Affinity Propagation

Example
Online Retail Product Recommendation:
If am working on online retail platform Goal is provide product recommendation to users based on purchasing browsing of the platform

Data Collection
Collect Data from the platform browser history
Such as
Purchase details from the past
Product has viewed
Current items added to shopping carts

Similiarity
Measure Similiarity between different user based on product details

Identifier Exampler:

Each user has a Exampler one who best represent different cluster of similar user
Which product they viewed or buyed become representative cluster

but based on the responsibility and availability matrices help in this decision-making process.

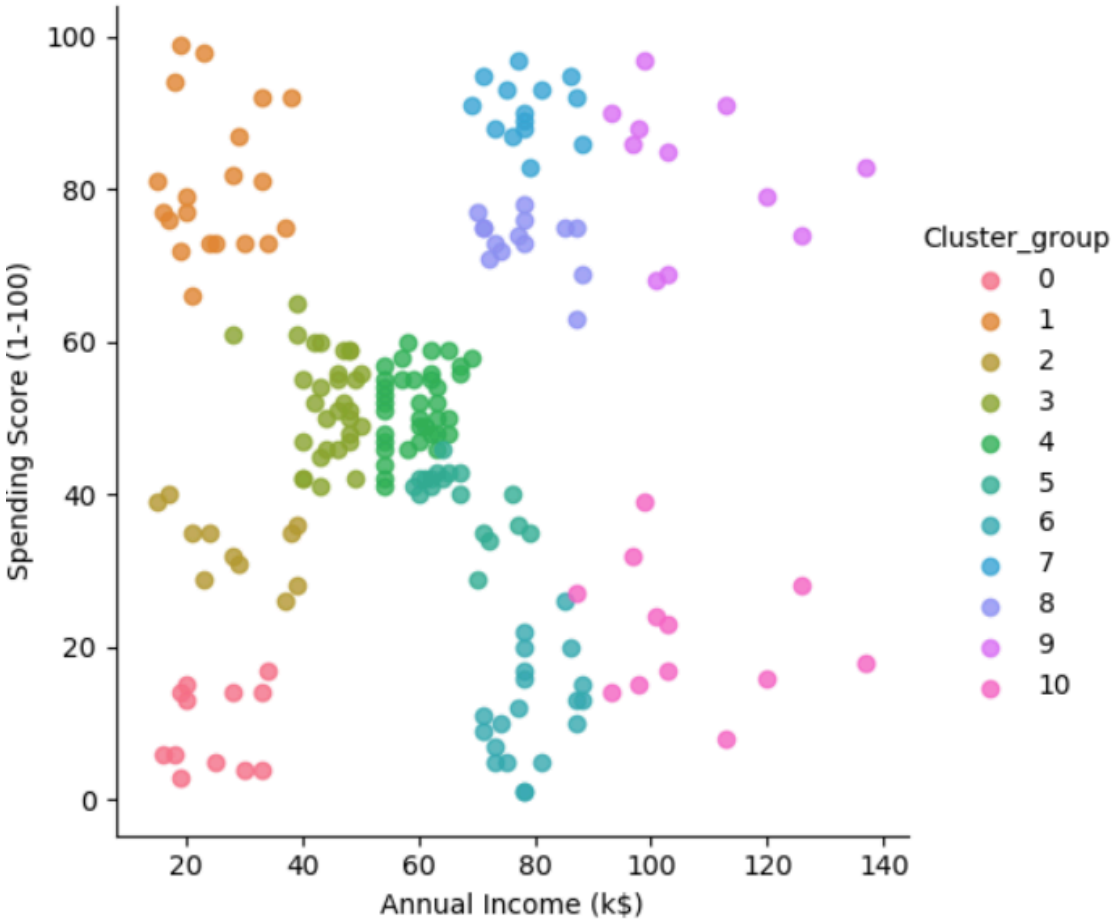
Responsibility: It is based on the similarity between the two users and how well other users consider the second user as their exemplar.

These iterations of responsibility and availability continue until convergence. The user with the highest availability value in each row is chosen as the exemplar for the other cluster.

Real-Time Update:

As users continue to browse and make purchases, the affinity propagation algorithm dynamically updates the clusters and exemplars in real-time, adapting to changes in user preferences.

Mall_Customer dataset using Affinity propagation



Mean Shift:

Data Collection:

- Collect data on customer behavior or product features, such as purchase history, preferences, and interaction patterns.

Feature Selection:

- Choose relevant features for clustering, such as product categories, purchase frequency, or customer demographics.

Normalization:

- Standardize or normalize the features to ensure equal contribution from each feature during clustering.

Mean Shift Clustering:

- Apply Mean Shift clustering algorithm to identify clusters of products or customers based on their feature similarities.

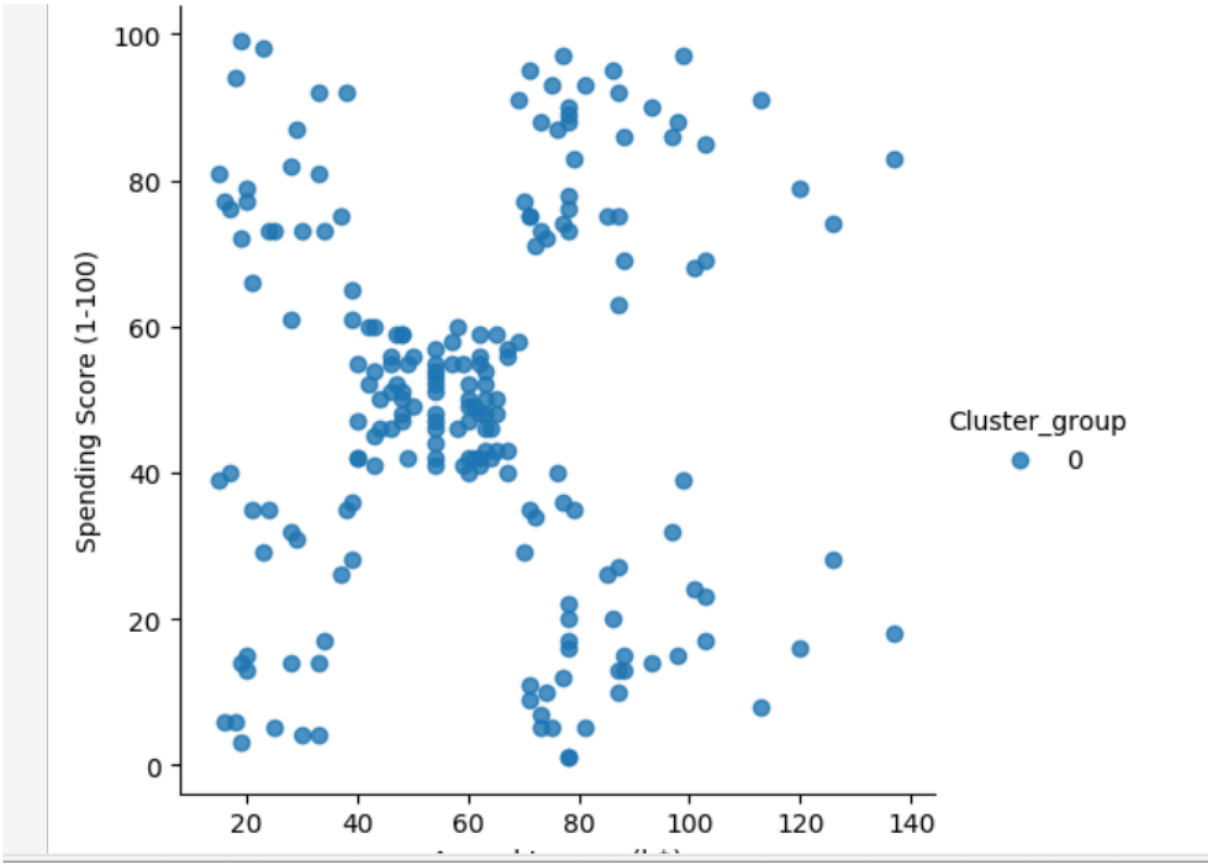
- Mean Shift iteratively shifts data points towards the mode (peak) of the data distribution.

Cluster Assignments:

- Assign each product or customer to the cluster with the highest density or mode where they converge.

Mall_Customer dataset using Mean shift

All data point shif to one cluster



Spectral Clustering

Data Collection:

- Collect data on customer behavior or product features, such as purchase history, preferences, and interaction patterns.

Feature Selection:

- Choose relevant features for clustering, such as product categories, purchase frequency, or customer demographics.

Graph Construction:

- Represent the data as a similarity graph, where nodes represent products or customers, and edges capture the similarity between them based on selected features.

Laplacian Matrix:

- Compute the Laplacian matrix of the similarity graph.

Eigenvector Decomposition:

- Perform eigenvector decomposition on the Laplacian matrix to extract eigenvectors and eigenvalues.

Cluster Assignment:

- Use the eigenvectors corresponding to the smallest eigenvalues to partition the data into clusters.

Dynamic Updates:

- Continuously update the clusters in real-time as new data on customer interactions or product preferences becomes available.

Mall_Customer dataset using Spectral Cluster

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plt.show()
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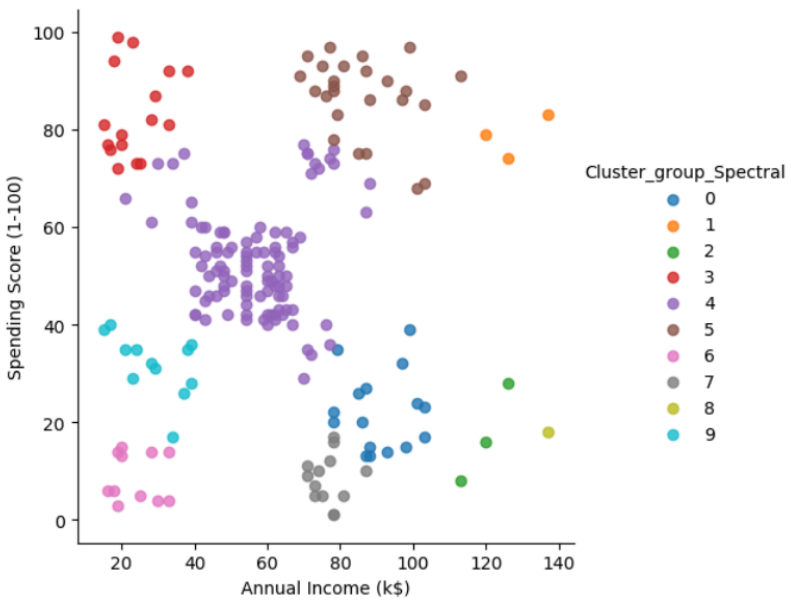


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