Final Report

Executive Summary:
This project aimed to understand mall customers better by grouping them into segments based on their demographics and spending habits. By using K-means clustering, we identified distinct customer groups that can help tailor marketing strategies and improve customer satisfaction.

Introduction:
The goal was to analyze data from a mall's customer dataset to group customers into meaningful segments. This segmentation helps in understanding customer behavior and preferences, enabling personalized marketing approaches.

Methodology:
Data Collection and Exploration:

We started by loading the dataset 'Mall_Customers.csv' and explored its initial structure and contents.
Data Cleaning and Preparation:

We checked for missing values and filled in any missing ages with the average age.
Columns were renamed for clarity, and rows with incomplete data were removed.
Gender information was encoded numerically (0 for Male, 1 for Female) for analysis.
Exploratory Data Analysis:

We visualized the distributions of Age, Annual Income, and Spending Score using histograms and KDE plots.
Relationships between Annual Income and Spending Score were explored through scatter plots, segmented by Gender.
Customer Segmentation with K-means Clustering:

Features like Age, Annual Income, and Spending Score were selected for clustering.
Standardization of these features ensured equal importance during clustering.
K-means clustering with 5 clusters was applied to group customers based on similarities in spending behavior.
Results:

The analysis revealed five distinct customer segments with different spending patterns.
We visualized these segments based on Annual Income versus Spending Score and assessed cluster quality.
Results:
Our findings highlighted five distinct customer segments, each with unique spending behaviors. This segmentation provides valuable insights for designing targeted marketing campaigns and improving customer service.

Conclusion:
Through K-means clustering, we successfully grouped mall customers into meaningful segments based on their spending habits. This segmentation approach helps businesses tailor their strategies to meet the specific needs of different customer groups, enhancing overall customer satisfaction and loyalty.

Appendices:
Additional charts and visualizations from our data exploration phase.
Code snippets used for data cleaning, preprocessing, and clustering.
References to datasets and methodologies used.