7/5/25

Lab 9:

K Mean clustering

For given data, compute two clusters using k-means algorithm for clustering where initial cluster centers are (1,1) & (5,7). Execute two iterations.

Record Number	A	B
R1	1.0	1.0
R2	1.5	2.0
R3	3.0	4.0
R4	5.0	7.0
R5	3.5	5.0
R6	4.5	5.0
R7	3.5	4.5

$C_1 = (1.0, 1.0)$, $C_2 = (5.0, 7.0)$

$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

Record	Point (A, B)	distance from (1.0, 1.0)
R_1	(1.0, 1.0)	0
R_2	(1.5, 2.0)	1.12
R_3	(3.0, 4.0)	3.61
R_4	(5.0, 7.0)	7.21
R_5	(3.5, 5.0)	5.0
R_6	(4.5, 5.0)	5.32
R_7	(3.5, 4.5)	4.3

Cluster 1 => R_1, R_2, R_3

Cluster 2 => R_4, R_5, R_6, R_7

$C_1 \rightarrow \left(\frac{1+1.5+3}{3}, \frac{1+2+2}{3}\right)$

$\rightarrow (1.83, 2.33)$

$C_2 \rightarrow \left(\frac{5+8+9.5+5.5}{4}, \frac{7.0+6.0+5.0+7.0}{4}\right)$

$\rightarrow (7.1, 6.25)$

Record	Point (A, B)	distance (1.83, 2.33)	dist	Cluster
R_1	(1.0, 1.0)	1.52	5.62	C_1
R_2	(1.5, 2.0)	0.47	4.52	C_1
R_3	(3.0, 4.0)	2.12	1.65	C_2
R_4	(5.0, 7.0)	3.71	1.35	C_2
R_5	(3.5, 5.0)	3.53	0.78	C_2
R_6	(4.5, 5.0)	3.42	0.53	C_2
R_7	(3.5, 4.5)	3.07	1.01	C_2

Cluster 1 $\rightarrow$ (1, 1), (1.5, 2.0)

Cluster 2 $\rightarrow$ (3.0, 4.0), (5.0, 7.0), (3.5, 5.0), (4.5, 5.0), (3.5, 4.5)

Elbow method to optimal K