Customer Segmentation

Fuzzy C-Means Clustering

Fuzzy C-Means Clustering

Clusters	N	R²	AIC	BIC	Silhouette
10	1000	0.588	2741.400	2986.780	0.100

Note. The model is optimized with respect to the *BIC* value.
Note. The optimum number of clusters is the maximum number of clusters. You might want to adjust the range of optimization.

Cluster Information

Cluster	1	2	3	4	5	6	7	8	9	10
Size	70	103	34	75	18	151	143	96	131	179
Explained proportion within-cluster heterogeneity	0.055	0.094	0.019	0.067	0.010	0.151	0.151	0.109	0.135	0.209
Within sum of squares	144.845	249.481	50.320	175.670	26.256	398.804	398.803	288.411	355.720	553.087
Silhouette score	0.248	0.120	0.226	0.218	0.297	0.038	0.081	0.035	0.085	0.023
Center age	1.182	−1.035	0.272	−0.709	−0.777	−0.254	0.077	1.244	0.339	0.656
Center income	−1.138	−1.142	−0.172	0.421	−0.190	−0.204	−0.712	−0.169	0.797	−0.022
Center spending_score	−0.503	0.201	1.558	−1.178	1.539	0.638	0.980	0.340	1.484	−1.000
Center purchase_frequency	1.194	0.571	0.571	−1.554	1.549	1.249	−1.274	1.116	−0.327	0.021
Center last_purchase_amount	0.876	−1.565	−0.951	1.667	−1.382	−0.394	0.863	−0.334	−1.154	1.157

Note. The Between Sum of Squares of the 10 cluster model is 3775.04
Note. The Total Sum of Squares of the 10 cluster model is 6416.43

Model Performance Metrics

	Value
Maximum diameter	5.371
Minimum separation	0.235
Pearson's γ	0.351
Dunn index	0.044
Entropy	2.165
Calinski-Harabasz index	98.015

Note. All metrics are based on the *euclidean* distance.

Cluster Means

|	age	income	spending_score	purchase_frequency	last_purchase_amount
Cluster 1	0.772	−1.152	−0.393	0.959	0.762
Cluster 2	−0.966	−0.837	−0.336	0.064	−1.036
Cluster 3	0.353	−0.558	1.242	0.140	−0.906
Cluster 4	−0.976	0.447	−0.954	−1.068	0.576
Cluster 5	−0.909	0.051	1.308	1.358	−1.193
Cluster 6	−0.704	0.241	0.287	0.942	0.151
Cluster 7	−0.030	−0.620	0.673	−0.934	0.584
Cluster 8	1.102	0.223	0.067	0.781	−0.460
Cluster 9	0.277	0.995	0.620	−0.702	−0.840
Cluster 10	0.511	0.290	−0.890	−0.081	0.616

Elbow Method Plot
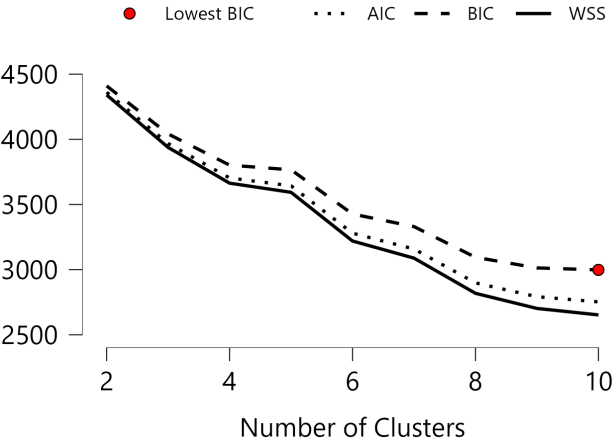
t-SNE Cluster Plot
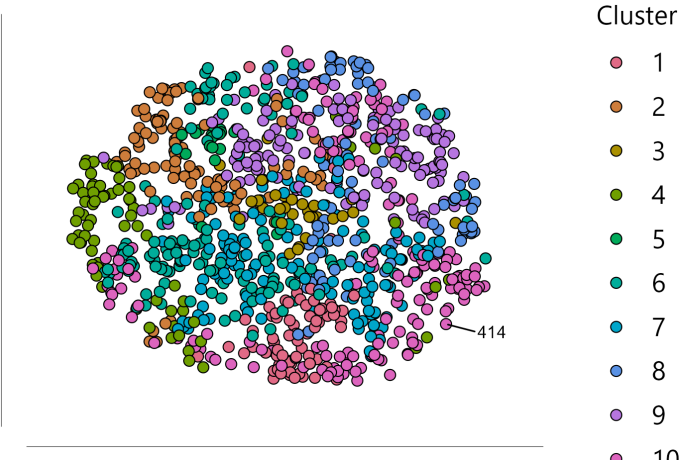
Cluster Matrix Plot
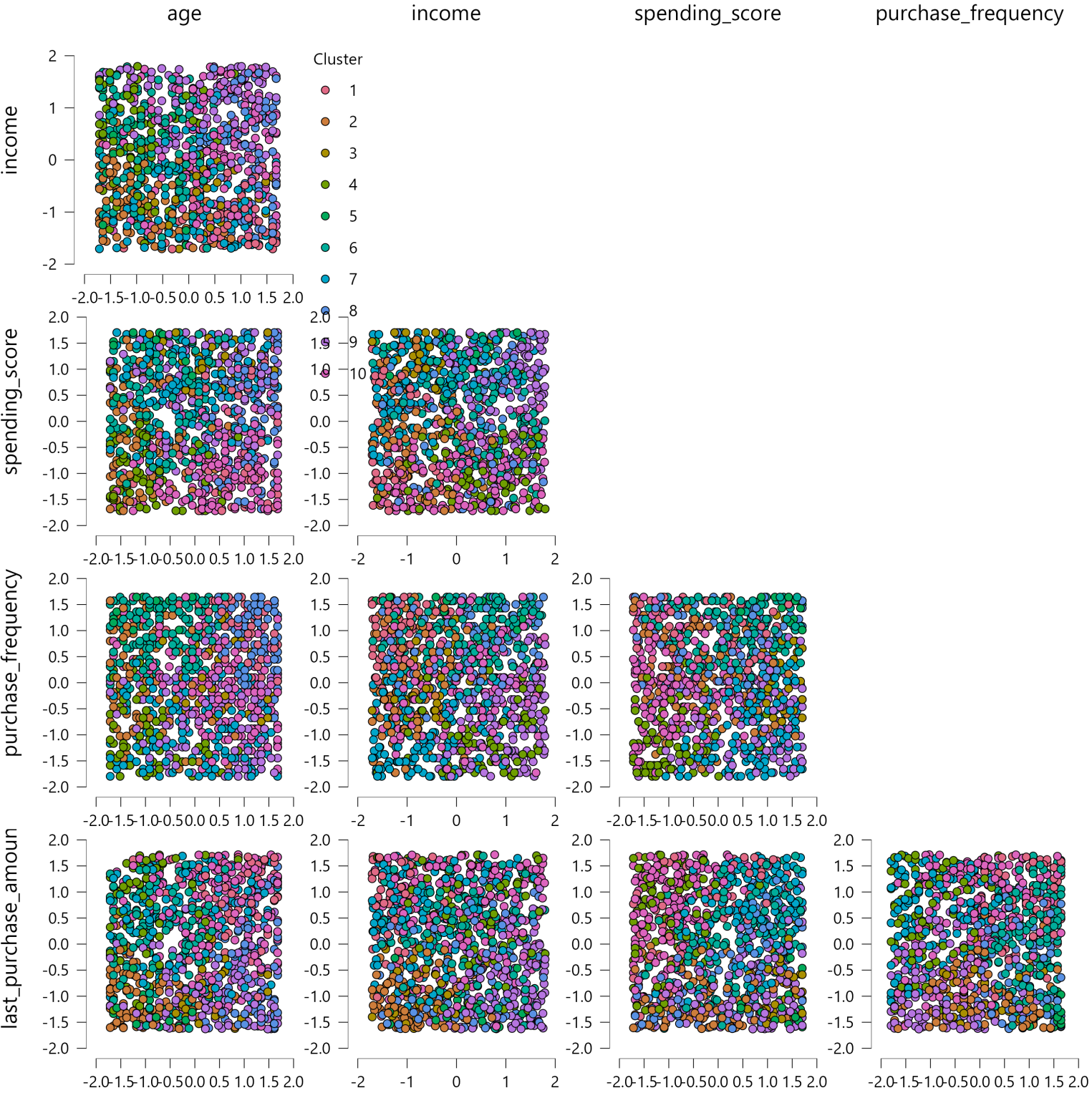
Cluster Mean Plots

All Features
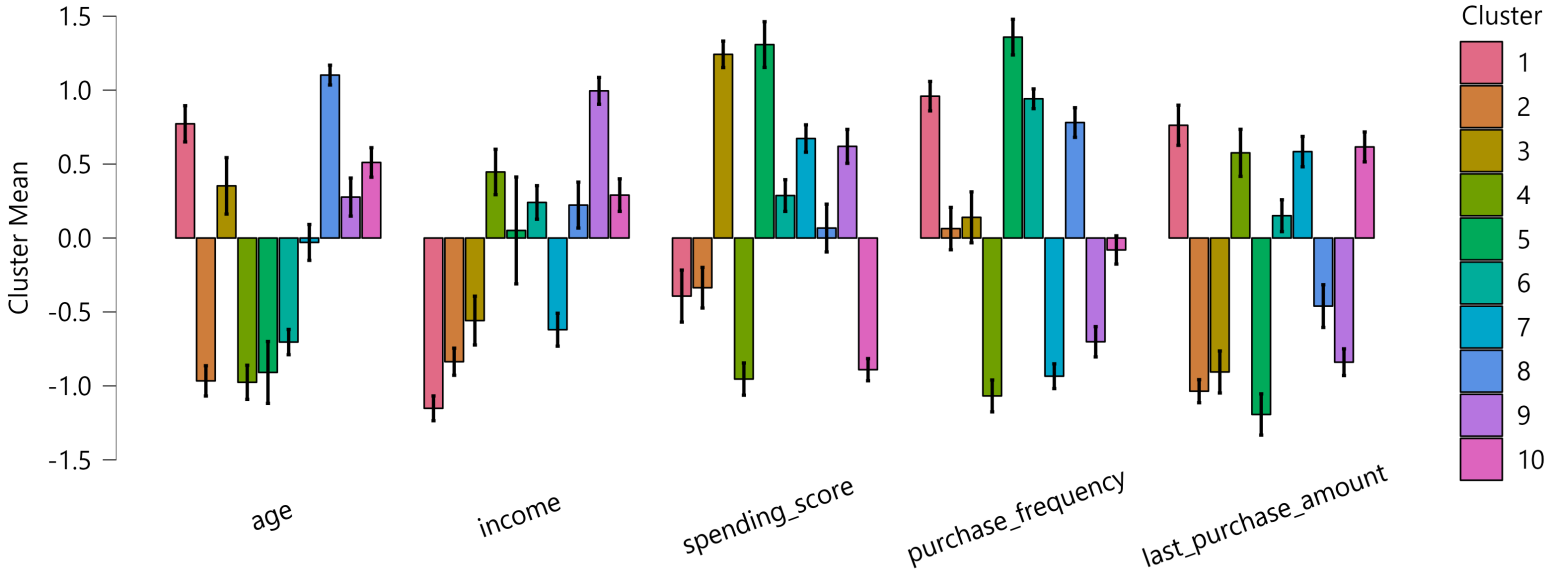
Cluster Density Plots

All Features