

EXPT NO: 6	EXPERIMENT: DATA VISUALIZATION USING POWER BI
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AIM

To learn data visualization using **Power BI** by connecting to various data sources, creating visualizations (bar charts, line charts, pie charts), calculated columns and measures, and building interactive dashboards.

ALGORITHM

1. **Start Power BI Desktop** and familiarize yourself with the **Power BI Interface**.
2. **Connect to data sources** (Excel, CSV, SQL, etc.) using *Home* → *Get Data*.
3. **Load dataset** into Power BI workspace.
4. **Data Preparation:**
 - Use **Transform Data** (Power Query) for cleaning, filtering, renaming columns.
 - Create **Calculated Columns** and **Measures** using DAX.
 - Example (Calculated Column):
$$\text{Profit} = \text{Sales[Revenue]} - \text{Sales[Cost]}$$
 - Example (Measure):
$$\text{Total Sales} = \text{SUM}(\text{Sales[Revenue]})$$
5. **Create Visualizations:**
 - Bar Chart (Sales by Category)
 - Line Chart (Sales Trend Over Time)
 - Pie Chart (Market Share by Region)
6. **Build Dashboard:**
 - Drag and arrange visuals into a report page.
 - Add slicers/filters for interactivity.
7. **Publish Dashboard (optional):** Publish to **Power BI Service** for sharing.

CODE / IMPLEMENTATION

```
# DATA VISUALIZATION SIMULATION OF POWER BI & TABLEAU
# USING PYTHON (Pandas, Matplotlib, Seaborn, Plotly)
# ----

import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import plotly.express as px
import sqlite3

# ----
# STEP 1: CONNECT TO DATA SOURCES
# ----

# Example: CSV/Excel file
csv_data = pd.DataFrame({
    "Category": ["Electronics", "Clothing", "Furniture", "Electronics",
    "Clothing", "Furniture"],
    "Region": ["North", "South", "East", "West", "North", "South"],
    "Revenue": [20000, 15000, 18000, 25000, 12000, 16000],
    "Cost": [12000, 7000, 9000, 14000, 6000, 8000],
    "Discount": [5, 10, 7, 6, 8, 9]
})
csv_data.to_csv("sales_data.csv", index=False)

# Load dataset from CSV
df_csv = pd.read_csv("sales_data.csv")

# Example: SQL Database
conn = sqlite3.connect(":memory:")
df_csv.to_sql("Sales", conn, index=False, if_exists="replace")
df_sql = pd.read_sql("SELECT * FROM Sales", conn)

print("\n☑ Data Loaded from CSV and SQL Database")
print(df_sql.head())

# ----
# STEP 2: CREATE CALCULATED COLUMNS / MEASURES
# ----

df_csv["Profit"] = df_csv["Revenue"] - df_csv["Cost"] # Calculated Column
total_sales = df_csv["Revenue"].sum() # Measure
avg_discount = df_csv["Discount"].mean() # Measure

print("\n☑ After Adding Calculations:")
print(df_csv)
```

```

# -----
# STEP 3: BASIC VISUALIZATIONS
# -----


# Bar Chart - Revenue by Category
plt.figure(figsize=(6,4))
sns.barplot(x="Category", y="Revenue", data=df_csv, estimator=sum)
plt.title("Revenue by Category")
plt.show()

# Line Chart - Revenue Trend (Index as Time)
plt.figure(figsize=(6,4))
plt.plot(df_csv.index, df_csv["Revenue"], marker='o', label="Revenue")
plt.plot(df_csv.index, df_csv["Profit"], marker='x', label="Profit")
plt.title("Revenue & Profit Trend")
plt.xlabel("Transaction Index")
plt.ylabel("Amount")
plt.legend()
plt.show()

# Pie Chart - Market Share by Region
region_share = df_csv.groupby("Region")["Revenue"].sum()
plt.figure(figsize=(6,6))
plt.pie(region_share, labels=region_share.index, autopct="%1.1f%%",
startangle=140)
plt.title("Revenue Share by Region")
plt.show()

# STEP 4: INTERACTIVE DASHBOARD (Plotly)
# -----


fig1 = px.bar(df_csv, x="Category", y="Revenue", color="Region",
title="Revenue by Category and Region")
fig2 = px.line(df_csv, x=df_csv.index, y="Revenue", markers=True,
title="Revenue Trend")
fig3 = px.pie(df_csv, values="Revenue", names="Region", title="Revenue Share
by Region")

fig1.show()
fig2.show()
fig3.show()

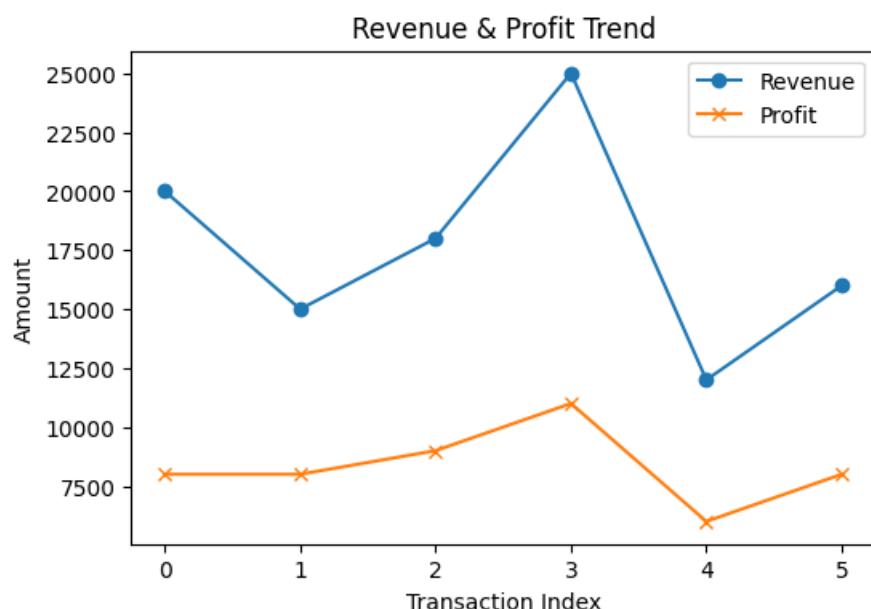
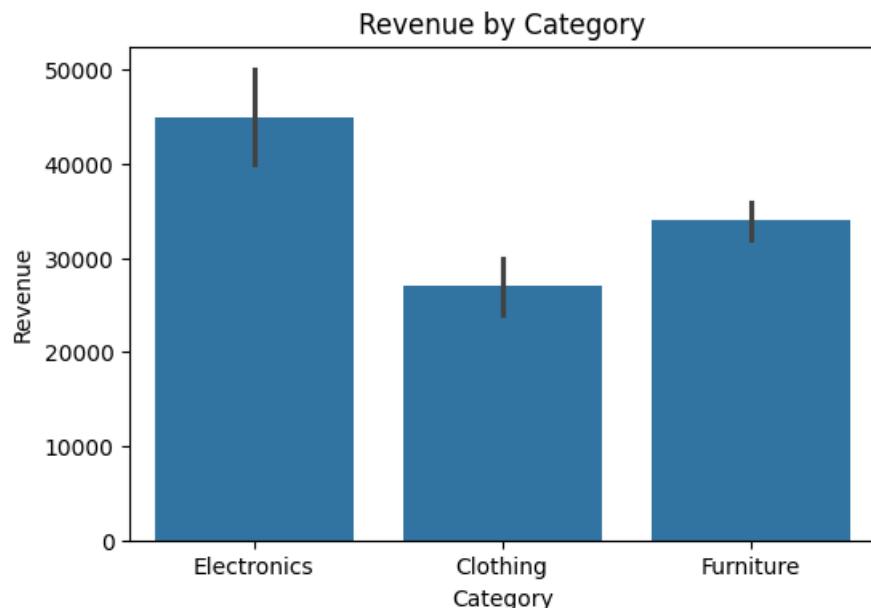
# STEP 5: RESULTS
# -----


print("\n⚡ RESULTS:")
print(f"Total Sales: {total_sales}")
print(f"Average Discount: {avg_discount:.2f}%")

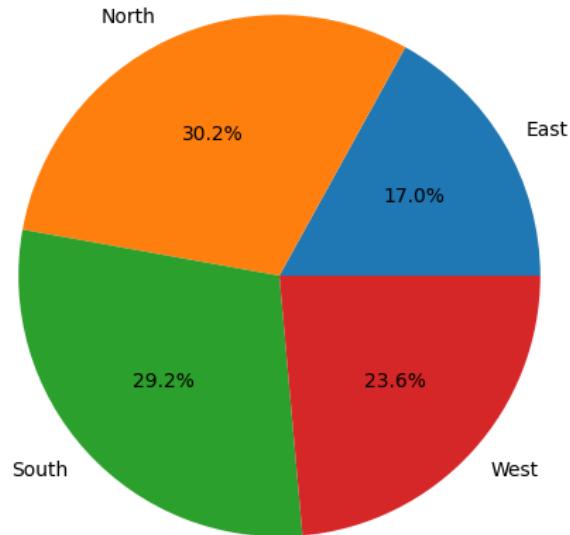
```

OUTPUT

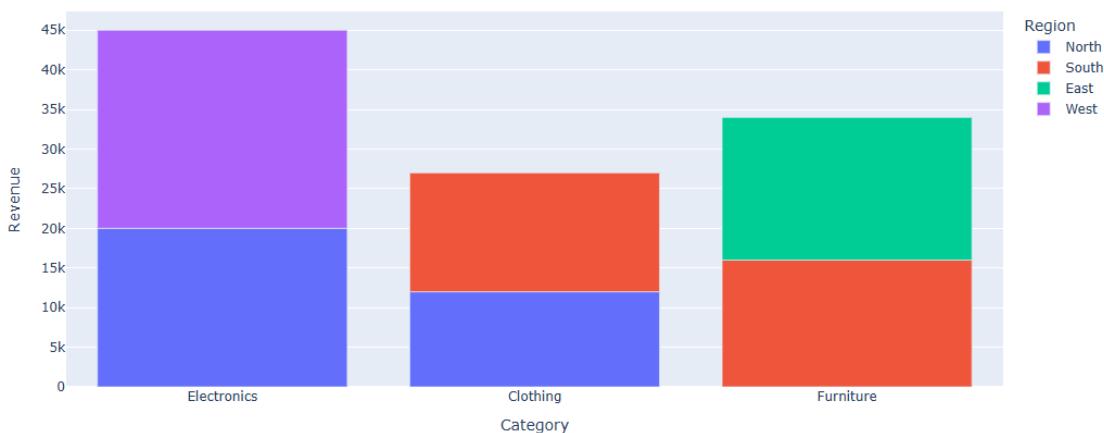
```
== Power BI Simulation Results ==
Total Sales: 106000
Average Discount: 7.5
```



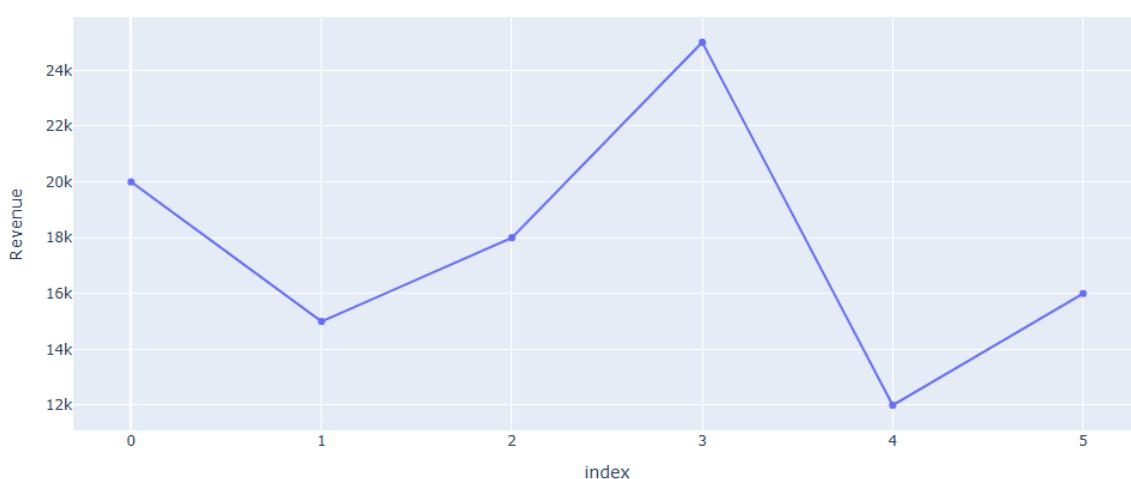
Revenue Share by Region



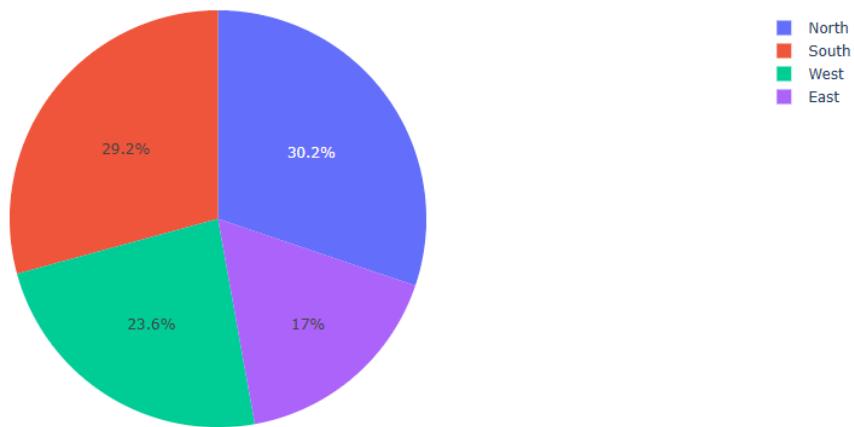
Revenue by Category and Region



Revenue Trend



Revenue Share by Region



RESULT:

A dashboard was successfully created in **Power BI** with multiple charts (bar, line, pie) displaying insights such as **sales trends, category distribution, and regional performance**. Calculated columns and measures enhanced the analytical capabilities of the dashboard.