to financial losses and negatively impact reputation. Too much inventory increases storage costs, while a shortage of goods leads to potential revenue loss and customer dissatisfaction.

Amazon, Walmart, Zara, Home Depot, Alibaba, and Unilever are well-known examples of successful use of inventory forecasting. Amazon and Walmart use machine learning to analyze the demand and optimize warehouses, ensuring fast order fulfilment [1]. Zara uses sales data to respond quickly to fashion trends, reducing excess inventory. Home Depot predicts seasonal peaks to avoid shortages of household goods, and Alibaba uses artificial intelligence to serve many customers during big sales. Unilever balances demand and inventory, considering factors such as weather and holidays.

The e-commerce market is highly dynamic, and demand for goods can change almost instantly due to new trends, seasonal fluctuations, or competitors' actions. Without proper forecasting, it is difficult for businesses to respond to such changes promptly, which leads to sales losses.

Forecasting systems allow businesses to monitor demand in real-time and adjust inventory automatically, providing flexibility. Thanks to this data, e-commerce stores can quickly adapt to changes, always having popular products in stock, and excess inventory is minimized.

The forecasting system helps to improve customer service by ensuring the availability of goods without long delays. Customers who can find and buy the right product at any time are satisfied with the service and become more loyal to the store, which positively impacts the business's long-term success.

Effective e-commerce forecasting models utilize various algorithms to predict demand, optimize inventory, and reduce costs. Essential forecasting methods include [2]:

1. **Regression models:** Regression models can predict the relationship between the number of items sold and factors such as price, marketing campaigns, or seasonality.
2. **Time Series:** A forecasting method that analyzes historical data to identify patterns and trends. They typically predict product demand based on seasonal changes or sales history. Popular models include ARIMA (AutoRegressive Integrated Moving Average) and Exponential Smoothing.
3. **Machine learning:** Modern forecasting methods heavily use machine learning algorithms like neural networks and decision trees.
4. **Clustering:** Clustering algorithms, such as K-Means, allow you to group similar products or customers by specific characteristics (e.g., product category or customer behaviour) and predict demand for each group.
5. **Deep Learning:** Includes complex neural networks that can consider more complex patterns and relationships in data.
6. **Big Data analysis:** Integrating data from sources like social networks, online reviews, and search queries enables more accurate forecasts by considering historical trends and external factors.

Forecasting allows companies to optimize resources, avoid overstocking or understocking, and stay competitive in the fast-paced world of e-commerce. Many methods and algorithms, such as regression models, time series, machine learning, and extensive data analysis, can ensure accurate forecasts and efficient inventory management.

References

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