Marketing Campaign Analysis

Batch: AT-6

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Contents:

Introduction

- The goal of this project is to group customers into different segments. By understanding how customers shop, how much they spend, and their personal details, businesses can create better marketing plans.
- This helps them send the right products to the right customers.

Problem Statement:

- Companies often don’t know how different customers behave. By using customer segmentation, we can:
- Understand customer needs better.
- Create targeted marketing campaigns.
- Improve customer retention and sales.

Data Analysis Steps

- Import necessary libraries (like pandas and matplotlib).
- Load the customer dataset.
- Explore and understand the data.
- Clean the data by removing or fixing missing values.
- Select important features for clustering.
- Standardize the data so all features are equally important.
- Apply clustering methods (like K-Means, **Hierarchical Clustering, and DBSCAN**).
- Analyze and visualize the customer clusters.

Data Summary

- The dataset contains information about customers, including:
- **Demographics:** Age, income, education, and marital status.
- **Behavior:** Recent purchases, complaints, and enrollment date.
- **Purchases:** Spending on different product categories.
- **Engagement:** Website visits, online shopping, and promotional responses.

Data Cleaning

- **Missing Values**:
  Numerical: Replaced with median
  Categorical: Replaced with mode
- **Encoding**: Converted categories using Label Encoding.
- Converted the customer enrollment date into a proper date format.
- **Outlier handling**: Identified through spending patterns and addressed.
- **Dropped irrelevant columns**: ID, date of customer registration.

Data Analysis

Feature Engineering & PCA:

- Created Total_Spending, Customer_Seniority, Total_Children.
- PCA reduced dimensions while retaining maximum variance.

Clustering Methods & Evaluation:

K-Means:

- Optimal clusters: 3 (based on Elbow Method)
- Well-defined, distinct clusters.

Data Analysis

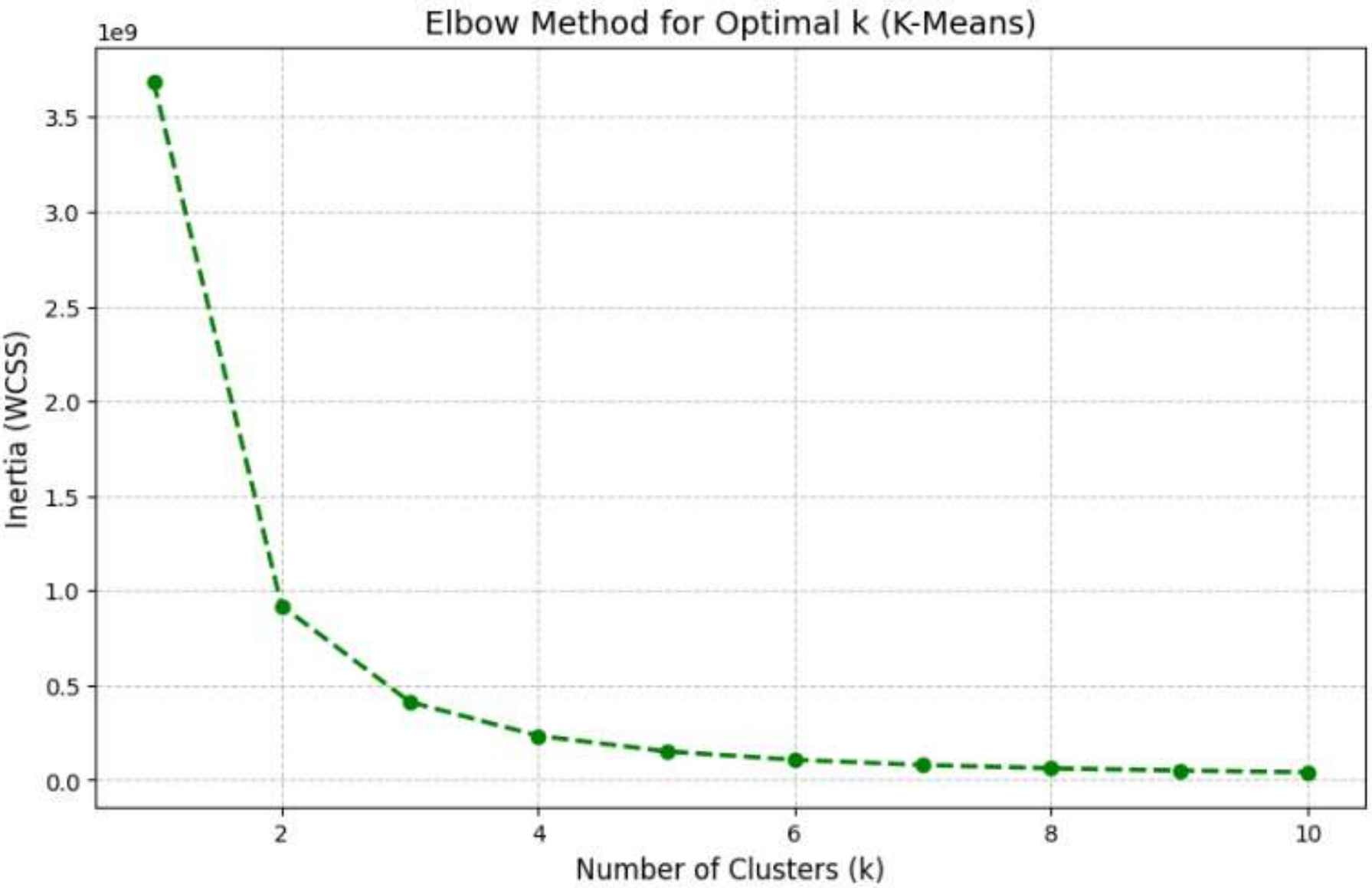
- **Hierarchical Clustering**:

  + Similar clusters but less distinct separation.

- **DBSCAN**:

  + Not suitable for this dataset (over-clustering & noise points).

Best Method: **K-Means** due to clear cluster formation and interpretability.


Elbow Method for Optimal k (K-Means)
1e9
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Inertia (WCSS)
2
4
6
8
10
Number of Clusters (k)

Conclusion

3 main customer segments identified:

- High spenders with family
- Young singles with moderate spending
- Low-income older customers with minimal spending

Marketing Strategy Recommendations:

- Target high spenders with premium offers.
- Engage younger segments with discounts and online promotions.
- Improve loyalty programs for low-spending customers.

Future Work:

- Incorporate real-time customer data.
- Refine models with additional features.