

SALES FORECASTING AND ANOMALY DETECTION

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Problem Statement

1. A retail organization wants to move from reactive reporting to predictive analytics. Management needs a solution to:
2. Forecast future sales
3. Detect unusual sales patterns (anomalies)
4. Identify risks and opportunities early
5. Due to increasing data volume, manual analysis is no longer sufficient.
6. Therefore, as an Advanced BI Analyst, the task is to build an AI-powered Power BI dashboard that can analyze historical trends, forecast sales, detect anomalies, and automatically generate insights for better decision-making.

Project Overview

Business Problem:

Traditional reports only explain past performance and fail to predict risks or opportunities in advance.

Solution:

Developed an interactive Power BI dashboard using:

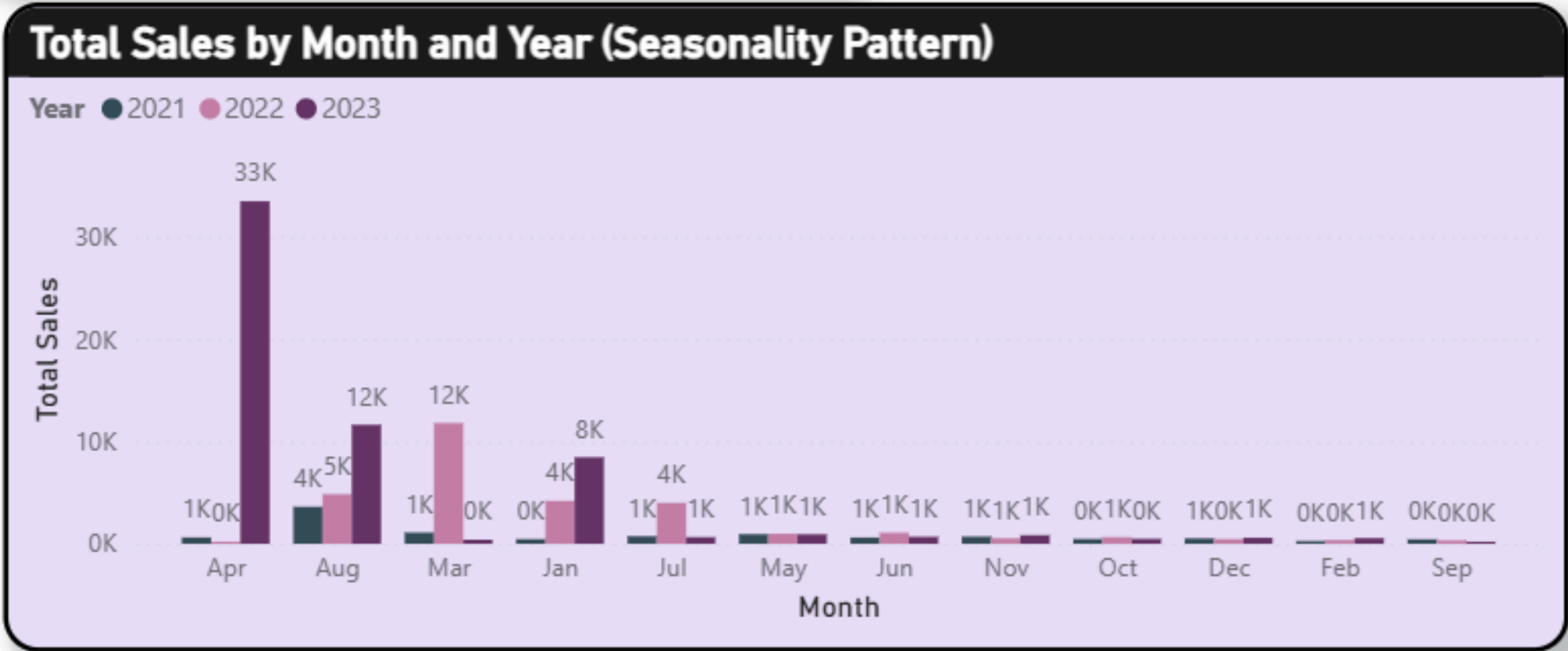
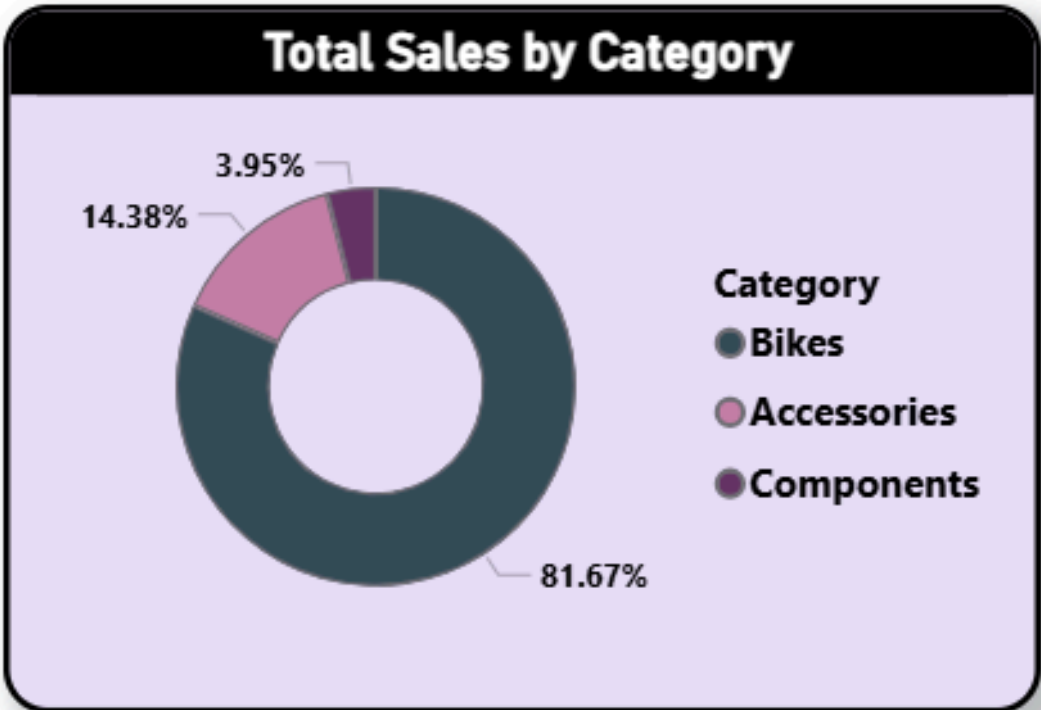
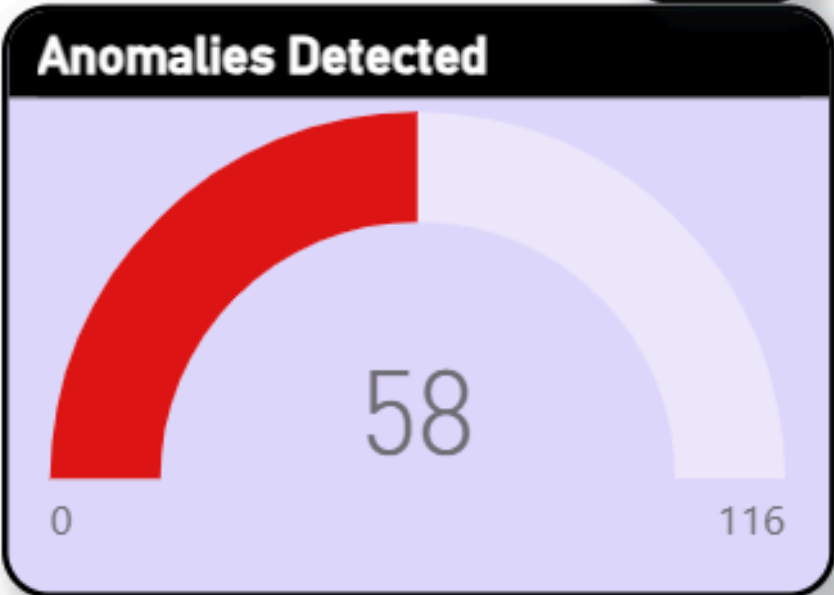
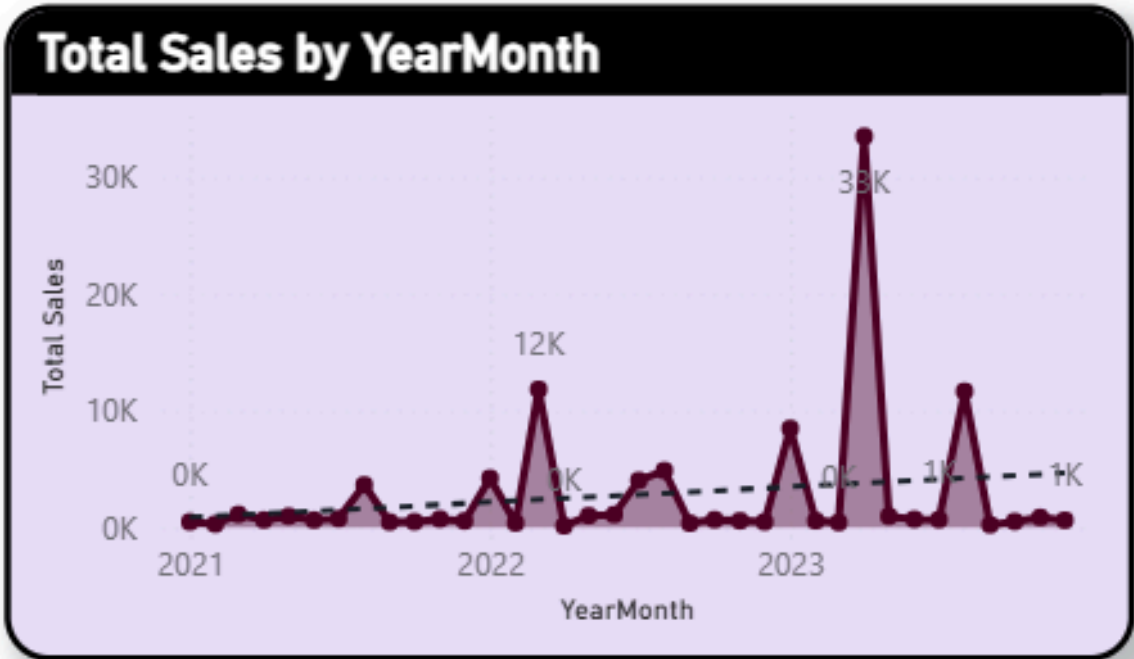
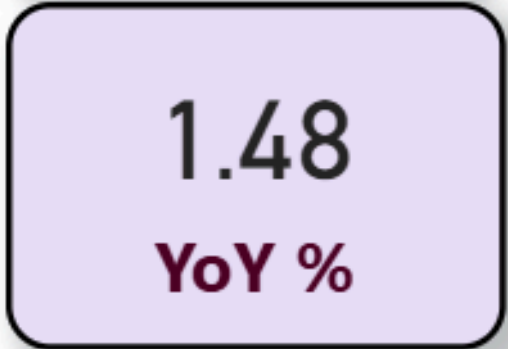
- Sales Forecasting to predict future trends
- Anomaly Detection to identify unusual sales spikes or drops
- Root Cause Analysis to find key drivers of performance

Key Features:

- KPIs: Total Sales, YTD, LY, YoY %
- Line charts for trend, forecast, and anomalies
- Decomposition Tree for root cause analysis
- Slicers for dynamic filtering

Sales Forecasting & Anomaly Detection (AI Project)

Next

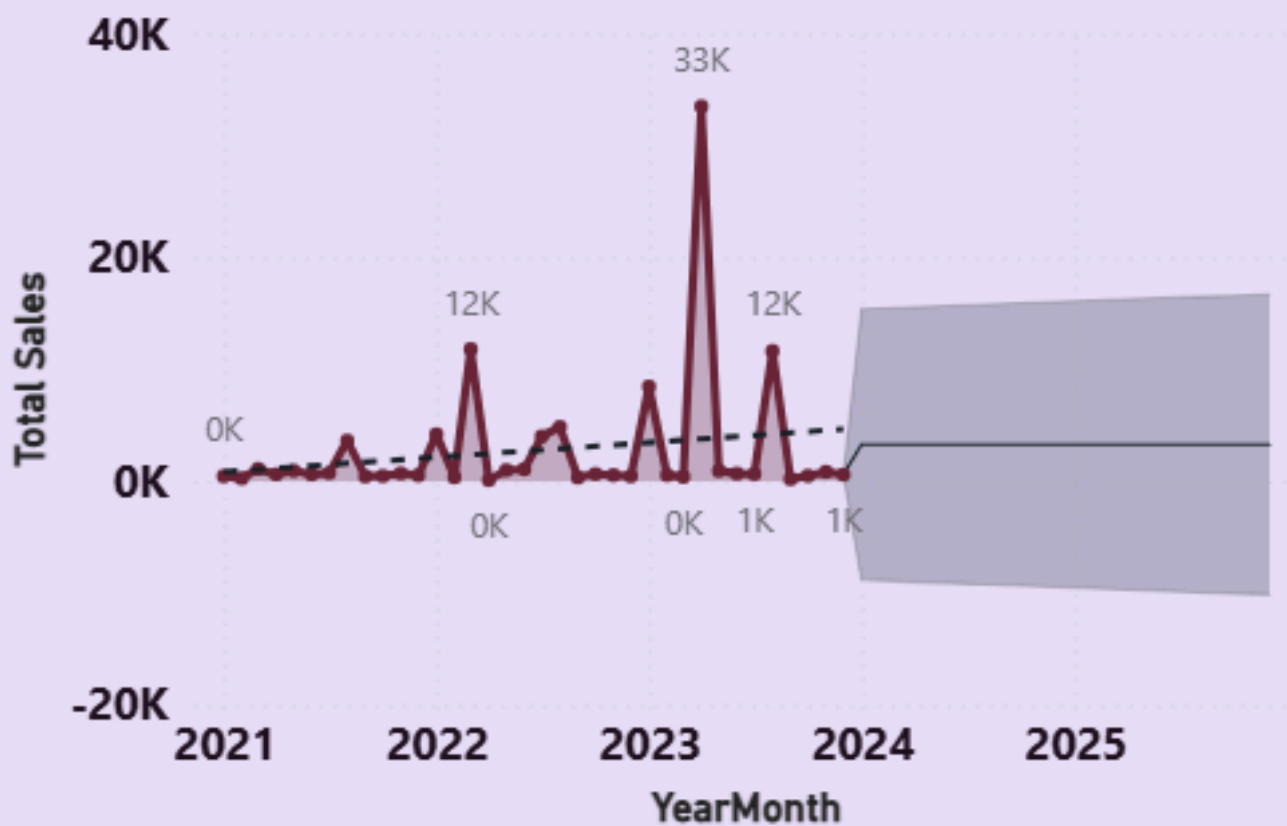




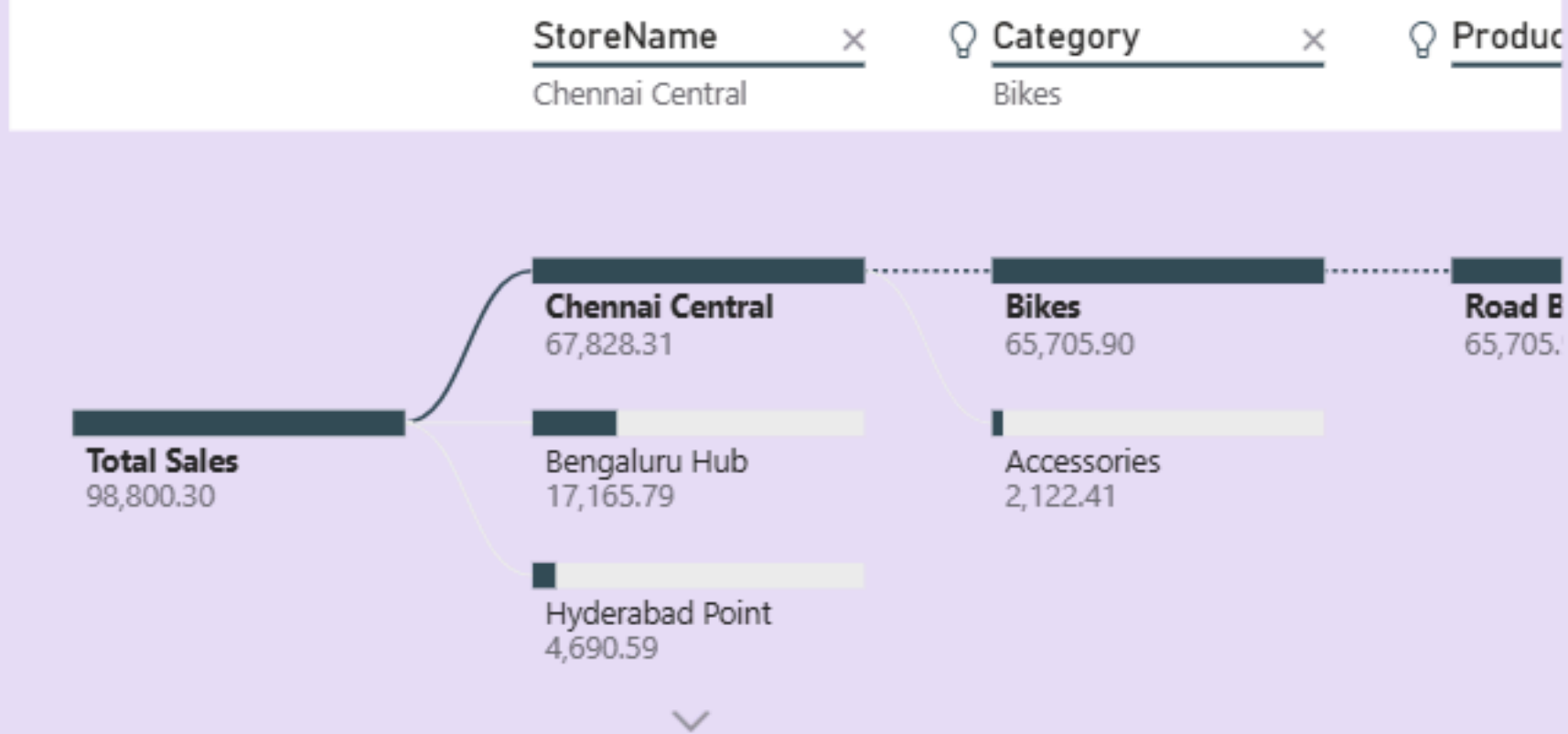
Sales Forecasting & Anomaly Detection

Next

Total Sales by YearMonth (Forecasting)



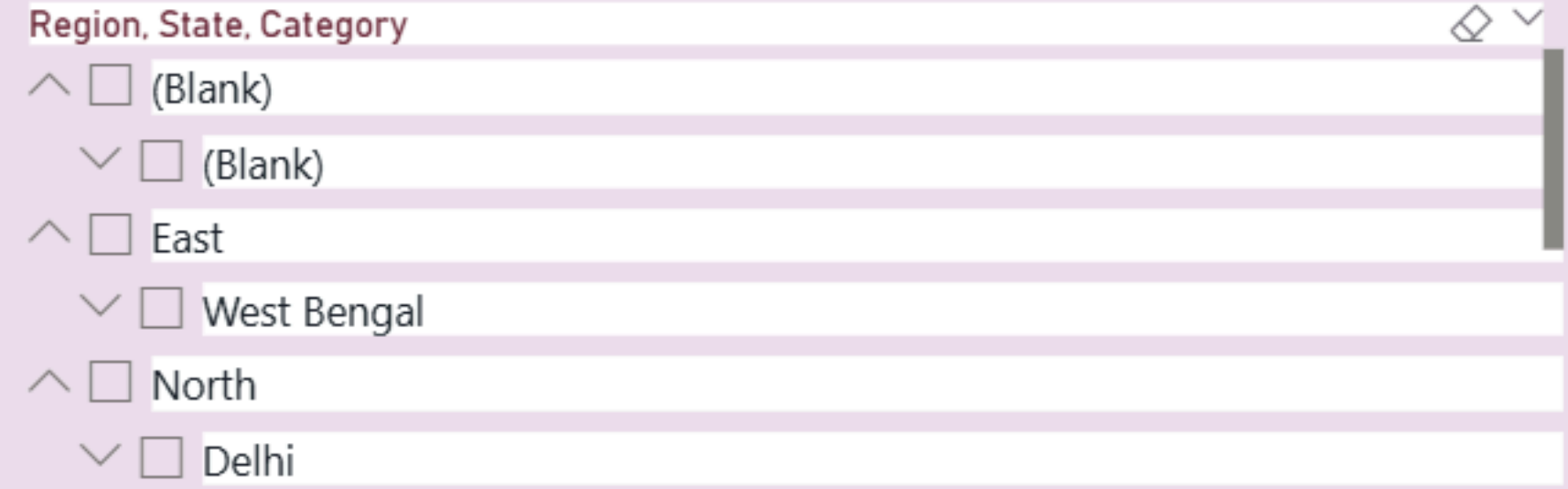
Root Cause



Forecast Reliability

The forecast model reliability is indicated by the **confidence interval** shown in the forecast chart. If the confidence band is **narrow**, the forecast is **more reliable** because sales patterns are consistent. If the band is **wide**, the forecast is **less reliable** because sales shows more fluctuations and uncertainty. In our dashboard, we used a **95% confidence interval**, so the forecast is statistically dependable within that range.

Slicer



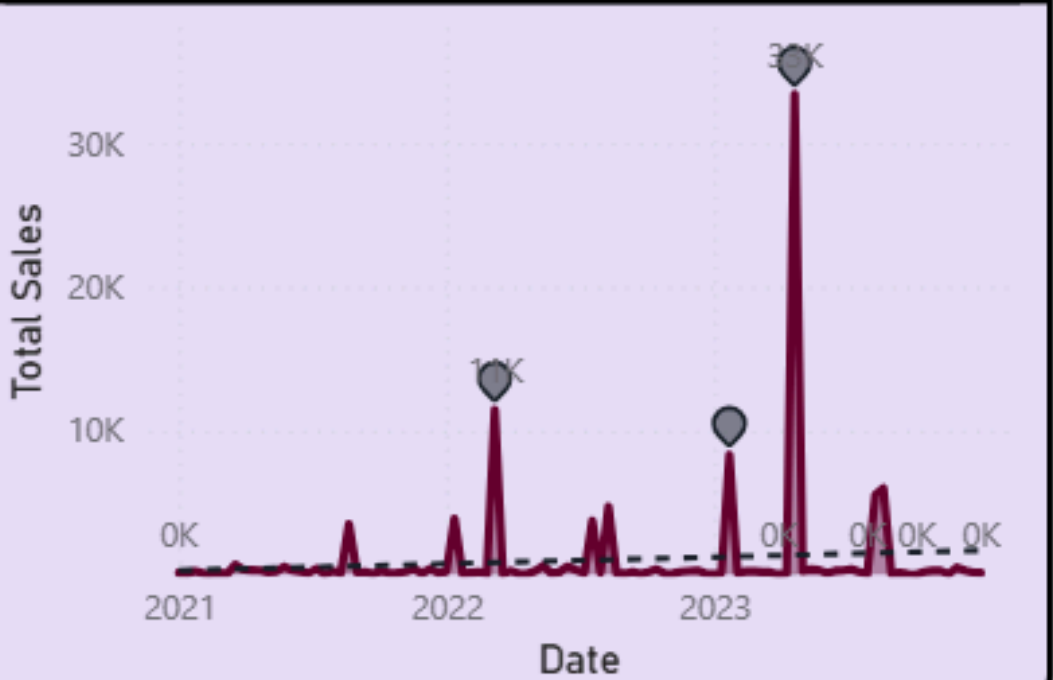


Sales Forecasting & Anomaly Detection

Sales Breakdown by Region, Store & Category

Region	Accessories	Bikes	Components	Total
South	9,927.81	80,689.22	1,824.74	92,441.77
West	2,228.14		1,201.12	3,429.26
North	2,054.41		607.68	2,662.09
East			267.18	267.18
Total	14,210.36	80,689.22	3,900.72	98,800.30

Total Sales by Date(Anomaly)



Management Actions:

- Increase stock in peak months
- Run promotions in low months
- Investigate anomaly stores/products
- Adjust pricing strategy

Key Insights

Total Sales trended up, resulting in a 30.49% increase between Friday, January 1, 2021 and Friday, December 1, 2023.

Total Sales started trending down on Saturday, July 1, 2023, falling by 8.58% (55.72) in 5 months. Total Sales jumped from 533.96 to 985.33 during its steepest incline between Wednesday, December 1, 2021 and Sunday, May 1, 2022.



Ask a question about your data



Try one of these to get started

what is the total sales by product category

what is the total sales by sales fact category

what is the average monthly sales by product category

Show all suggestions

Data Sets

✕	✓								
OrderID	OrderDate	StoreID	ProductID	Category	UnitsSold	UnitPrice	DiscountPct	SalesAmount	Anomaly Flag
ORD00001	44197	S09	P007	Components	2	63.03	0	126.06	1
ORD00003	44219	S03	P014	Accessories	9	28.62	0	257.58	0
ORD00004	44230	S03	P009	Components	4	22.7	0	90.8	1
ORD00006	44252	S10	P004	Accessories	2	63.2	0	126.4	1
ORD00007	44263	S10	P008	Components	8	7.39	0	59.12	1
ORD00008	44274	S01	P013	Accessories	12	57.91	0	694.92	0
ORD00009	44285	S03	P004	Accessories	5	68.69	0	343.45	0
ORD00010	44296	S07	P012	Accessories	12	26.73	0	320.76	0
ORD00011	44308	S08	P010	Components	8	37.52	0	300.16	0
ORD00012	44319	S07	P013	Accessories	3	54	0	162	1
ORD00013	44330	S10	P011	Accessories	12	19.55	0	234.6	0
ORD00014	44341	S06	P013	Accessories	10	54.23	0	542.3	0
ORD00015	44352	S06	P010	Components	8	36.69	0	293.52	0
ORD00016	44363	S01	P014	Accessories	7	30.59	0	214.13	0
ORD00017	44374	S05	P005	Accessories	4	26.81	0	107.24	1
ORD00018	44385	S09	P015	Accessories	20	21.7	0	434	0
ORD00023	44440	S05	P012	Accessories	5	29.65	0	148.25	1
ORD00024	44451	S07	P010	Components	6	35.24	0	211.44	0
ORD00025	44462	S10	P015	Accessories	4	19.9	0	79.6	1
ORD00026	44473	S08	P003	Accessories	5	49.02	0	245.1	0
ORD00027	44484	S09	P006	Accessories	8	12.43	0	99.44	1
ORD00028	44495	S09	P015	Accessories	6	21.07	0	126.42	1
ORD00030	44517	S05	P013	Accessories	8	50.88	0	407.04	0
ORD00031	44529	S06	P006	Accessories	8	13.17	0	105.36	1
ORD00032	44540	S09	P013	Accessories	8	53.32	0	426.56	0
ORD00033	44551	S03	P010	Components	3	35.8	0	107.4	1
ORD00034	44562	S10	P012	Accessories	8	28.6	0	228.8	0
ORD00035	44573	S08	P001	Bikes	4	971.39	0	3885.56	0
ORD00036	44584	S01	P015	Accessories	4	20.08	0	80.32	1
ORD00038	44606	S05	P015	Accessories	10	18.68	0	186.8	1

▼	📊	Products	
	Σ	BaseUnitPrice	
		Category	
		ProductID	
		ProductName	
		StoreID	
▼	📊	Sales_Fact	🔍 ...
	📊	Actual Sales	
	📊	Anomalies Detected	
	📊	Anomaly Flag	
	📊	Average Monthly Sales	
		Category	
	Σ	DiscountPct	
	📊	Monthly Sales	
		OrderDate	
		OrderID	
	📊	Previous Month Sales	
		ProductID	
	📊	Sales Growth %	
	📊	Sales LY	
	📊	Sales YTD	🔍 ...
	Σ	SalesAmount	
		StoreID	
	📊	Total Sales	
	Σ	UnitPrice	

Thank You!
