Sales Forecasting & Anomaly Detection Using AI in Power BI

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CSE-B 3rd-yr

Problem Statement

The retail organization is experiencing rapid growth in sales data volume, making manual analysis inefficient and time-consuming.

Current reporting is primarily **reactive**, meaning decisions are made only after trends or issues have already occurred.

Management lacks the ability to:

- Accurately forecast future sales
- Detect unusual or abnormal sales patterns in real time
- Identify risks and growth opportunities early
- Understand the impact of external factors such as holidays, promotions, and economic changes

Solution

The solution includes:

- Creating a structured data model integrating sales, transactions, holidays, oil prices, and promotions
- Analyzing historical sales trends to identify patterns and seasonality
- Applying built-in AI forecasting to predict future sales trends
- Using anomaly detection to automatically identify unusual spikes or drops
- Generating Smart Narratives to provide automated business insights

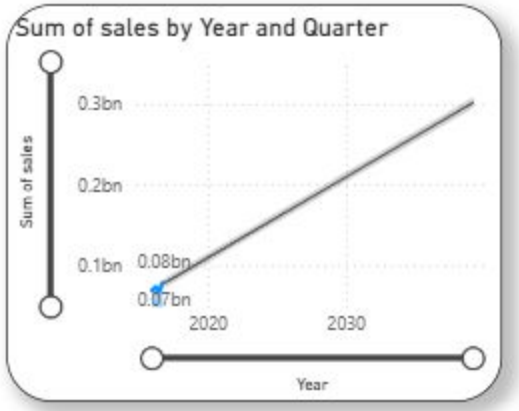
This approach enables proactive decision-making, early risk identification, and strategic business planning based on predictive analytics rather than past reports.

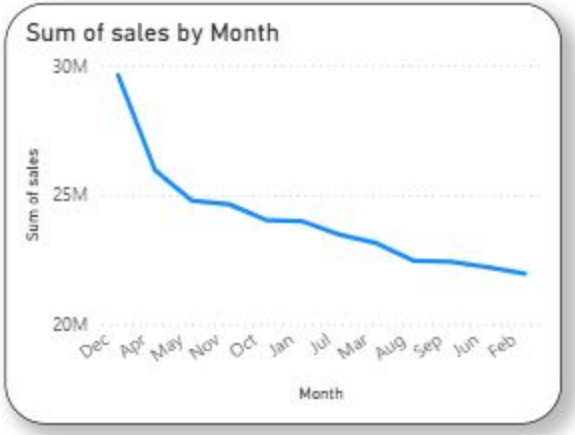
Objectives :

Tasks Required to be focused are :

- Use AI-powered analytics in Power BI
- Forecast future sales trends
- Detect anomalies
- Automatically generate insights using Smart Narratives

Sales Forecasting & Anomaly Detection





Sum of sales trended up, resulting in a 13.40% increase between January 2016 and October 2016.

Sum of sales started trending up on January 2016, rising by 13.40% (9256292) in 3 quarters.

Sum of sales jumped from 69056937 to 78313229 during its steepest incline between January 2016 and October 2016.

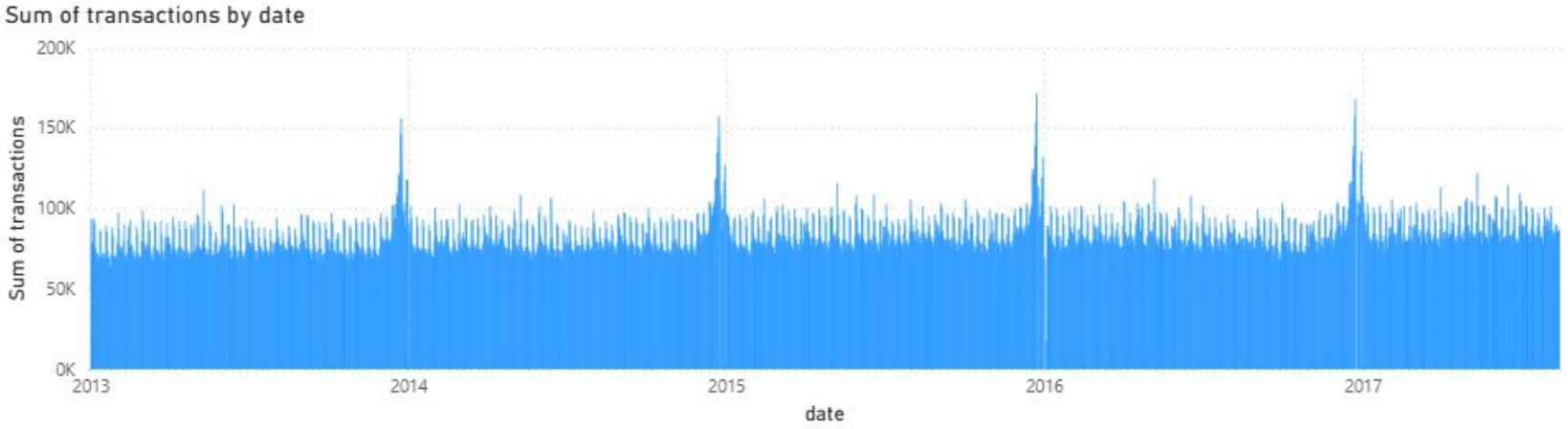
At 29640308, Dec had the highest Sum of sales and was 35.05% higher than Feb, which had the lowest Sum of sales at 21947365.

Sales Forecasting & Anomaly Detection

636.05K
Avg Daily Sales

1bn
Total Sales

141M
Total Transactions

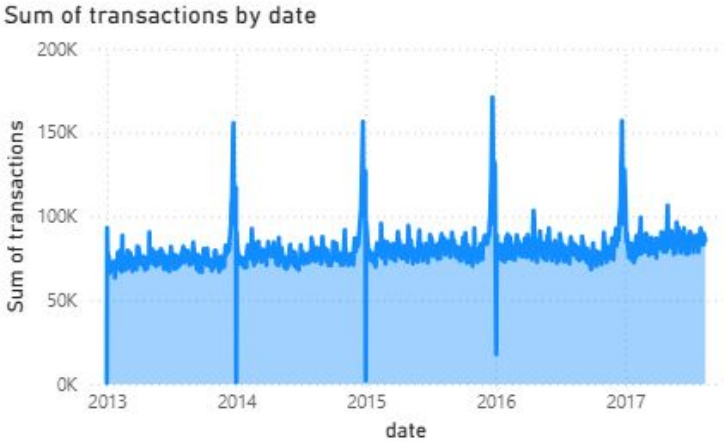


Sales Forecasting & Anomaly Detection

55.58
Avg Oil Price

1090
Total Promotions

78.19K
Avg Daily Transactions



Conclusion

This project shows how AI-driven analytics in Power BI can turn historical sales data into predictive insights. The forecast model is fairly reliable due to consistent multi-year trends and clear seasonality, making it suitable for short- and medium-term planning. Based on the insights, management should plan inventory around peak seasons, optimize promotions, monitor anomalies proactively, and use forecasts for smarter budgeting and demand planning.

Thank You