Customer Segmentation Analysis for Mall Visitors

Introduction

This analysis aims to segment mall visitors using K-Means clustering to understand customer behavior and optimize marketing strategies. The process involved data quality assessment, exploratory data analysis, and clustering to identify distinct customer segments.


Data Quality Assessment and Exploration

Data Quality Investigation

- Checked for null values, duplicates, and format issues.

- Addressed data type inconsistencies and other potential data quality problems.

Exploratory Data Analysis

- **Histograms**: Plotted histograms for key variables:

  - **Income**: Displayed a normal-ish distribution with a high number of lower-income individuals and a few higher-income individuals.

  - **Age**: Showed a normal-ish distribution skewed towards younger ages.

 - **Spending Score**: Exhibited a normal distribution.
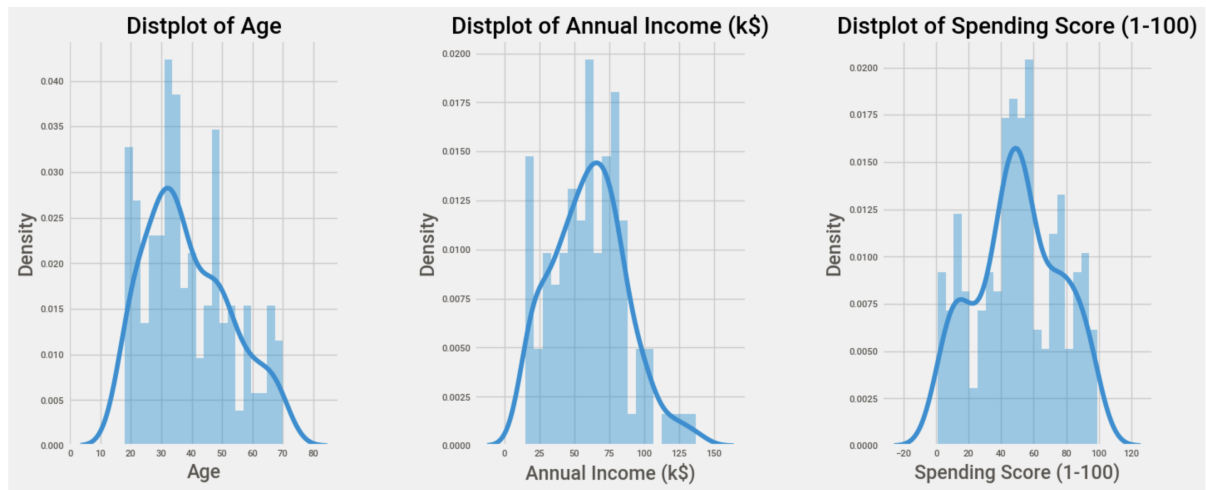
- **Gender Bias Check**: Analysed gender distribution, noting a slight female majority.
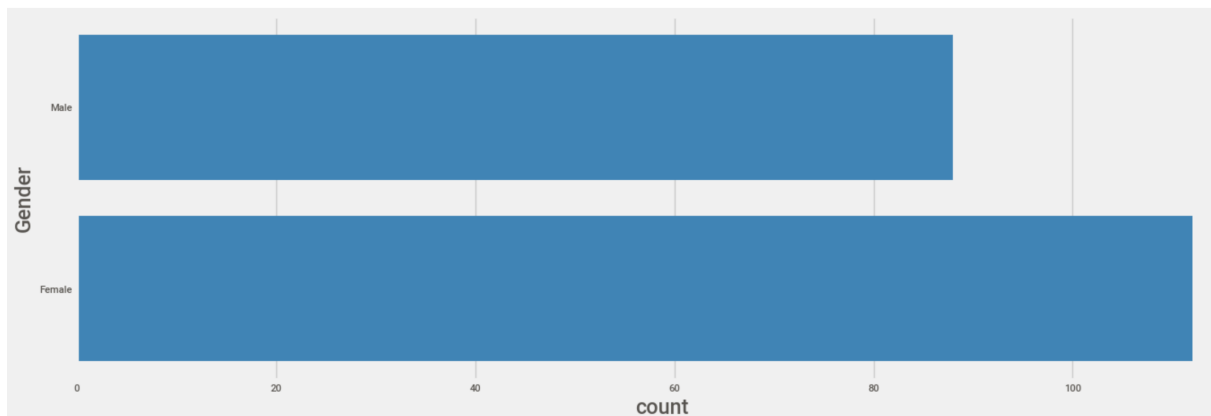
- **Correlation Analysis**: Examined relationships between age, income, and spending score.

  - Spending score decreases as age increases.

  - Middle-income individuals are average spenders, while both high and low-income individuals can vary in spending.
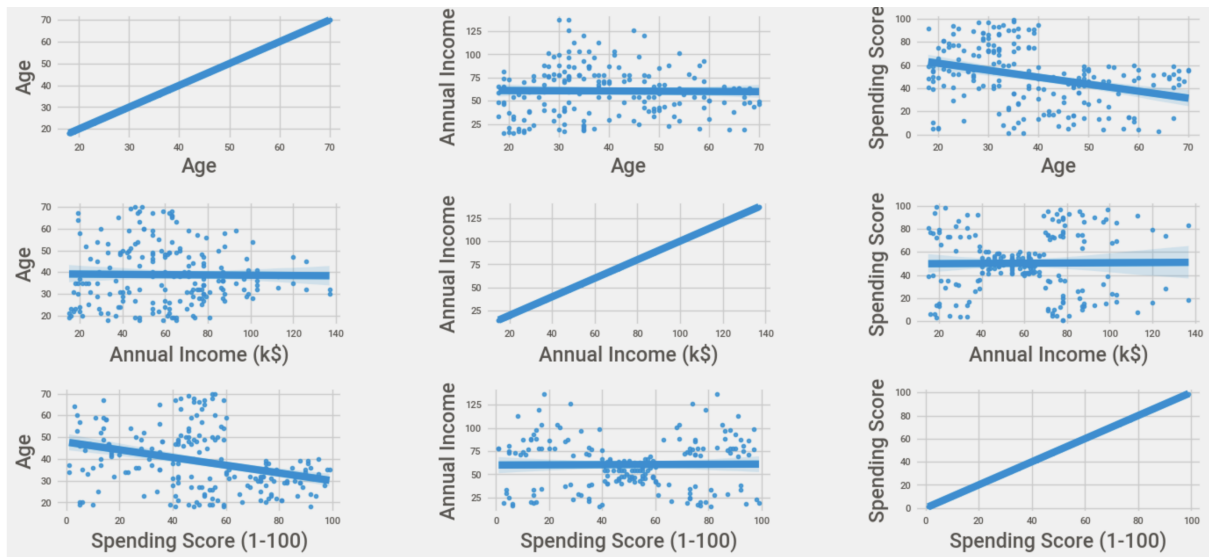
- **Income vs. Age by Gender**: Plotted annual income against age, colour-coded by gender, revealing no discernible difference between male and female spending patterns.
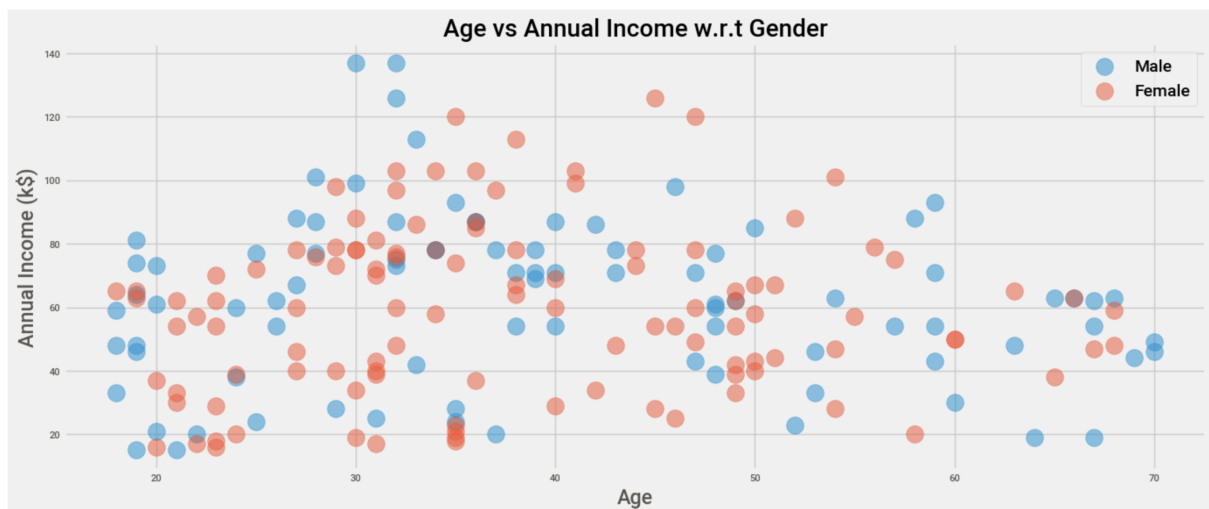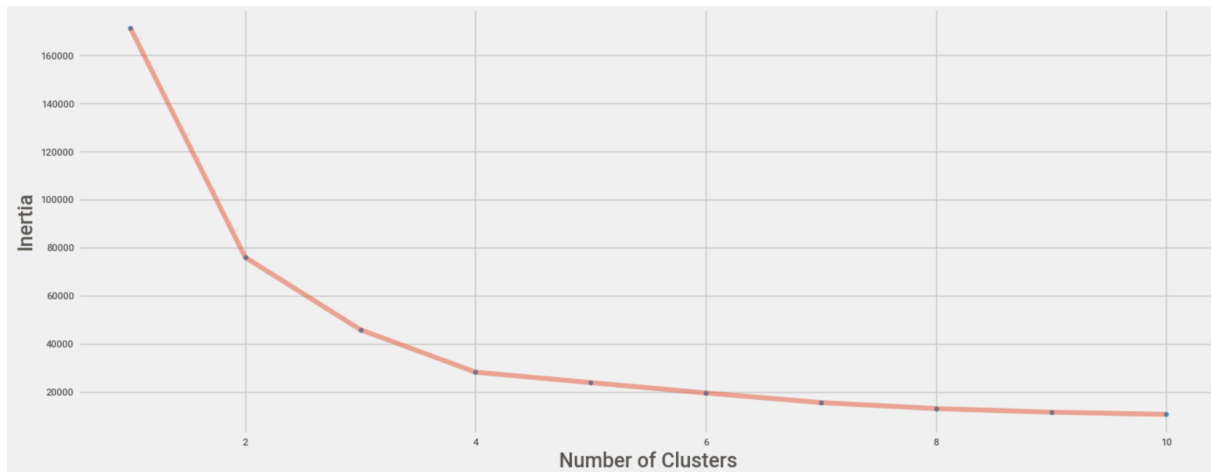

K-Means Clustering Analysis

Feature Selection

- Selected age and spending score as predictors for segmentation due to their strong indicative patterns.
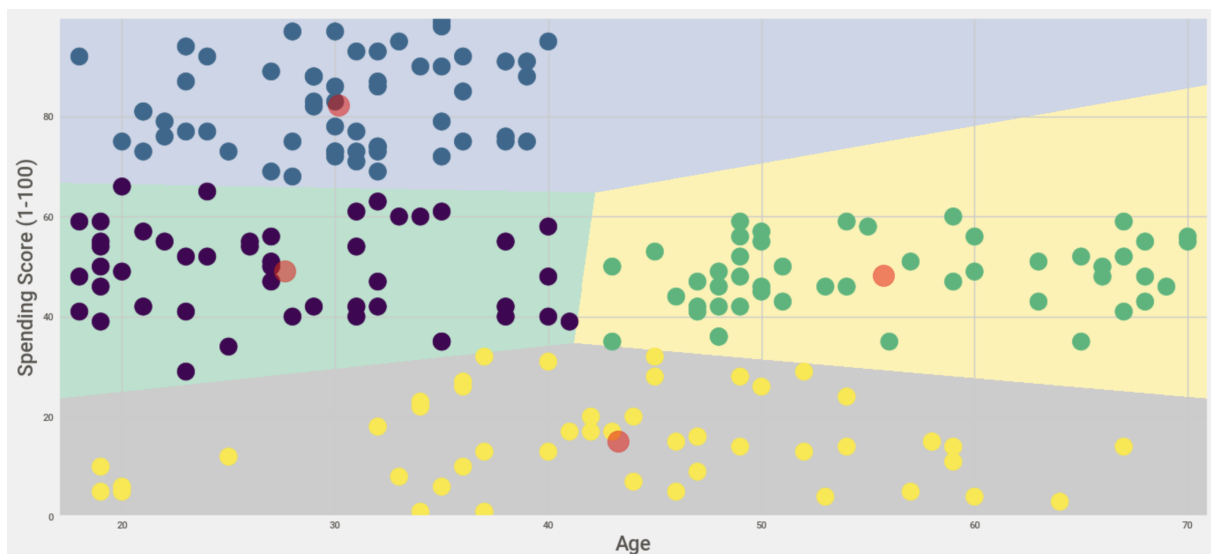
Elbow Method

- Determined the optimal number of clusters using the Elbow Method, identifying four clusters.

Cluster Identification

- Analysed the resulting clusters to define segments:
  - **Young High Spenders**
  - **Low Spenders**
  - **Young Mid Spenders**
  - **Older Mid Spenders**

Conclusion

The K-Means clustering analysis successfully identified distinct customer segments, providing valuable insights into visitor behaviour. These insights can inform targeted marketing strategies to enhance customer engagement and optimise mall operations.

Next Steps

- Implement targeted marketing campaigns based on identified segments.
- Continuously monitor and update the segmentation model with new data for improved accuracy.