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Faculty of Cyber Physical Systems  
Department of Internet of Things and Robotics Engineering  
B.Sc. in Internet of Things and Robotics Engineering

**Course Title:** Data Science

**Course Code:** IOT 4313

**Assignment On:** Clustering

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## **INTRODUCTION:**

Through distinct groupings of customers based on behavior, socioeconomic status, and purchasing patterns, companies can develop methods for presenting their products, maximize customer satisfaction, and boost output.

We examine the methods and outcomes of applying diverse clustering computations on the Shopping center Client dataset in this extensive research. Important client attributes including age, annual salary, and investing score are included in the dataset.

### **Part A: K-means Clustering**

#### **Method:**

##### **1. Establishing the Ideal K:**

Linked the Outline Score and Elbow Strategy techniques to identify the optimal number of clusters (K). looked into K between the ages of 1 and 15.

##### **2. Preprocessing Data:**

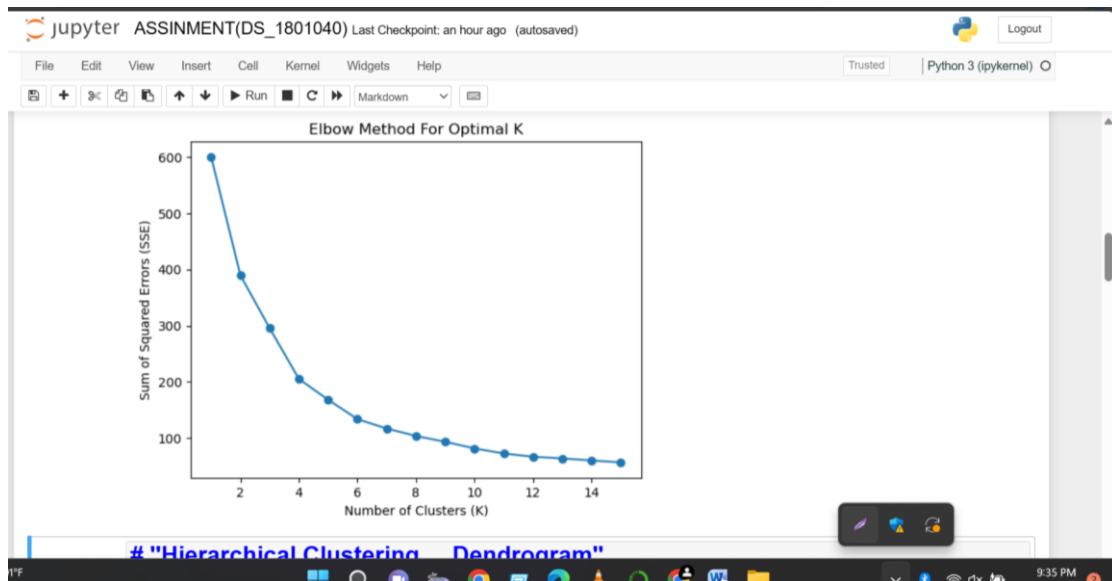
The following key points were extracted: age, annual salary, and investing score.

##### **3. K-means Clustering:**

Clients were divided into K clusters using the K-means clustering computation.

##### **4. Findings:**

Based on investment behavior, identified client pieces and created detailed client profiles for each cluster.



## Part B: Hierarchical Clustering

### Method:

#### 1. Analysis of Dendrograms:

Created a dendrogram to visualize the different levels of linkages between information foci and determine the optimal number of groups.

#### 2. Data Preprocessing:

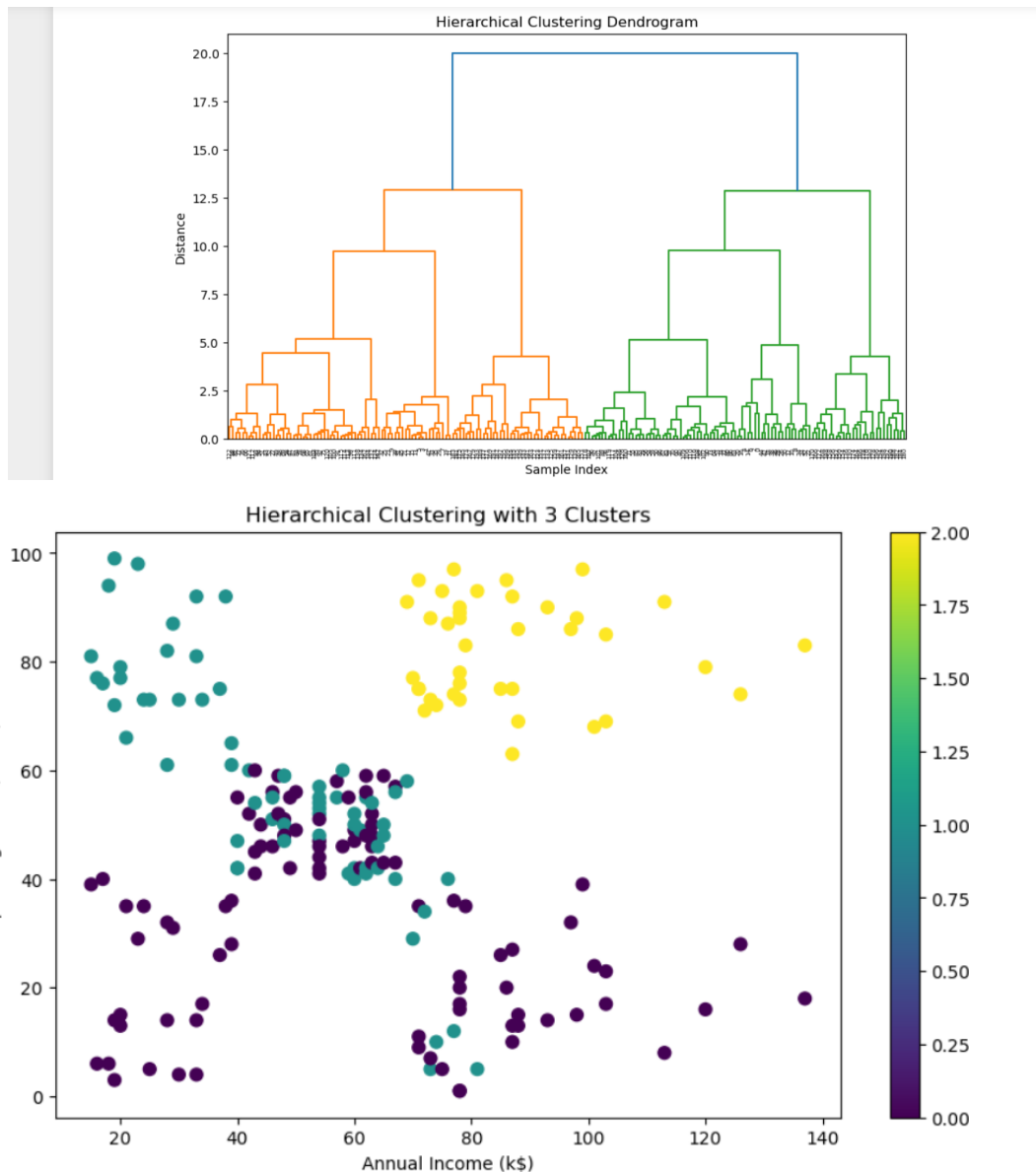
Age, Yearly Salary, and Investing Score were used as the same highlights..

#### 3. Agglomerative Various Levels Clustering:

Based on the optimal number of clusters from the dendrogram, actualized agglomerative progressive clustering.

#### 4. Comes into being:

Showed the basic structure of client pieces by visualizing the progressing clusters.



## Part C: Density-based Clustering (DBSCAN)

### Method:

#### 1. Information Preparation:

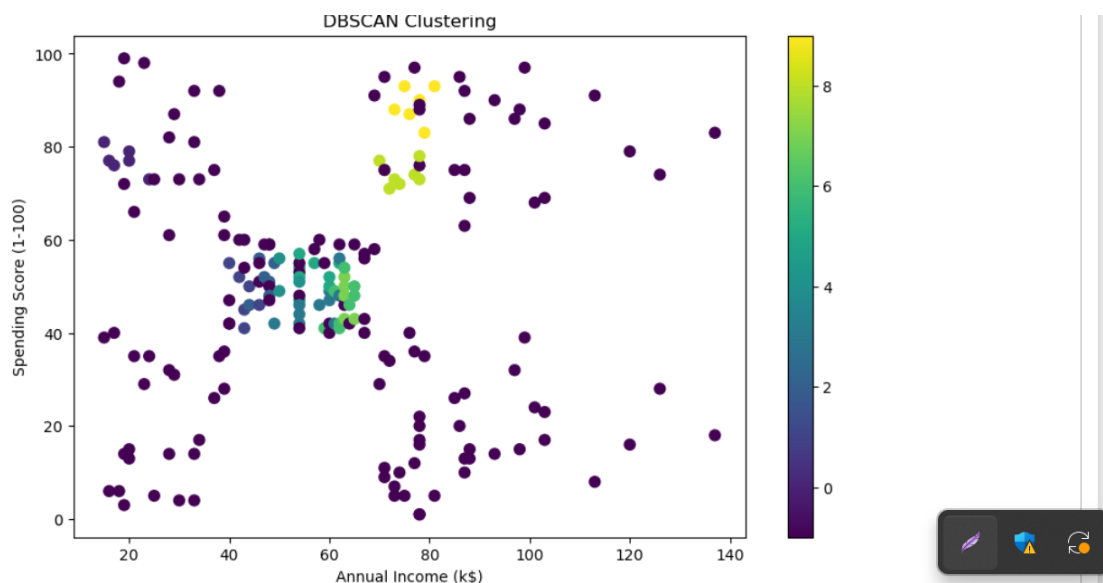
The same features were selected: investing score, age and annual salary. used Standard Aero to standardize the highlights in order to estimate thickness steadily.

## 2. DBSCAN Clustering:

Utilizing density-based clustering, this connected DBSCAN computation focuses on identifying self-assertive formed clusters.

## 3. Occurs:

Clients were grouped according to dense areas in the include space, effectively identifying exceptions as focal points of noise.



## CONCLUSION:

K-means clustering provides a fantastic initial overview, highlighting distinct, recognizable client groups. Different degrees of grouping delved further, exposing confusing relationships between client divisions, aiding in crucial decision-making.

**GitHub Link:** <https://github.com/01869/Assignment.git>