

PRODUCT SALES ANALYSIS

DOCUMENTATION:

First we describe the Project Definition, Analysis Objectives, Data Collection, Proposed Types, System manage Requirements, System Design.

ABSTRACT :

Sales analysis is a topic discussed by many researchers. Finding trends within sales and discovering the most important factors affecting sales are interesting issues. A lot of methods are created to analyse sales. Furthermore, transactional data are stored in databases.

Many supermarkets today do not have a good forecast of their yearly sales. This is mostly due to the lack of skills, resources and knowledge to make sales estimation.

At best, most supermarket chain store use ad hoc tools and processes to analyze and predict sales for the coming year.

INTRODUCTION :

EXISTING:

1. Project Definition:

The project involves using IBM Cognos to analyze sales data and extract insights about top selling products, peak sales periods, and customer preferences. This project includes defining analysis objectives, collecting sales data, designing relevant visualizations in IBM Cognos, and deriving actionable insights

2. Analysis Objectives:

Define the specific insights you want to extract from the sale data, such as identifying top-selling products, analyzing sales trends, and understanding customer preferences.

3. Data Collection:

Determine the sources and methods for collecting sales data including transaction records, product information, and customer demographics.

PROPOSED:

- Advanced Data Analytics
- Real Time Data
- Customer Segmentation
- Predictive Maintenance
- Voice And Visual Search
- Block Chain For Transparency
- Personalization
- Augmented Reality
- Sustainability Metric
- Competitor Analysis

SYSTEM REQUIREMENT :

Overview :

For retailers, understanding the sales and customers' buying habits is highly valuable. Insights about customer satisfaction,

demographics and buying price can drive decisions for marketing, sales and even inventory management.

Goals :

Increase profit by optimizing the marketing efforts, increasing the number of sales and discontinue unprofitable products.

Objectives :

Increase revenue by selling higher quantity at optimal selling price
Increase sales by improving marketing effectiveness through understanding of the customers' buying habits
Increase profit by discontinuing products in dissatisfying revenue

How To Perform Sales Analysis

Step 1: Choose the Right Sales Analysis Method

Different sales analysis methods will allow you to generate different kinds of reports. So, before you do anything else, choose a method that aligns with your sales goals.

Here are seven specific sales analysis reports you need to know about:

- Sales trend analysis
- Sales performance analysis
- Predictive sales analysis
- Sales pipeline analysis
- Product sales analysis
- Prescriptive analysis
- Market research

Step 2: Identify the Specific Information You Need

You've chosen the perfect sales analysis method. It just seems to get you and the sales goals you want to achieve. Congratulations! But your work is far from

over. Now you need to identify the specific bits of information that you need.

For example, you might want to measure the impact of your sales training efforts. Or find the top-selling product from a recent marketing campaign. Or determine similarities between repeat customers.

Step 3: Choose a Sales Analysis Tool and Analyze Your Data

Your sales analysis efforts are going strong! To keep them that way, invest in an analytics tool to help you get the most out of every metric you decide to track. Here are a few ideas:

- SpreadSheet
- CRM Software
- Sales Analytics Apps

Step 4: Share Your Results with Relevant Stakeholders

Last but not least, you need to present your sales data analysis to key stakeholders. Unless you're asked to share the

process by which you arrived at your results, only show the main findings. You can use graphs and visuals to help your audience interpret the data. Additionally, employing tools like the [revenue growth calculator](#) can be instrumental in visualizing and comprehending complex sales data effectively.

For example:

If you lead a sales team and want to share information regarding sales team performance with your CEO, you might want to include charts around your sales goals, your best-selling products, and the revenue and expenses of your team.

Overall, your sales analysis presentations should share actionable insights *and* be easy to understand. End with recommendations to help accomplish this goal.

System and User Plan :

System testing was divided into three parts, which are developer testing, user testing and customer testing.

The testing comes with the intent to ensure that the system meets identified requirements stated in the early stage.

Testing Definition:

Admin and user entry data is stored in the Microsoft Access database.

Since then the transactions involve a lot of database interactions, the performance of the used database is important to test.

To measure the reliability of the developed database a group of 50 to 100 product records was inserted.

In addition, the test also includes syntax, functionality, and logical errors.

User reviews:

This testing is carried out after the software development is complete.

The users have been briefing about how to operate the system and how to interact with the interface.

Comments of users appropriate to the system such as software interface-related errors, errors in functionality, command structure and errors in entry were recorded.

It was done for the selected target users that are Yochang Store's owner and staff.

This testing was done to compare the efficacy of controlling inventory using this system via POS.

The procedure followed in conducting the user test as follows:

Users were split into two groups: Automatic and Manual groups.

The automated was trained and instructed in the management of sales and inventories and system used to process sales.

Automatic group then use system to handle customer transactions while Manual group use the current way to attend the clients.

Overall the transaction process was captured in the test during a given time period.

The users were given a set of questionnaires to obtain information about their use of the system satisfaction and performance after the user has completed the test.

Comments from users regarding the Sales and Inventory Management System they were recorded.

EVALUATION:

1 .TOTAL REVENUE :

Total Revenue =
Number of Products Sold x Price Per Product

2. NET REVENUE RETENTION :

Net Revenue Retention =
(Starting

MRR – Contraction MRR – Churn MRR +
Expansion MRR) ÷ (Starting MRR x 100)

3. REPEAT CUSTOMER RATE :

Repeat Customer Rate % =
(Number
of Customers Who've Purchased Before ÷
Total Number of Customers) × 100

4. AVERAGE CUSTOMER LIFE TIME VALUE:

Customer Lifetime Value =
Average
Purchase Value × Average Purchase
Frequency × Average Customer Lifespan

5. CONVERSION RATE :

Conversion Rate = Number of
Leads
Converted Into Sales ÷ Total Number of
Leads) ×
100

6. LEAD CONVERSION RATE :

Lead Conversion Rate = Number

of Captured Leads ÷ Total Visitors

7. LEAD TO OPPORTUNITY :

Lead to Opportunity = Number of Leads Converted to Opportunities ÷ Number of Total Leads.

CODING 1 :

```
```python
import pandas as pd
import matplotlib.pyplot as plt
Load your data from a CSV file
data =
pd.read_csv('product_sales_data.csv')
Display the first few rows of the dataset
print(data.head())
Calculate total sales per product
product_sales =
data.groupby('Product')['Sales'].sum().reset_index()
```

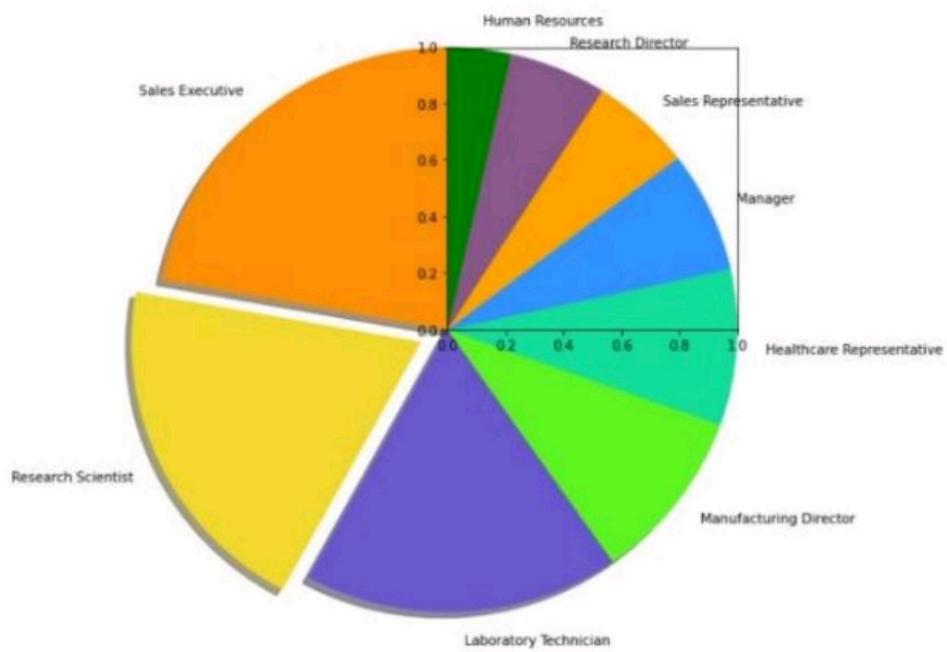
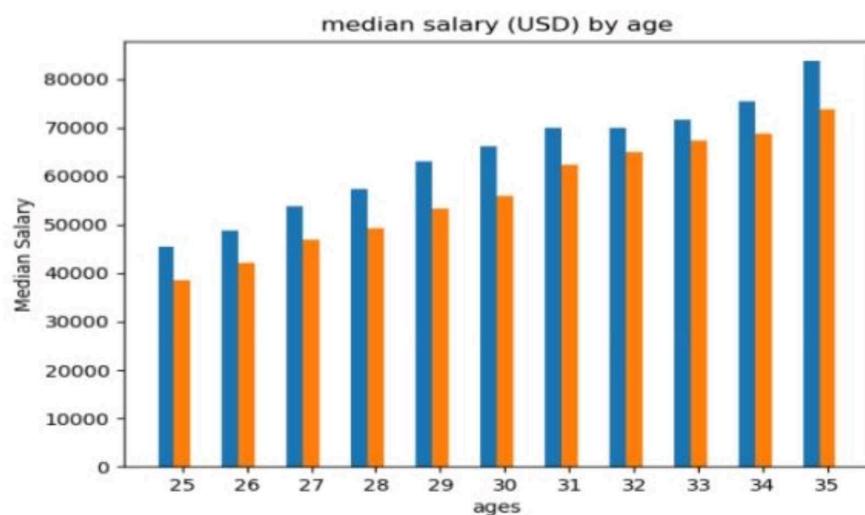
```
Plot the product sales
plt.figure(figsize=(10, 6))

plt.bar(product_sales['Product'],
product_sales['Sales'])

plt.xlabel('Product')
plt.ylabel('Total Sales')
plt.title('Product Sales Analysis')
plt.xticks(rotation=90)
plt.show()
...
```

Make sure to replace  
`'product\_sales\_data.csv'` with the actual  
path to your dataset. This code loads the  
data, calculates the total sales per  
product, and then creates a bar chart to  
visualize the results.

## OUTPUT :



## CODING 2:

```
import pandas as pd
```

```
import numpy as np
```

```
import seaborn as sns
```

```
sns.set_context('notebook')
```

```
sns.set_style('white')
```

```
sns.set_palette('dark')
```

```
import matplotlib.pyplot as plt
```

```
%matplotlib inline
```

Data Reading ang Cleaning

```
Months=["January","February","March","April","May","June","July","August","September","October","November","December"]
```

```
header = ['Order ID', 'Product', 'Quantity Ordered', 'Price Each', 'Order Date', 'Purchase Address']
```

```
dfs=[]
```

```
for i in months:
```

```
temp = pd.read_csv('../input/sales-product-
```

```
data/Sales_{}2019.csv'.format(i),
index_col = None, header= None,
skiprows =1)
```

```
dfs.append(temp)
```

```
df = pd.concat(dfs, axis=0,
ignore_index=True)
```

```
df.dropna(inplace =True)
df.dropna(inplace =True)
df.columns= header
df.drop(df.loc[df['Order ID'] =='Order
ID'].index.tolist(),axis=0,inplace=True)
df.info()
<class 'pandas.core.frame.DataFrame'>
Int64Index: 185950 entries, 0 to 186849
Data columns (total 6 columns):
 # Column Non-Null Count Dtype
 -- ----- ----- ----- -----
 0 Order ID 185950 non-null object
 1 Product 185950 non-null object
 2 Quantity 185950 non-null object
 3 Price Each 185950 non-null object
 4 Order Date 185950 non-null object
```

dtypes: object(5)

memory usage: 9.9+ MB

df.dtypes

Order ID object

Product object

Quantity Ordered object

Price Each object

Order Date object

Purchase Address object

dtype: object

from datetime import datetime

df['Order Date'] = pd.to\_datetime(df['Order Date'], errors='coerce')

df['Purchase Address'] = df['Purchase Address'].astype(str)

```
df['Quantity Ordered'] = df['Quantity
Ordered'].astype(int)
```

```
df['Price Each'] = df['Price
Each'].astype(float)
```

In [8]:

```
df['City'] = df['Purchase
Address'].str.split(',').str[1].astype(str
)
```

In [9]:

linkcode

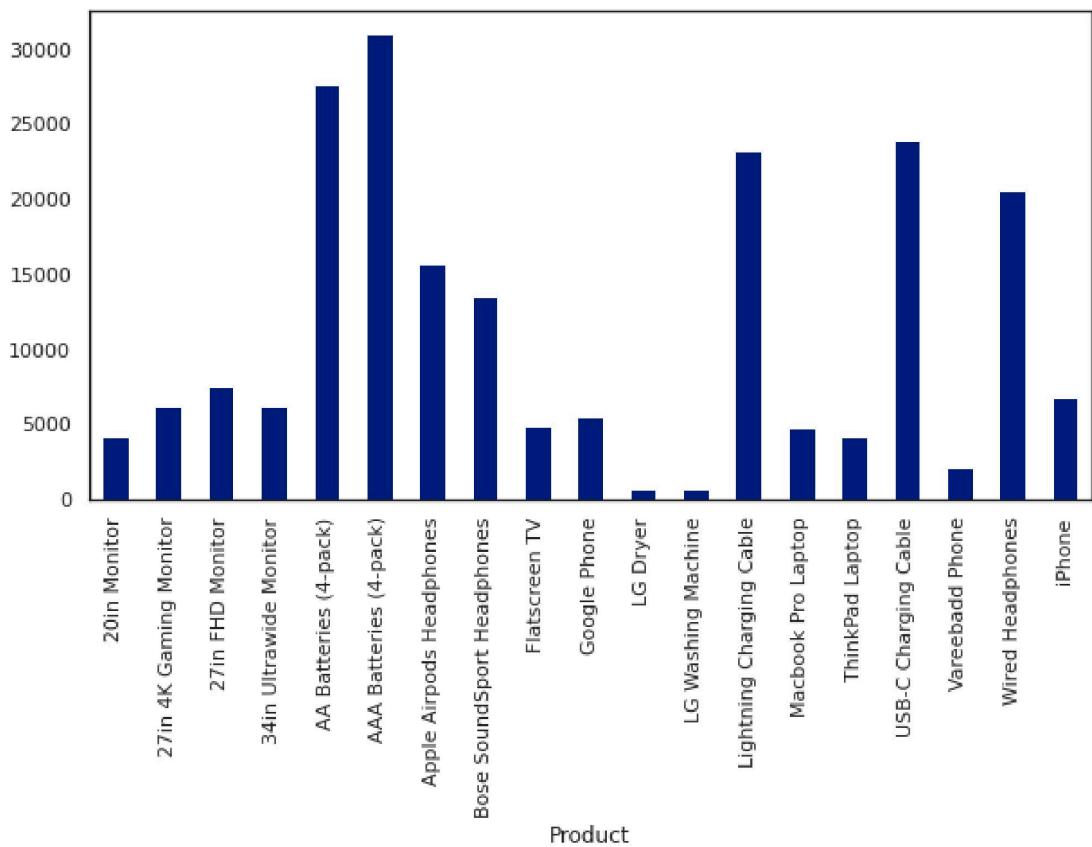
```
df['Total Price'] = df['Quantity Ordered']*
df['Price Each']

df.head()
```

	<b>Order ID</b>	<b>Poduct</b>	<b>Order Date</b>	<b>Pricr Each</b>	<b>City</b>	<b>Todal Price</b>
0	<b>141234</b>	iphone	2019-01-22 21:25:00	700.00	AAE	700.00
1	<b>141235</b>	<b>Light Charge cable</b>	2019-01-28 14:15:00	14.95	AAR	14.95
2	<b>141236</b>	<b>Wired Head phones</b>	2019-01-17 13:33:00	11.99	ABJ	23.98
3	<b>141237</b>	<b>27 in FHD 149.99 Monitor</b>	2019-01-17 13:33:00	149.99	San	149.99
4	<b>141238</b>	iphone	2019-01-25 11:59:00	700.00	Log	11.99

Items sold the most(quanatity)

```
ax = items['Quantity Ordered'].plot.bar(figsize = (10,5))
```



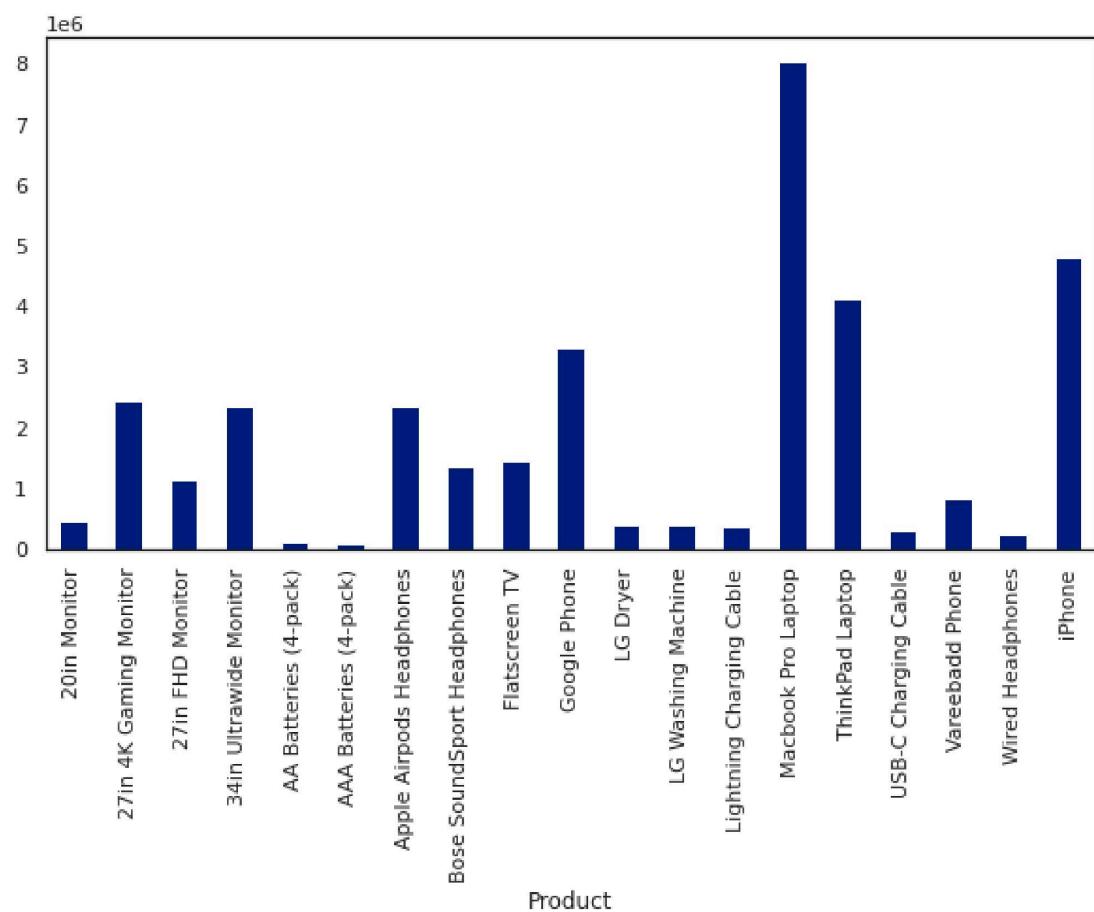
it can be seen that the most amount of sales are for batteries (AAA and AA) followed by Charging cables (USB-C and Lighting Cables).

Least amount of sales are for LG washing machines and LG Dryers

## Analysis Of Sales

```
Ax= items['TotalPrice'].plot.bar
(figsize = (10,5))
```

# OUTPUT:



The highest sales are for Macbook Pro Laptop, followed by iPhones. ThinkPad Laptops has third highest sales, followd by Google Phones.

### **CODING 3:**

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt # visualizing
data
import seaborn as sns
from collections import Counter
%matplotlib inline
import plotly.plotly as py
from plotly.offline import init_notebook_mode,
iplot
import plotly.graph_objs as go
import plotly.figure_factory as ff
```

```
import os
print(os.listdir("../input"))
import plotly.plotly as py
import plotly.graph_objs as go
import seaborn as sns
```

## OUTPUT:

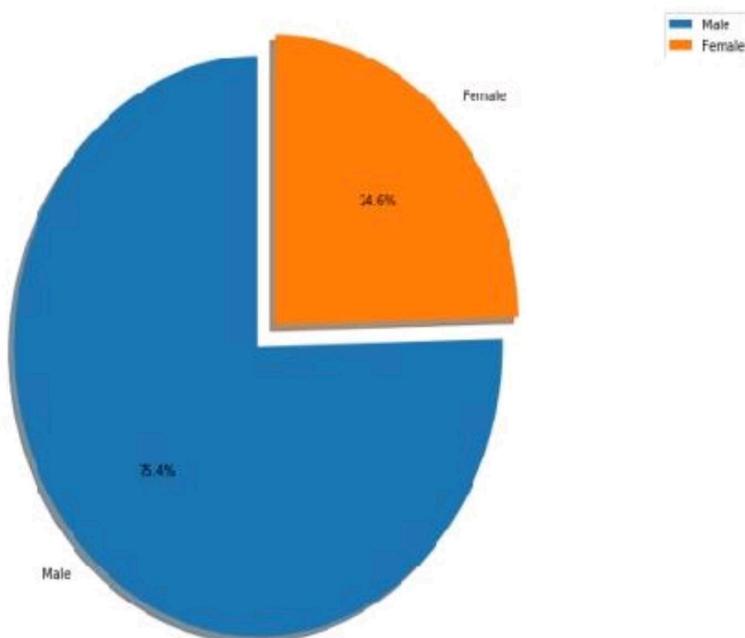
['BlackFriday.csv']

## CODING FOR GENDER:

```
explode = (0.1,0)
fig1, ax1 = plt.subplots(figsize=(12,7))
ax1.pie(df['Gender'].value_counts(),
explode=explode,labels=['Male','Female'],
autopct='%.1f%%', shadow=True,
startangle=90)
```

```
Equal aspect ratio ensures that pie is drawn
as a
circle
ax1.axis('equal')
plt.tight_layout()
plt.legend()
plt.show()
```

## OUTPUT:



## **CONCLUSION:**

Sales forecasting is mainly required for the organizations for business decisions. Accurate forecasting will help the companies to enhance the market growth.

Machine learning techniques provides the effective mechanism in prediction and data mining as it overcome the problem with traditional techniques.

These techniques enhances the data optimization along with improving the efficiency with better results and greater predictability.

After predicting the purchase amount, the companies can apply some marketing strategies for certain sections of customers so that the profit could be enhanced.