Sports Wear Group – Case Study
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Agenda

01

Sports Wear Group - Portfolio

Organization’s business climate and goals

02

Challenges & Objective

Explore the problem and its impact to the company

03

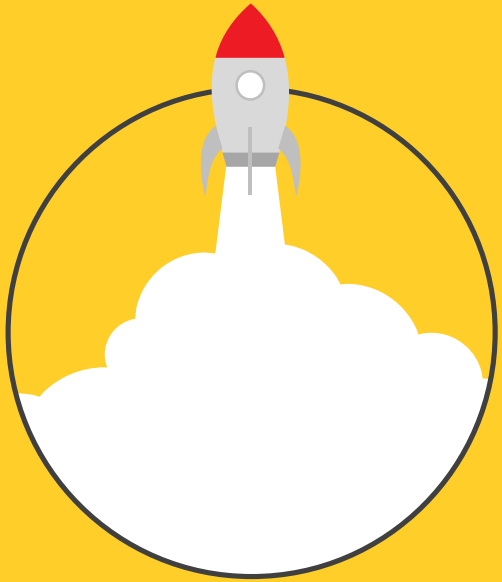
Advanced Analytics

Get a modern PowerPoint Presentation that is beautifully designed

04

Data Science Process

Get a modern PowerPoint Presentation that is beautifully designed

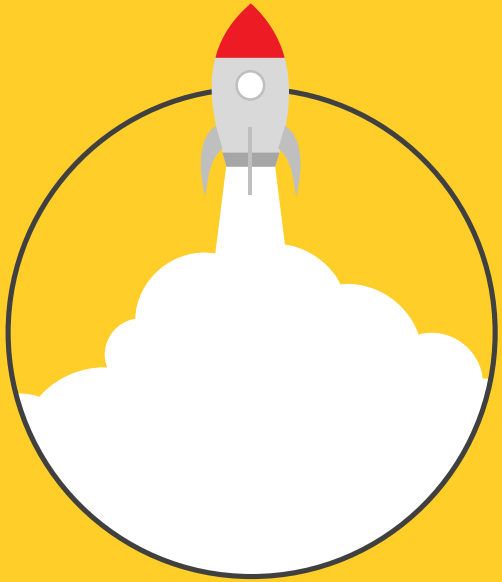


Sports **W**ear **G**roup

Portfolio

Portfolio

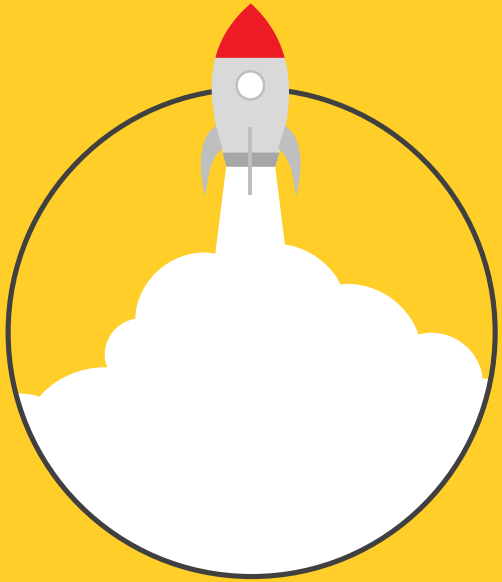
Sports **W**ear **G**roup is a prominent retail industry player in the region, boasting over 50 branches. The company operates multiple lines of business applications, primarily in the sports goods industry. Currently, they are actively pursuing a digital transformation initiative to enhance their market position by effectively meeting and surpassing customer expectations.



Sports **W**ear **G**roup - Objective

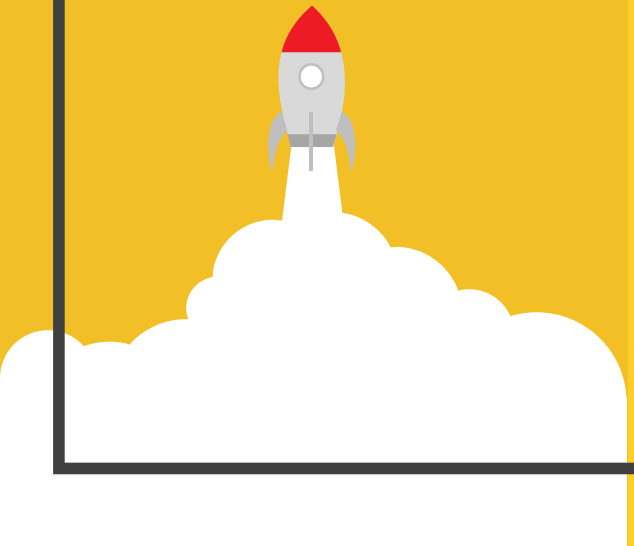
Objective !

Increase sales and improve marketing efficiency through advanced analytics.



Sports **W**ear **G**roup - Challenges

Challenges

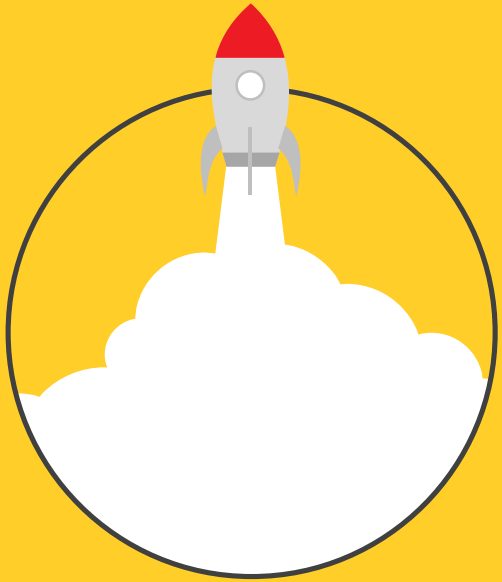


Leveraging Advanced Analytics for Improved Marketing Efficiency

In today's competitive business environment, it is essential to use data-driven insights to make informed decisions. Without the ability to analyze customer behavior and identify patterns, the company may miss out on opportunities to increase sales and improve marketing efficiency.

Additionally, ineffective marketing campaigns can lead to a decrease in custo mer loyalty and brand reputation, which can have long-term negative effects on the company's bottom line.

Therefore, it is crucial for Sports Wear Group to leverage advanced analytics to address this problem and stay ahead of the competition.



Sports **W**ear **G**roup - Advanced Analytics

About Data..

Sales Data Sample

Countries

The data covers three countries Germany, Austria , France

Retail weeks

28 Dec 2014 and 30 April 2017

Features

10000 records, sales, price ,promo1 (media advertisement) promo2 (store event) article and its specification (productgroup , gender , size, color) , label (customer bought or not)

KPIs - All about Asking Right Questions !

Sales Performance

Monitor the total number of units sold (sales) as a primary KPI. This will give an indication of the overall sales performance and the effectiveness of marketing campaigns.

Conversion Rate

Calculate the conversion rate by dividing the number of customers who made a purchase (label = 1) by the to tal number of customers who are exposed to one of the campaign/offer that was send. This KPI will provide i nsights into the effectiveness of marketing efforts in converting customers

Promotion Effectiveness

Analyze the impact of promotional activities by measuring the sales and conversion rates during promotional periods (promo1 and promo2). Compare the performance during these periods with non-promotional weeks to evaluate the effectiveness of marketing campaigns.

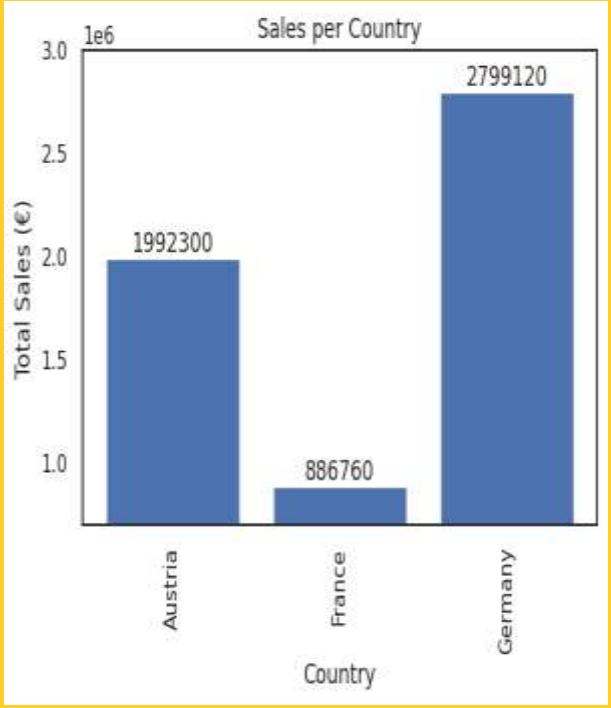
Price Optimization

Assess the impact of pricing strategies on sales and profitability. Analyze the ratio (current_price/regular_price) and its effect on sales. Determine if offering discounts (1 - ratio) leads to higher sales or improved conversion rates.

Market Comparison

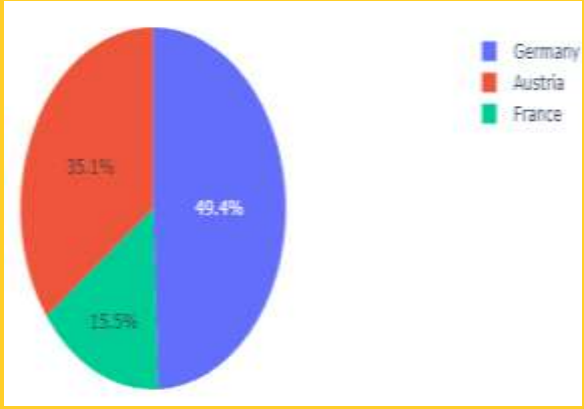
Compare sales performance across different countries to identify growth opportunities or assess the market share in each country. You can use metrics such as total sales, sales growth rate, or market penetration to evaluate your p erformance against competitors.

Sales & Promotions Analytics

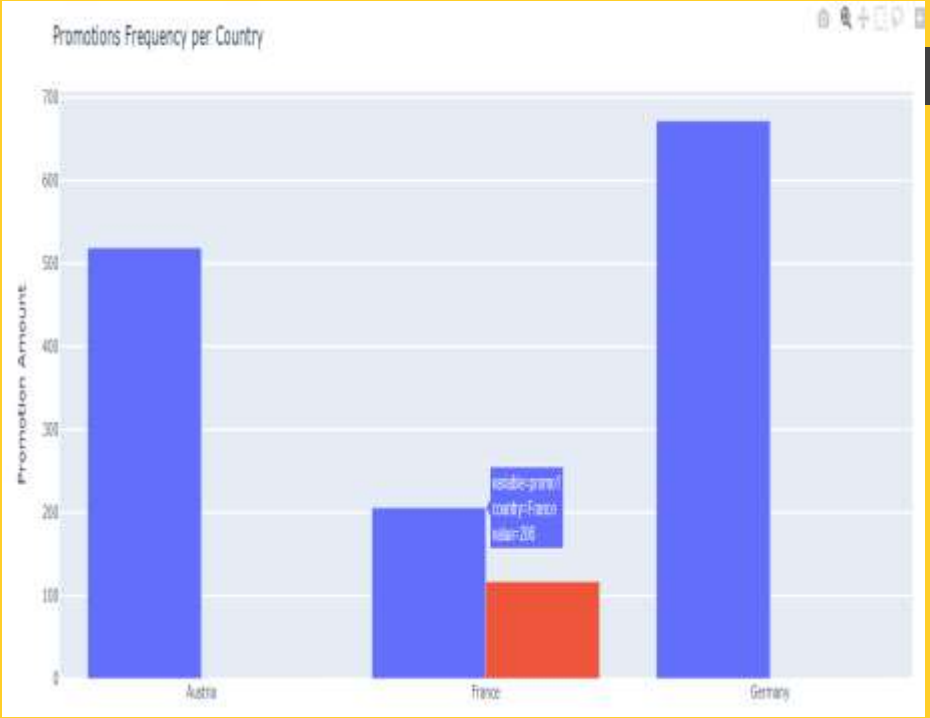


Inference

It is worth noting that the country with the highest sales rev enue is Germany, followed by Austria and France, in desce nding order, Peering in mind data is imbalanced toward Ge rmany



Sales & Promotions Analytics

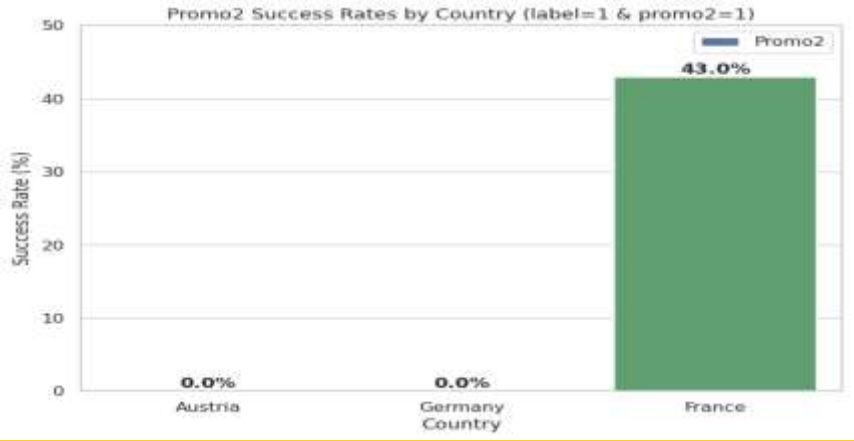


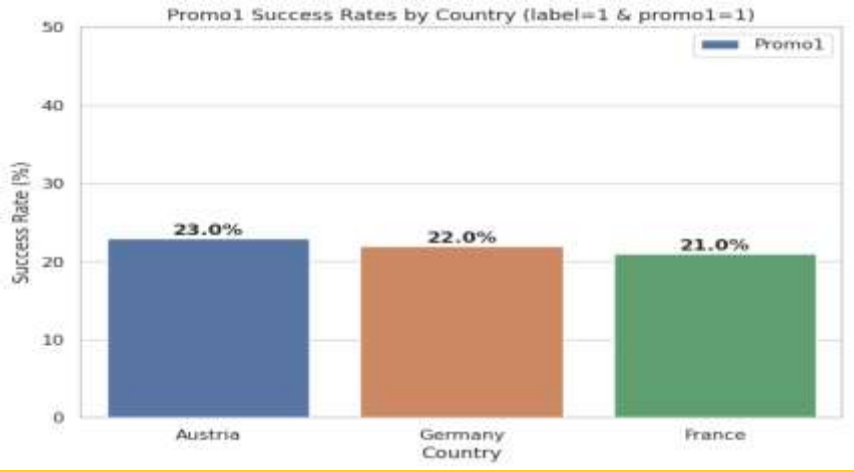
Inference

- While Promo1 had been launched in all three countries, Promo2 only had been launched in France

- The figure depicts the distribution of media advertisements & stor e events (promo1 and promo2) across countries within a time per iod between 2014-12-28 and 2017-04-30. The data highlights the following:

    - In Germany, a total of **672 media advertisements** were launched.
    - In Austria, a total of **519 media advertisements** were launched.
    - In France, there were **206 media advertisements** and **117 store events** launched.





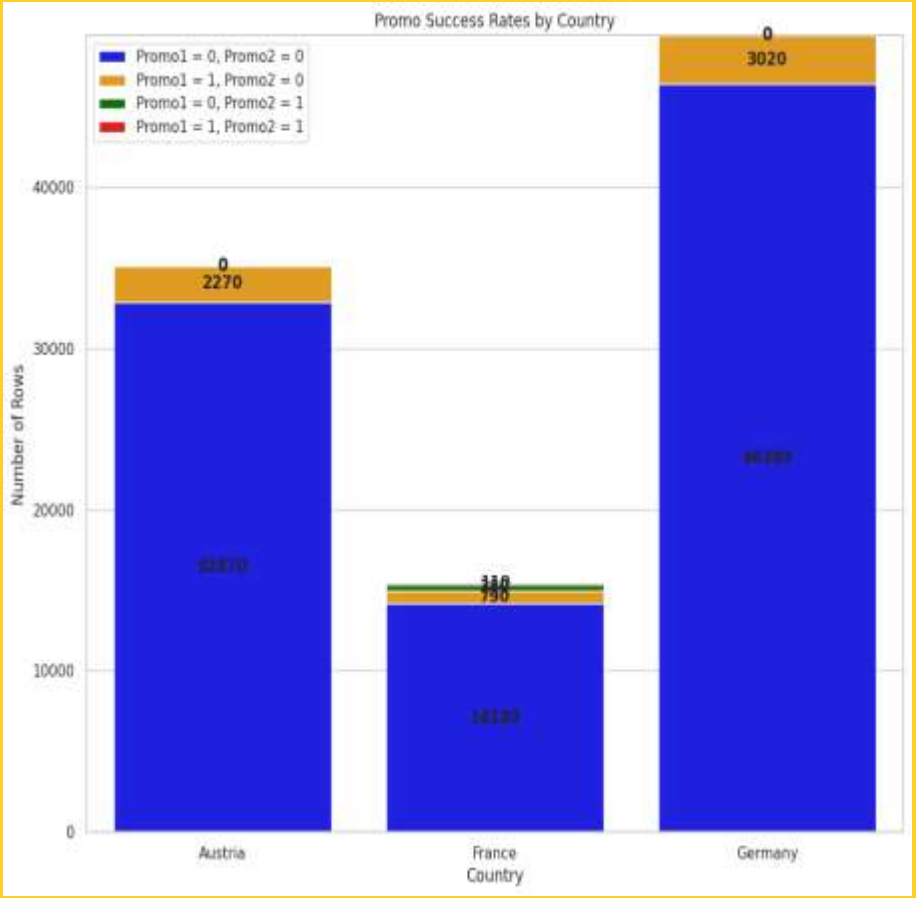
Sales & Promotions Analytics

Inference

It's noted that:

- In regards of sales, promo1 is doing well in **'Germany & Aust ria'** , while promo2 is doing much better in **France**
- However **900** media advertisements -promo1 were launched in France, while only **490** store events- promo2, had been conducted. It's noted that store events has the double Succes s Rate of media advertisements in France ,while it's only the half number.

Sales & Promotions Analytics



Inference

- In Austria, a total of **2270** clients were exclusively reached through media advertisement, while **32870** clients neither received information through media advertisement nor participated in any store events.

- Moreover, in Germany, **3020** clients were solely informed through media advertisement, and **46380** clients did not receive information through media advertisement nor attend any store events.

- Moving on to France, there were **790** clients who solely received information through media advertisement, and out of those, only **390** clients attended store events. Additionally, **110** clients in France were both informed through media advertisement and attended store events. However, there were **14180** clients who did not receive information through media advertisement and did not attend any store events.

Products & Consumption Behaviors Analytics

	Country	Most Sold Article	productgroup	category	gender
0	Austria	XC9518	SHOES	TRAINING	women
1	France	TC9631	SHOES	TRAINING	women
2	Germany	BX8284	SHOES	INDOOR	women

Inference

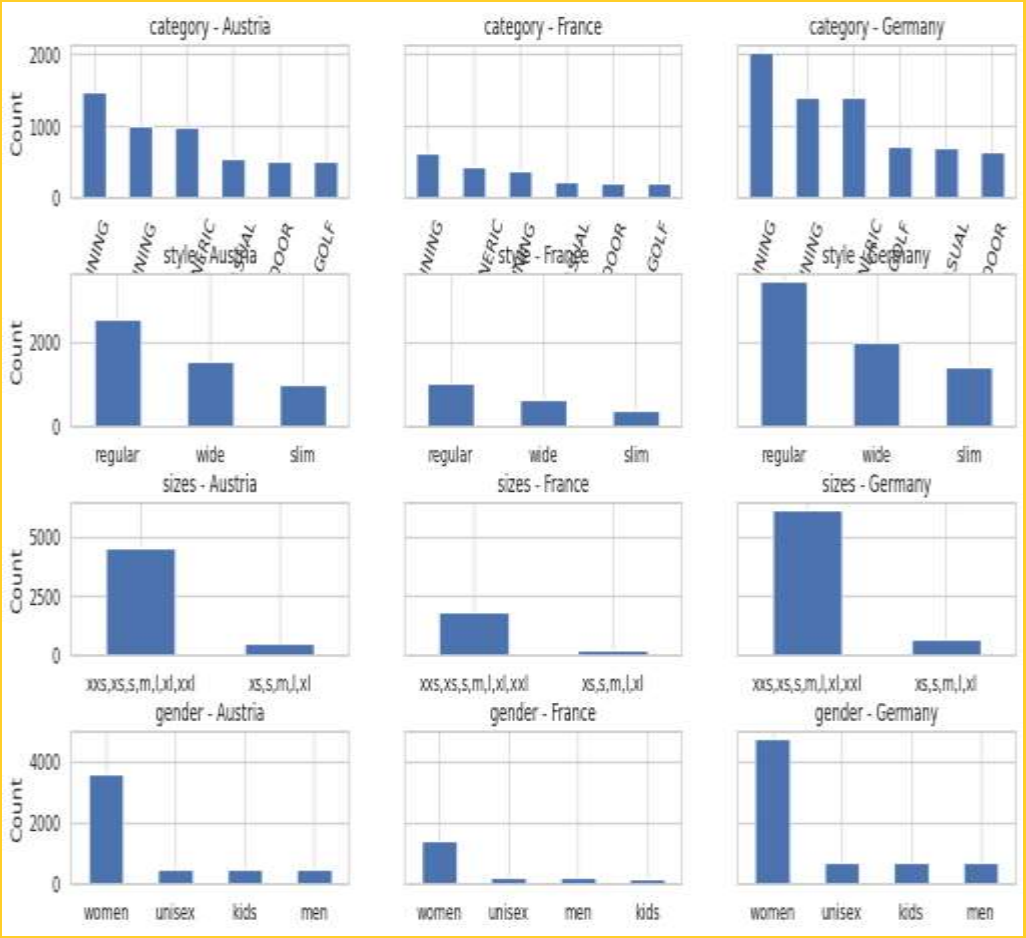
- Regarding The Best Seller product was:
  - XC9518 in Austria
  - TC9631 in France
  - BX8284 in Germany

•While the most interested customer segment in the all three countries is **women**, who are interested particularly in buying **SHOES.**

• While most common product_category in Austria and France is **Training** , yet in Germany is **Indoor.**

•The second graph indicates that the three countries almost have the **same consumption behavior** pattern

Products & Consumption Behaviors Analytics



Inference

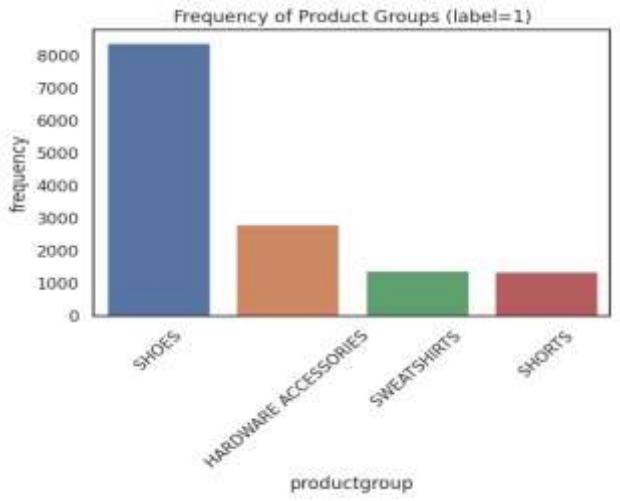
- The customers in all three countries have the same consumption behavior that:
    1. Training ,
    2. Size xxs,xs,s,m,l,xl,xxl

- While the target segment in all three countries should be Women.

- Peering in mind that **France** is the less consumption behavior comparing to **Germany and Austria** , thus more promos need to be launched in France.

Products & Consumption Behaviors Analytics

	productgroup	frequency
0	SHOES	8374
1	HARDWARE ACCESSORIES	2814
2	SWEATSHIRTS	1389
3	SHORTS	1351



Inference

It seems that most sold items were :

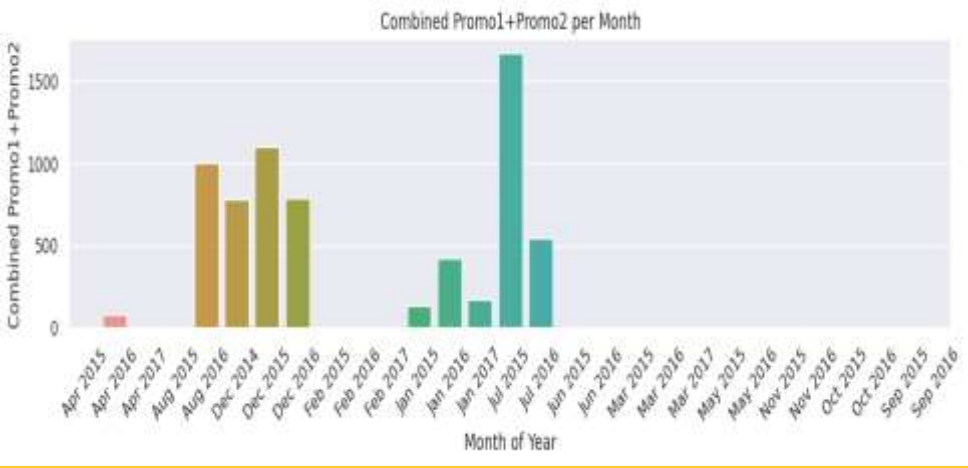
1. SHOES
2. HARDWARE ACCESSORIES
3. Sweatshirts
4. shorts

	country	Most Sold Article	count	article	regular_price	current_price	ratio	cost	promo1	promo2
0	Austria	XC8518	260	XC8518	26.9	16.9	0.6	13.3	1	0
1	Austria	MR4948	240	MR4948	31.9	22.9	0.7	13.3	0	0
2	Austria	PW6278	230	PW6278	63.0	37.0	0.6	9.6	0	0
3	Austria	BC1489	220	BC1489	45.0	18.9	0.4	2.5	1	0
4	Austria	CA2479	220	CA2479	7.0	6.0	0.9	1.7	0	0
5	France	TC0631	230	TC0631	33.0	20.9	0.6	13.3	0	0
6	France	BR3179	210	BR3179	29.9	25.9	0.9	13.3	0	0
7	France	LR5226	210	LR5226	25.9	21.9	0.8	8.7	0	0
8	France	MA7179	210	MA7179	25.9	21.9	0.8	2.3	0	0
9	France	RC5832	210	RC5832	27.9	23.9	0.9	13.3	0	0
10	Germany	BX8284	320	BX8284	26.9	19.9	0.7	5.2	1	0
11	Germany	SW2464	260	SW2464	80.0	52.0	0.6	13.3	0	0
12	Germany	GC8114	250	GC8114	42.0	27.9	0.7	8.7	1	0
13	Germany	JW4878	250	JW4878	29.9	24.9	0.8	13.3	0	0
14	Germany	DZ3492	240	DZ3492	88.0	82.0	0.9	13.3	0	0

Products & Consumption Behaviors Analytics

Inference

- Based on the analysis of average prices for the top five best-selling items in each country, it can be inferred that customers in Germany are willing to pay/afford prices that are approximately twice as expensive as those in France and Austria. This observation suggests that:
  - ❑ There is potential for increased sales in both Austria and France by offering items at lower and clearance price, as well as encourage clearances discounts points.
  - ❑ While investing more in promotional activities in Germany to target a broader range of customer segments.



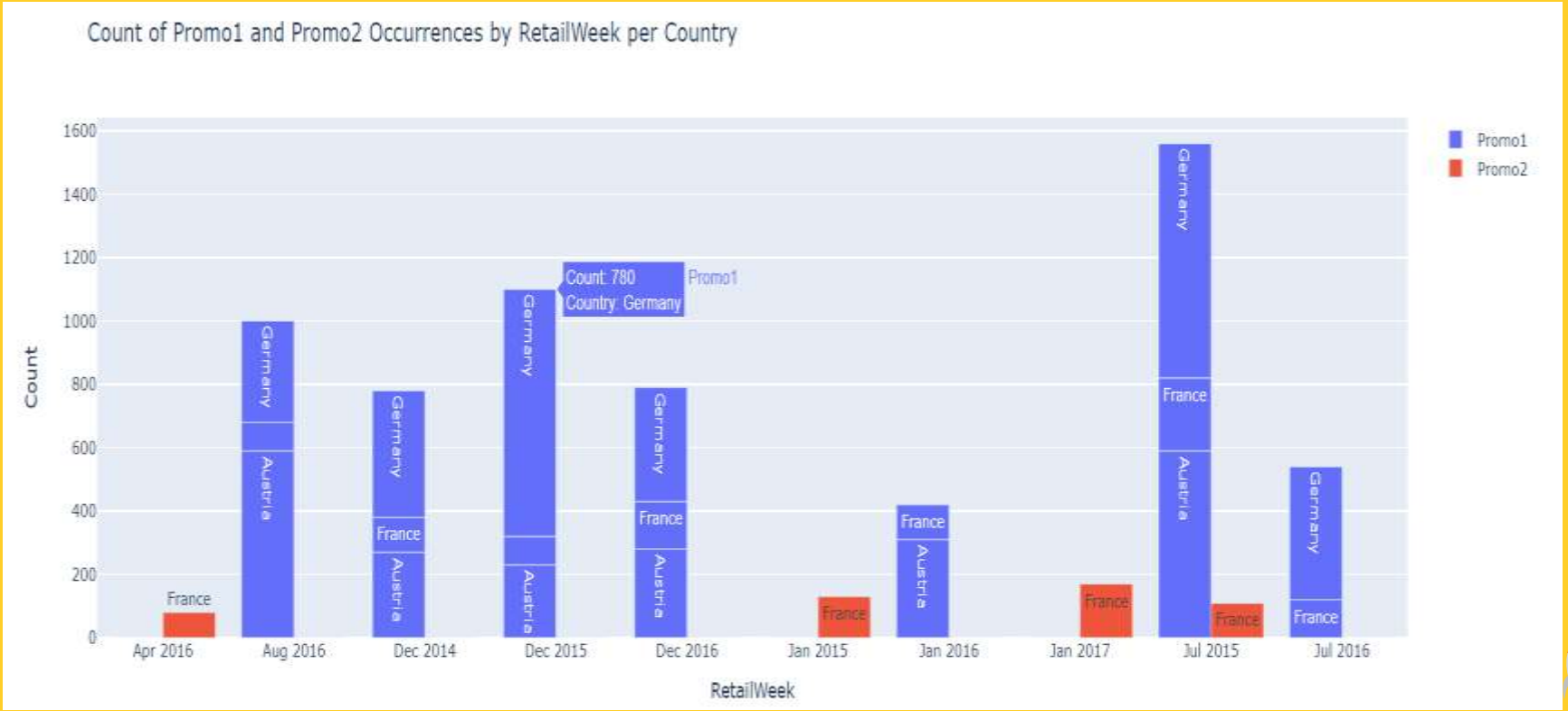
Promotions Time Analytics

Inference

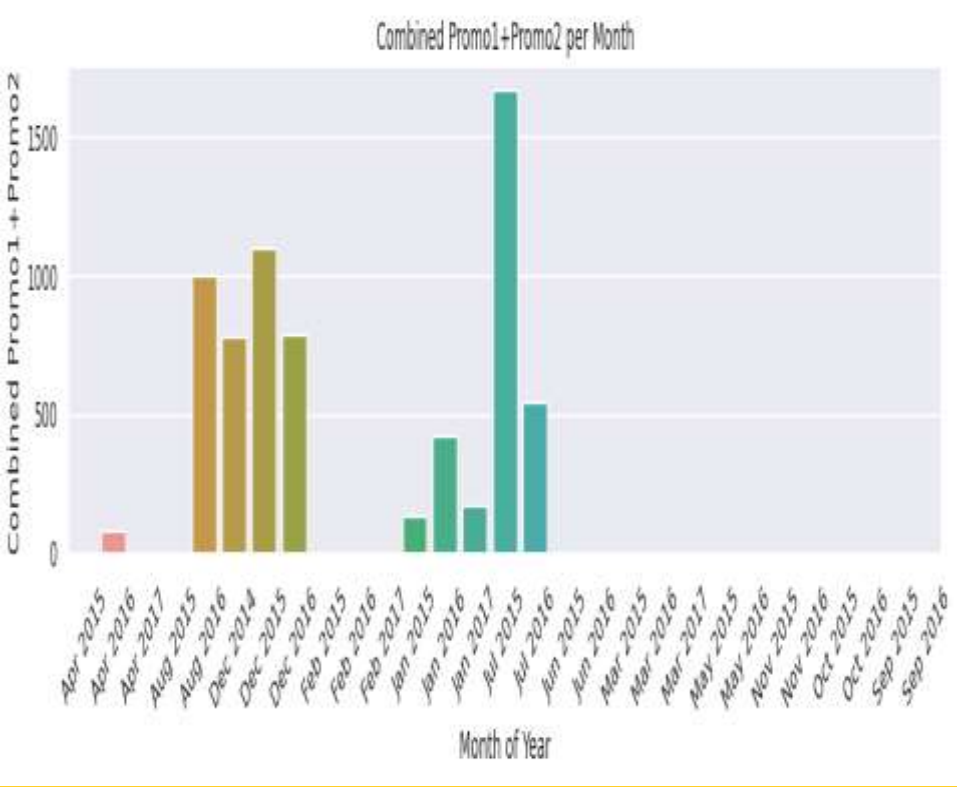
- **We can see that** Month with the highest s ales is **May 2016**
- Month with the number of Promos is **Jul 2015 .**

which may indicates that promotions are not having such high impacts on sales as much as expected

Promotions Time Analytics



Sales & Promotions Analytics



Inference

- The company strategically promoted its products during specific periods namely
  - ✓ August 2015 and 2016
  - ✓ December 2014, 2015, and 2016.

These months coincide with the peak of holiday seasons, including [Christmas, Black Friday, and Cyber Monday] . Consequently, the company observed a slight increase in sales during these promotional periods.

- On the other hand, launching campaigns in:
  - ✓ January 2015, 2016, and 2017,
  - ✓ April 2015 and February 2017, and
  - ✓ July 2015 and 2016 (the highest peak of promotions)

which did not yield the same level of sales increase compared to the holiday seasons.

Sales & Promotions Analytics

The previous findings may indicate that the impact on sales varies between holiday seasons and summer months. Based on these findings, it is recommended that the company focuses its campaigns and promotions during the holiday seasons rather than the summer months.
It is important to take into consideration that the influence of media advertisements and store events may differ from one country to another, with store events having a greater impact in France compared to media advertisements.

Sales & Promotions Analytics

Inference

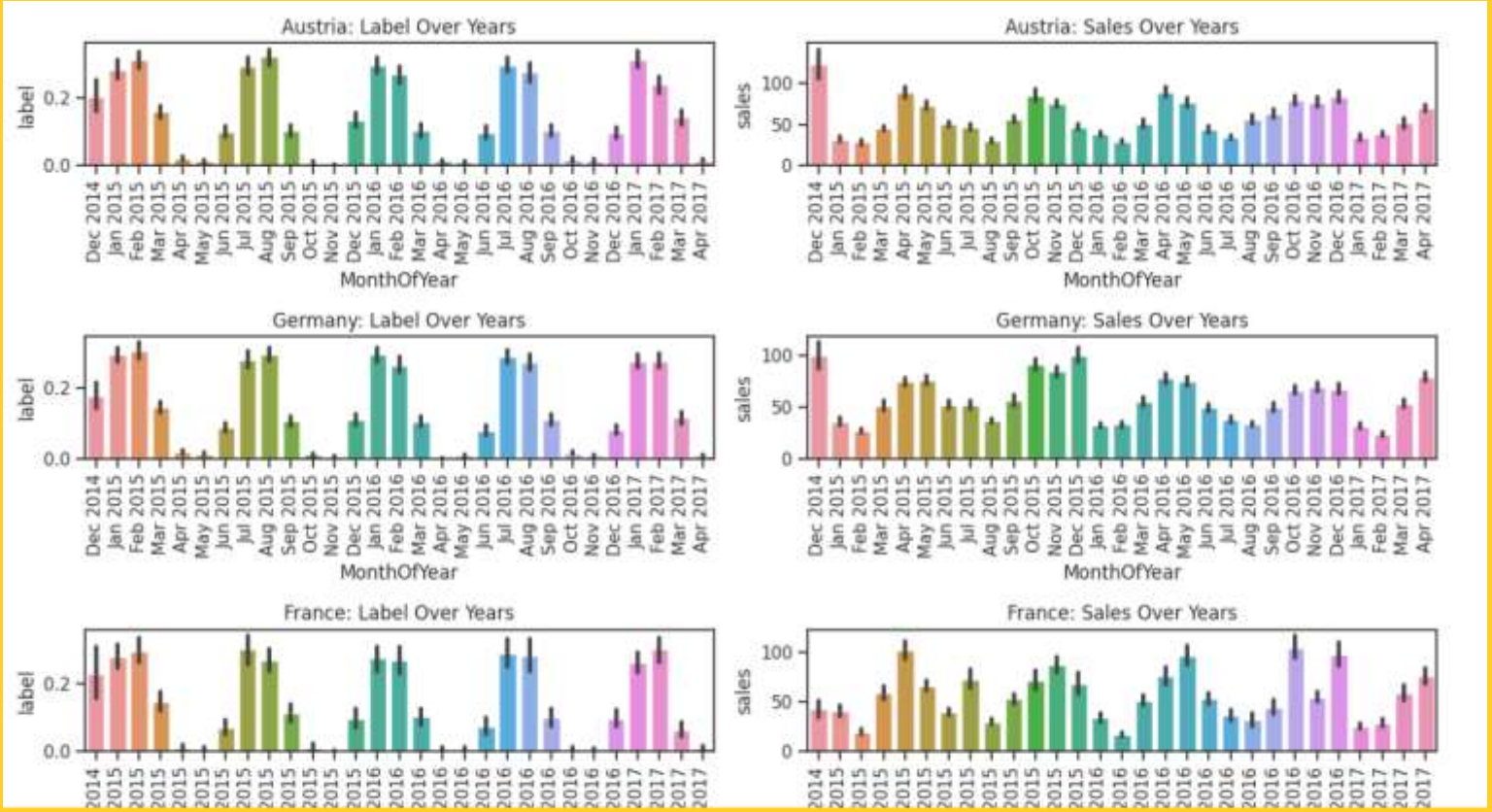
It's Noted that sales exhibits :

1. sharp decrease in January and February, which does make since as there are two main sales periods in Europe:
    - Winter sales, which usually start on the second Wednesday of January and last four weeks.
    - Summer sales, which begin on the last Wednesday of June and last four weeks.

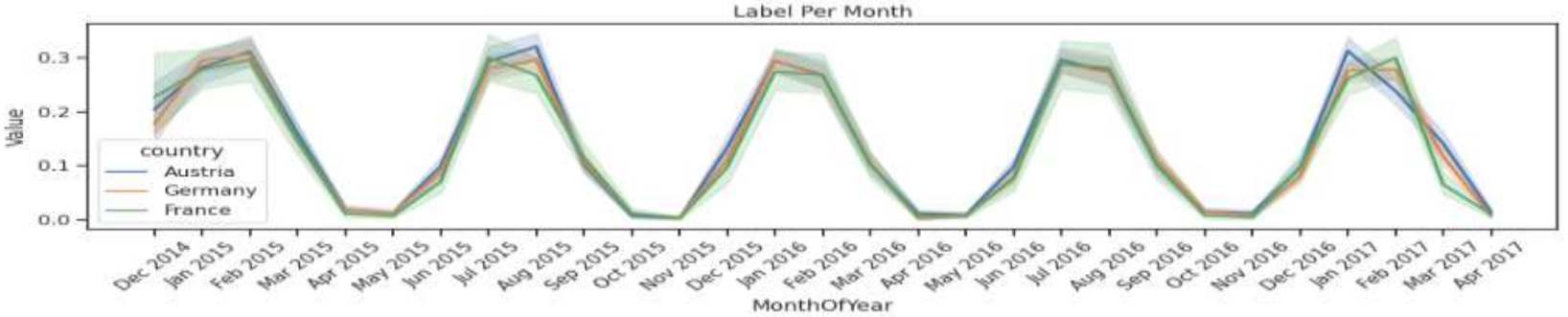
2. High increase in the months of October, November and December each year,the peak in November and December can be explains in regards of the holiday season:
    - Christmas Season
    - Black Friday which is usually on the fourth Friday of November every year.
    - Cyber Monday which is on the Monday immediate ly after Black Friday.

Thus It's highly recommended to launch media advertisement & store events during month with high-shopping peaks as October, November and December then April ,and May

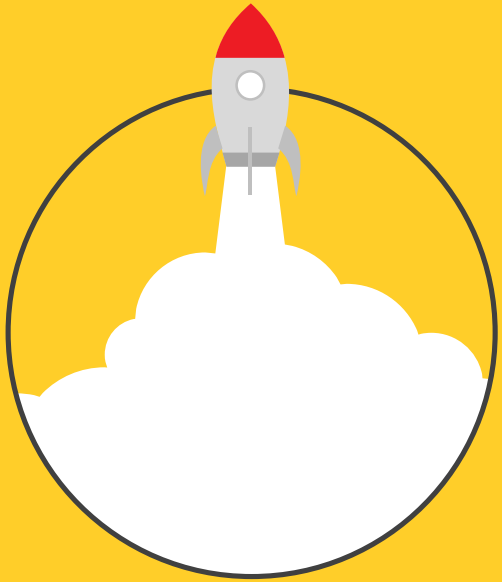
Sales & Promotions Analytics



Sales & Promotions Analytics



The graph illustrates an inverse relationship between the label and sales variables. As the label increases, the sales decrease, and vice versa.



Sports **W**ear **G**roup – Data Science Process

Pipeline

Getting Closer Look
- Shuffled Data
- Redundant CustomerID
- Imbarned Data

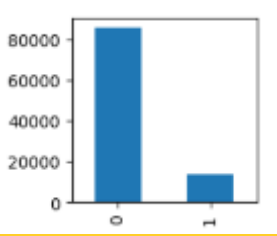
Data Preprocessing
- No Missing values
- Outliers

EDA
- Feature Correlation

Feature Engineering
- Frequency Encoding

Split Data
- Stratified k-fold cross-validation

Feature Selection
- Random Fores



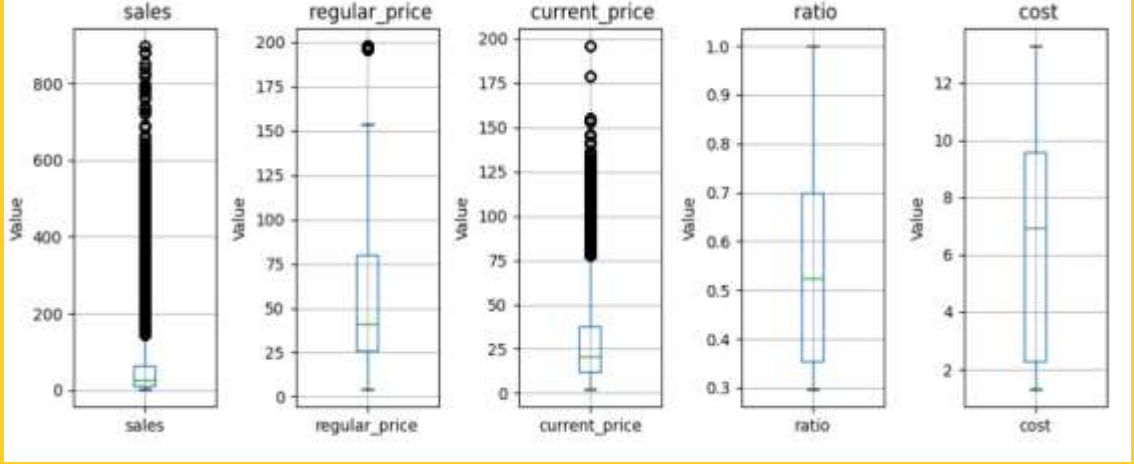

```
columns_to_encode = ['country','article','article.1', 'productgroup', 'category', 'style', 'sizes', 'gender','MonthOfYear']
```

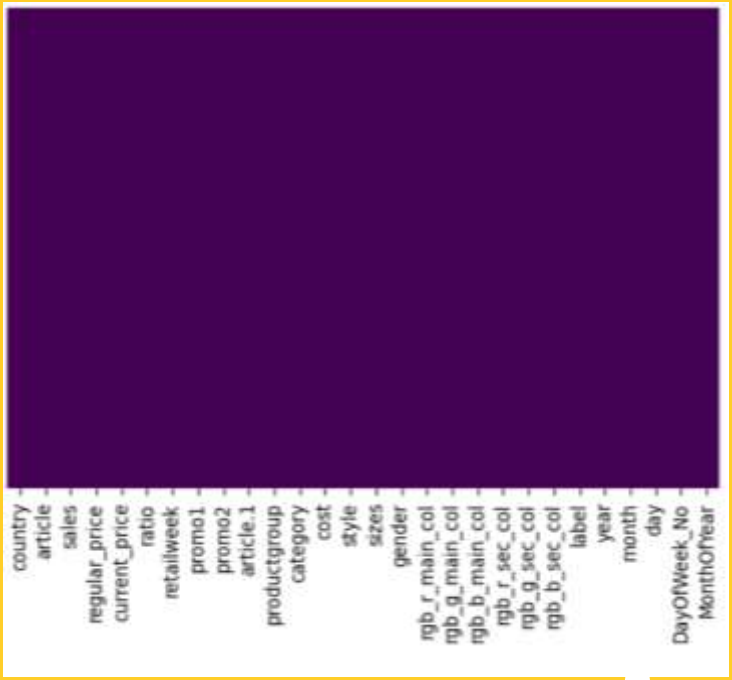
```
# check balanced data
y_train.value_counts()
```

```
0    77465
1    12535
Name: label, dtype: int64
```

Checking Nullable and Outliers

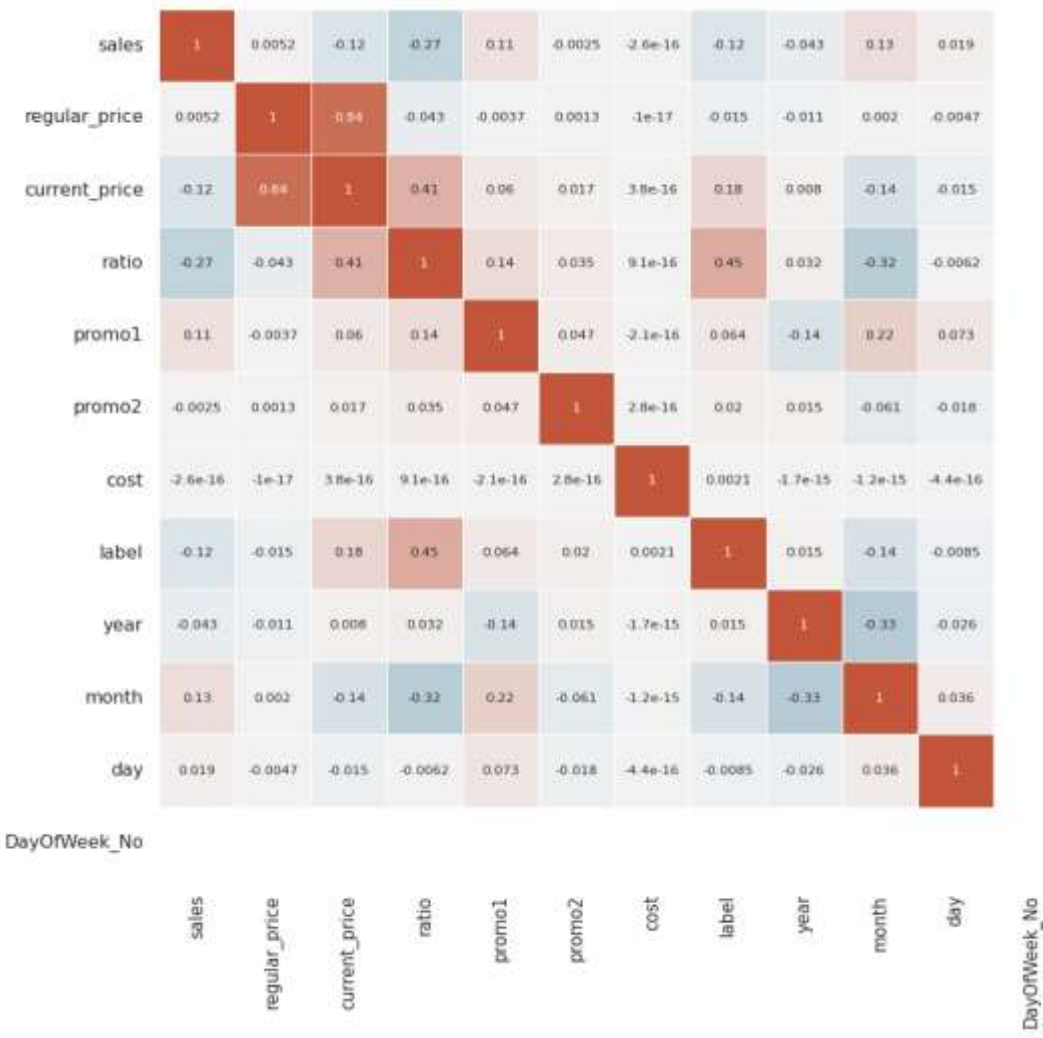
	count	mean	std	min	25%	50%	75%	max
regular_price	100,000.0	52.4	35.3	4.0	25.9	41.0	80.0	197.9
current_price	100,000.0	28.3	22.6	1.9	11.9	20.9	38.0	195.9
ratio	100,000.0	0.5	0.2	0.3	0.4	0.5	0.7	1.0
cost	100,000.0	6.5	3.9	1.3	2.3	6.9	9.6	13.3



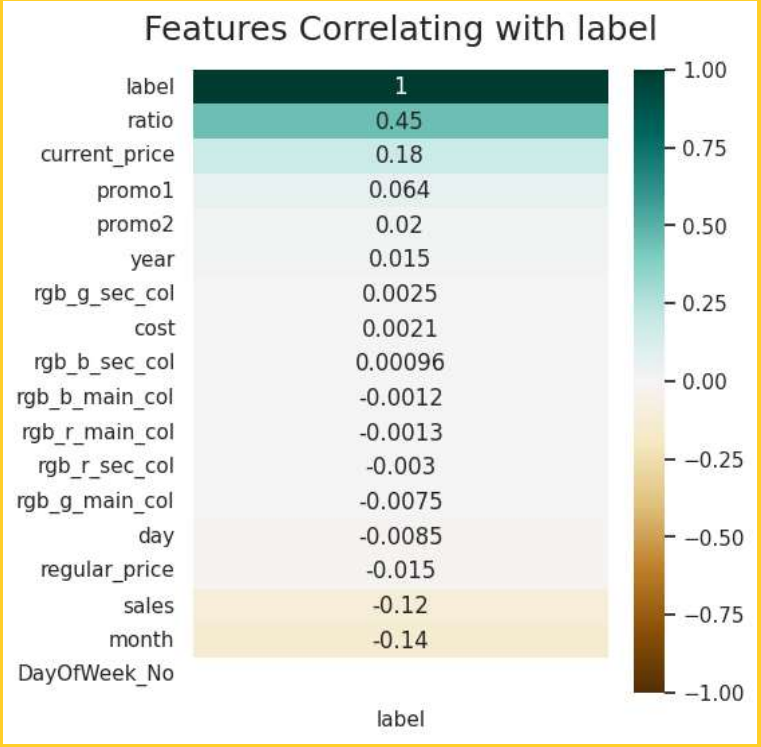


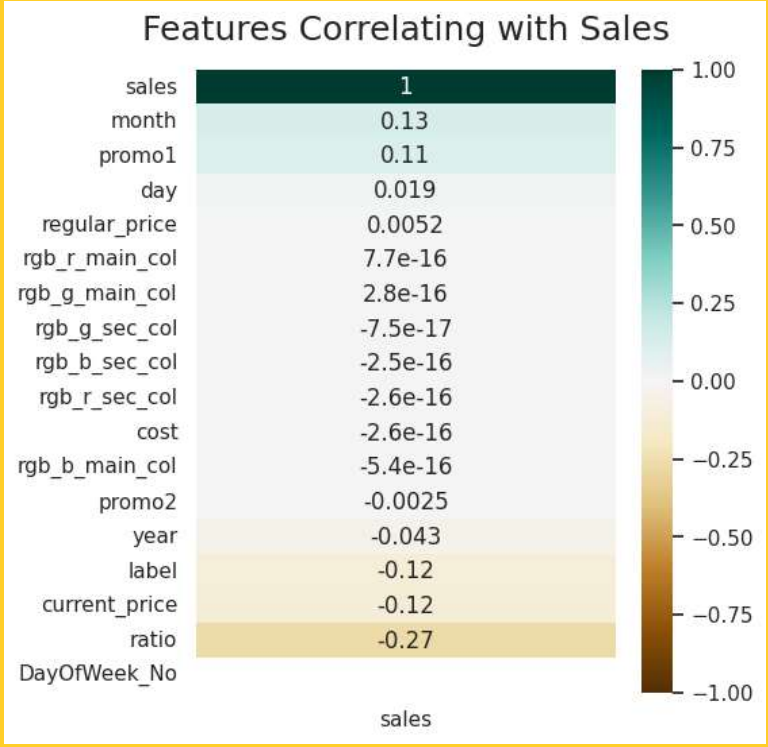
Exploratory Data Analysis - Correlation

- Check Feature Correlation
- Negative correlation between sales & ratio and sales & current price
- Positive correlation between label & ratio a nd label & current price
- Positive correlation between regular price & current price (need to dropped)
- Positive correlation between sales & month
- No clear correlation between label & (prom o1 and promo2)

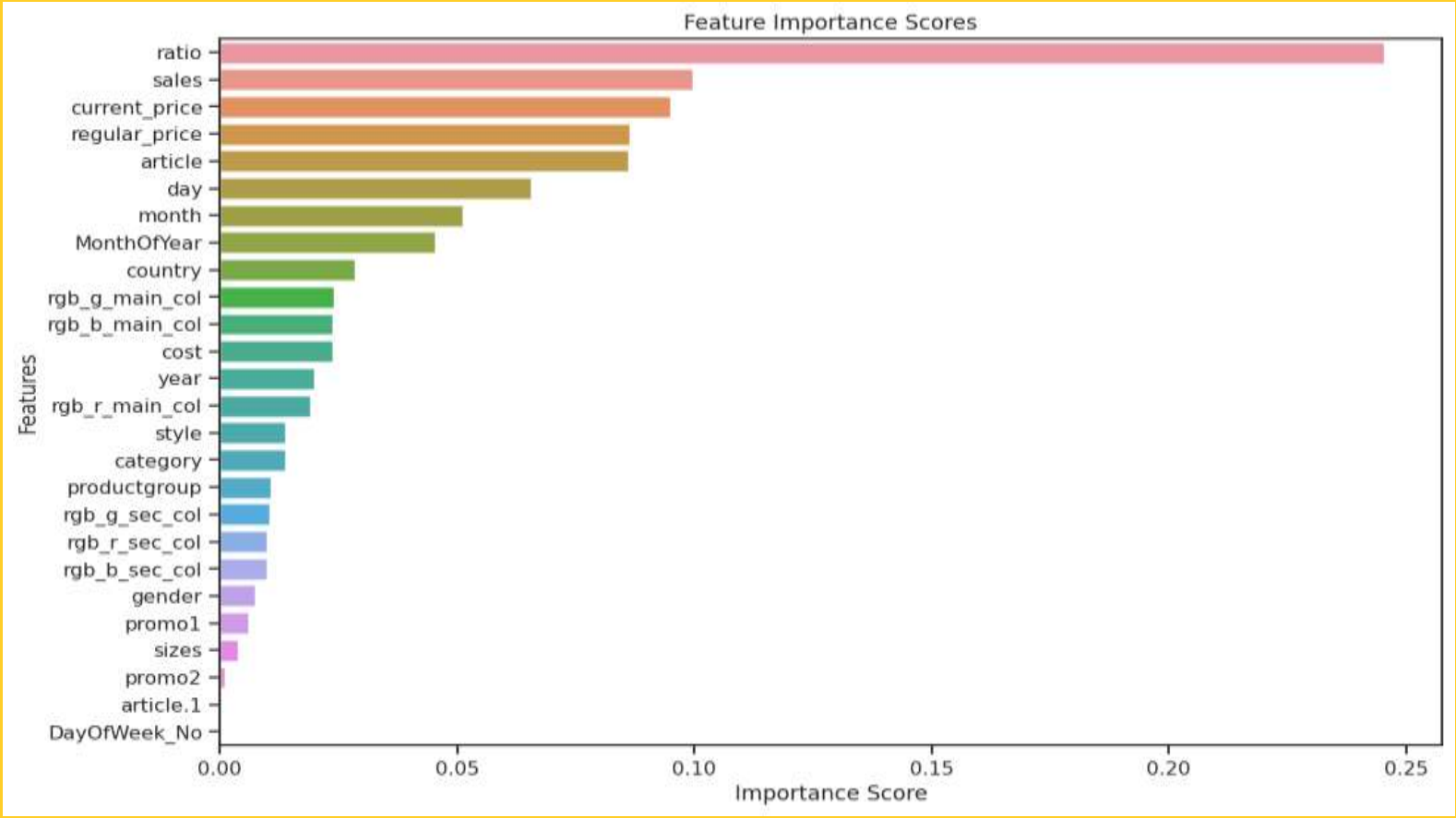


Exploratory Data Analysis - Correlation





Feature Selection – Random Forest



Modeling

Modeling (CV=3)

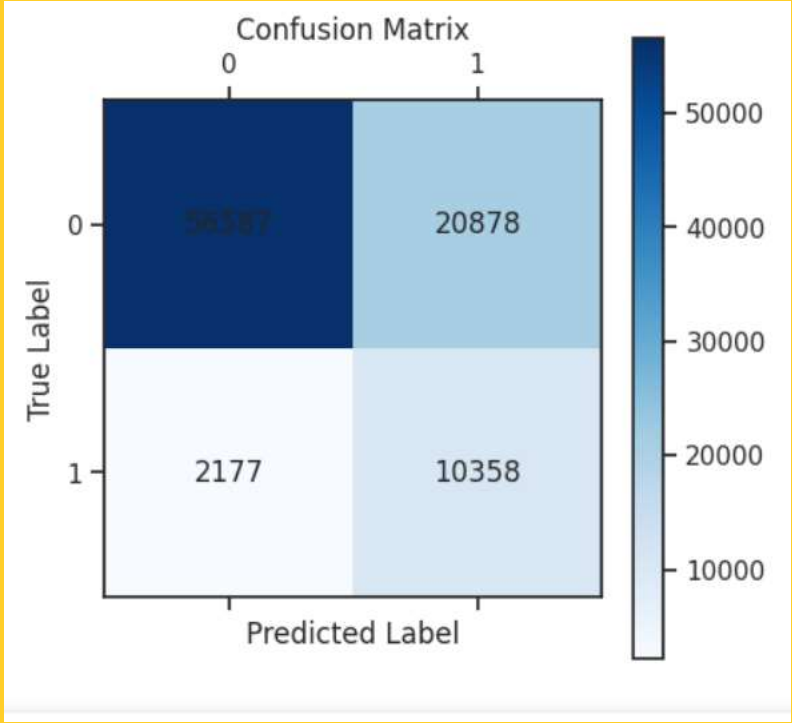
- Creating a Bassline Model (GaussianNB)
- Model Comparison & Selection
  - Logistic regression (Choosen)
  - Decision Tree
  - K Nearest Neighbors (KNN)
  - Random Forest
  - Voting Classifier

	Model	Accuracy	F1 Score
0	GaussianNB	0.842	0.197
1	Logistic Regression	0.744	0.477
2	Decision Tree	0.811	0.215
3	KNN	0.806	0.240
4	Random Forest	0.825	0.124
5	VotingClassifier	0.838	0.058

Model Evaluation

Confusion Matrix

- ✓ True negatives (TN): 56587
- ✓ False positives (FP): 20878
- ✓ False negatives (FN): 2177
- ✓ True positives (TP): 10358



Recommendations

First, Develop a focused marketing strategy for each country based on their consumption behavior pattern and target segment. In France, the company should invest in more promotional activities and prioritize store events over media advertisements. In Austria and Germany, the company should target a broader range of customer segments by investing more in promotional activities.

Recommendations

Second, Offer products at lower and clearance prices in Austria and France to increase sales. Customers in these countries are willing to pay lower prices compared to customers in Germany. To improve sales in Austria and France, the company can offer items at lower prices and encourage clearance discounts.

Recommendations

Third, Focus on launching media advertisements a nd store events during months with high shopping p eaks, such as October, November, and December. These months have been observed to have a high i ncrease in sales, especially during the holiday seas on. Additionally, the company should launch promoti onal activities during April and May, which have also been observed to have high sales.

Recommendations

Forth, To improve customer loyalty and brand reputation, the company should focus on identifying the best-selling products in each country and offer more promotions and discounts on these products. The company can also consider developing a loyalty program to reward customers for their repeat purchases.

Recommendations

Fifth and Finally, the company should continue to leverage advanced analytics to gain insights into customer behavior and identify patterns to make informed marketing decisions. By doing so, the company can improve its market position and stay ahead of the competition

Future Idea..

Insert the title of your subtitle Here

Handling Imbalanced Data

Use resampling methods and SMOTE to balance the representation of differe nt classes within the dataset.

Feature Engineering

Add 'IspromotingMonth', can provi de valuable insights. This feature c ould indicate whether a particular month exhibits a higher potential fo r promotional activities or not

Exploring additional aspects

Analyzing these specifications can help identify preferred articles that were significantly sold in each cou ntry, shedding light on each countr y's preferences.

Clustering Techniques

Clustering articles and customers seeking for patterns and groups will enabling a deeper understanding of the relationships between different articles or customer segments.

Time Series Analysis

Decomposing a time series into its original, trend, seasonality, and residual components, which may help to understanding overall patterns and detecting seasonal pattern.

Thank you

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