1. Problem Statement

A retail organization aims to move from reactive reporting to predictive analytics. Management wants to forecast future sales, detect unusual sales patterns, and identify risks and opportunities early. Due to increasing data volume, manual analysis is no longer sufficient.

2. Project Objective

As an Advanced BI Analyst, the objective of this project is to use AI-powered analytics in Power BI to analyze historical sales data, forecast future sales trends, detect anomalies, and generate actionable insights using Smart Narratives.

3. Dataset Overview

The dataset consists of sales transactions across multiple years, regions, categories, sub-categories, sales channels, discounts, promotions, and targets. It enables trend analysis, seasonality identification, forecasting, and anomaly detection.

4. Dashboard Description

An AI-powered dashboard was created in Power BI with key KPIs such as Total Sales, Total Units Sold, Target Sales, and Average Discount Percentage. The dashboard includes line charts, bar charts, donut charts, and slicers for interactive analysis.

The following dashboard was developed using Power BI to visualize sales trends, forecasts, anomaly detection, and AI-generated insights.

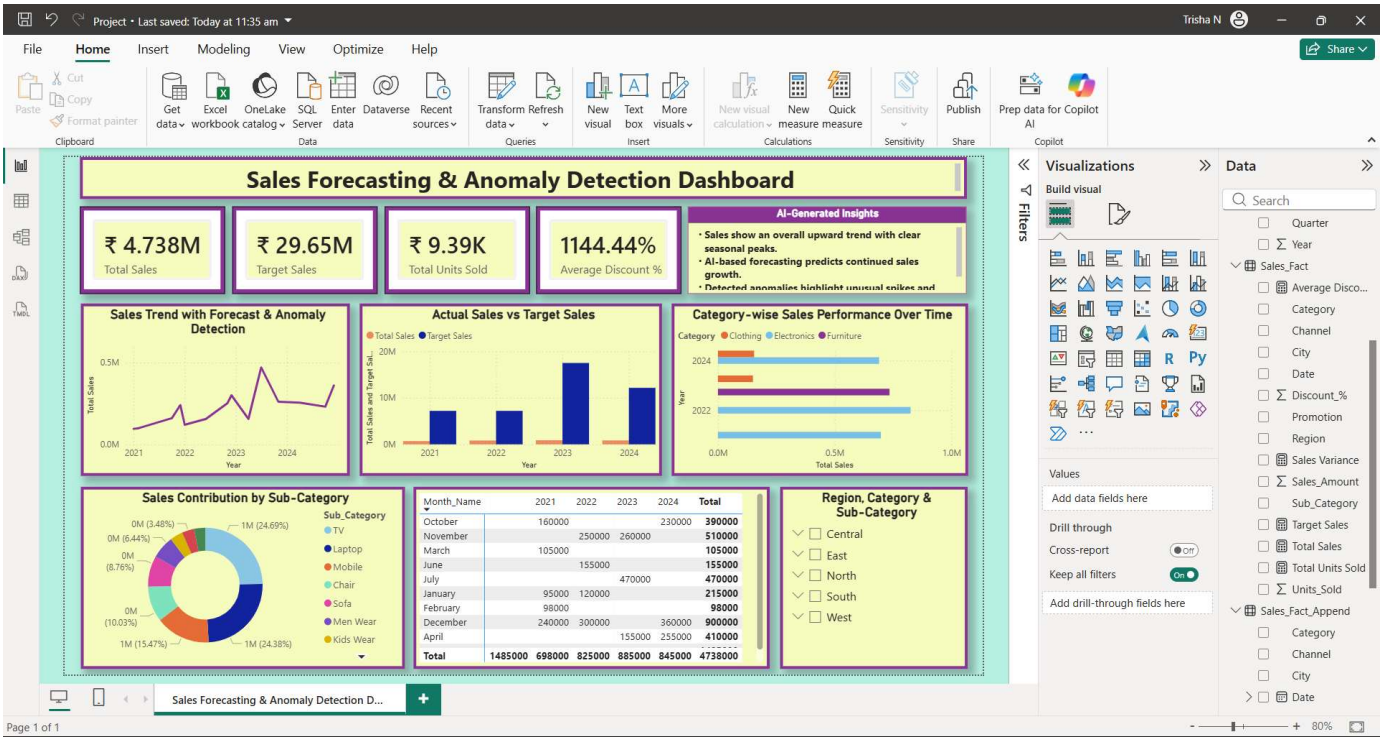

Figure 1: Sales Forecasting & Anomaly Detection Dashboard

5. Analysis & Answers

5.1 Historical Sales Trend Analysis

Historical sales trends were analyzed using a line chart. The analysis shows an overall upward trend in sales over time with some fluctuations, indicating business growth with periodic variations.

5.2 Seasonality Patterns

Seasonality patterns are visible through recurring sales peaks during specific months and years. These peaks suggest increased demand during festive seasons and promotional periods.

5.3 Sales Forecasting

AI-based forecasting in Power BI was applied to predict future sales. The forecast indicates continued sales growth based on historical trends and seasonality, along with confidence intervals to account for uncertainty.

5.4 Anomaly Detection

AI anomaly detection was used to identify unusual sales spikes and drops that deviate from expected patterns. These anomalies help highlight abnormal business behavior requiring attention.

5.5 Reasons for Detected Anomalies

Detected anomalies can be attributed to factors such as promotional campaigns, high discount periods, festive sales, operational issues, or sudden changes in customer demand.

5.6 Smart Narrative Insights

Smart Narratives summarize key insights from the dashboard. The insights indicate sales growth with seasonal peaks, forecasted future growth, and detected anomalies that reveal potential risks and opportunities.

5.7 Actual vs Forecasted Sales Comparison

Actual sales values were compared with forecasted values. The close alignment between actual and forecasted sales indicates that the forecasting model is performing effectively.

5.8 Forecast Model Reliability

The forecast model is reasonably reliable as it is based on consistent historical data and identifiable seasonality. Confidence intervals improve reliability by accounting for possible variations.

5.9 Management Actions Based on AI Insights

Based on AI insights, management should plan inventory ahead of peak seasons, monitor anomalies for early risk detection, align promotions with forecasted demand, and use insights for strategic planning and budgeting.