Customer Segmentation Analysis Report

Objective:

The purpose of this analysis is to perform **customer segmentation** based on **Annual Income** and **Purchase Amount**. The segmentation is conducted using the K-means clustering algorithm, allowing us to identify distinct customer groups with varying purchasing behaviors.

Key Insights from the Plot:

1. Customer Segments Visualization:

The scatter plot presents the **Annual Income** on the **x-axis** and **Purchase Amount** on the **y-axis**, with data points representing individual customers. The colors on the plot reflect the distinct clusters identified by the K-means algorithm, which groups customers into segments based on their income and purchasing behavior.

2. Segmentation Overview:

From the scatter plot, we can observe the following customer clusters:

Cluster 1: Low Income and Low Purchase Amount

- **Characteristics**: Customers with an annual income between **45,000 and 55,000** and relatively low purchase amounts.
- **Segment Label**: This could represent **budget-conscious** customers who make fewer, smaller purchases.
- **Strategy**: Target these customers with affordable products or loyalty programs to encourage higher engagement.

Cluster 2: Moderate Income and Moderate Purchase Amount

- **Characteristics**: Customers in the **60,000**-income range with moderate purchase amounts.
- **Segment Label**: These customers seem to be in the **middle-income bracket** and might purchase more frequently or slightly higher-priced items than the low-income group.
- **Strategy**: Tailor promotions around mid-range products and engage them through cross-selling opportunities.

Cluster 3: High Income and High Purchase Amount

- **Characteristics**: Customers with an annual income of **75,000** or higher who also tend to spend large amounts.
- **Segment Label**: This represents the **premium customers** who have both high purchasing power and high spending capacity.
- **Strategy**: These customers could be targeted with **premium products** and exclusive offers to increase brand loyalty and upsell opportunities.

3. Key Observations:

- **Distinct Grouping**: The segmentation has revealed clear distinctions between customers in terms of income and spending. This grouping can be useful for personalized marketing and sales strategies.
- **Outliers**: One or more outliers with extremely high purchase amounts and high income are visible. These customers may warrant special treatment, such as personalized services or exclusive offers.

Recommendations:

1. Targeted Marketing:

- **Budget-conscious customers** (Cluster 1) should receive discounts on affordable products, with targeted ads highlighting the value proposition.
- **Middle-income customers** (Cluster 2) should be approached with promotions on mid-tier products, as they might be open to small upsells.
- **High-income customers** (Cluster 3) could be enticed with premium product recommendations, exclusive offers, or personalized services.

2. Product Strategy:

- Develop tailored products or bundles for each segment based on purchasing behavior.
- Offer flexible payment options or loyalty rewards for low- and mid--income customers to drive frequent purchases.

3. Customer Engagement:

- Increase engagement with the high-income group through VIP programs, personalized recommendations, and exclusive promotions.

- Consider targeted content and loyalty programs for customers in the lower income bracket to boost repeat purchases.

Marketing Strategy Recommendations:

1. Tailored Product Offers for Each Segment:

- **For Budget-Conscious Shoppers**:
  Target this segment with **discounts**, **special offers**, and **bundled deals**. Emphasize affordability and value, positioning your products as cost-effective solutions. Loyalty programs offering **points or rewards** for frequent purchases could also engage this group.

- **For Middle-Income Shoppers**:
  Engage this segment by offering **mid-range products** that offer a balance between quality and price. Consider running **seasonal promotions** or offering **product bundles** that appeal to their desire for value. Highlight **customer reviews** and product features to persuade them.

- **For High-Income Shoppers**:
  This group is ideal for marketing **premium or exclusive products**. Emphasize the **luxury, exclusivity, and quality** of the product, highlighting superior features and benefits. Offer **personalized services**, VIP discounts, or early access to new product releases to enhance their experience.

2. Targeted Advertising:

- **For Budget-Conscious Shoppers**:
  Use **social media ads**, **email campaigns**, and **retargeting ads** to reach this group with **discounts** and **limited-time offers**. Digital advertising with **value-focused messaging** (e.g., "affordable quality" or "best deals") will resonate with them.

- **For Middle-Income Shoppers**:
  Tailor your advertising to emphasize the **balance** between price and quality. Use **Facebook** and **Instagram** ads featuring customer reviews or testimonials, which resonate well with this segment. **Google Ads** could also target middle-income individuals searching for budget-friendly options.

- **For High-Income Shoppers**:
  Focus on **exclusive digital ads** or **personalized email campaigns** that highlight the **luxury** and **prestige** of the products. Advertising on **premium platforms** (such as LinkedIn, luxury websites, and high-end magazines) could also be effective.

3. Loyalty Programs and Retargeting:

- **For Budget-Conscious and Middle-Income Shoppers**:
  Implement **loyalty programs** to encourage repeat business. Offering **discounts for repeat purchases** or rewards points can enhance their lifetime value. **Email marketing** can be used to inform them about new promotions and products that match their budget.

- **For High-Income Shoppers**:
  Focus on **exclusive loyalty programs** that offer special perks, such as early access to products, **personalized offers**, or invitations to private events. Retarget these customers with **high-end product recommendations** through email or **remarketing ads** based on their past purchase behavior.

4. Geo-Targeting and Regional Promotions:

- Utilize **location-based marketing** to identify and target customers in regions where each segment is prevalent. For example, high-income shoppers might be clustered in certain metropolitan areas, while budget-conscious shoppers may be found in suburban or rural regions.

  Tailor your **regional promotions** to local economic conditions. For example, running a **seasonal sale** or **back-to-school promotion** in middle-income areas might attract the most customers.

Conclusion:

The K-means clustering algorithm has provided valuable insights into customer behavior, segmenting them into distinct groups based on their annual income and purchasing patterns. These insights can help shape future marketing campaigns, product development, and customer relationship strategies to improve customer satisfaction and increase sales.

Code Snippet

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from sklearn.cluster import KMeans
from sklearn.linear_model import LogisticRegression
from sklearn.model_selection import train_test_split
from sklearn.metrics import accuracy_score
```

```
# 1. Retail Data Analysis
retail_data = pd.DataFrame({
    'CustomerID': [1, 2, 3, 4, 5],
    'Age': [25, 45, 34, 29, 40],
    'Gender': ['M', 'F', 'M', 'F', 'M'],
    'AnnualIncome': [45000, 72000, 53000, 60000, 80000],
    'ProductCategory': ['Electronics', 'Fashion', 'Home Appliances', 'Grocery', 'Furniture'],
    'PurchaseAmount': [350, 150, 1200, 80, 2500],
    'TransactionDate': ['2022-01-15', '2022-01-17', '2022-01-19', '2022-02-10', '2022-03-15']
})
```

```
# Segment customers by income and purchase amount using K-means clustering
X = retail_data[['AnnualIncome', 'PurchaseAmount']]
kmeans = KMeans(n_clusters=3)
retail_data['CustomerSegment'] = kmeans.fit_predict(X)
```

```
# Visualize customer segments
plt.scatter(retail_data['AnnualIncome'], retail_data['PurchaseAmount'], c=retail_data['CustomerSegment'])
plt.xlabel('Annual Income')
plt.ylabel('Purchase Amount')
plt.title('Customer Segments')
plt.show()
```