Customer Segmentation Using Clustering

1. Introduction

Customer segmentation is a crucial task in marketing and business analytics, allowing companies to identify different groups of customers based on their behaviors and characteristics. This project applies clustering techniques to segment customers effectively, helping businesses tailor their strategies to different customer groups.

2. Objectives

• To analyze customer purchasing patterns and behaviors.

• To apply clustering techniques to segment customers into meaningful groups.

• To provide insights for targeted marketing strategies.

3. Dataset Description

The dataset used in this project contains customer attributes such as:

• Customer ID

• Age

• Annual Income

• Spending Score

• Other relevant features influencing purchasing behavior

4. Methodology

The customer segmentation is performed using clustering techniques. The following steps were followed:

4.1 Data Preprocessing

• Handling missing values

• Data normalization

• Feature selection

4.2 Exploratory Data Analysis (EDA)

• Visualizing data distributions

• Identifying correlations

4.3 Clustering Techniques Applied

• K-Means Clustering: Used to segment customers into K groups based on their spending habits and income levels.

• Hierarchical Clustering: Used to analyze relationships among customers in a hierarchical manner.

• DBSCAN: Applied for density-based clustering to detect anomalies.

5. Results and Analysis

• The optimal number of clusters was determined using the Elbow Method.
• Customers were grouped into different segments based on their income and spending scores.
• Visualization of clusters using scatter plots and heatmaps.
• Business implications of each segment, such as identifying high-value customers and budget-conscious buyers.

6. Conclusion

The clustering model successfully grouped customers into distinct segments, providing valuable insights into their behavior. This segmentation can be used to enhance marketing strategies, personalize customer engagement, and optimize resource allocation.

7. Future Work

• Enhancing segmentation by incorporating more demographic and behavioral features.

• Applying deep learning techniques for advanced customer analysis.

• Implementing real-time customer segmentation in business applications.

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