

CH P E 256 .

K Mean Cluster Shopping Index & Income
Index: Assignment.

Point A \Rightarrow we will use K-means clustering with $K=2$.

Let's choose our initial clusters as $(2, 6)$, $\underline{(4, 5)}$, $\underline{(8, 3)}$, $(9, 1)$ as they are furthest points.

Individual Centroid

Cluster 2

	Cluster 1	Cluster 2		
Step	Shopper	Centroid	Shopper	Centroid
1.	4	(2,6)	16	(9,1)
2.	1,4	(2.5,5.5)	16	(9,1)
3.	1,2,4	(2.6,5)	16	(9,1)
4.	1,2,3,4	(3.25,5.25)	16	(9,1)
5.	1,2,3,4,5	(3.4,5.2)	16	(9,1)
6.	1,2,3,4,5,6	(3.8,5.6)	16	(9,1)
7.	1,2,3,4,5,6,8	(4.14,5.28)	7,16	(7.5,1.5)
8.	1,2,3,4,5,6,8,10	(4.25,5.38)	7,16	(7.5,1.5)
9.	1,2,3,4,5,6,8,10,9			
10.	1,2,3,4,5,6,8,(4.44,5.55)	7,16		(7.5,1.5)
	Individual	Centroid		
Cluster 1	4	(2.6)		
Cluster 2	16	(9,1)		
	Individual	Centroid		
Cluster 1	11	1,2,3,4,5,6,8,(4.44,5.55)	7,11,16	(7.33,1.66)
Cluster 2	12	1,2,3,4,5,6,8,(4.44,5.55)	7,11,12,16	(7.5,2.5)
	Individual	Centroid		
Cluster 1	13	1,2,3,4,5,6,8,(4.44,5.55)	7,11,12,13	(7.44,2.52)
Cluster 2	14	1,2,3,4,5,6,8,(4.44,5.55)	7,11,12,13	(7.83,2.16)
	Individual	Centroid		
Cluster 1	15	1,2,3,4,5,6,8,(4.44,5.55)	7,11,12,13	(8,2.7)
Cluster 2	16			(9,10)

Let's choose our initial clusters as (2,6), (4,5), (8,3) & (9,1) as they are furthest points.

Point A \Rightarrow we will use K-means clustering with $K=2$.

The remaining individuals are now examined in sequence and allocated to the cluster to which they are closest, in terms of Euclidean distance to the cluster mean.

Cluster 1		Cluster 2	
Shopper	Centroid	Shopper	Centroid
1,2,3,4,5	(4.44, 5.55)	7,11,12,13,14,15,16,17	(8, 2.75)
6,8,9,10			

Now, lets compare the distance to its own individual cluster mean and to that of other clusters.

Since, distance to centroid of Cluster 2 to point 8=(6,3) is closer than that to centroid of Cluster 1. Therefore, point 8=(6,3) is relocated to cluster 2.

Shopper	Distance to centroid of cluster 1 (4.44, 5.55)	Distance to centroid of cluster 2 (8, 2.75)	Shopper	Centroid	Shopper	Centroid
1	4.48	5.48	2	2.11	5.15	2.25
2	0.78	4.42	3	0.78	6.82	0.02
4	2.48	2.48	5	0.70	4.58	0.75
6	2.90	5.62	7	3.87	2.14	0.25
8	2.98	2.02	9	0.72	4.42	0.42
10	2.13	4.69	11	4.37	1.25	0.25

Now, again lets compare if all points belongs to correct cluster -

Since, we verified that all points are in correct cluster. Therefore, our final clusters are.

Index	Distance to Centroid of Cluster 1 (4.255.9)	Distance to Centroid of Cluster 2 (7.77.27)
1	4.54	5.26
2	2.27	4.92
3	0.75	4.25
4	2.25	6.61
5	0.93	4.38
6	2.73	5.52
7	4.27	4.93
8	3.38	4.78
9	0.75	4.25
10	2.06	4.5
11	4.77	4.08
12	3.85	2.24
13	6.82	2.15
14	5.41	0.8
15	4.75	3.4
16	6.82	2.15
17	4.24	0.32

	Shafiqeen.	Centroid
Cluster 1	1, 2, 3, 4, 5, 6, 9, 10	(4.25, 5.9)
Cluster 2	7, 8, 11, 12, 13, 14, 15, 16, 17	(7.77, 2.27)