

DATA-DRIVEN STRATEGY FOR GOLD PROCUREMENT & FINANCIAL RESILIENCE



The dataset consists of:

1. **Sales Data:** Gold sales over two time periods.
2. **GoldBees Data:** ETF prices tracking gold values.
3. **Daily Rate Capture:** Daily gold and silver prices

Main challenges :

Managing gold procurement amidst price fluctuations to maximize profitability and minimize risk.

EDA & DATA PREPROCESSING

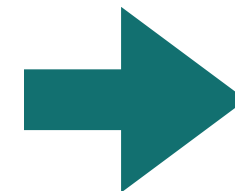
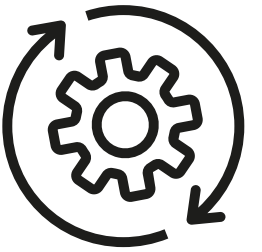


- Removed duplicates.
- Fixed spelling inconsistencies.
- Converted all text columns to uppercase for consistency.
- Handled missing values.
- Numerical values imputed with the median.
- Categorical values imputed with the mode.
- Standardized size and weight ranges.
- Converted '2-4 GRAMS' to [2, 4].

AFTER PREPROCESSING :

I	J	K	L	M
Weight Range	Size	Pcs	Gwt(Grams)	Sales_Value
2-4 GRAMS	18 INCH	1	4.05	25049.86
36-40 GRAMS	24 INCH	1	40.58	218750.04
60-64 GRAMS	24 INCH	1	63.52	347109.78
10-12 GRAMS	18 INCH	1	12.03	68750.2
52-56 GRAMS	24 INCH	1	55.92	306613.82
20-24 GRAMS	18 INCH	1	23.94	129720.63
36-40 GRAMS	24 INCH	1	39.44	229750.43
6-8 GRAMS	18 INCH	1	8.52	54454.06

- Extracted numeric values from text (e.g., converted '24 INCH' to '24').
- Handled outliers using Z-Score.
- Converted dates to datetime format.
- Encoded categorical variables using one-hot encoding or label encoding.
- Split data into training and testing sets for model development.



I	P	Q	R	S	T	U
Size	Weight Mi	Weight Ma	Profit Mar	Revenue P	Product Performance	
18	2	4	9.967561	6185.151	Slow Moving	
18	36	40	6.128735	5390.587	Fast Moving	
24	10	12	94.54547	5714.896	Fast Moving	
18	20	24	4.123623	5418.573	Fast Moving	
18	36	40	9.826049	5825.315	Fast Moving	
18	6	8	15.11626	6391.322	Fast Moving	
24	20	24	7.497816	5538.32	Fast Moving	
18	6	8	92.04034	5889.069	Fast Moving	
24	8	10	10.64314	5759.166	Slow Moving	
24	14	16	11.80869	5543.481	Slow Moving	
18	4	6	4.732128	6005.937	Fast Moving	
18	20	24	2.300745	5422	Fast Moving	
18	2	4	2 596744	6206 668	Fast Moving	

SALES OVERVIEW DASHBOARD

Total Sales
(amount in Lakhs)

3.13K

Peak Sales day

03-Nov-2024 - ₹6,863,084.75

Peak Sales Month

December

Average Sales
Per Transaction

80.28K

ABC JEWELLERY

Total Profit Margin (%)

5664

Total Profit Margin (%)

21.52

Total Weight Sold (Grams)

53.40K

BRANCH

Branch

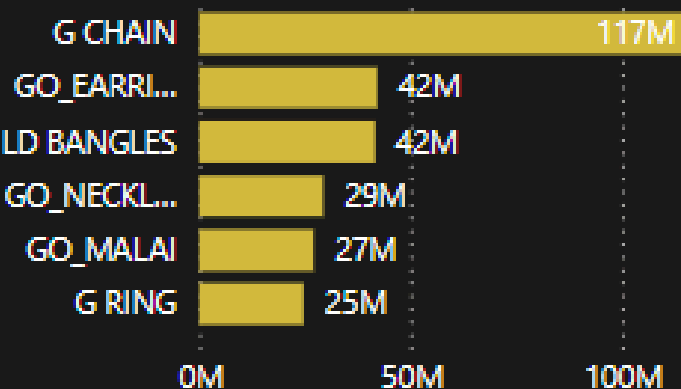
- ☐ CBT
- ☐ CNI
- ☐ MDU
- ☐ SLM

Year, Month

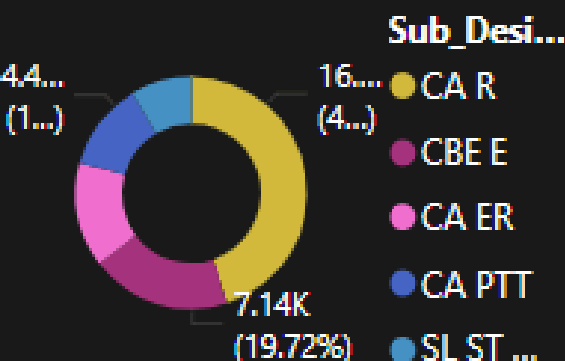
2024

- ☐ January
- ☐ February
- ☐ March
- ☐ April
- ☐ May
- ☐ June
- ☐ July
- ☐ August
- ☐ September
- ☒ October
- ☒ November

Product Category Performance



Profitability by Design Type

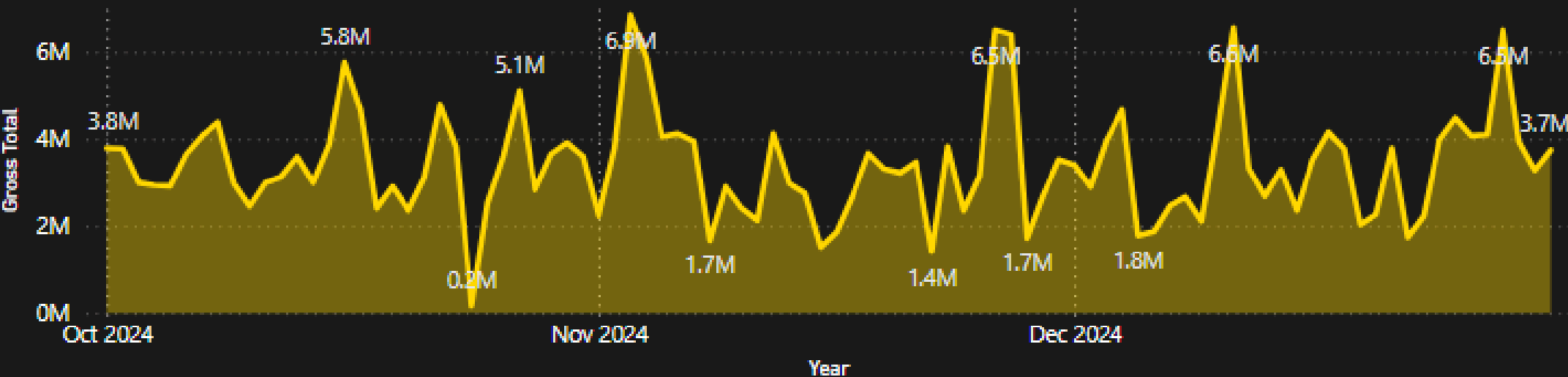


Fast Moving &
Slow Moving
products

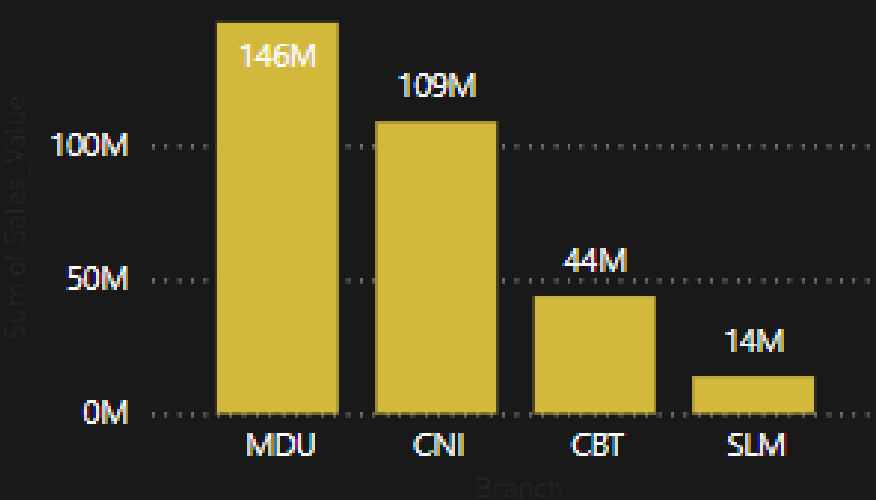
1370

4294

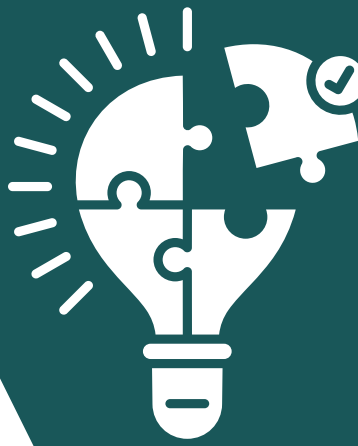
Sales Trend Over Time



Total Sales by Branch



DESCRIPTIVE STATISTICS



HYPOTHESIS TESTING :

Buy Amount vs. Net P/L

Null Hypothesis (H_0): There is no significant relationship between Buy Amount and Net P/L.

Alternative Hypothesis (H_1): Higher Buy Amount is associated with higher Net P/L.

Pearson Correlation: 0.0338839459692825, p-value: 5.884236847774343e-07

Reject the null hypothesis: There is a significant relationship between Buy Amount and Net P/L.

Monthly Buying Trends

Hypothesis : Monthly Buying Trends (Chi-Square Test)

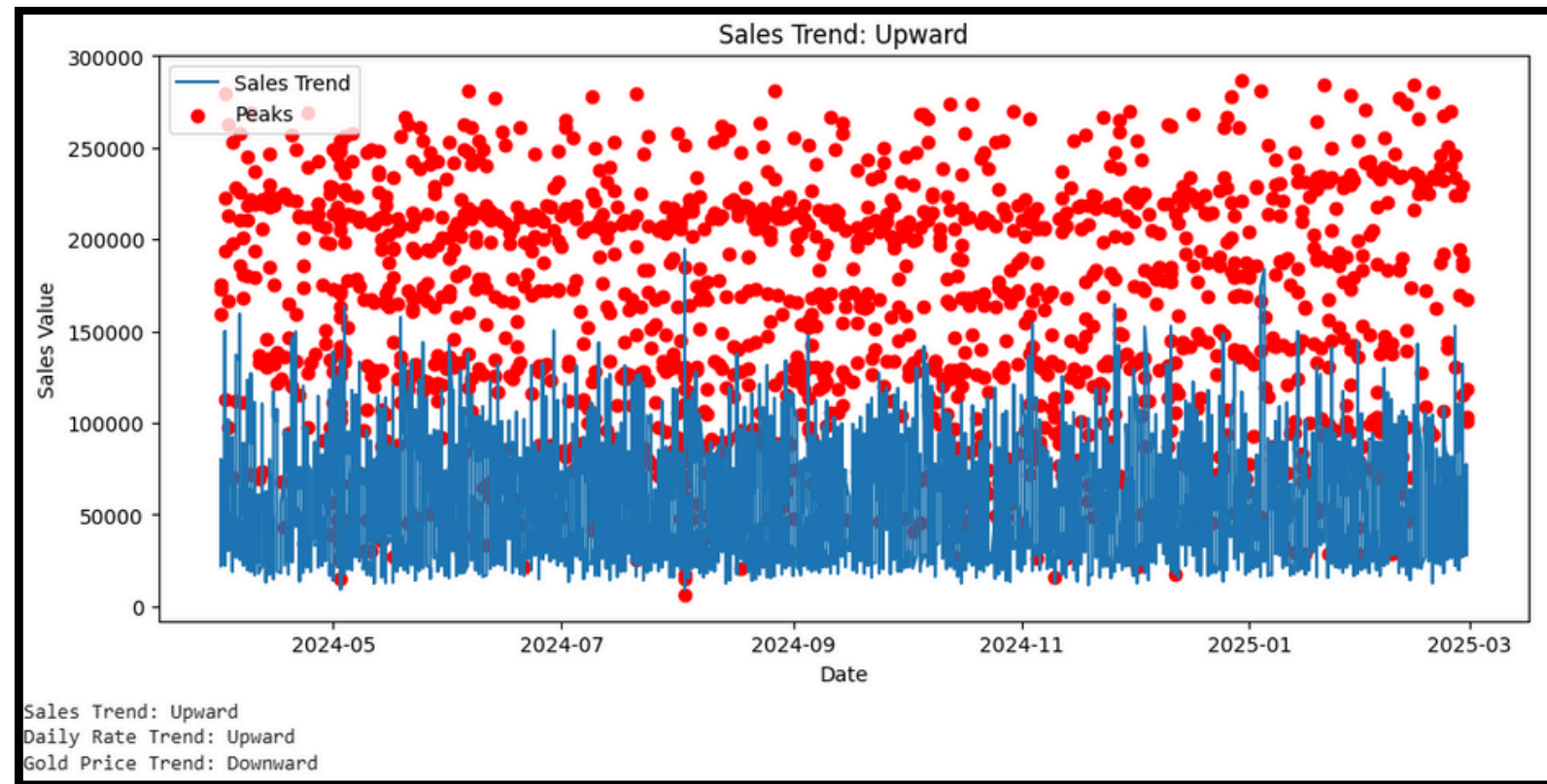
Null Hypothesis (H_0): Buy Amount distribution does not vary significantly across months.

Alternative Hypothesis (H_1): Buy Amount distribution varies significantly across months.

Chi-Square Test: Chi2-statistic = 312.9768105303783, p-value = 2.797938435468681e-61

Reject the null hypothesis: Buy Amount distribution varies significantly across months.

SALES TREND ANALYSIS

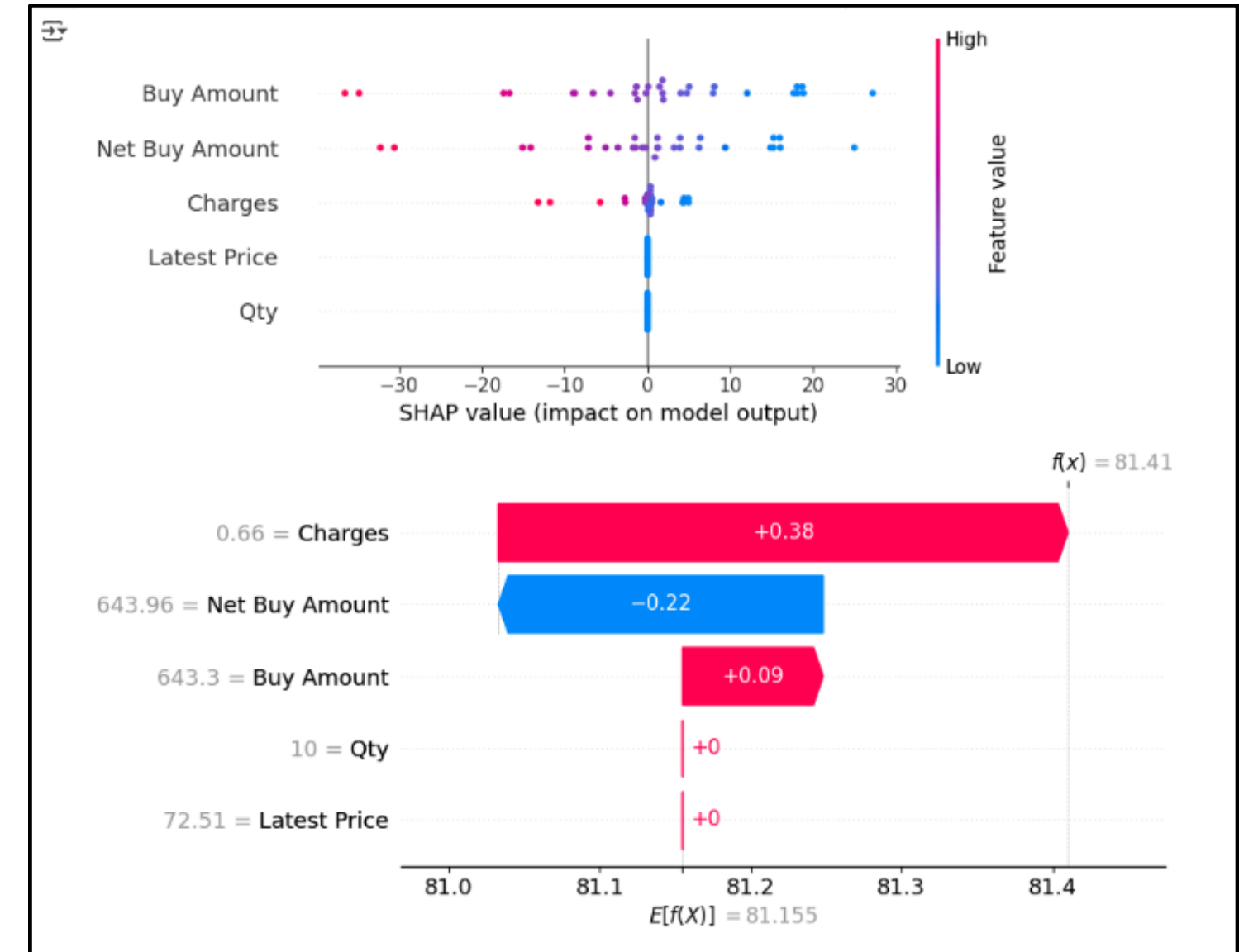


Sales Trend (Blue Line): Sales have been increasing over time.

Peaks (Red Dots): The identified peaks (local maxima) represent points where sales values spiked significantly.

High Frequency of Peaks: The large number of peaks at different levels suggests significant sales volatility with frequent high sales days.

FACTORS INFLUENCING PROFIT/LOSS



Charges (+0.38 impact on profit) → Higher charges increased profit.

Net Buy Amount (-0.22 impact on profit) → Higher net buy amount decreased profit.

Buy Amount (+0.09 impact on profit) → Slightly increased profit.

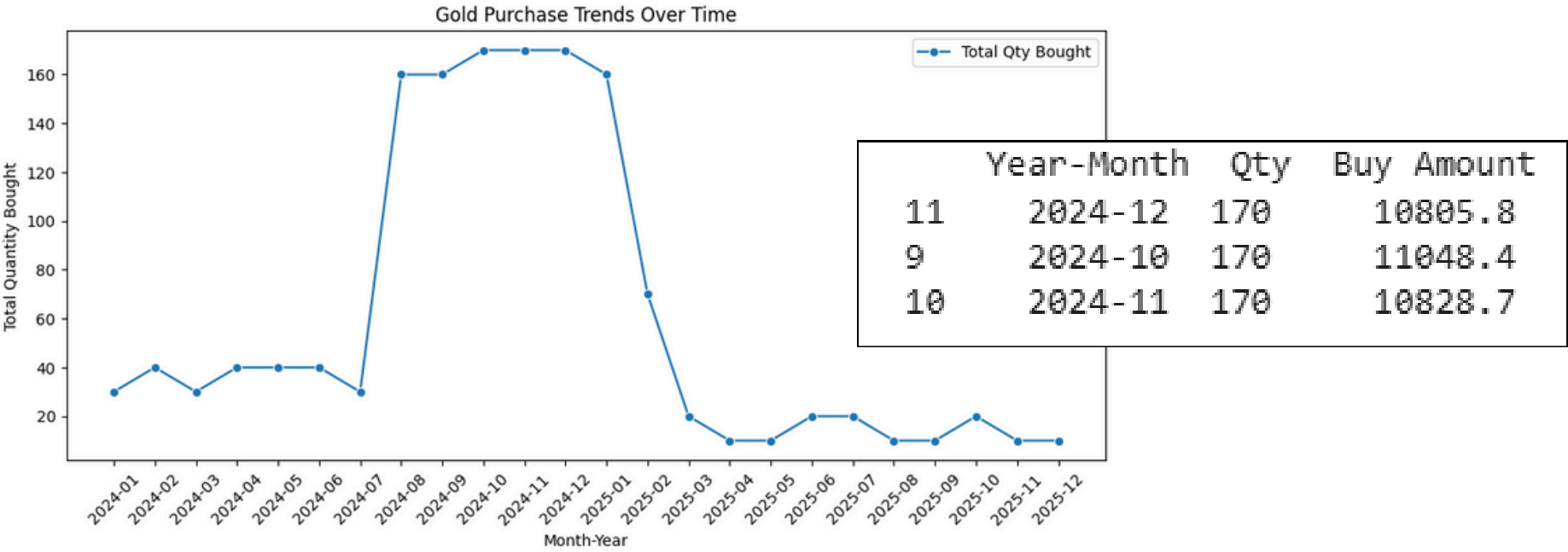
Qty and Latest Price had no impact on this specific prediction.

MARKET BASKET ANALYSIS :

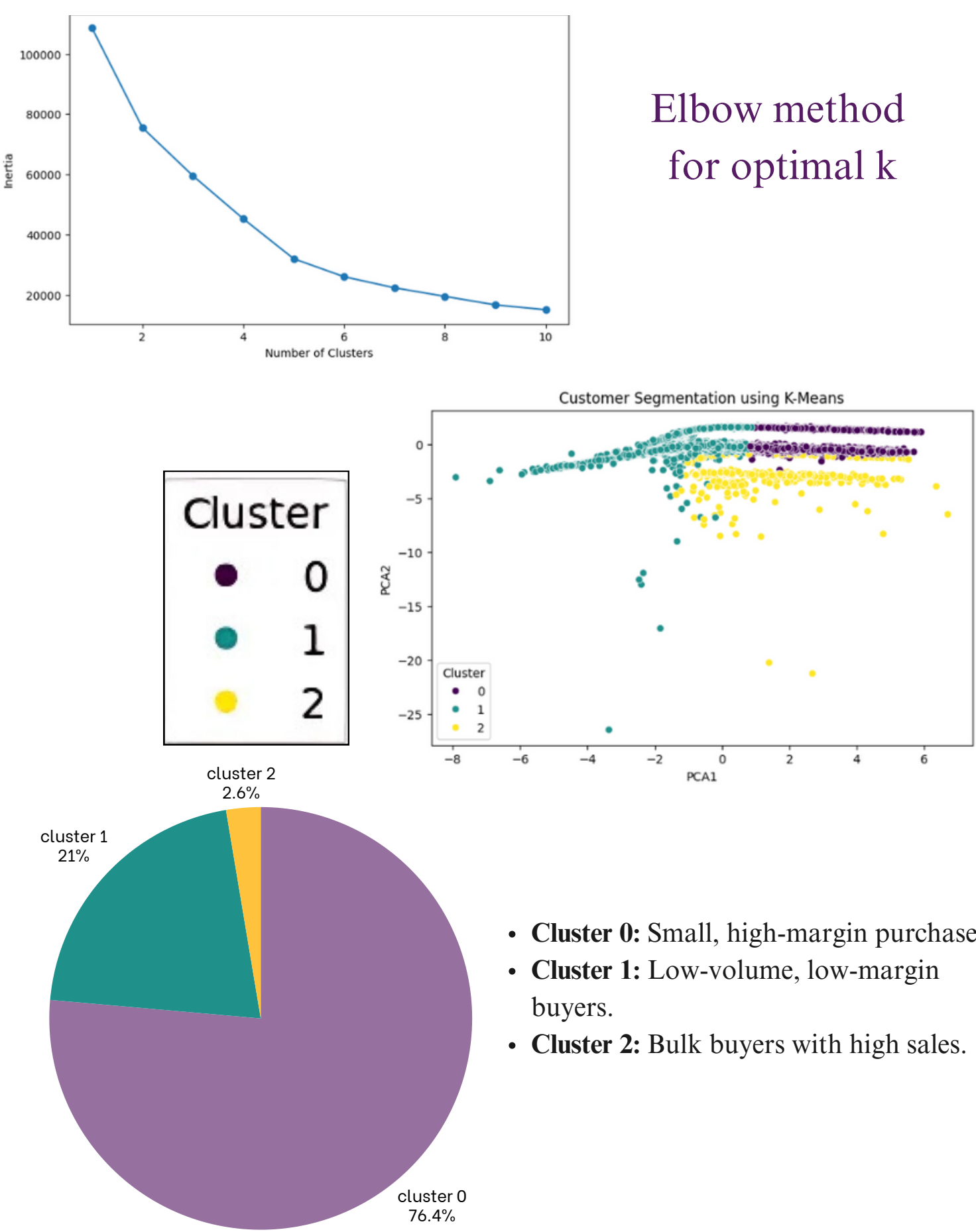
	antecedents	consequents	antecedent support
20	(GO_PENDANT, LD BANGLES)	(G CHAIN)	0.028959
28	(G RING, GO_PENDANT, GO_EARRINGS)	(G CHAIN)	0.026501
16	(GO_PENDANT, GO_EARRINGS)	(G CHAIN)	0.086878
12	(GO_BRACELET, GO_PENDANT)	(G CHAIN)	0.020945
0	(GO_PENDANT)	(G CHAIN)	0.212225
8	(G RING, GO_PENDANT)	(G CHAIN)	0.066147
2	(GO_BRACELET, G RING)	(G CHAIN)	0.035371
24	(GO_BRACELET, GO_EARRINGS)	(G RING)	0.042637
3	(GO_BRACELET, G CHAIN)	(G RING)	0.039859
29	(G CHAIN, G RING, GO_EARRINGS)	(GO_PENDANT)	0.045950

SEASONAL PROMOTIONS :

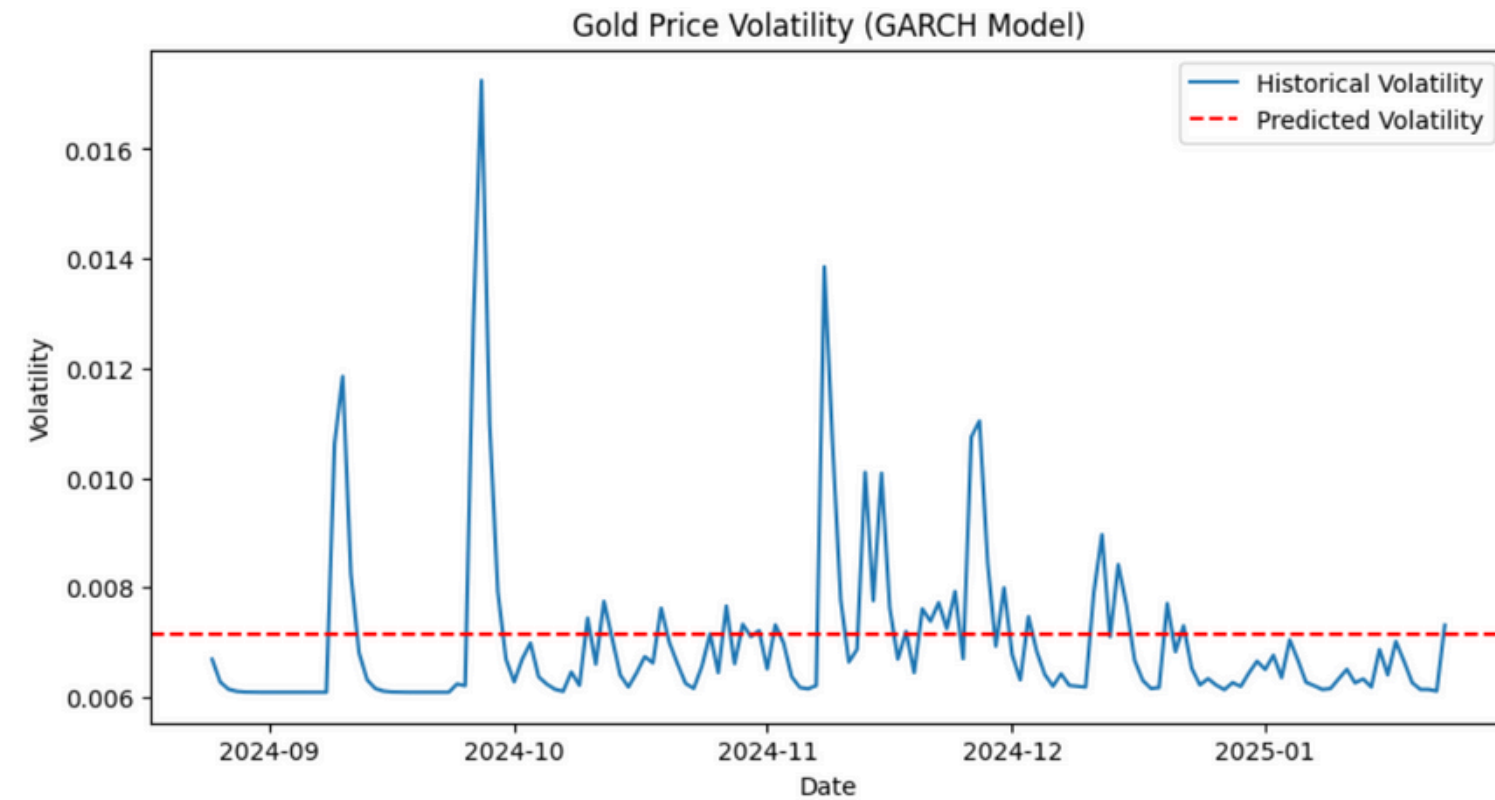
Top months for promotional campaigns based on purchases :



CUSTOMER SEGEMENTATION :



RECOMMENDATIONS



✅ Volatility is Stable. Normal procurement can continue.

GARCH model → To assess price volatility risk, ensuring financial resilience

GARCH helps measure risk and uncertainty, guiding hedging strategies

📌 Insight:

- If volatility spikes, ABC Gold should be cautious before bulk purchases.
- If volatility remains low, planned purchases are safer.

Currently, volatility is relatively low, suggesting a more stable market for making informed buying decisions.

Bollinger Bands → To detect overbought/oversold zones for timing entry

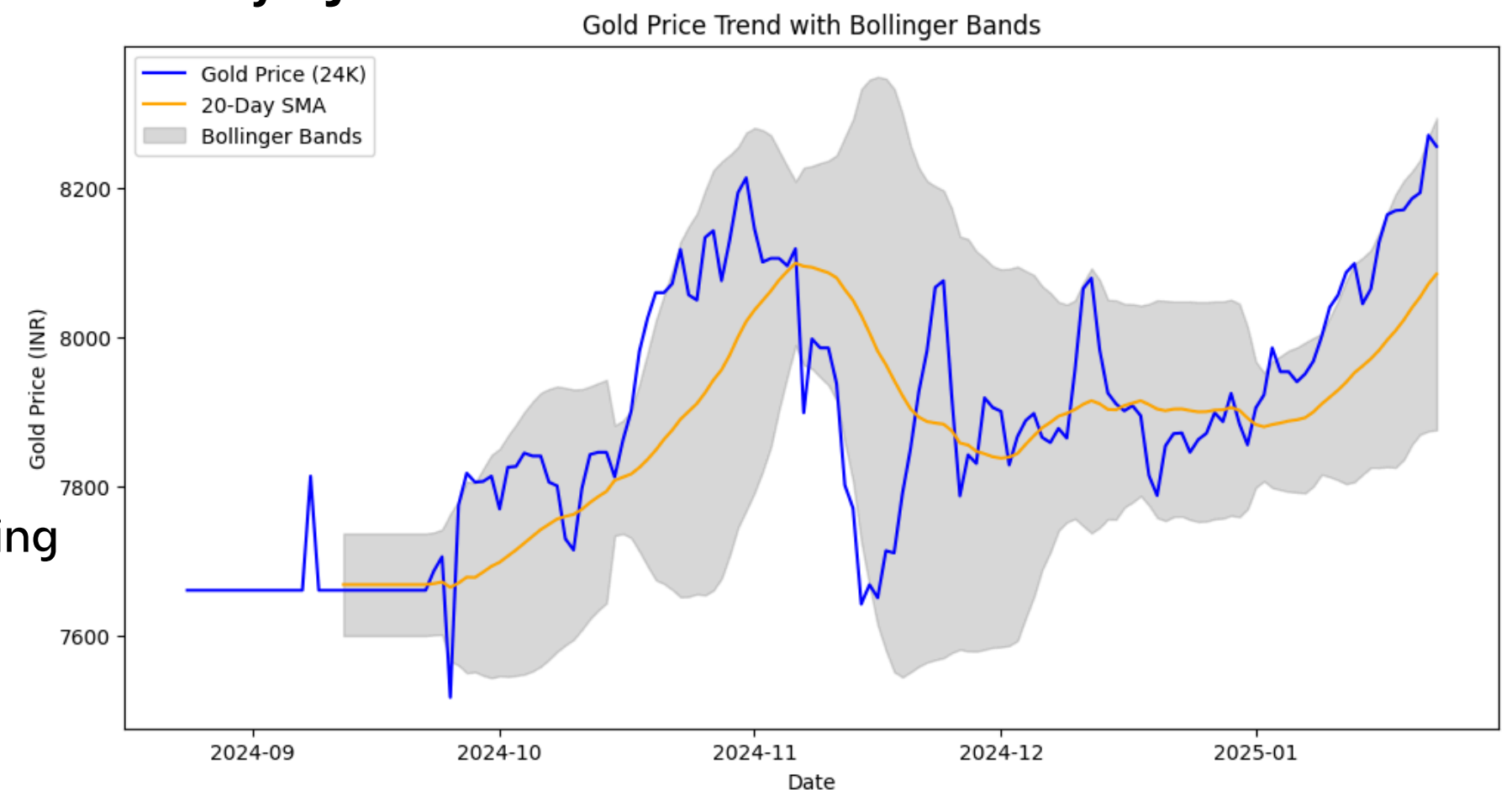
Bollinger Bands indicate whether current prices are too high or low

How to Interpret?

- If the price is touching the upper band, gold is overbought → Consider delaying purchases.
- If the price is touching the lower band, gold is oversold → Consider buying in bulk.
- If price is near the moving average, the market is stable.

📌 Insight:

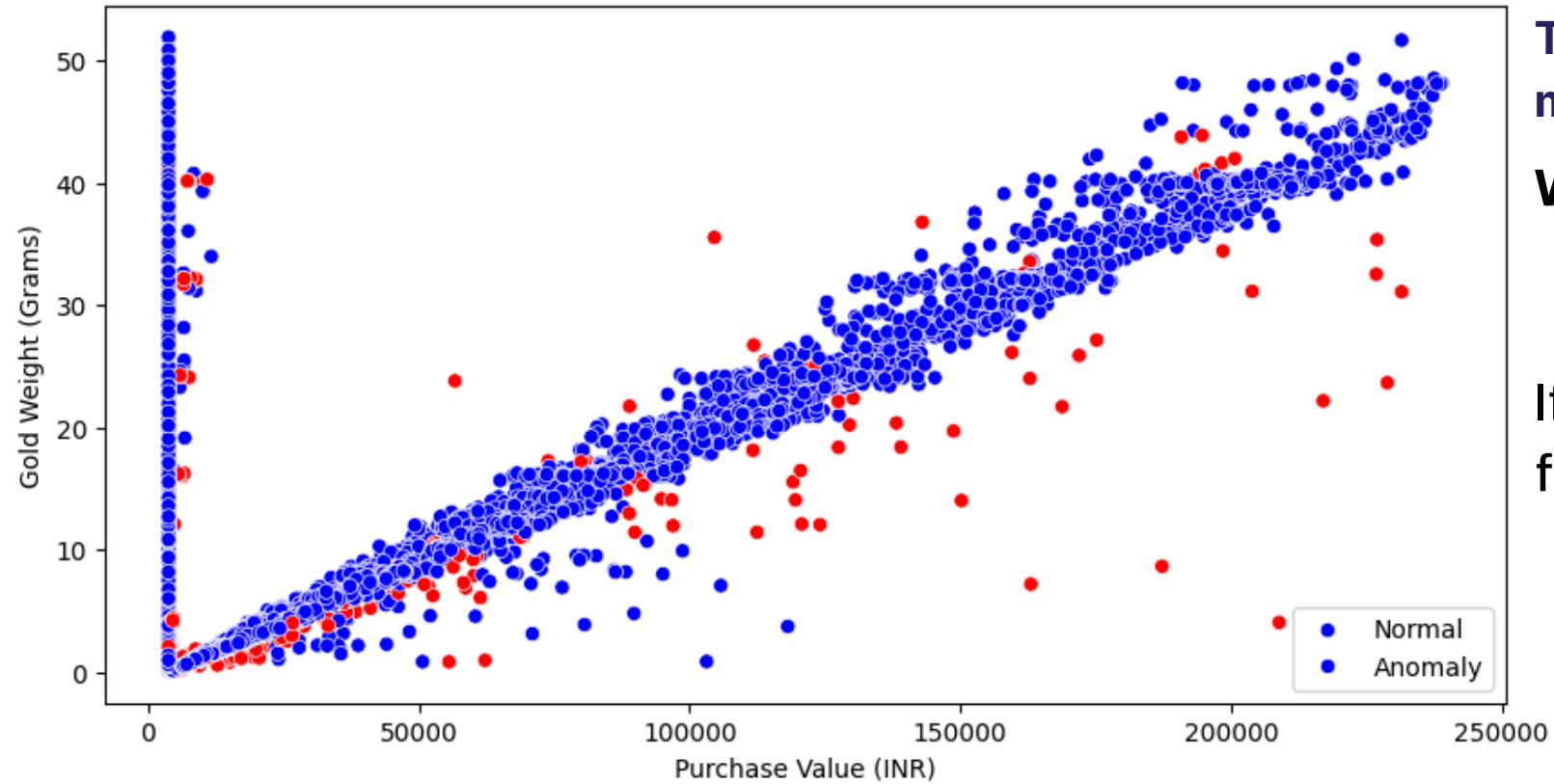
- If price is in the upper band, buying is risky due to possible correction.
- If price is in the lower band, it's a good time to purchase.



📊 Gold price is within the normal range. Monitor for opportunities.

RECOMMENDATIONS

Anomaly Detection using Local Outlier Factor (LOF)



Anomaly Detection using Local Outlier Factor (LOF) for gold transactions

There's a clear positive correlation between purchase value and gold weight (higher cost = more gold)

Why Are Some Anomalies Near Normal Points?

- LOF does not just look at distance but compares the density of points in the neighborhood.

If a point is isolated or belongs to a small dense group far from the majority, it is flagged even if it's close to a normal point.

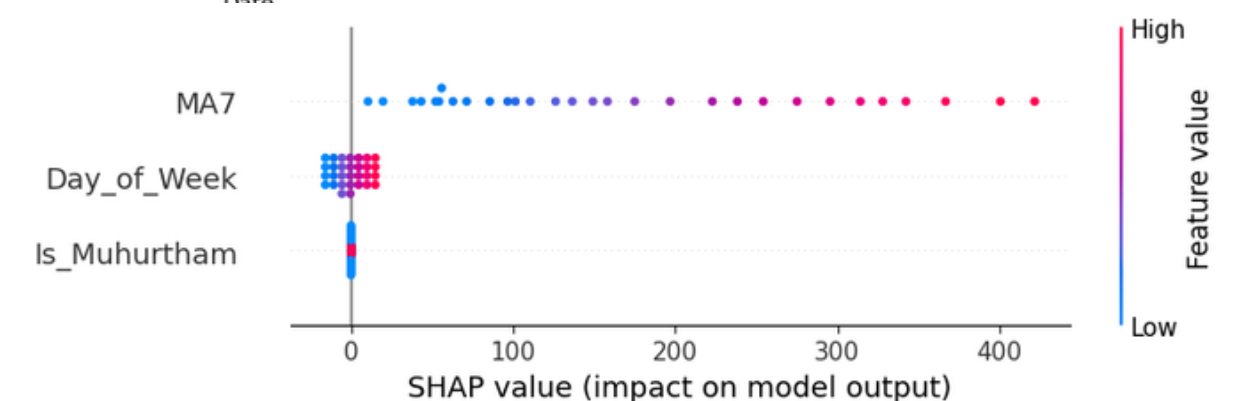
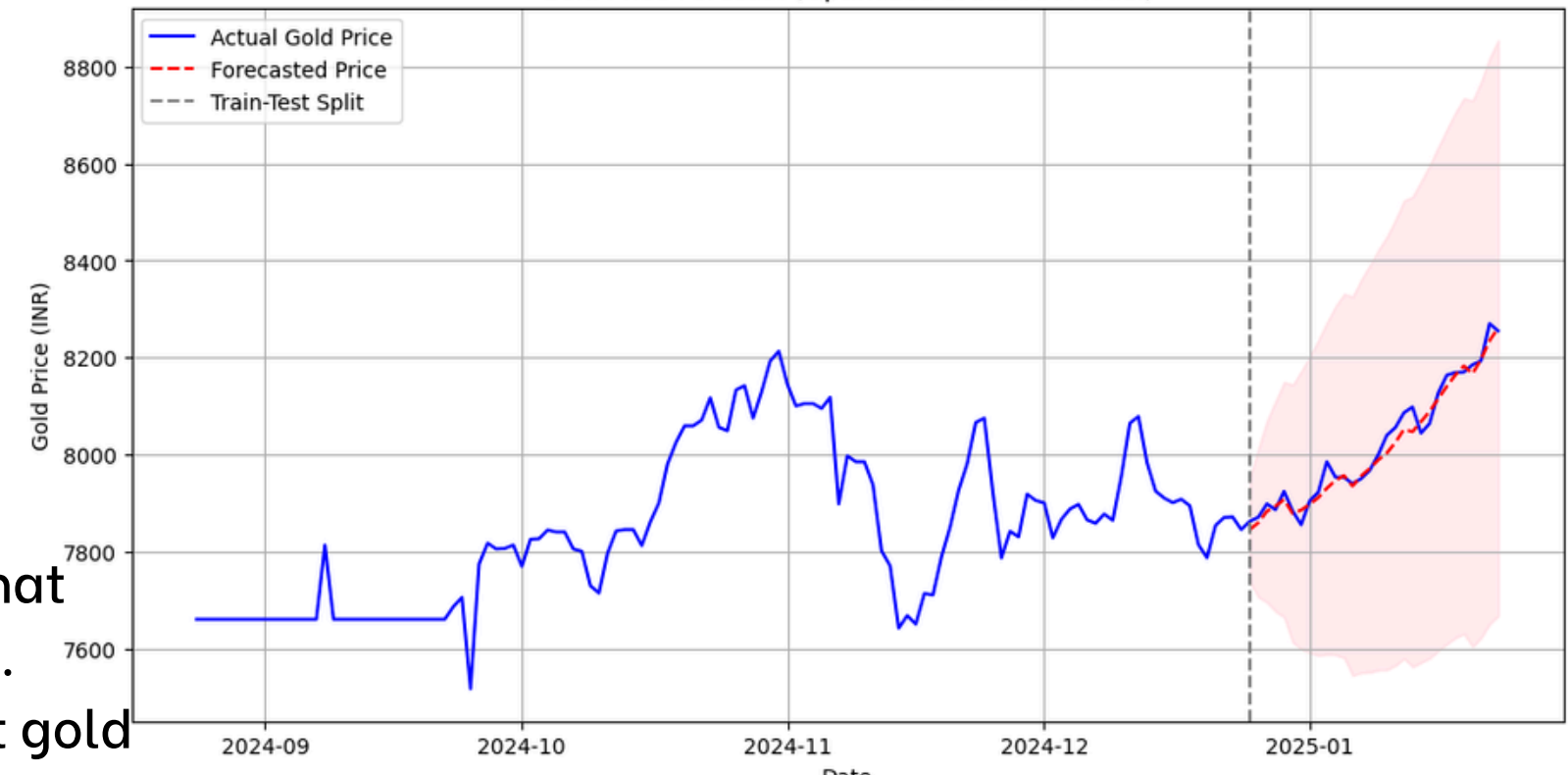
How to Interpret?

- MA7 (7-Day Moving Average of Gold Price) is the most impactful feature. This suggests that recent price trends heavily influence predictions.
- Day_of_Week (Weekday Impact) - Clusters around zero, meaning that different weekdays do not significantly impact gold price predictions.
- Is_Muhurtham (Special Festival/Occasion Days) - This confirms that gold prices may rise on special occasions but with less impact than MA7.

INSIGHT :

- Gold price is primarily driven by past trends (MA7) rather than fixed dates (Day_of_Week).
- Muhurtham days have an occasional but moderate effect, confirming demand-driven price spikes.

Gold Price Forecast (Optimized SARIMAX Model)





THANK YOU