# Sales Forecasting & Anomaly Detection Using Power BI

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**Class : 3rd year IT – C**

**Subject : EDA using Power BI**

**Problem Statement**

A retail organization aims to move from traditional, reactive reporting to **predictive, AI-driven analytics**. With increasing sales data, manual analysis is no longer sufficient. Management requires a solution that can:

- **Forecast future sales** to support demand and inventory planning
- **Detect unusual sales patterns (anomalies)** to identify risks early
- **Highlight opportunities** during promotional or seasonal periods

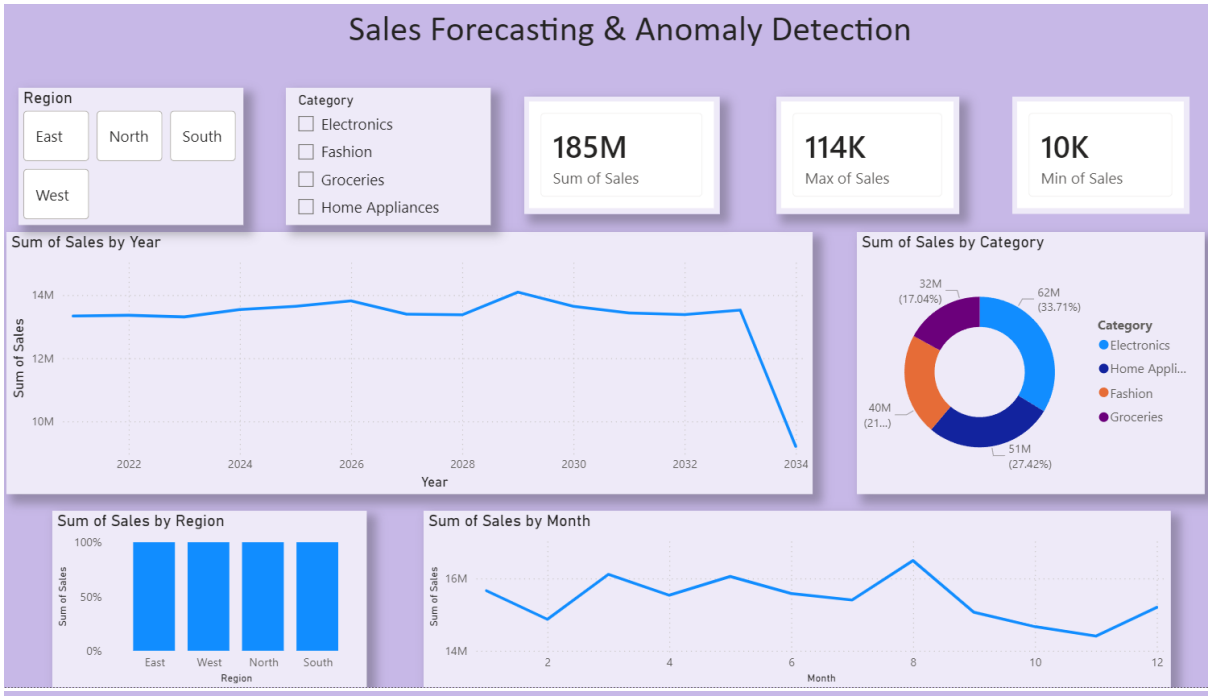
**Why Power BI?**

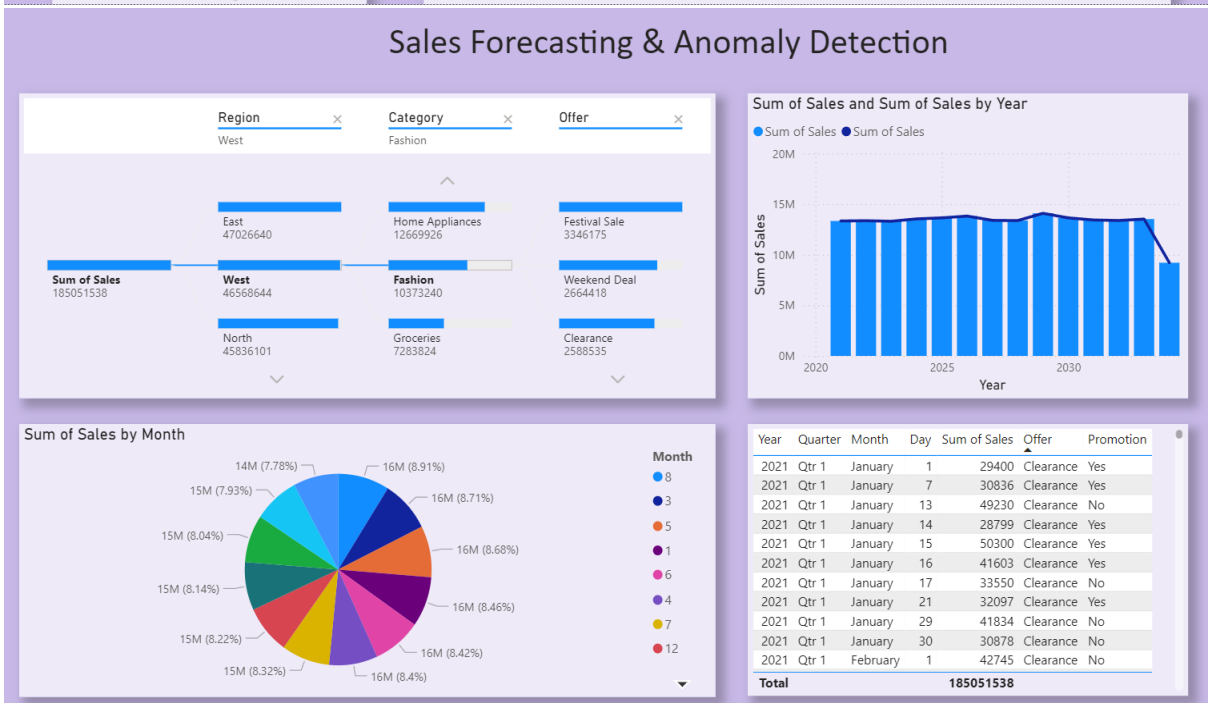
Power BI provides built-in **AI visuals**, forecasting capabilities, and anomaly detection that enable organizations to turn raw data into actionable insights. It helps analyze trends, predict future outcomes, and automatically generate smart narratives for better decision-making.

**Project Objective**

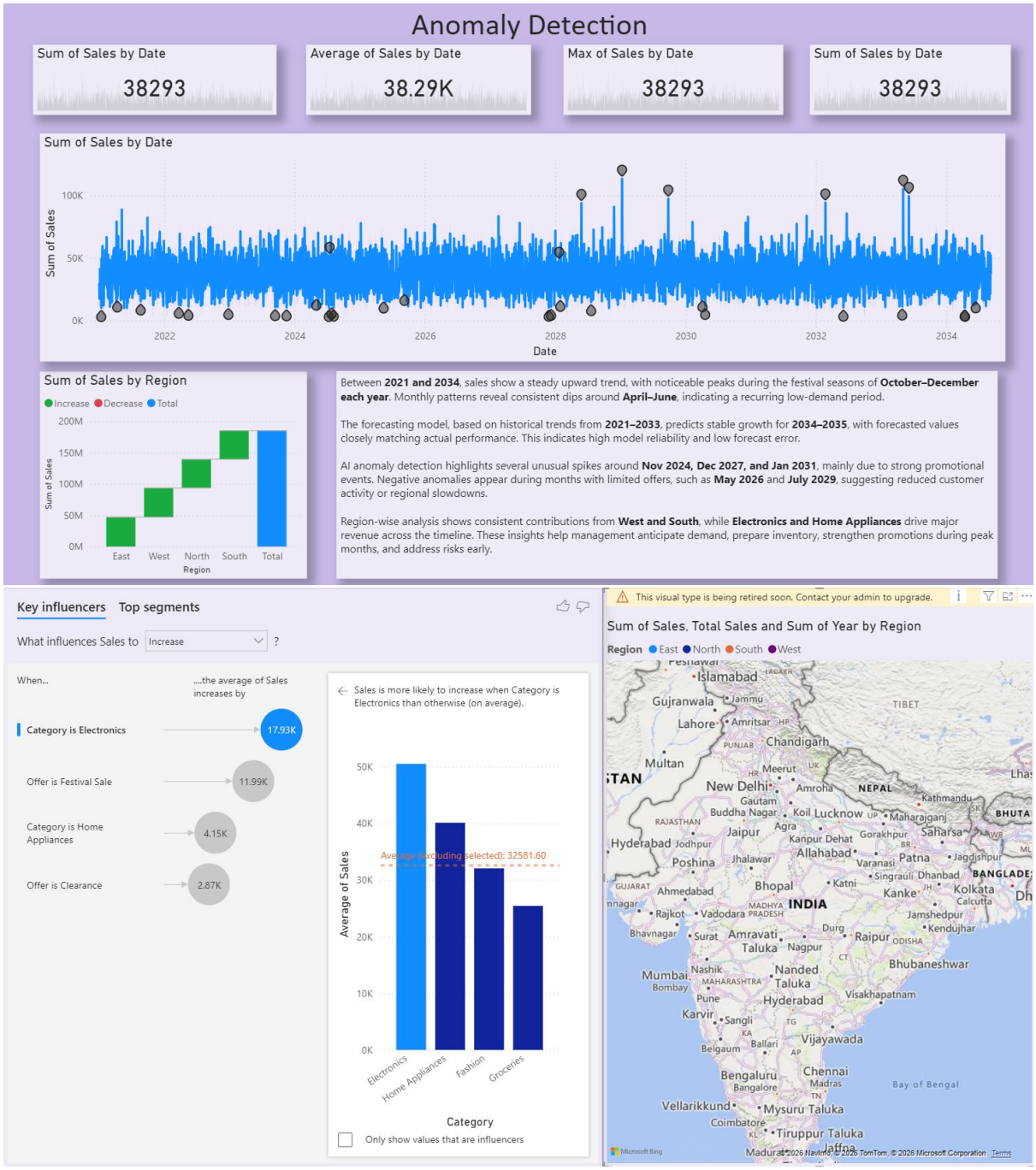
Using Power BI, this project delivers an **interactive, AI-powered dashboard** that:

- Analyzes historical trends
- Predicts future sales using forecasting
- Detects anomalies using AI insights
- Summarizes key findings through Smart Narrative
- Supports faster, data-driven decisions for management




| Year | Quarter | Month | Day | Sum of Sales | Offer | Promotion |
|---|---|---|---|---|---|---|
| 2021 | Qtr 1 | January | 1 | 29400 | Clearance | Yes |
| 2021 | Qtr 1 | January | 7 | 30836 | Clearance | Yes |
| 2021 | Qtr 1 | January | 13 | 49230 | Clearance | No |
| 2021 | Qtr 1 | January | 14 | 28799 | Clearance | Yes |
| 2021 | Qtr 1 | January | 15 | 50300 | Clearance | Yes |
| 2021 | Qtr 1 | January | 16 | 41603 | Clearance | Yes |
| 2021 | Qtr 1 | January | 17 | 33550 | Clearance | No |
| 2021 | Qtr 1 | January | 21 | 32097 | Clearance | Yes |
| 2021 | Qtr 1 | January | 29 | 41834 | Clearance | No |
| 2021 | Qtr 1 | January | 30 | 30878 | Clearance | No |
| 2021 | Qtr 1 | February | 1 | 42745 | Clearance | No |
| **Total** | | | | **185051538** | | |


Anomaly Detection
Sum of Sales by Date
38293
Average of Sales by Date
38.29K
Max of Sales by Date
38293
Sum of Sales by Date
38293
Sum of Sales by Date
Sum of Sales
100K
50K
0K
2022
2024
2026
2028
2030
2032
2034
Date
Sum of Sales by Region
Increase
Decrease
Total
200M
150M
100M
50M
0M
East
West
North
South
Total
Region
Between 2021 and 2034, sales show a steady upward trend, with noticeable peaks during the festival seasons of October–December each year. Monthly patterns reveal consistent dips around April–June, indicating a recurring low-demand period.
The forecasting model, based on historical trends from 2021–2033, predicts stable growth for 2034–2035, with forecasted values closely matching actual performance. This indicates high model reliability and low forecast error.
AI anomaly detection highlights several unusual spikes around Nov 2024, Dec 2027, and Jan 2031, mainly due to strong promotional events. Negative anomalies appear during months with limited offers, such as May 2026 and July 2029, suggesting reduced customer activity or regional slowdowns.
Region-wise analysis shows consistent contributions from West and South, while Electronics and Home Appliances drive major revenue across the timeline. These insights help management anticipate demand, prepare inventory, strengthen promotions during peak months, and address risks early.


Key influencers
Top segments
What influences Sales to
Increase
?
When...
....the average of Sales increases by
Category is Electronics
17.93K
Offer is Festival Sale
11.99K
Category is Home Appliances
4.15K
Offer is Clearance
2.87K
Sales is more likely to increase when Category is Electronics than otherwise (on average).
Average (excluding selected): 32581.60
Average of Sales
50K
40K
30K
20K
10K
0K
Electronics
Home Appliances
Fashion
Groceries
Category
Only show values that are influencers


This visual type is being retired soon. Contact your admin to upgrade.
Sum of Sales, Total Sales and Sum of Year by Region
Region
East
North
South
West
Islamabad
Gujranwala
Jammu
Lahore
Amritsar
Chandigarh
Multan
New Delhi
Meerut
Amroha
NEPAL
Kathmandu
Gautam Buddha Nagar
Koil
Lucknow
Maharajganj
BHUTA
Jaipur
Agra
Kanpur Dehat
Gorakhpur
Saharsa
Hyderabad
Jodhpur
Allahabad
Varanasi
Patna
Jagdishpur
Poshina
Jhalawar
Singrauli
Dhanbad
BANGLADE
Ahmedabad
Bhopal
Katni
Kanke
Kolkata
Calcutta
INDIA
Rajkot
Vadodara
Jamshedpur
Bhavnagar
Surat
Amravati
Taluka
Nagpur
Durg
Raipur
Kendujhar
Bhubaneshwar
Mumbai
Bombay
Nashik
Nanded
Taluka
Visakhapatnam
Hyderabad
Pune
Karvir
Sangli
Vijayawada
Belgaum
Ballari
Chennai
Madras
Bengaluru
Bangalore
Bay of Bengal
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