

Machine Learning

Assignment 10.2

Submitted By: Ranji Raj

January 20, 2021

a) Initialization: $C_1(1, 0)$ and $C_2(5, 6)$

points	x	y
A	1	2
B	3	2
C	5	2
D	1	1
E	5	1

Table 1: Data

points	C_1^{dist}	C_2^{dist}	Cluster assignment
A	2	5.65	C_1
B	2.82	4.47	C_1
C	4.47	4	C_2
D	1	6.4	C_1
E	4.12	5	C_1

Table 2: Cluster assignment-1

centroids	x	y
C_1	2.5	1.5
C_2	5	2

Table 3: Centroids at Iteration-1

Table 4: Iteration-1a

b) Initialization: $C_1(2.75, 3)$ and $C_2(3.25, 0)$

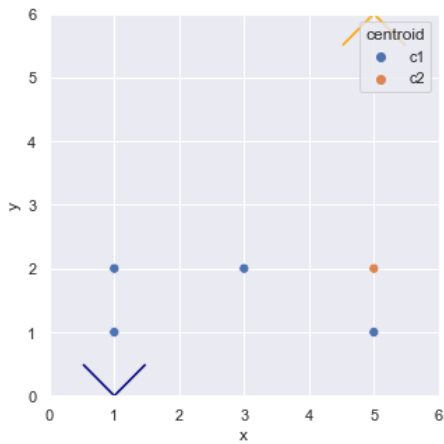


Figure 1: Initial settings

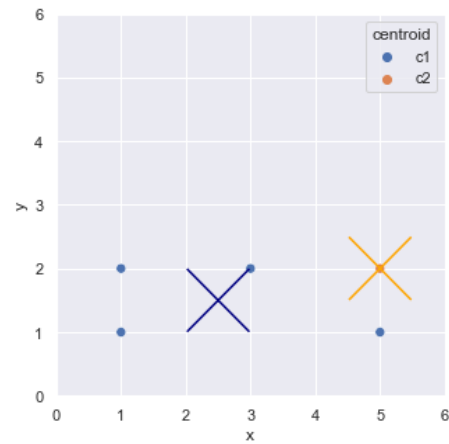


Figure 2: After iteration-1

Figure 3: Visualisation-1a

points	C_1^{dist}	C_2^{dist}	Cluster assignment
A	1.58	4	C_1
B	0.7	2	C_1
C	2.54	0	C_2
D	1.58	4.12	C_1
E	2.54	1	C_2

Table 5: Cluster assignment-2

centroids	x	y
C_1	1.67	1.67
C_2	5	1.5

Table 6: Centroids at Iteration-2

Table 7: Iteration-2a

points	C_1^{dist}	C_2^{dist}	Cluster assignment
A	0.74	4.03	C_1
B	1.37	2.06	C_1
C	3.34	0.5	C_2
D	0.94	4.03	C_1
E	3.39	0.5	C_2

Table 8: Cluster assignment-3

centroids	x	y
C_1	1.67	1.67
C_2	5	1.5

Table 9: Cluster centers-3

Table 10: Iteration-3a

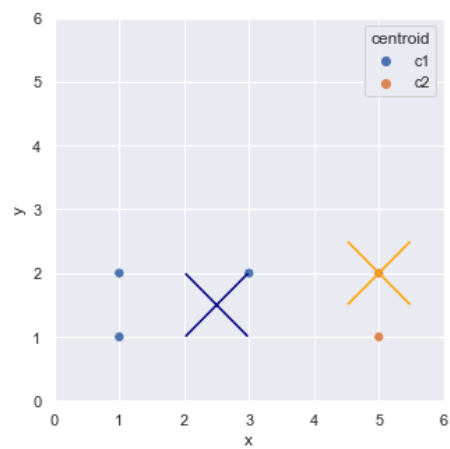


Figure 4: Cluster assignment-2

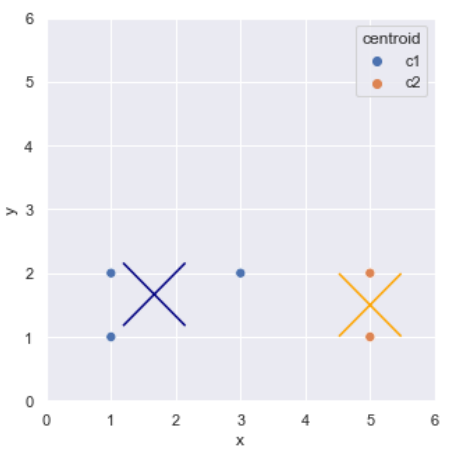


Figure 5: After iteration-2

Figure 6: Visualization-2a

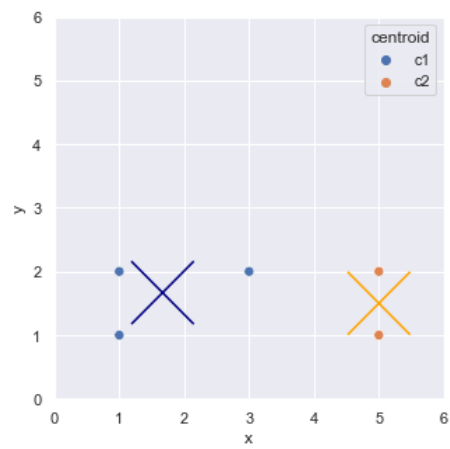


Figure 7: Cluster assignment-3

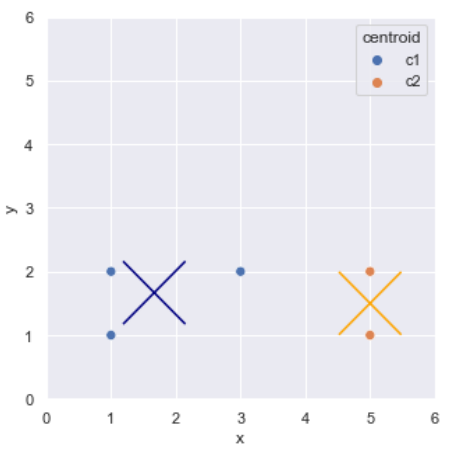


Figure 8: Final clusters

Figure 9: Visualization-3a

points	C_1^{dist}	C_2^{dist}	Cluster assignment
A	2.01	3.01	C_1
B	1.03	2.01	C_1
C	2.46	2.65	C_1
D	2.65	2.46	C_2
E	3.01	2.01	C_2

Table 11: Cluster assignment-1b

centroids	x	y
C_1	3	2
C_2	3	1

Table 12: Centroids at Iteration-1b

Table 13: Iteration-1b

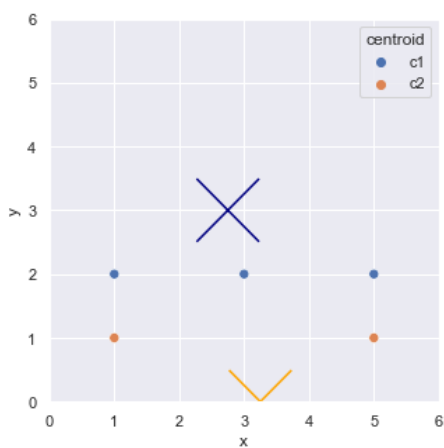


Figure 10: Cluster assignment-1b

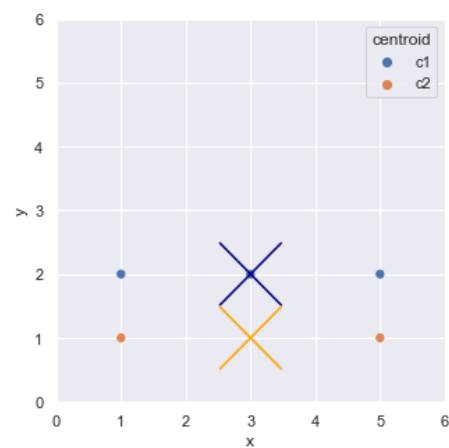


Figure 11: Cluster centers-1b

Figure 12: Visualization-1b

points	C_1^{dist}	C_2^{dist}	Cluster assignment
A	2	2.23	C_1
B	0	1	C_1
C	2	2.23	C_1
D	2.23	2	C_2
E	2.23	2	C_2

Table 14: Cluster assignment-2b

centroids	x	y
C_1	3	2
C_2	3	1

Table 15: Centroids at Iteration-2b

Table 16: Iteration-2b

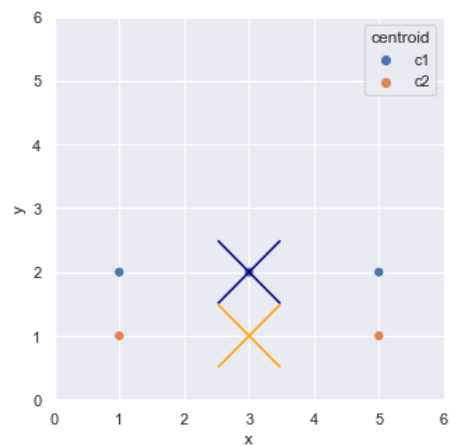


Figure 13: Cluster assignment-2b

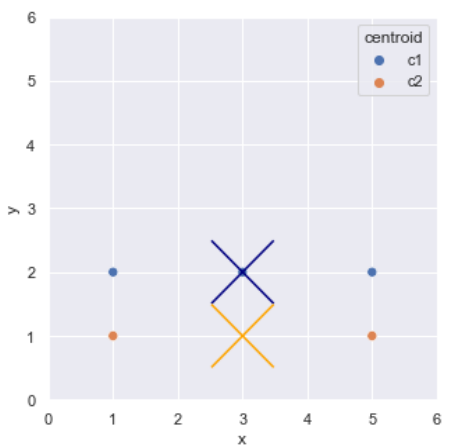


Figure 14: Final clusters

Figure 15: Visualization-2b