E-COMMERCE ANALYTICS

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Introduction

- **Theory:**
- E-commerce analytics is the process of collecting, analyzing, and interpreting online retail data. It helps businesses understand customer behavior, identify trends, optimize operations, and make data-driven decisions.

Importance of analytics

- Understand customer behavior
- Optimize marketing strategies
- Improve product recommendations
- Enhance customer experience
- Boost conversion rates

Python source code

```
import pandas as pd
import matplotlib.pyplot as plt

# Sample Data
data = pd.DataFrame({
    'Product': ['Laptop','Shoes','Chair','Book','Smartphone','Shirt','Table','Headphones','Bag','W
    'Category': ['Electronics','Fashion','Home','Books','Electronics','Fashion','Home','Electronic
    'Sales': [200,150,100,80,220,130,90,180,120,70],
    'Month': ['Jan','Jan','Jan','Jan','Feb','Feb','Feb','Feb','Mar','Mar']
})

# Key Metrics Bar Chart
metrics = pd.DataFrame({'Metric': ['Sales','Conversion Rate','Retention','AOV','Cart Abandonment']
                        'Value': [85,70,60,75,50]})
plt.bar(metrics['Metric'], metrics['Value'], color='skyblue')
plt.title("Key Metrics"); plt.xticks(rotation=25); plt.show()

# Sales Trends Line Chart
sales_trends = pd.DataFrame({'Month':['Jan','Feb','Mar','Apr','May','Jun'], 'Sales':[500,700,650,8
plt.plot(sales_trends['Month'], sales_trends['Sales'], marker='o', color='orange')
plt.title("Sales Trends"); plt.xlabel("Month"); plt.ylabel("Sales"); plt.grid(True); plt.show()

# Top Categories Pie Chart
categories = ['Electronics','Fashion','Home','Books','Other']
sales_percent = [40,25,15,10,10]
plt.pie(sales_percent, labels=categories, autopct='%1.1f%%', startangle=140)
```

```
# Top Categories Pie Chart
categories = ['Electronics','Fashion','Home','Books','Other']
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plt.pie(sales_percent, labels=categories, autopct='%1.1f%%', startangle=140)
plt.title("Top Selling Categories"); plt.show()

# Top Products Analysis
top_products = data.groupby('Product')['Sales'].sum().sort_values(ascending=False)
print("Top 5 Products by Sales:\n", top_products.head(5))
```
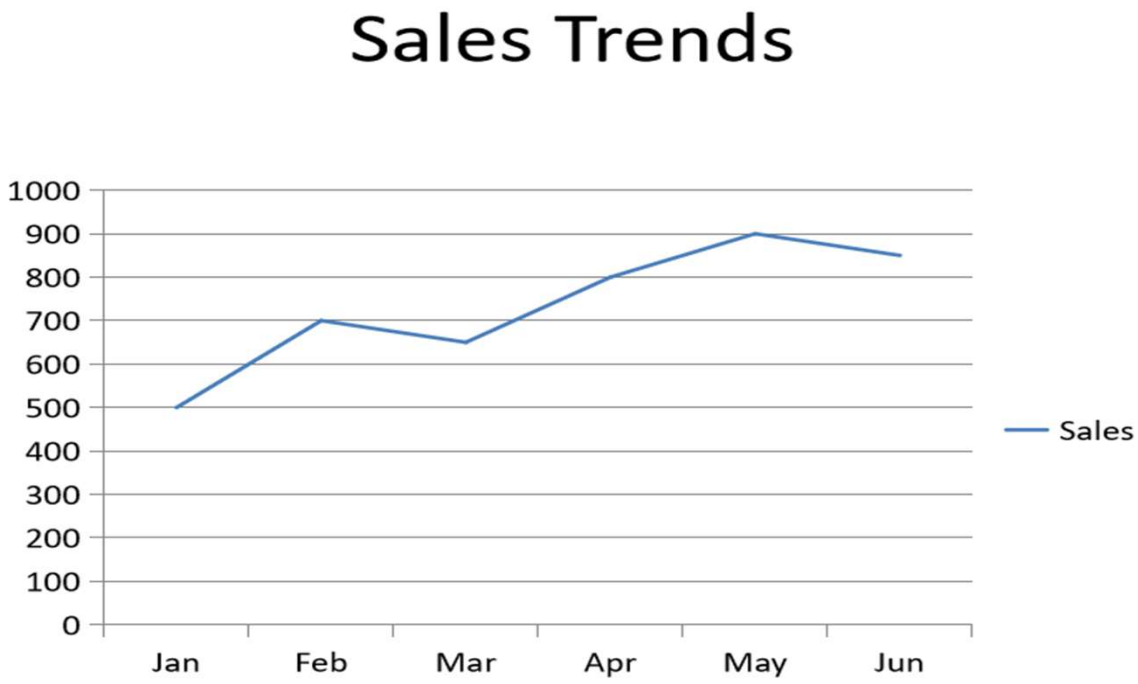

Outputs


Sales Trends
1000
900
800
700
600
500
400
300
200
100
0
Jan
Feb
Mar
Apr
May
Jun
Sales

Pie-chart

Tools Used

- Google Analytics
- Python (Pandas, Matplotlib, Seaborn)
- Power BI / Tableau
- Excel / SQL
- Shopify / Amazon dashboards

Challenges

- Data privacy & security
- Integrating multiple data sources
- Real-time data processing
- Maintaining data quality

Conclusion

- E-commerce analytics empowers businesses to make **data-driven decisions** by providing actionable insights from customer behavior, sales trends, and product performance. It helps companies **optimize marketing strategies**, reduce costs, and target the right audience more effectively. By analyzing key metrics such as conversion rates, average order value, and cart abandonment, businesses can **enhance customer experience** and improve retention.